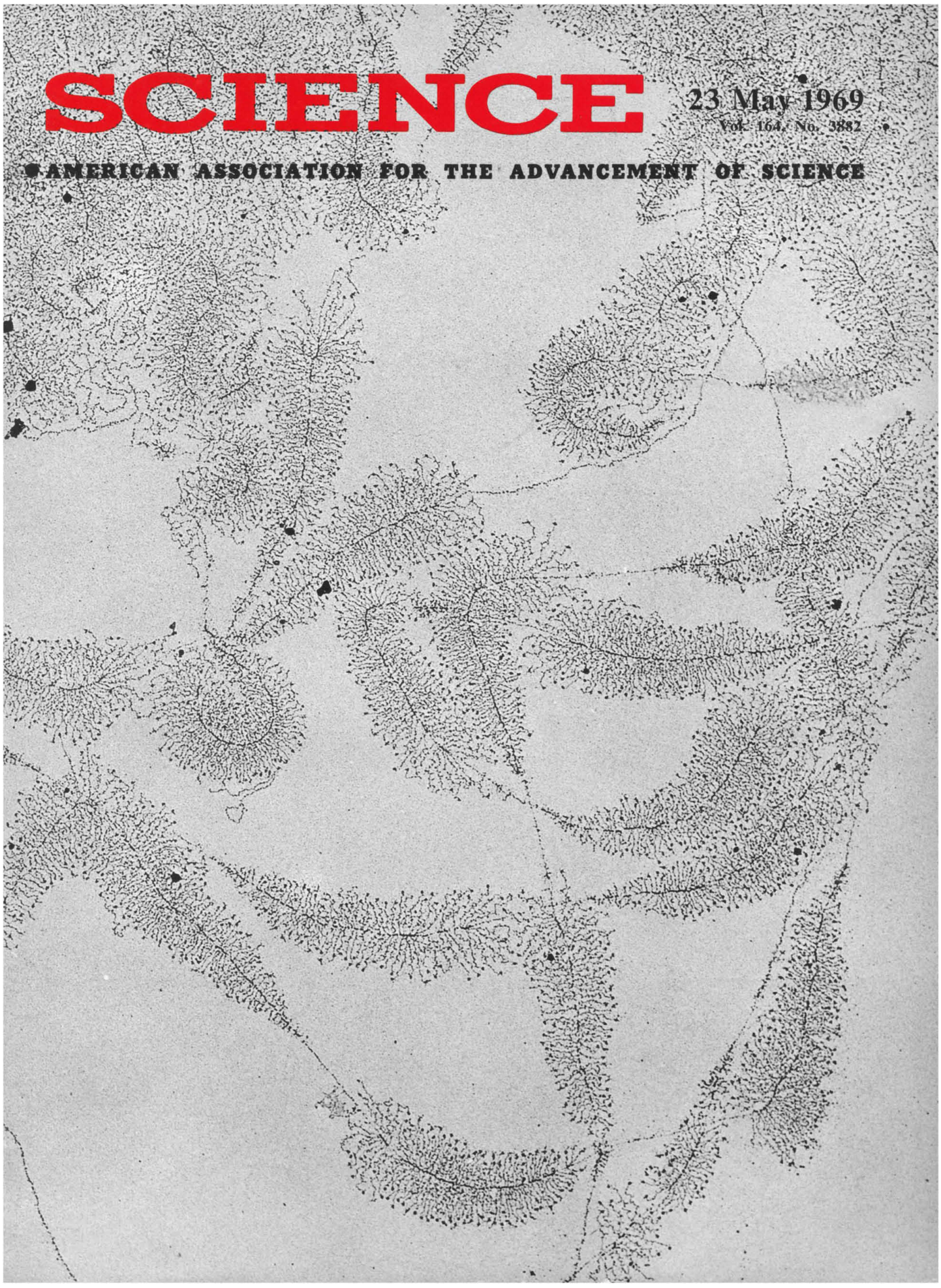
SCIENCE

23 May 1969

Vol. 164, No. 3882

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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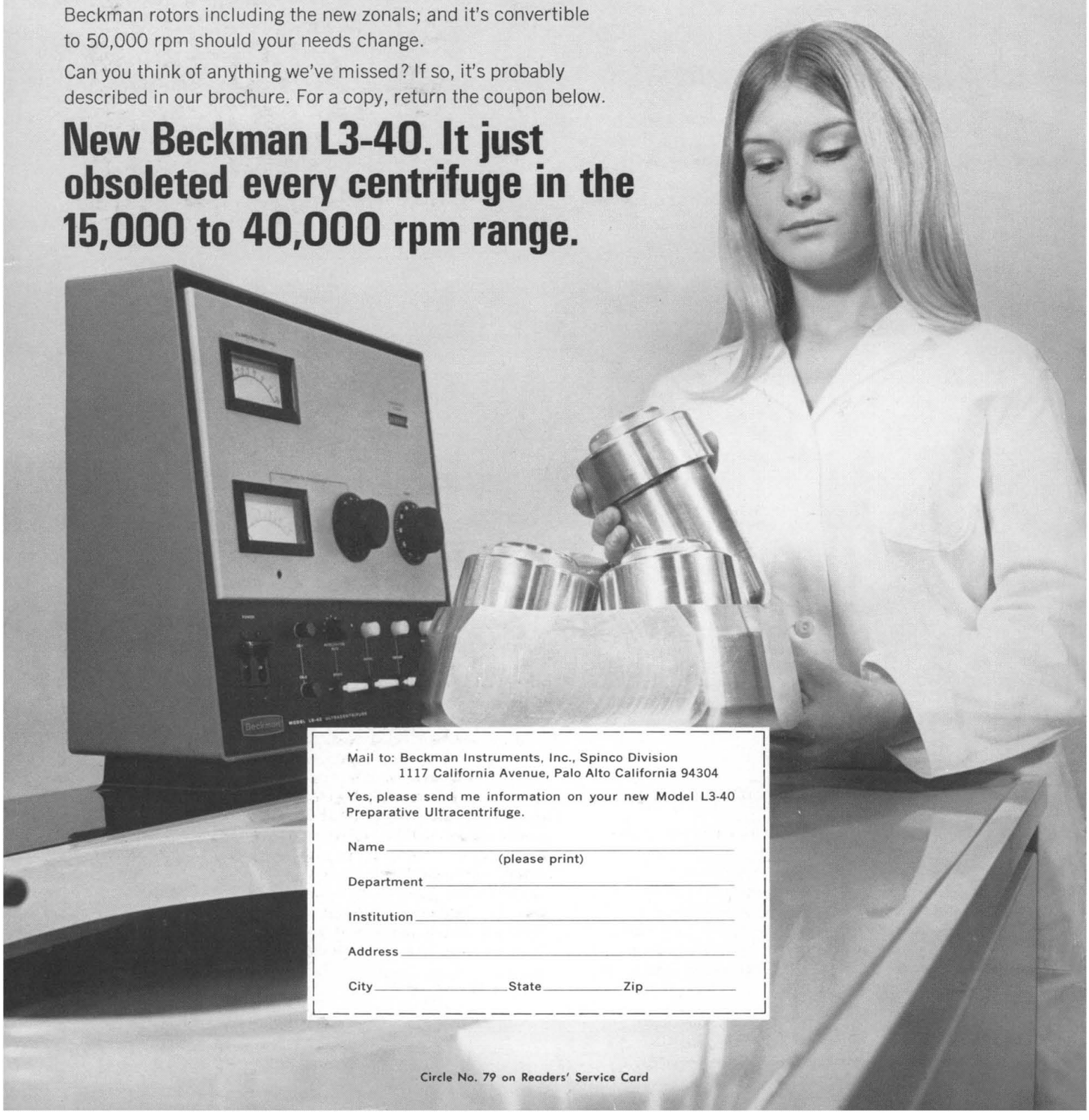

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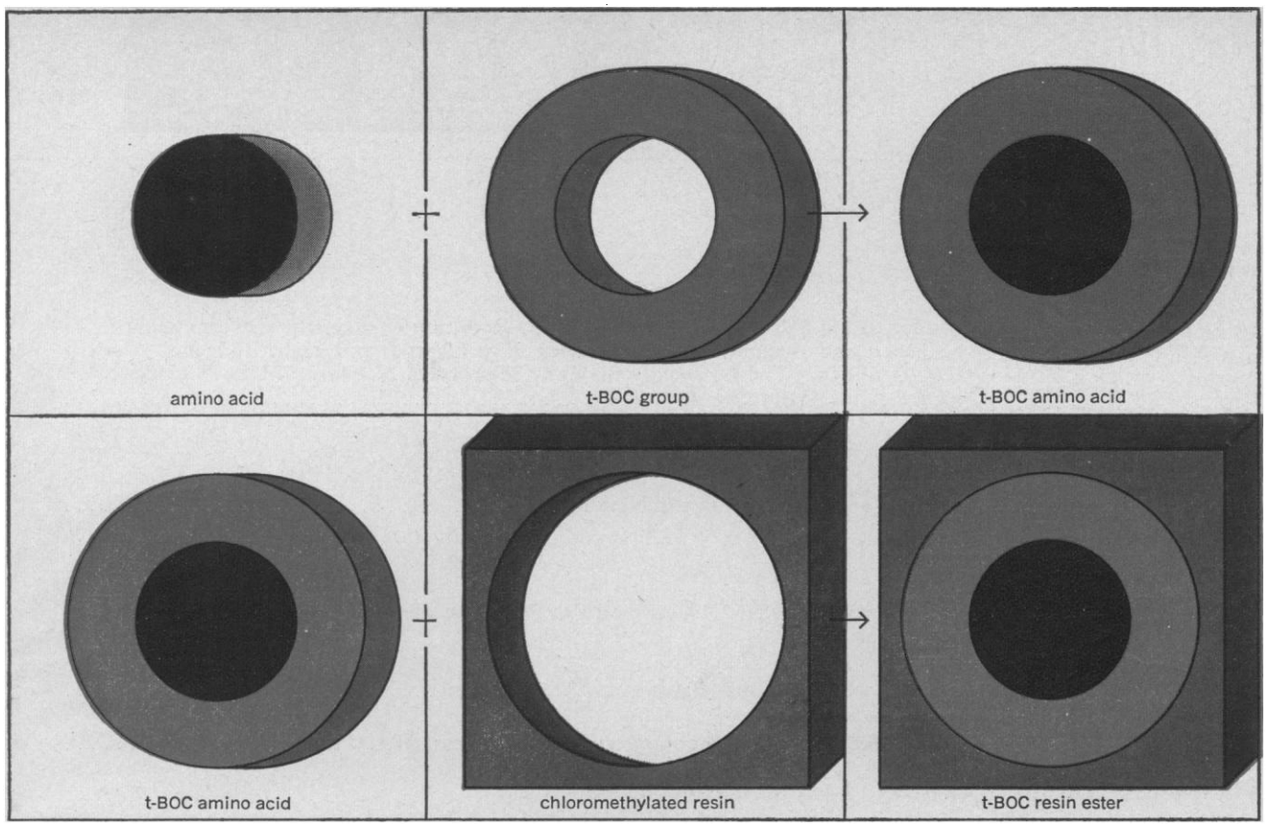

How to simplify peptide synthesis based on t-BOC amino acids.

(Just skip some of the annoying steps.)

That is, skip those steps that others can handle for you. Ourselves, for example. For some time now we have been steeped in peptide synthesis (solid-phase and otherwise) with t-BOC amino acids. Consequently, we can offer a wide variety of t-BOC amino acids, cold and hot, arising from our own not inconsiderable experience. Good and well. But perhaps an equally important point to be made here is this: although we certainly want you to note (and to use) our 25 unlabeled t-BOC amino acids, our 11 H^3-labeled, and our 11 C^{14}-labeled, we hope you'll finish this present communication with a clear and lasting impression of the many *other* compounds and services that we also provide for work in this field. This awareness might then encourage you to superimpose your research needs upon our manifold offerings and to note those segments of the job that we've already worried through for you. You'll find, in effect, that you can integrate our staff (research, production, and quality control too) into your own laboratory — part-time — with a meaningful saving of time, energy, money. Husband your resources.

Schwarz t-BOC Amino Acids: Now turn to pages 11 and 12 of our 1967 catalog to see a listing of our first 20 unlabeled t-BOC amino acids. (If you need a copy of our 130 page catalog, please tell us.) Since catalog presstime we've added 5 more unlabeled t-BOC amino acids, plus 11 H^3-labeled, and 11 C^{14}-labeled. Each of these Schwarz t-BOC amino acids (as well as *everything* else we offer) comes to you with a detailed Product Analysis Report which yields a wealth of relevant analytical data. Another time and money saver.

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For all of the above t-BOC materials, write "t-BOC" and your name, address and zip code on a postcard. For information on our amino acids and/or our full 130 page general catalog, write "and catalog" on that postcard. For aid from our experienced technical people, simply tell us your problem. R.S.V.P.

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23 May 1969
Vol. 164, No. 3882

SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Nucleolar genes from an amphibian oocyte. These genes, which code for ribosomal RNA, repeat along the DNA axis and are visualized because approximately 100 enzymes are simultaneously transcribing each gene. The gradient of fibrils extending from each gene contains ribosomal RNA precursor molecules in progressive stages of completion (electron micrograph, × 25,000). See page 955. [O. L. Miller, Jr., and Barbara R. Beatty, Biology Division, Oak Ridge National Laboratory]

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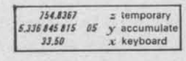

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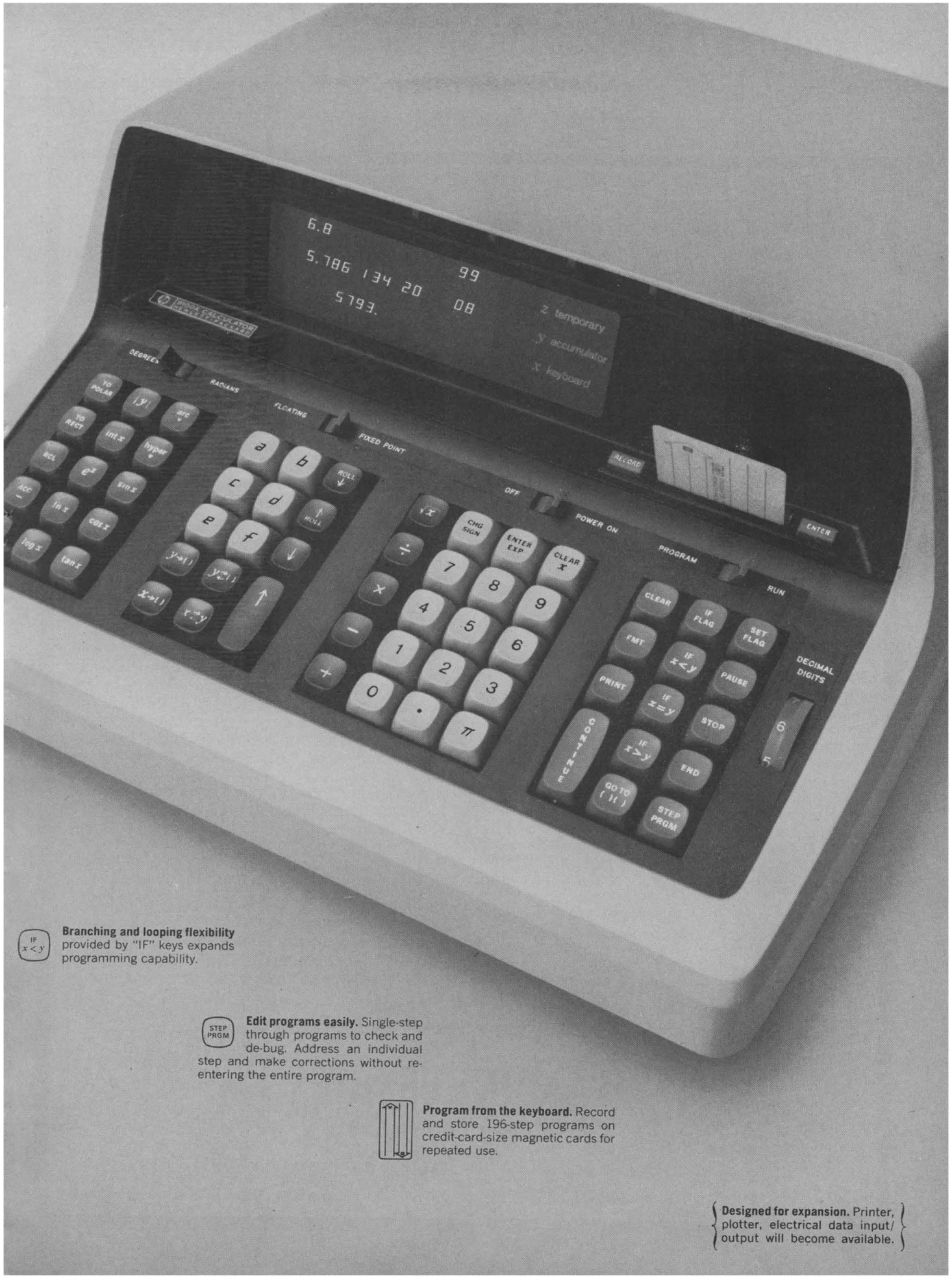

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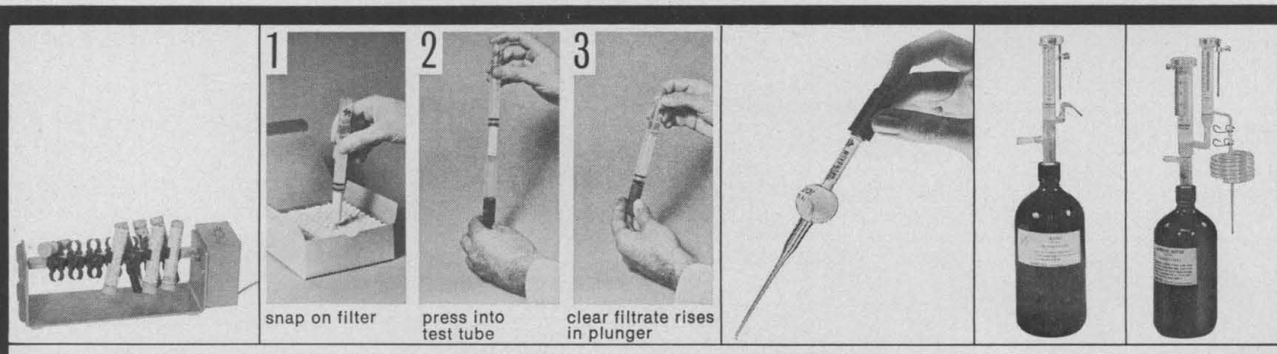

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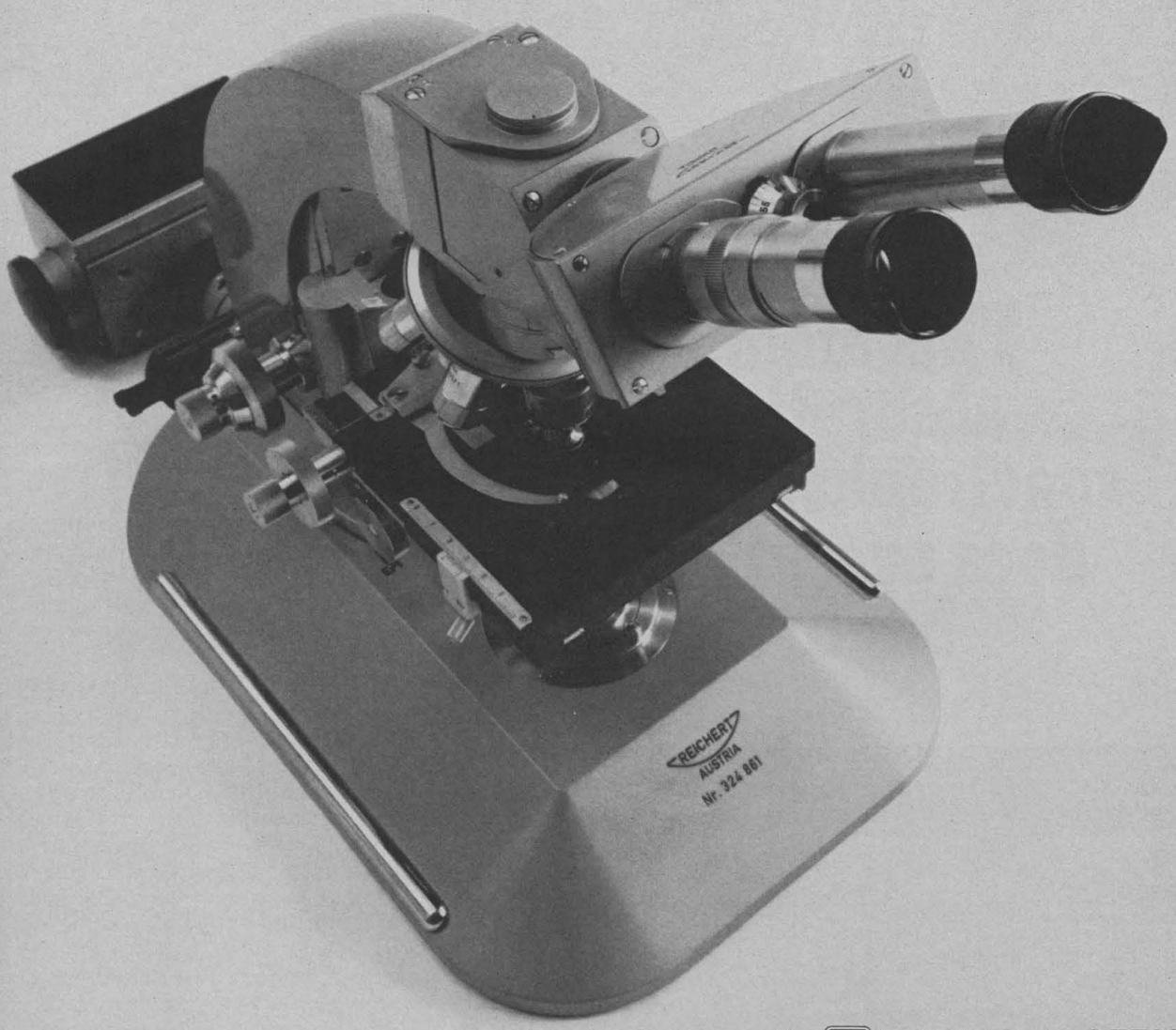

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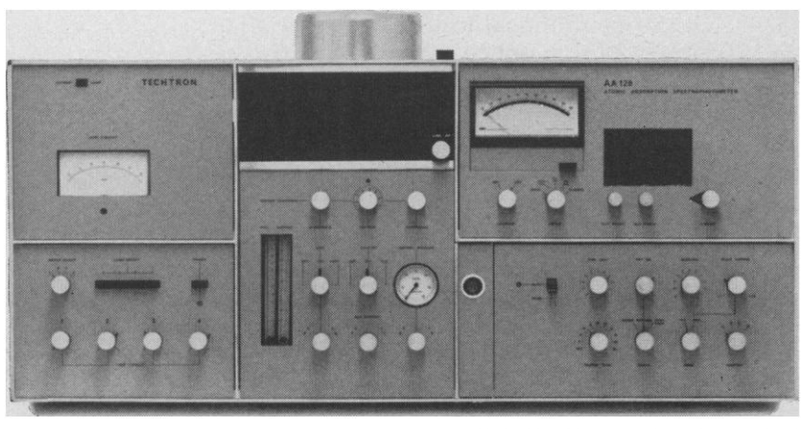
This atomic absorption spectrophotometer does everything but fly.



The new Varian Techtron AA-120 (left) is the finest medium-priced, all-purpose AA spectrophotometer ever built. It was designed for chemists who want the best possible performance for their money. But who don't especially plan on using the sometimes-far-out techniques being employed by today's research chemists.

The new AA-120 is completely modular in design and almost embarrassingly easy to operate and install. Its monochromator (0.25 meters, 1274 lines/mm grating) is smaller than that found on our research-oriented AA-5, but it takes a backseat to nothing in performance. The new monochromator also comes with variable slit height and slit-width adjustments; and its selectable optical filters reduce the effects of unwanted source radiation. Other AA-120 (and AA-5) features include direct concentration readout, being

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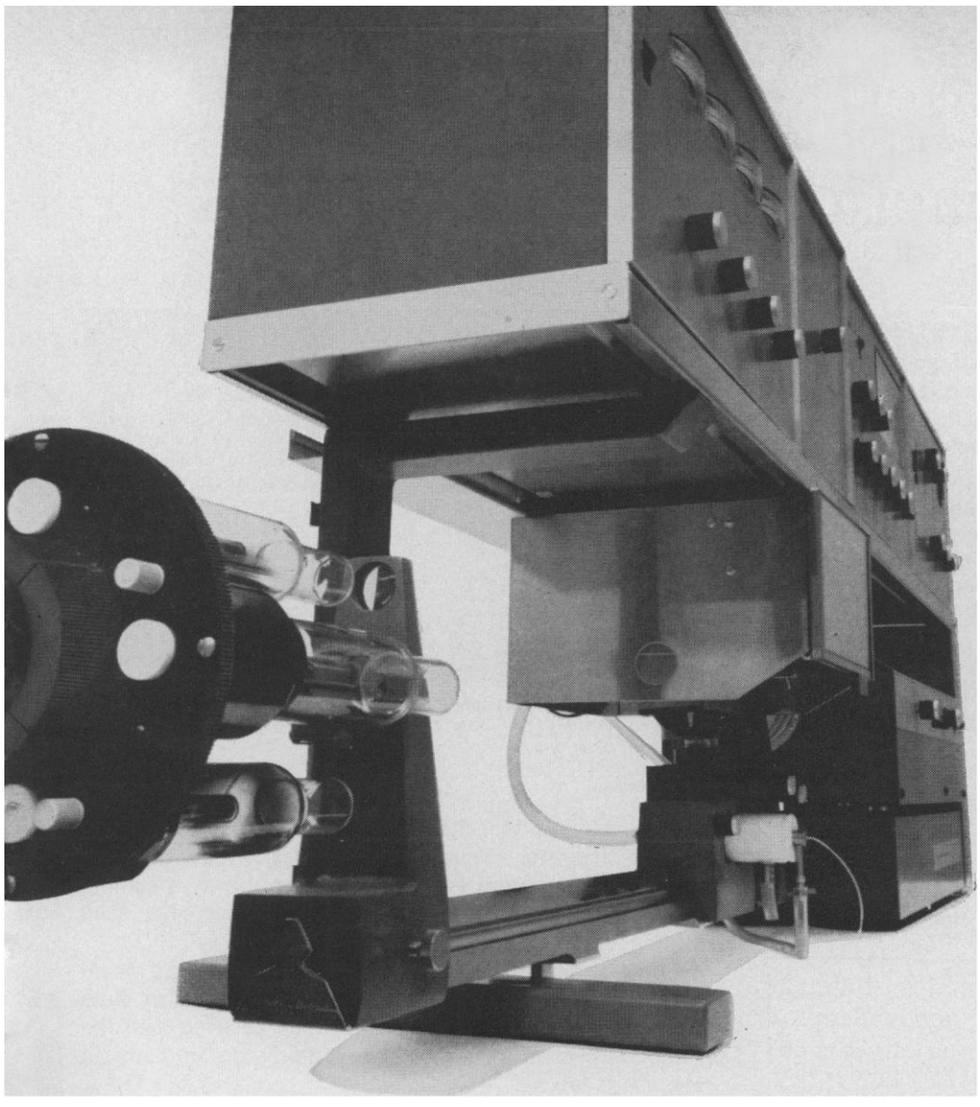

This one does everything.

linear in % transmission or absorbance; variable absorbance scale expansion; zero suppression and automatic baseline correction.

Separately encased Readout, Amplifier and Power Supply modules are identical (except for some nice new convenience features) to those found on the AA-5.

The AA-120 holds four lamps in the same mounting as the AA-5 and any two may be operated in the standard instrument (or all four operated simultaneously when the supplementary power supply is included). As in the AA-5, burner adjustment has been simplified since the grooved titanium burner head may be positioned in three planes by external controls to obtain the best sensitivity.

Finally, flame emission may be used on the AA-120 when the accessory chopper (provision built-in) is activated by the flick of a switch.

OUR ULTIMATE RESEARCH WEAPON (Above)

Introduced late last year, the Varian Techtron AA-5 is the most versatile AA spectrophotometer ever made. It was designed for the research chemist who demands highest performance and the facility to let him experiment with a never-before-tried technique when he feels the urge.

The AA-5 is completely modular and electronically identical to the AA-120. And, with its optical rail, it readily adapts to emission or fluorescence studies.

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We now have the best research instrument (AA-5) and the best medium-priced, all-purpose instrument (new AA-120) in the industry.

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For a catalog which describes the Varian Techtron line in complete detail, write Cary Instruments, 2724 South Peck Road, Monrovia, California 91016. Cary is a Varian subsidiary and the United States sales and service agent for Varian Techtron Pty., Ltd., Melbourne, Australia. Ask for data file E903-59.

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Three New Aminco Instruments For Rapid-Reaction Kinetics Studies

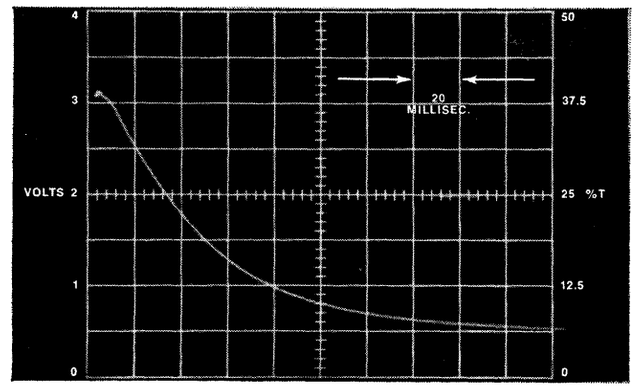
RAPID MIXING, STOPPED-FLOW SYSTEM

This is a high-speed stopping-syringe-type mixing system that permits monitoring of reactions heretofore too rapid for observation. It provides the fastest mixing now commercially available, with a total dead time of 200 microseconds.

Quartz observation ports are available, permitting transmission measurements in the deep ultraviolet. The apparatus is water-jacketed. It is a commercial model of a prototype instrument developed by Dr. Robert Berger, NIH.* A typical oscilloscope trace obtained with this instrument is shown at right.

VARIABLE-RATIO MICROFLOW APPARATUS

Ideal for use with turbid solutions of biological materials, this instrument is a commercial extension to variable-ratio operation based on original work in fixed-ratio done by Dr. Richard Harvey, of Rutgers Medical School. It incorporates a pneumatic, variable-ratio syringe-drive mechanism which provides extreme flexibility. When injected solutions are flowing through the mixer and into a quartz observation cuvette, a float is driven up the cuvette; after the observation period, a spring loaded aspirator depresses the float, evacuating the cuvette. The system is then ready for the next sample injection. Total dead time is in the range of 1 to 3 milliseconds.



Curve obtained with Aminco-Morrow apparatus where equal amounts of Reagents "A" and "B" were mixed. Reagent "A" was 0.02M $NaHCO_3$ with 3.4×10^{-5} M bromphenol blue added as an indicator. Reagent "B" was 0.01N HCl. The temperature was approximately 25°C. There were five replicates.

Three windows in the mixing chamber permit monitoring of transmission changes, fluorescence, or both simultaneously. Modular, the unit may be used with the Aminco-Bowman or other monochromators already in the user's lab.

STOPPED-FLOW APPARATUS

A commercial model of a prototype developed by Dr. Jack Morrow, of The City College of The City University of New York, this unit is a fixed-ratio, stopping-syringe type unit that may be used with the Aminco Grating Monochromator or most existing monochromators. A unique method of porting eliminates bubbles and permits a change of solutions in about one minute. The unit accommodates cells of various sizes. It may be used for studies of fluorescence or pH. Simple to operate, the unit is rugged; the only fragile component is the quartz observation window.

All three rapid mixing devices described above are available as single modules for use with existing spectrophotometers or may be incorporated into complete spectrophotometer systems customized to your requirements.

Aminco also has an instrument which is utilized for T-jump chemical relaxation studies.

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"But that day has passed. Instruments are now available, and are opening up a new era in research on chemical reactions.

"Techniques for studying rapid reactions may be divided into two groups, according to their basic principle of operation: flow methods and relaxation methods.

"Techniques for monitoring changes in absorbance, fluorescence, temperature, pH, conductivity, concentration of free radicals, or magnetic susceptibility may be used with both the flow and relaxation methods."

So begins a three-page article appearing in **Aminco Laboratory News, 24,** 3, 1968. The article surveys the various techniques used in rapid reaction kmetics studies in both organic and inorganic systems: FLOW METHODS: continuous flow, accelerated flow and stopped flow; RELAXATION METHODS: Single Disturbance Methods: temperature jump (T jump), pressure jump (P jump), and electric impulse; PERIODIC METHODS, and others.

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* Laboratory of Technical Development, National Heart Institute, NIH.

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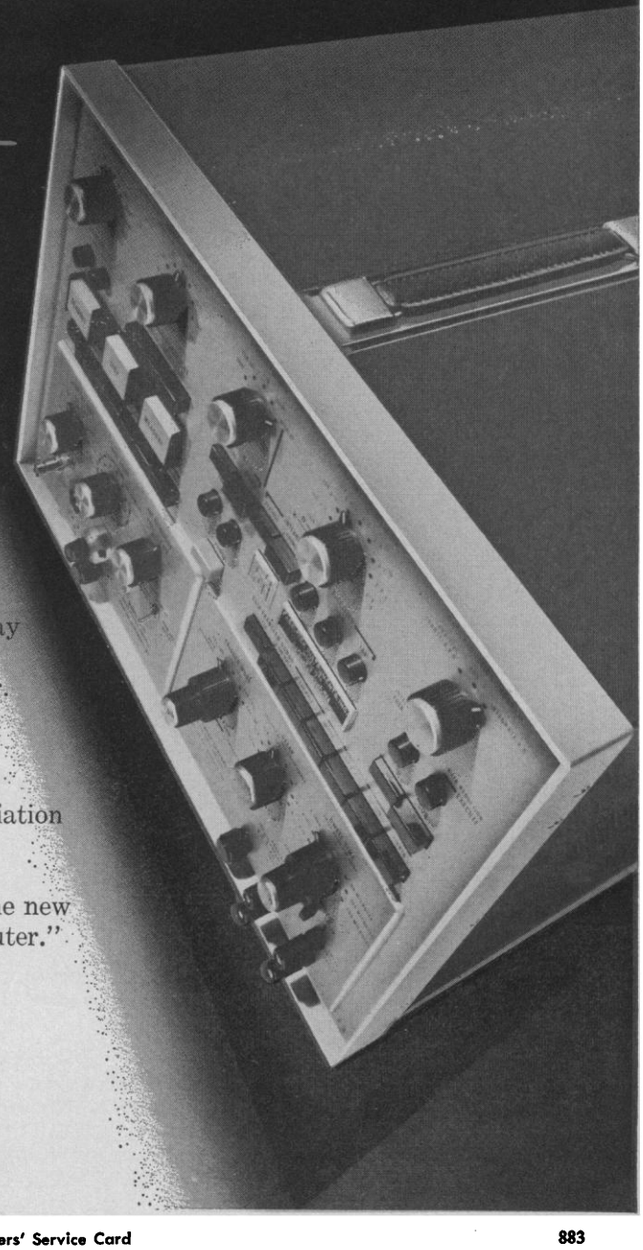

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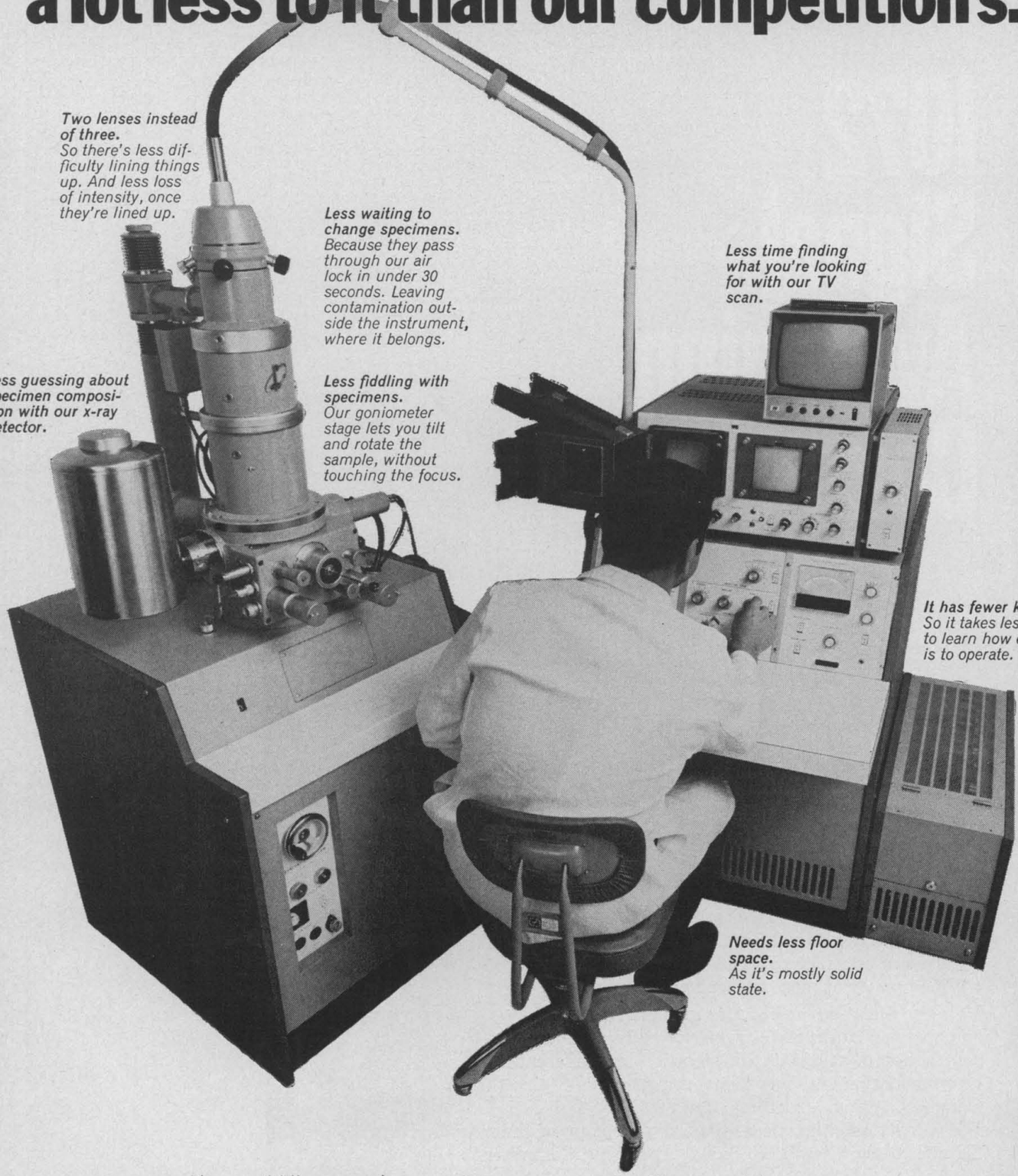

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Or adding other stages in seconds. To run more special projects.

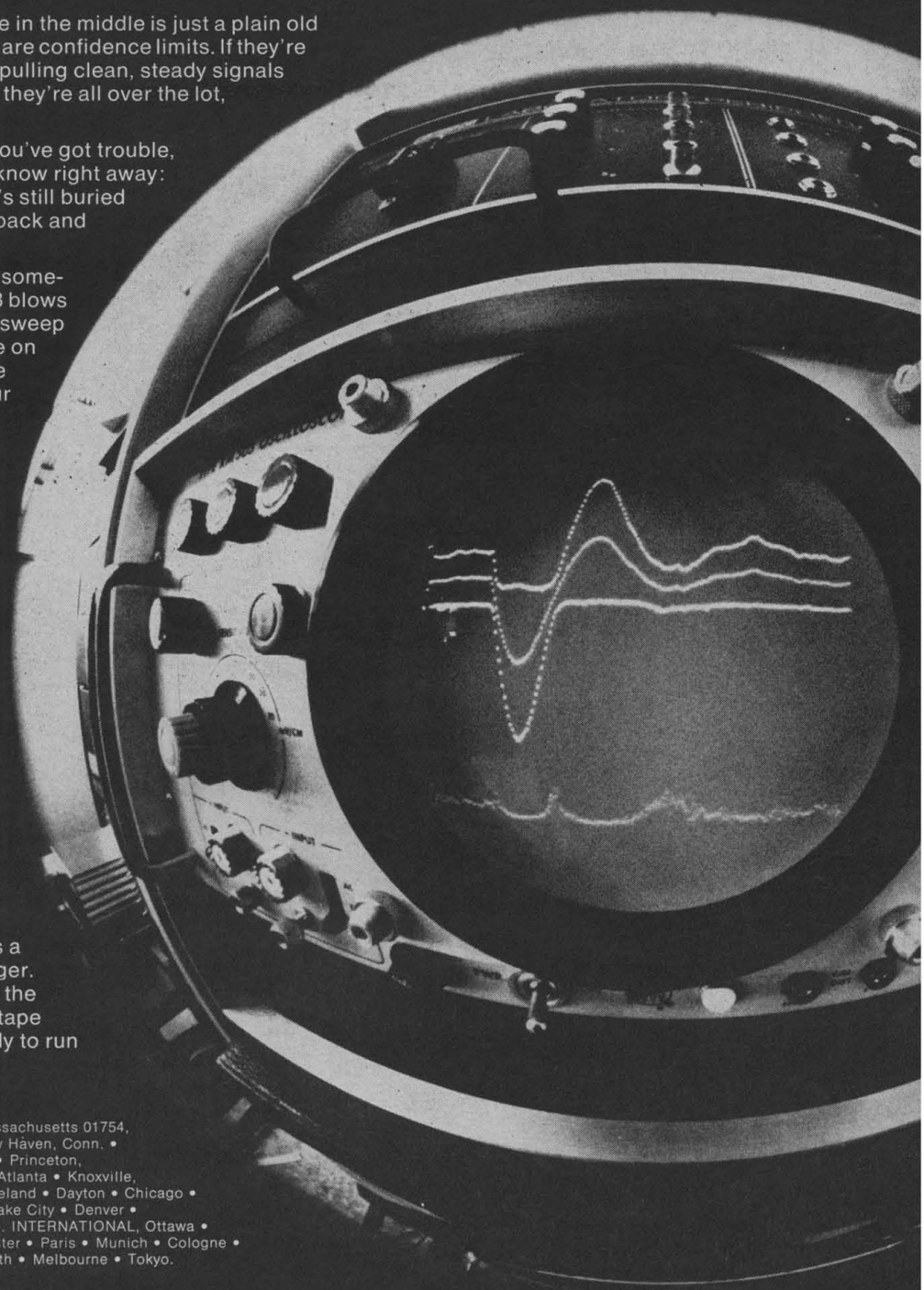
And that's our JSM-2. More or less.

jeolco U.S.A. INC. ELECTRON OPTICS DIVISION
477 Riverside Avenue, Medford, Massachusetts 02155/Telephone (617) 396-6021

See those three curves on top? The one in the middle is just a plain old average. That's basic. The body guards are confidence limits. If they're nice and tight, you know that LAB-8 is pulling clean, steady signals out of the background. Beautiful. But if they're all over the lot, you've got trouble.

Look at the bottom line. Trend. When you've got trouble, trend tells you something you need to know right away: your signal is drifting, it's oscillating, it's still buried in the noise. Now you know how to go back and do it better.

Other good LAB-8 tales to tell. There's something you really want to look at – LAB-8 blows it up, gives you more data on a shorter sweep segment, and still keeps the big picture on the scope. It can start averaging before the sync pulse. And it talks back to your technician in English. And it records run parameters on paper tape (so they come back to fight another day).



No other Signal Averager Can make This Statement.

LAB-8 costs approximately as much as a conventional, hard-wired signal averager. The basic price includes the averager, the computer that runs it, Teletype, paper tape punch, and reader. This system is ready to run the day it comes into the laboratory.

That says something, too.

DIGITAL EQUIPMENT CORPORATION, Maynard, Massachusetts 01754, Telephone: (617) 897-5111 – Cambridge, Mass. • New Haven, Conn. • Rochester, N.Y. • New York City • Long Island, N.Y. • Princeton, Parsippany, N.J. • Washington, D.C. • Cocoa, Fla. • Atlanta • Knoxville, Tenn. • Huntsville • Philadelphia • Pittsburgh • Cleveland • Dayton • Chicago • Minneapolis • Ann Arbor • Houston • Dallas • Salt Lake City • Denver • Albuquerque • Los Angeles • San Francisco • Seattle. INTERNATIONAL, Ottawa • Toronto • Montreal • Edmonton • Reading • Manchester • Paris • Munich • Cologne • The Hague • Stockholm • Milan • Sydney • West Perth • Melbourne • Tokyo.

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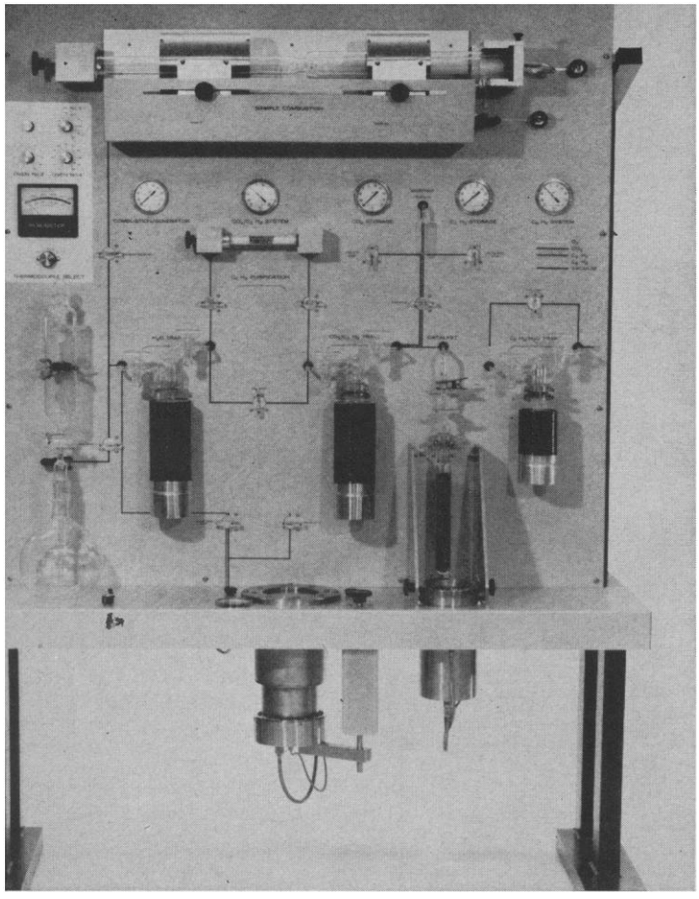
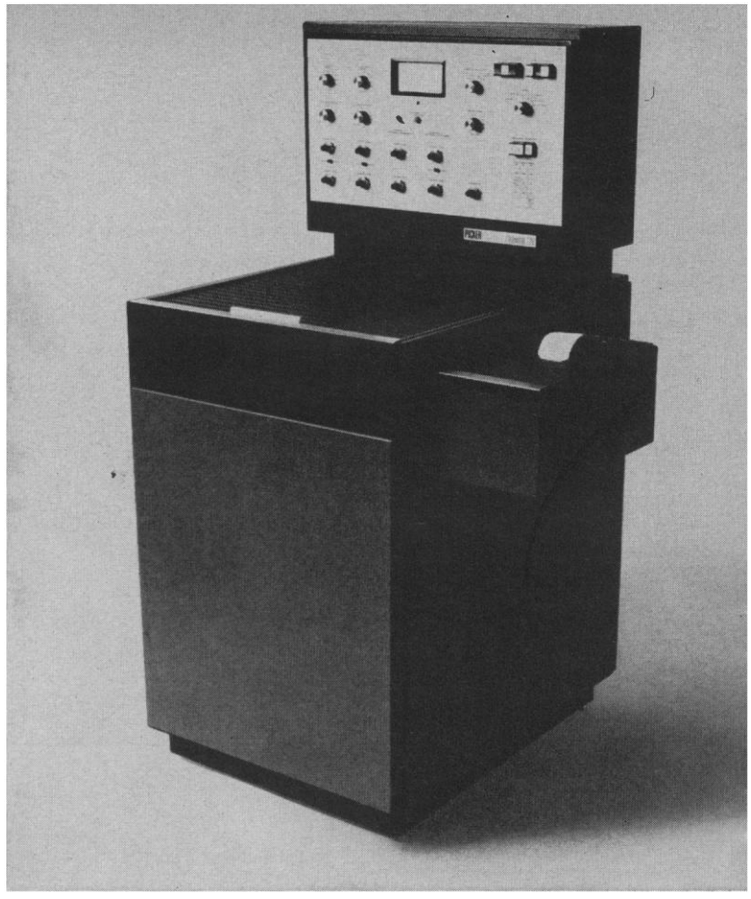
COMPUTERS · MODULES





Now Picker offers a complete ^{14}C Dating Laboratory for less than $17,000.

Picker has combined a benzene synthesizer and a liquid scintillation counter to achieve a sensitive system for low-level ^{14}C and ^{3}H counting. The benzene synthesizer converts a ^{14}C or ^{3}H sample to benzene which is then counted by the liquid scintillation counter. This system is suitable for a variety of applications including ground water studies, reactor monitoring, accelerator experiments, air and ground water pollution studies, and for the measurement of very low activity biological samples. As a ^{14}C dating laboratory, it can achieve 50,000 years.

Picker's Benzene Synthesizer

This integrated sample conversion system is unusual because the overall conversion efficiency is so high: yields are typically greater than 90%. The secret is a new high-efficiency, non-explosive vanadium-alumina catalyst that can be reused if thermally reactivated prior to use, and, most importantly, produces no observable fractionation. The synthesizer has both wet and dry combustion trains.

The organization of the benzene synthesizer makes it relatively simple to operate (and to live with) since standard laboratory glassware predominates and all the connections are easily accessible and can be modified or repaired by the investigator. It requires no special facilities for installation (but does require 220V. AC).

Picker's Liquimat® 220 Liquid Scintillation Counter

This is a seasoned counter ideally suited to this application. It offers a combination of moderate cost, high analytical performance, and user utility unmatched by any other liquid scintillation counter. The Liquimat 220 is a four-channel, 100 sample, ambient temperature system with independent operation of each analysis channel, logarithmic energy response, and exceptional quench correction versatility. This counter is a high-performance version of the Liquimat 220 with a guaranteed E^2/B of 450 or better for ^{14}C and 150 or better for ^{3}H. Phototubes are specially selected for extremely low noise.

Can we now send you detailed information? Please write to Picker Nuclear, 1275 Mamaroneck Avenue, White Plains, N.Y. 10605. Please request file 237S.

PICKER

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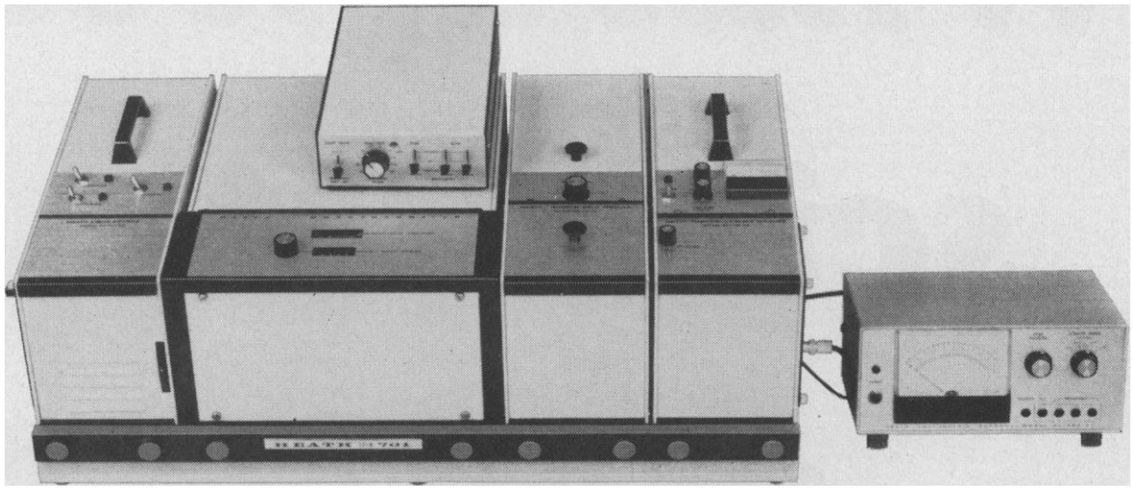
Now Available . . .
Heath 701 Spectrophotometer



- **UV - Vis**
- **± 1 Å Accuracy**
- **Better than 1 Å Resolution**
- **Less than 0.1% Stray Light**
- **Linear Absorbance readout**
- **Interfaces directly with recorder and DVM**
- **Convertible to Atomic Absorption and Double Beam**
- **. . . $2500***

The new Heath/Malmstadt-Enke "701" UV-Visible Single-Beam Spectrophotometer is now ready for delivery. This instrument utilizes an original design based on the unique Heath/Malmstadt-Enke modular system. The "701" offers unequalled flexibility and versatility with excellent photometric accuracy and reproducibility for just $2500*.

NEW OPEN-ENDED CONCEPT. The "701" consists of modules locked together into a single unitized instrument by means of a self-aligning instrument base. Future conversion of the "701" into other spectrometric systems is easily possible by integrating the Monochromator and the Photomultiplier modules with other components. New modular units will be available soon expanding the system's capability to Atomic Absorption, Atomic Fluorescence, Flame Emission and Double Beam modes. The need for multiple instruments is eliminated and investment considerably reduced as there is no duplication of equipment.

HIGH PERFORMANCE. The "701" features a wavelength range of 1900 to 7000 Å. Level of stray light is extremely low: 0.05% average with less than 0.1% maximum between 2200 and 6000 Å. Wavelength accuracy is ± 1 Å, wavelength reproducibility is ± 0.2 Å, both constant throughout the wavelength range. System resolving power is better than 1 Å. Spectral bandwidth is continuously adjustable between 0.5 and 40 Å.

UNIQUE FEATURES. The "701" uses electronic digital stepped scanning which permits a greater number of accurate speeds than by mechanical means. The IC digital design allows for pulse-to-pulse synchronization of the wavelength scan with the recorder and other system modules. Remote control is built-in as the "701" is operated by a separate Control Unit. Provisions for external programming are also included.

CONVENIENT OPERATION. The unusually large light-tight sample cell compartment of the "701" is capable of holding a wide variety of cells from 0.1 to 10 cm. It allows accurate and reproducible positioning of four 1 cm cells. Space is provided for auxiliary equipment: temperature control devices, filters, stirrers, etc. The Photo-multiplier module is supplied with a 1P28A PM tube interchangeable for conventional side window as well as end-on window type tubes with special characteristics.

DESIGN OF THE "701". Locked on the EU-701-1 Instrument base are the following modules:

Light Source Module EU-701-50 producing UV, Vis and near IR radiation at very constant intensity from its Deuterium and Tungsten lamps. Power supply is included.

Monochromator EU-700 featuring Czerny-Turner f/7, 350 mm, 1180 lines/mm grating optical design with MgF_2 coated aspheric mirrors for maximum UV efficiency.

Sample Cell Module EU-701-11 accepting a wide range of special sample handling devices from micro-cells to vessels up to 5" diameter.

Photomultiplier Module EU-701-30 containing a 1P28A PM tube mounted in a double light-tight compartment with shutter. PM voltage from power supply can be adjusted between 150 and 1500 V and is externally programmable. A set of seven filters for broad band wavelength discrimination is provided with the system.

READOUT OPTIONS. The standard analog readout is in % Transmittance and in Linear Absorbance over the spans of 0-1, 0-2 and 1-2 on the 6" meter of the Photometric Readout Module EU-703-31 which can also be used as an interface with a recorder or a DVM. An alternative log/linear recorder readout on a 10" chart is also available by using the EU-201V Multi-Speed Log/Linear Recording Photometer. The recorder is calibrated in the same linear Absorbance and Transmittance ranges plus three decades of scale expansion. Two or more readouts can be used for simultaneous direct readout and chart recording.

The "701" is especially useful for research in universities and in industry but is equally well suited for routine use in control laboratories. Its versatility and performance together with its very low price make the "701" the best value in UV-Vis Spectrophotometers.

Price of the "701" is $2500* with analog photometric readout, $2695* with log/linear recorder, $2245* without readout. Write for detailed information.

HEATH

HEATH COMPANY, Dept. 560-19 *a Schlumberger company*
Benton Harbor, Michigan 49022

☐ Please send detailed information "701" Spectrophotometer.

Name .....

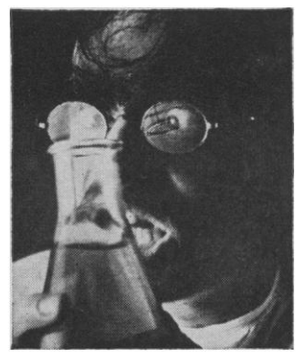
Address .....

City .....State ..... Zip .....

Prices & specifications subject to change without notice.

* Mail order prices; F. O. B. factory. EK-275

What drives scientists mad?



Lousy customer service, that's what. So S/P did a little research on the subject. Unlike Dr. Jekyll, we found no magic formula for creating two people out of one S/P Representative. So we did the next best thing. We created his alter ego—the S/P Customer Service Representative. They're trained exactly like your S/P Representative. So when your S/P Representative is out calling on customers like you, your S/P Customer Service Representative stays home to answer your questions and to make sure your order is promptly, accurately filled and delivered. Who knows how many scientists we have kept from going over the edge? If you feel yourself slipping, place a quick call to your S/P Representative. You'll find us listed in the Yellow Pages in most major cities. S/P... the single source for all laboratory equipment, supplies, scientific instruments. Scientific Products, a division of American Hospital Supply Corporation, 1210 Leon Place, Evanston, Illinois 60201.

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GENERAL ELECTRIC

137-19

Our newest recording star: Honeywell's 5600.

Versatility · price · portability · all the makings of a great performer.

This "Jet-Pack" portable offers full-size 14-channel, 16-track recording capability yet fits easily under the seat of a commercial jet.

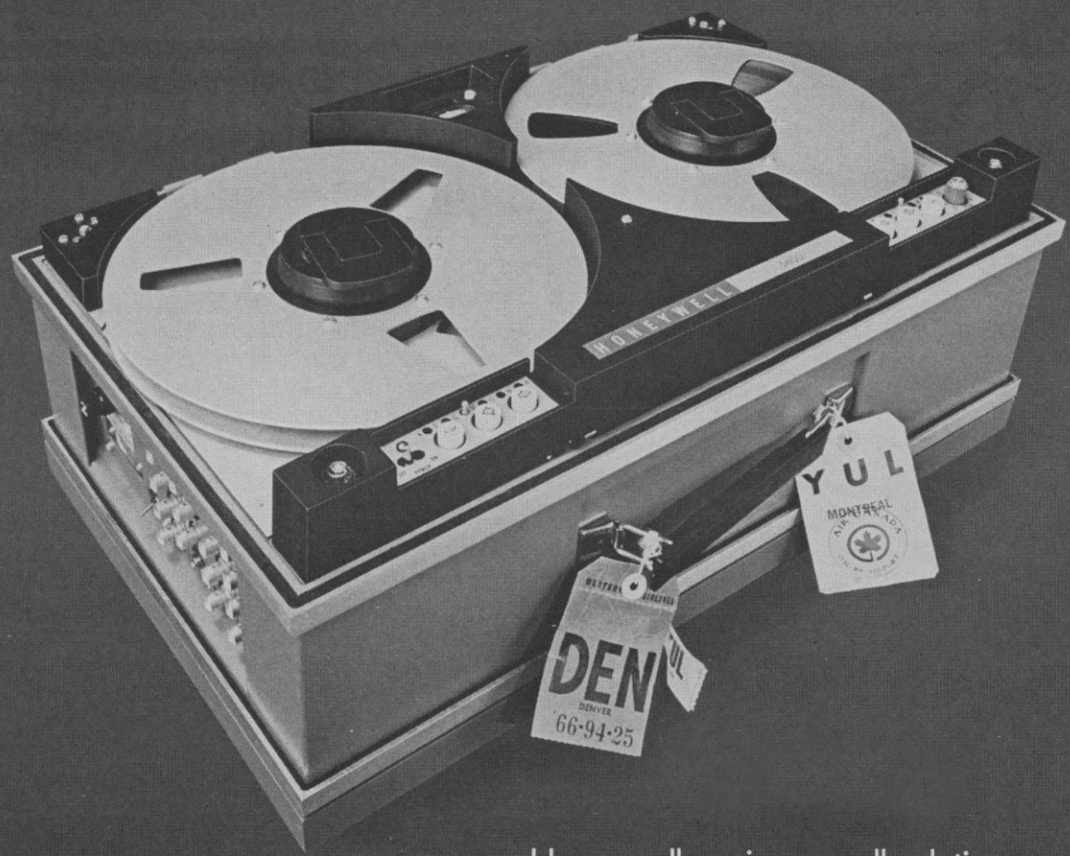
And its versatility is in true 7600 tradition: the 5600 converts from tape widths of ¼", ½" and 1" on all standard reels up to 10½" and provides a choice of FM, direct and digital electronics. *Plus* seven electrically switched speeds.

Low-mass, high-performance capstan servo drive delivers a faster response than is found with other drive systems. And the 5600 may be powered from virtually *any* commercial source as well as two different battery voltages: 12 volts and 28 volts.

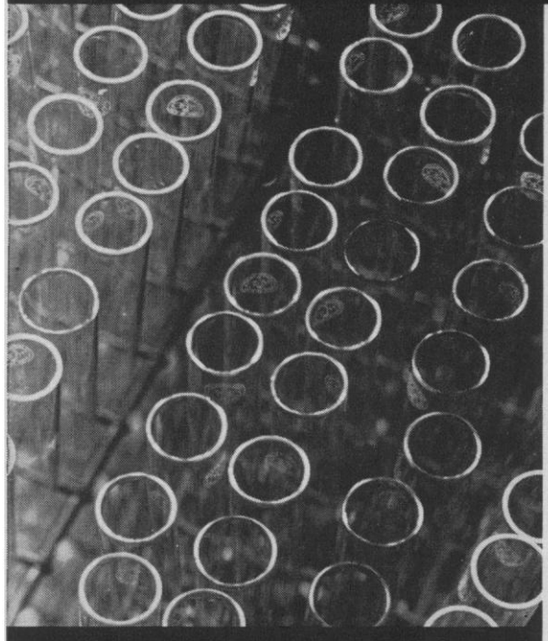
These features were previously found only in large recording systems. Now, they can be yours for half the price, starting at $6,500.

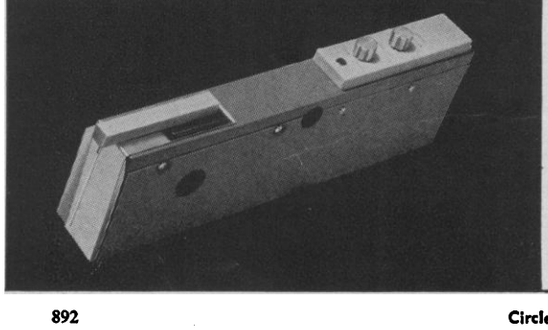
For more information on this "go anywhere, do anything" portable tape recorder, call Bud Corbin (collect) at (303) 771-4700 or write: Mail Station 222, Honeywell, Test Instruments Division, P. O. Box 5227, Denver, Colorado 80217.

Honeywell



Honeywell engineers sell solutions





300 UV or VIS Spectrophotometric Determinations per Hour ... with the Model 2443 Rapid Sampler

Rack after rack of samples can now be processed simply and rapidly, perhaps with your spectrophotometer.

The vacuum operated Gilford Rapid Sampling System requires samples of only 0.7 ml and can process over 300 per hour. The cuvette remains in the measuring beam for both filling and cleaning. Sample handling and cuvette breakage are minimized. The Kel-F construction is chemically inert.

Samples can be analyzed with either UV or VIS energy, as the Model 2443 is adaptable to Gilford UV, VIS Spectrophotometers, and certain quality monochromators..

The increased productivity provided by the Model 2443 Rapid Sampler can make transcription time a limiting factor. A permanent record of absorbance or concentration can be printed out automatically by adding the Gilford Model 410 Absorbance/Concentration Meter and Model 4006 Data Lister.

Learn how easily and inexpensively these devices can be adapted to your present system. Call 216/774-1041 today, or write for Bulletin S-5239.

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stop the biologic clock

A cryogenic refrigerator holds biologic specimens unchanged until it's time to retrieve them. Cryogenic storage is a practical way to preserve virtually anything—tissues, cells, microorganisms, or enzymes. Cultures now can be stored for extended periods without the bother and risk of subculturing.

Is cryogenic storage complicated? The answer is a simple no. A cryogenic refrigerator using liquid nitrogen as a refrigerant has no moving parts... no machinery to break down or take up space. Racking systems enable easy storage and retrieval at −196°C to −100°C. Try that with a conventional laboratory refrigerator.

Now is the time to learn what cryogenics can hold in store for your laboratory. Return the coupon and we'll send a free report on cryobiologic techniques and more information on our cryogenic refrigerators, storage and retrieval systems. Or, if you request, we'll have a representative call.

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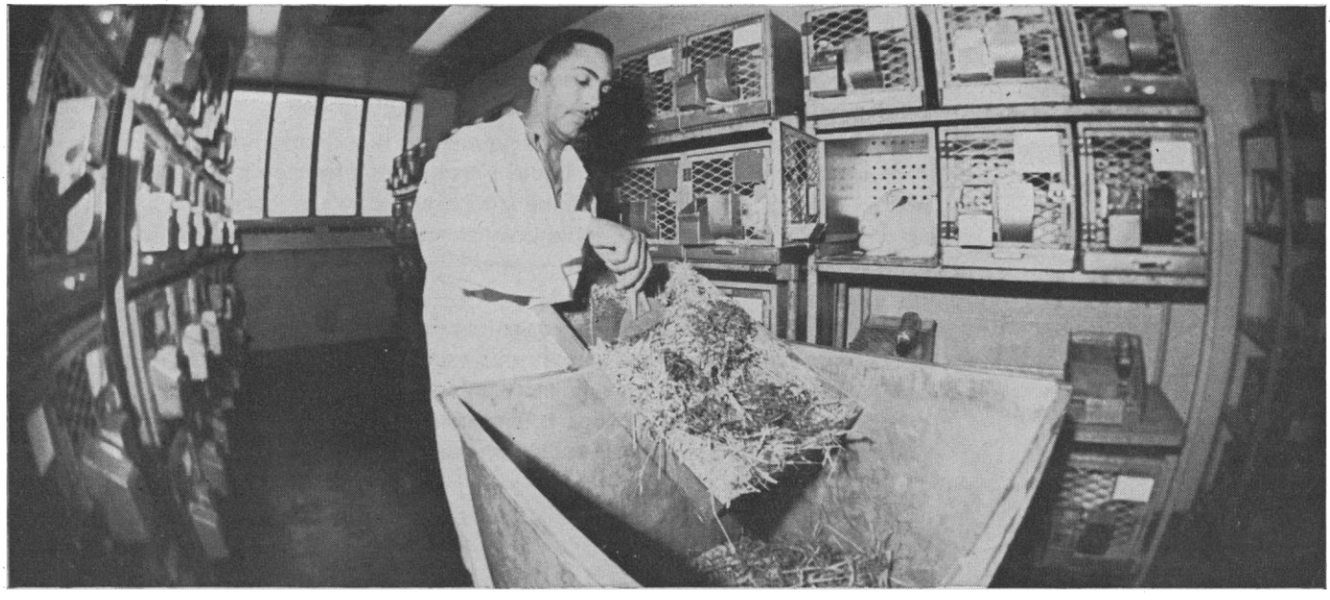
Eliminate cross-contamination, cut disposal costs

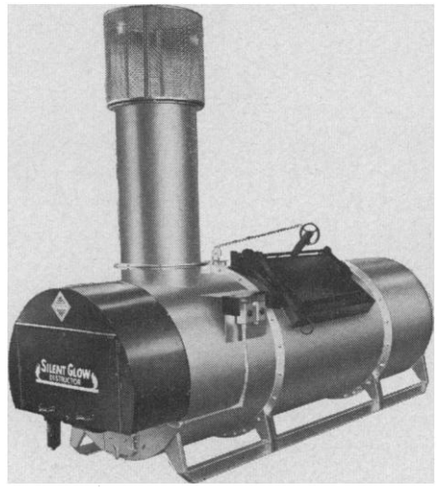


The danger of cross-contamination is inherent in many current R&D laboratory waste disposal practices. The transporting of contaminated wastes, pen litter, and research animal remains to a central collection location is an invitation to cross-contamination.

There is only one solution: pollution-free, on-site cremation that stops infection dead. Self-contained Silent Glow crematories employ a patented burning process that insures pollution-free operation. Designed to implement Silent Glow's on-site disposal concept, the units can be located in, or adjacent to areas where wastes are created.

Other units are designed for the trash created in the office area, and still others are engineered to handle garbage and other wastes from your food service operation. In operation, these units have cut laboratory solid waste disposal costs from 33 to 50 percent.

For example, the infectious wastes created in each R&D laboratory and pathology facility can be reduced to sterile, inert ash in, or just outside of, the laboratory building.



Write or telephone for complete details on Silent Glow pollution-free solid waste disposal equipment – and arrange for a disposal engineer to conduct a survey of your solid waste disposal problem. After careful analysis, he'll recommend the on-site system that can eliminate cross-contamination and cut your disposal costs. The Silent Glow Corporation, 850 Windsor Street (P.O. Box 2580), Hartford, Connecticut 06101 (203) 522-8125.

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Our B-20. Give it all you've got.

Feed it the daily routine. Or challenge it with special assignments. Either way, this high-speed refrigerated centrifuge is equal to the job. It's the strong, silent type that takes all the punishment you can dish out. Yet it's so sophisticated it handles B-14, B-15, and Z-15 zonal rotors. Swings 4 x 250ml in a rugged bucket head. Offers belt-driven flexible drive designed to loaf along at 46,300g. And gives you automatic programming, precise temperature control, Turbo-Cover and feedback speed control. In short, an advanced performer that keeps going when the going gets tough. Write to us for Bulletin B-20 at 300 Second Avenue, Needham Heights, Massachusetts 02194. Or call your IEC distributor.

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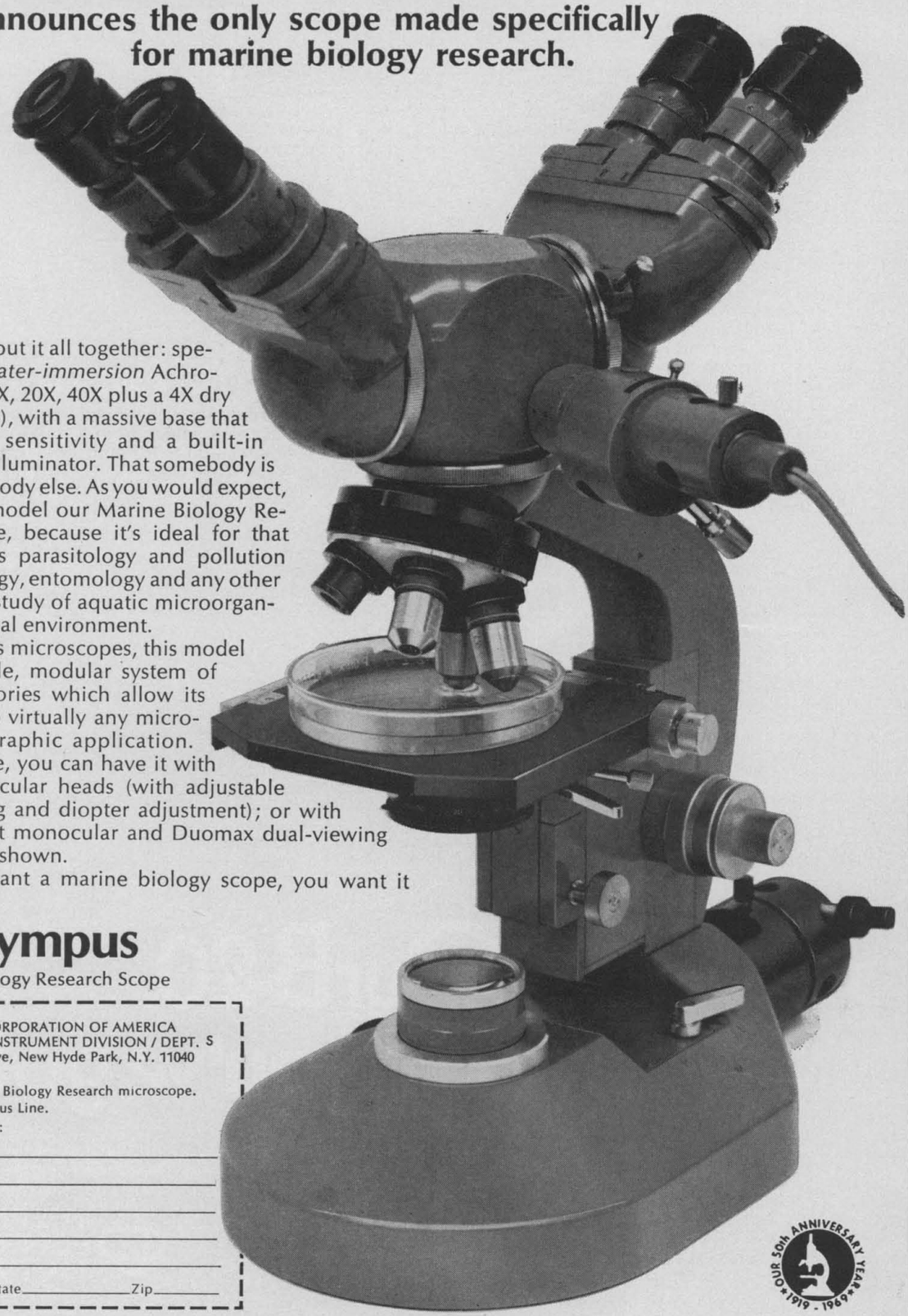
STUDY THEM WHERE THEY LIVE.

Olympus announces the only scope made specifically for marine biology research.



Somebody finally put it all together: specially computed *water-immersion* Achromat objectives (10X, 20X, 40X plus a 4X dry scanning objective), with a massive base that offers 0.0005mm sensitivity and a built-in Koehler substage illuminator. That somebody is Olympus. And nobody else. As you would expect, we call this new model our Marine Biology Research microscope, because it's ideal for that science as well as parasitology and pollution control, bacteriology, entomology and any other science requiring study of aquatic microorganisms in their original environment.

Like all Olympus microscopes, this model is part of a flexible, modular system of optics and accessories which allow its easy conversion to virtually any microscopic or photographic application.

For one example, you can have it with binocular or trinocular heads (with adjustable interocular spacing and diopter adjustment); or with inclined or upright monocular and Duomax dual-viewing teaching heads, as shown.

Any way you want a marine biology scope, you want it from Olympus.

Olympus

Marine Biology Research Scope

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☐ The Olympus Marine Biology Research microscope.
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new developments make DISC ELECTROPHORESIS more convenient and productive

New baths, power sources, microdensitometers and accessories from Canalco can now make Disc Electrophoresis easier and more productive in your laboratory.

The new Model 1200 Bath, which handles 12 samples at a time, is compact and immersible in coolant for low-temperature runs. Electrode polarity is instantly reversible for cathodic-moving fractions, and the entire bath is safety-interlocked to prevent exposure to hazardous voltages. A special coolant tank, available as an accessory, holds enough ice-water mixture to keep the bath cold for several hours.

An optional long lower bath accepts gel tubes of 6-inch length, twice normal, for Kohlrausch preconcentrating of dilute protein solutions up to 3 ml in volume (unique to Disc Electrophoresis). A special research-oriented accessory pack contains equipment for gel preparation. Storage of separating gels prepared in quantity up to two weeks in advance of use is now made possible by a new technique and new accessories.

The low-cost new Model 100 Power Source provides output to run 12 samples at 1-5 ma each, at up to 300 volts. Its safety interlock circuitry matches the Model 1200 Bath.

Among new accessories are the Phoreto-Phot camera that takes a color picture of six gels at a time and delivers the print in 60 seconds; a fast destainer that removes unbound amido schwarz and similar stains in just 10 minutes; gel slicers for elution, radioactivity counting and autoradiography; special enzyme staining incubators and reagents; and even a safety interlock adapter for use with non-Canalco power sources.

Microdensitometry reaches new levels of performance and convenience with the new Model G Microdensitometer, featuring operation at filter-selected wavelengths in both the ultraviolet and visible. The Model G has high-resolution capability for Disc Electrophoresis gels (unmatched by any competitor in its price range), and can also accommodate cellulose acetate strips, TLC plates, slab gel media, small or large photographic films and other flat specimens up to 10 x 10 inches (e.g., radioautographs, electron micrographs, X-ray diffraction plates) with 10-inch scan length. Adapters hold static and flow-type liquid cuvettes for spectrophotometry and flow monitoring.

Available as an alternate to the Model G is the new Model K Microdensitometer, a low-cost instrument featuring exceptional resolution—25 microns—with filter wavelength selection in the visible. The Model K holds specimens up to 2 x 8 inches, with 8-inch scan travel. It can readily be used as a liquid colorimeter.

Both the Model G and the Model K use a new Canalco fast-response 8-inch strip chart recorder with built-in integrator and ten switch-selectable chart speeds.

A new brochure describes the new Canalco Research Disc Electrophoresis Apparatus. Write now for a copy and learn how Disc Electrophoresis can be easier and more productive for you!

CANALCO INC., 5635 Fisher Lane, Dept. S, Rockville, Maryland 20852 (301) 427-1515

CANALCO

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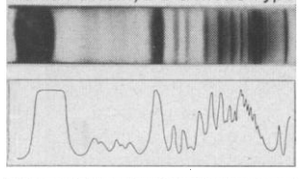
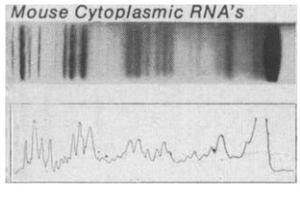
Human Serum, 2-2 Genetic Type

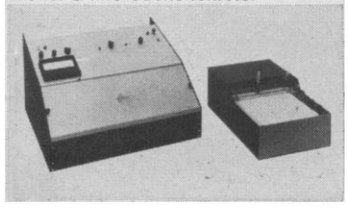


Mouse Cytoplasmic RNA's

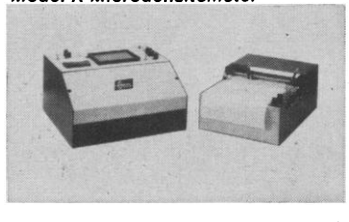


RESOLUTION. *Disc* Electrophoresis (meaning the use of discontinuous buffer pH and gel pore size after Ornstein and Davis) provides separation of fine fractions at resolution levels far superior to any continuous gel system, whether or not samples for the latter are loaded in low-ionic media, run with boundary sharpening discontinuities after Poulik, or hit with pulsed current. Automatic concentration of dilute protein solutions does *not* occur in continuous gel systems, so that direct electrophoresis of CSF, urine and dilute column effluents can be done *only* by the true *Disc*ontinuous method of Ornstein and Davis. These two gel patterns, of human serum proteins and mouse cytoplasmic RNA's, were done by the Disc method. We invite comparison of any competitive claims.

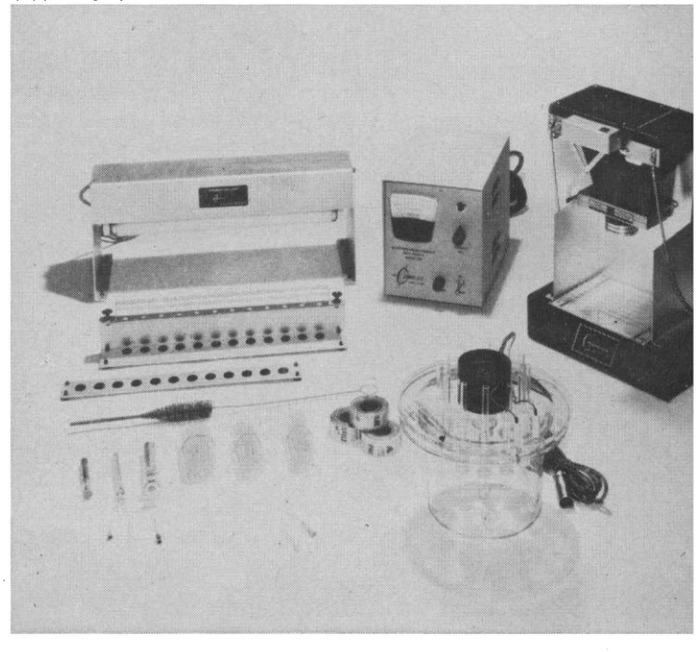
Model G Microdensitometer

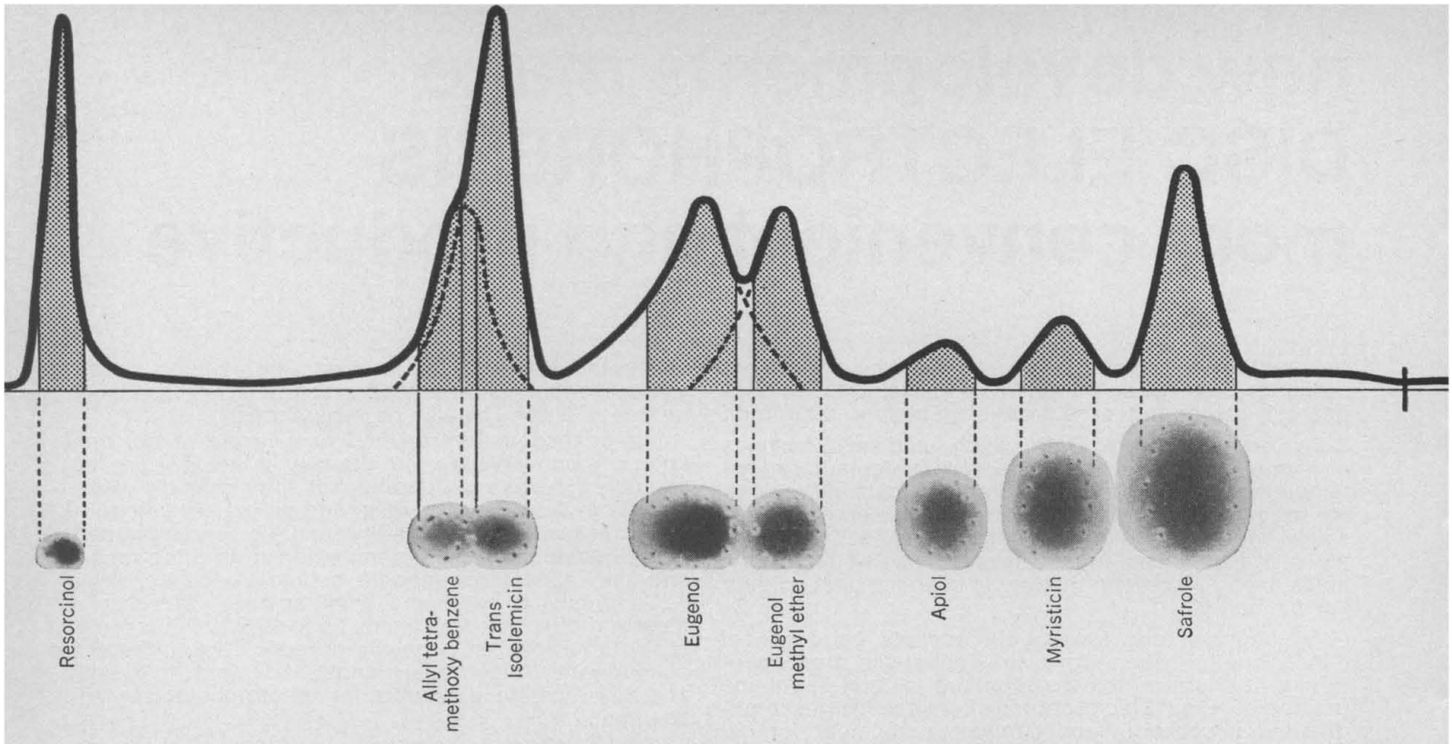


Model K Microdensitometer



Model 1200 Bath with Research Accessory Pack and (upper right) Model 100 Power Source and Phoreto-Phot





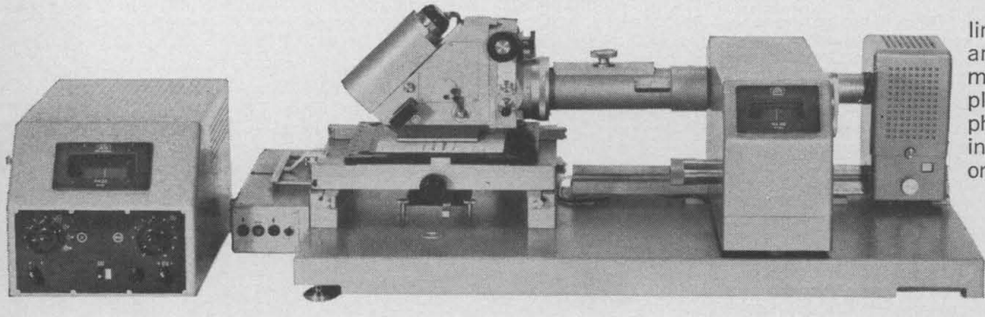
Recording of reflectance of phenol-derivatives (1 μg. each) separated on a silica gel plate treated with molybdic phosphoric acid.

Now— thin-layer chromatograms can tell you more than meets the eye

There's a lot more information contained in a thin-layer chromatogram than you can learn by just looking at it. And there's an easy, accurate and reliable way of extracting that information—non-destructively.

The ZEISS Chromatogram Spectrophotometer not only provides rapid identification of chromatographic zones by direct examination, scanning at any wavelength between 200-2500nm, it also enables you to make quantitative evaluations. We repeat, quantitative evaluations, with no loss of substance. The method is the measurement of light absorption by diffuse reflectance, transmission, or fluorescence at the proper wavelengths.

But even if quantitative evaluations aren't vital to you, the Chromatogram Spectrophotometer will still save you time and increase the accuracy of your routine chromatographic analyses. For instance, in many cases you can eliminate staining altogether. It will identify also many spots where the amount of substance present is too small to be characterized by conventional methods.



And its versatility is such that it is not limited to TLC plates alone. It can, as examples, make transmission measurements of films and plastics, photographic plates, electrophoresis and chromatography strips; reflectance measurements of individual spots or reflectance variations on paper, plastics, tiles and paper chromatographs; fluorescence measurements of individual spots or variations on all of the above.

There are a great many technical details and modes of operation of this unique instrument. For the complete story, write: Carl Zeiss, Inc., 444 Fifth Avenue, New York, N.Y. 10018.

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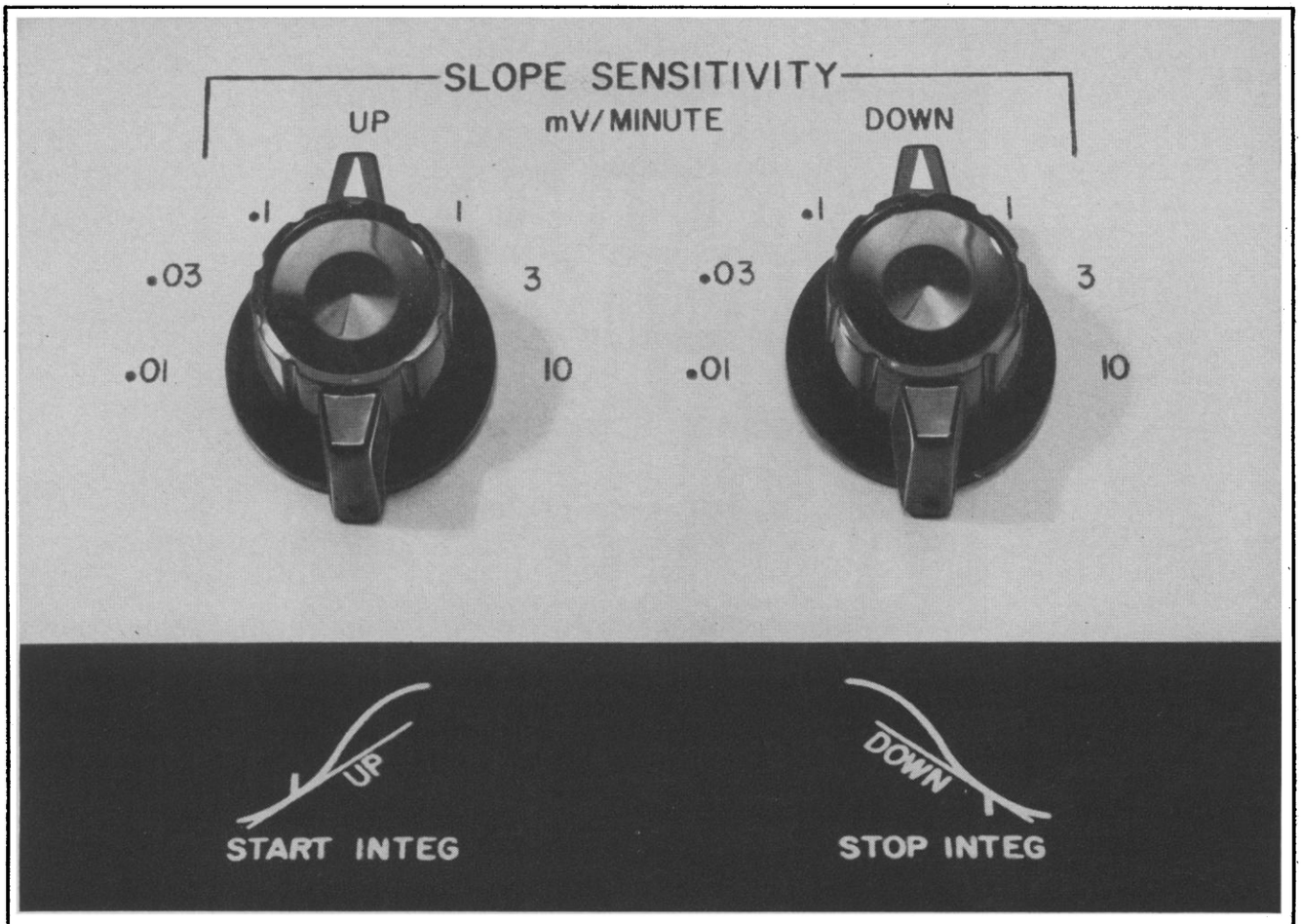

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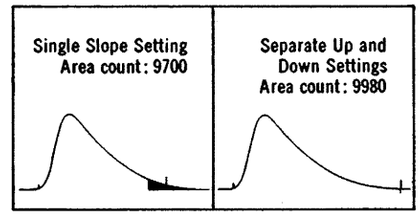

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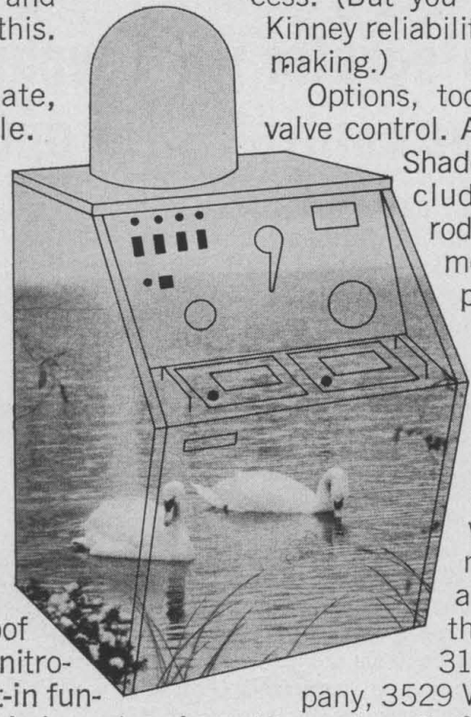

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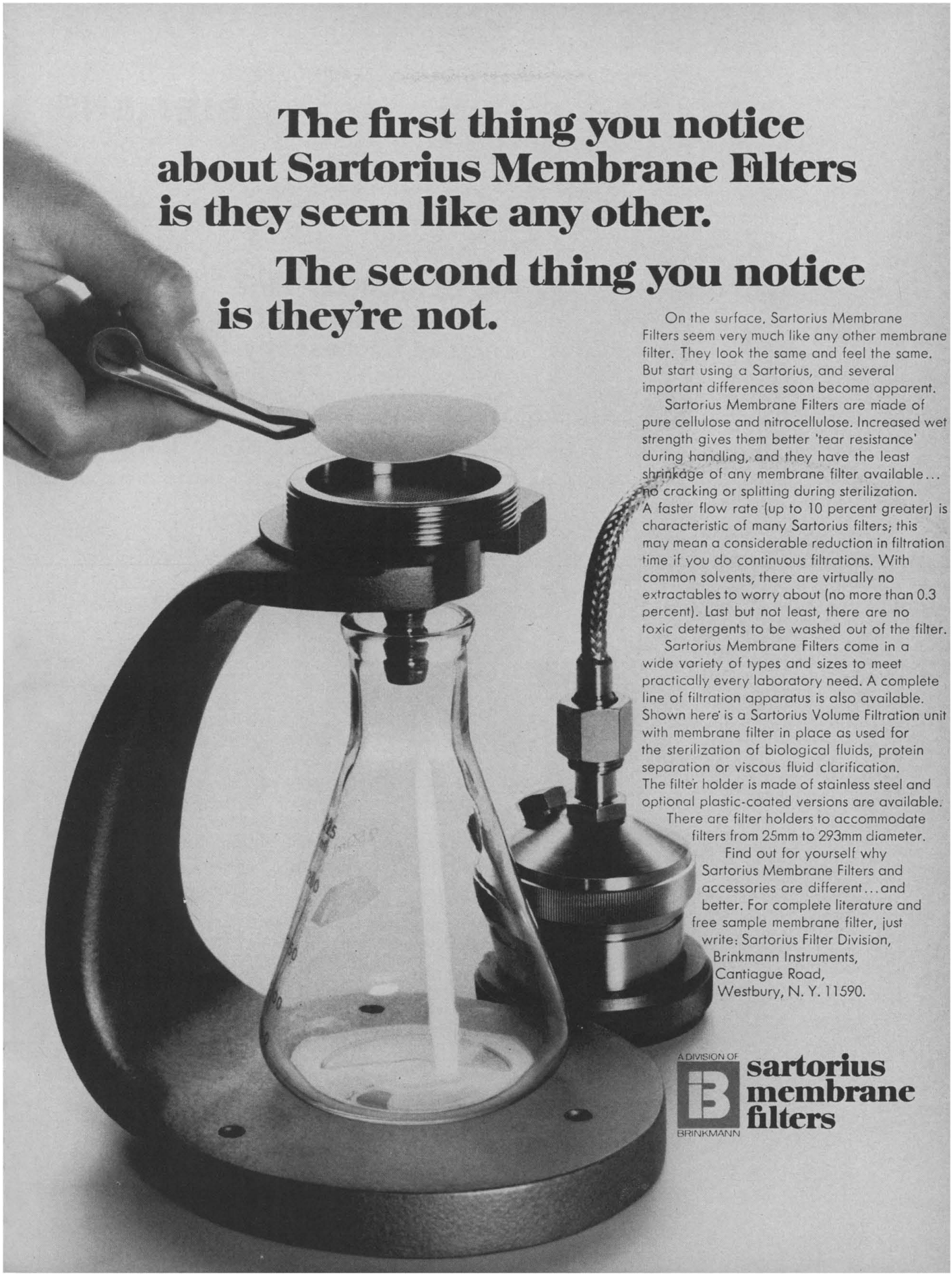

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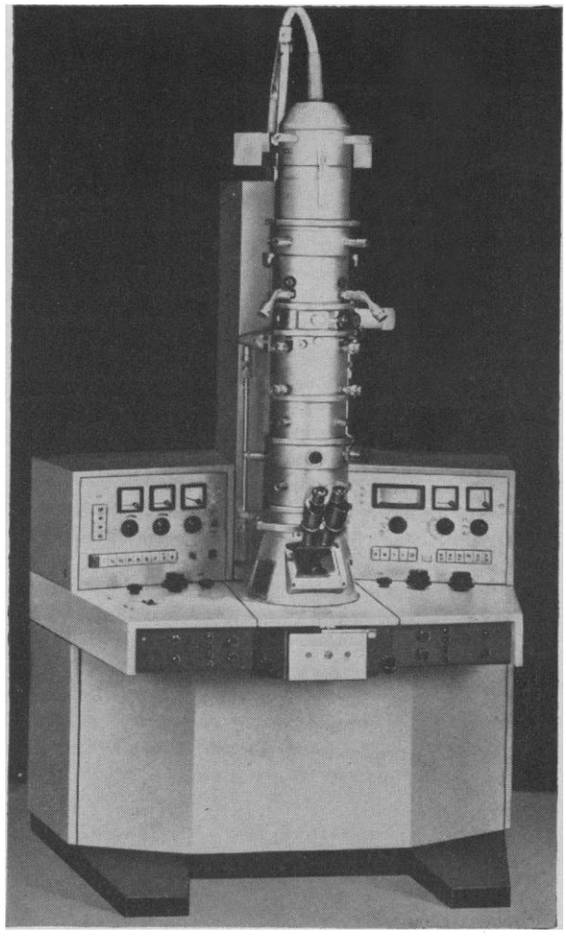

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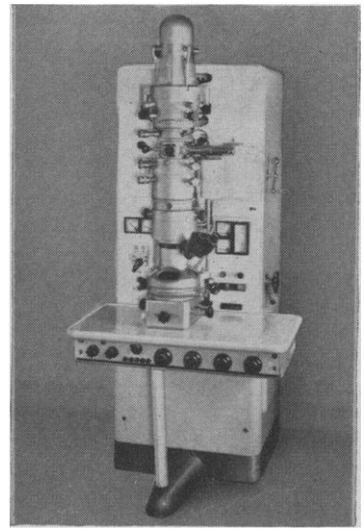

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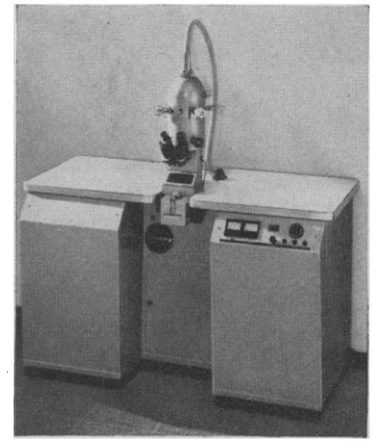

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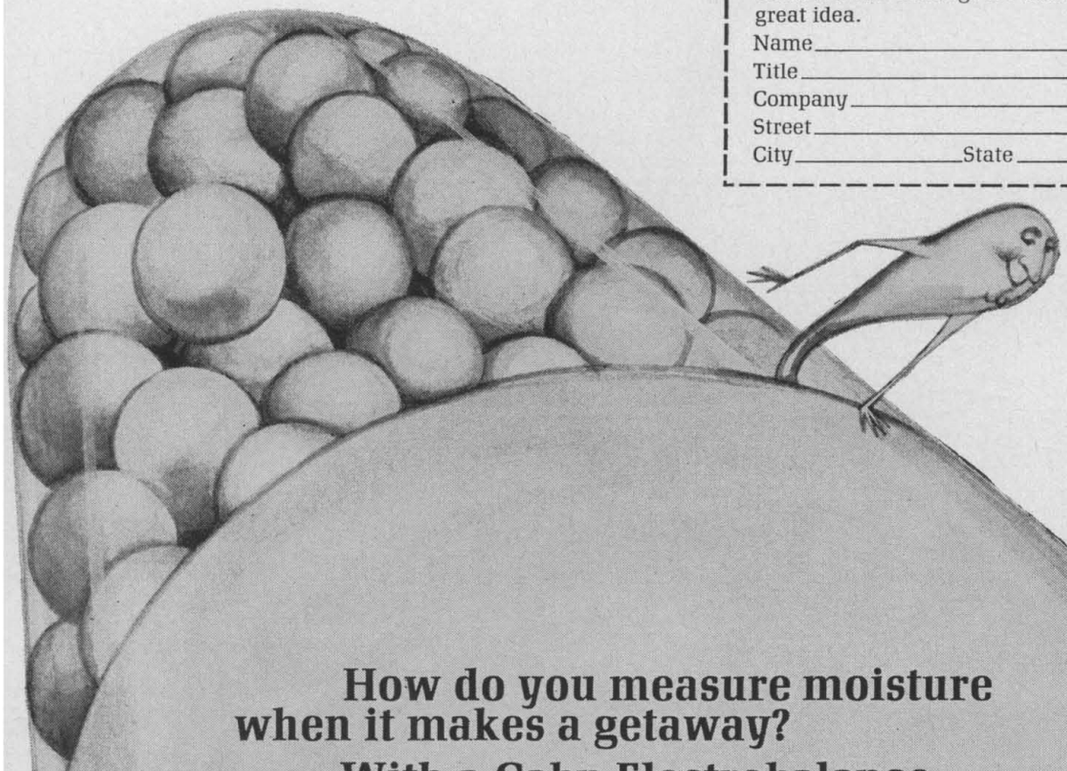

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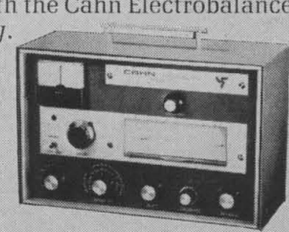

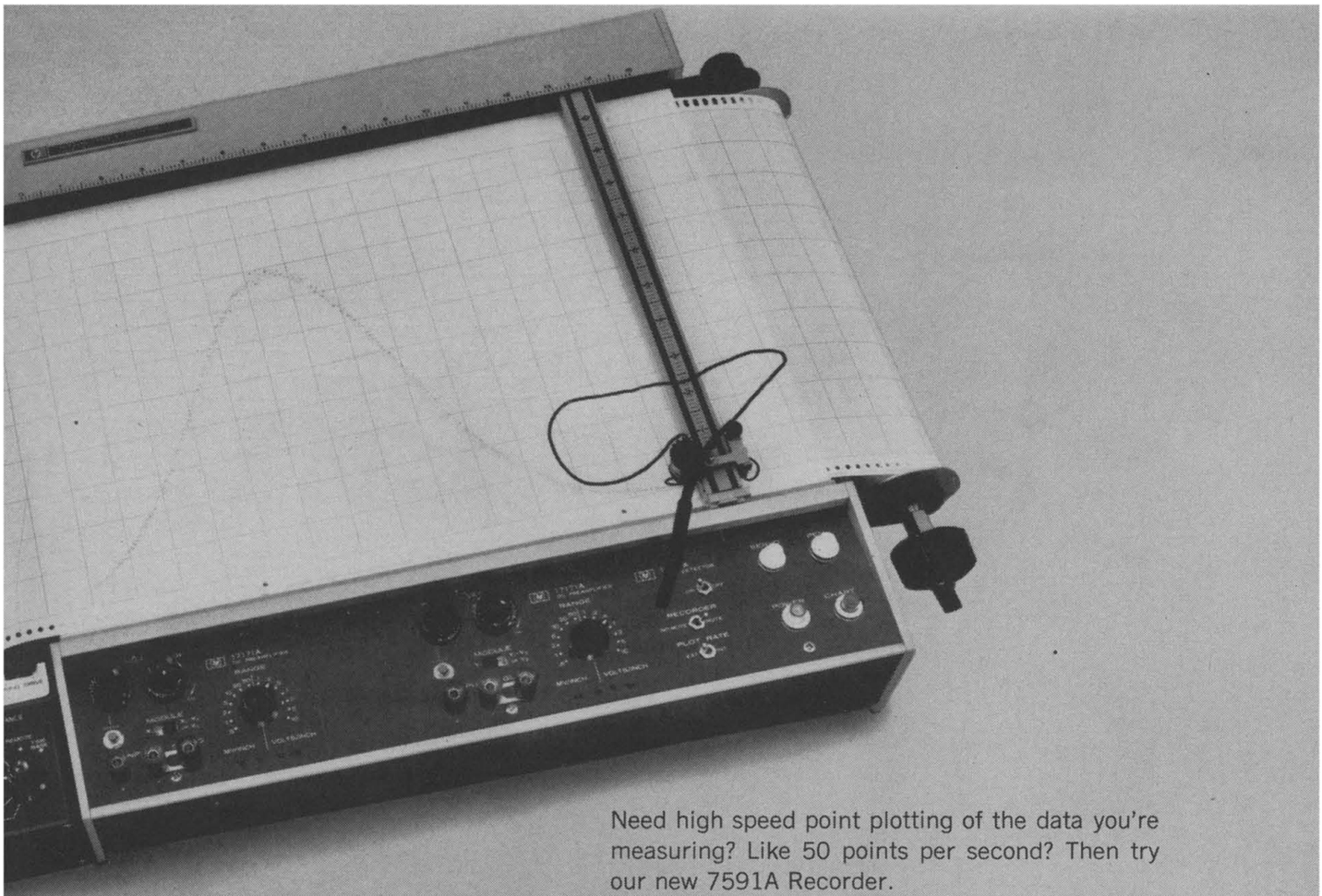

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meet all or most of the cost by raising subscription rates. Some are organs of societies that have comfortable publication reserves. Perhaps an effort to obtain direct subsidies may be the most feasible and equitable solution. These might be administered by a special committee of the National Academy of Sciences. Subsidies on a continuing basis will have to come from the government, but as an emergency measure some of the foundations might be willing to contribute to maintain the quality and quantity of American scientific publications.

HARRY GRUNDFEST
Department of Neurology,
Columbia University, New York 10032

The University in Many Mirrors

C. West Churchman has taken the opportunity in his review of *The Closed Corporation: American Universities in Crisis* (14 Feb., p. 664) to drag his own soapbox to Sather Gate. Despite his oversimplified references to public figures, I applaud most of his pronouncements. His final question "What is a university?" is certainly the most important question to ask. Individual answers will range from a laboratory-library concept of detached experimentation and ascetic activity to describing an orgy of collective involvement in controversial issues of the moment. Also, the pictures of the ideal student-teacher relationship will vary from one showing a harsh master-apprentice arrangement to one in which teacher and student are depicted as soul brothers engaged in an intense inquiry into the ultimate meaning of everything.

Whatever visions develop for the ideal university, however, vast amounts of support in money and goodwill are needed. Concerning this point, Churchman appears to be unrealistic. We simply cannot ignore the feelings of the "majority of the electorate." The electorate has yet to be convinced that universities possess divine insight into their own worthiness. Until such a day arrives, both public and private universities must temper idealism with more than just a grudging awareness of public opinion. Hypocrisy need not result. The electorate has long ago adjusted to the general fact that students and professors do not agree with many or, in the electorate's mind, most of the current political, moral, and religious convictions. The electorate will never adjust,

however, to having these cherished beliefs treated with insolence. Nihilists are making the most of this fact. In addition, well-meaning students and faculty have too often confused the lofty concept of freedom of expression with freedom to give pointless, or even pernicious, insult and offense. To me, "performing in a manner which pleases the majority of the electorate" does not mean conforming to popular whims or beliefs, but it does mean approaching our task with dignity and understanding.

STANLEY N. DAVIS
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Columbia 65201

PULSE in the City of the Future

In his article "Science and the city: The question of authority" (28 Feb., p. 902), Carroll has presented a comprehensive picture of the Department of Housing and Urban Development research activities. Also his reference 67 alluded to "HUD's most substantial technological study to date," the New Systems Study of Urban Transportation which is summarized in a HUD publication "Tomorrow's Transportation" (May 1968). Among the new technological developments suggested in the study is the Public Urban Locator Service (PULSE), a system which can automatically and rapidly report the location of many moving objects (people, vehicles, or goods), wherever they might be, to a central point where they can be rerouted if necessary to meet an emergency or changed requirements. This system could improve the functions of police operations, public transit, ambulance service, fire control, and movements of goods, to name a few.

PULSE is being developed under HUD leadership, assisted by the departments of Justice, Post Office, Health, Education, and Welfare, and Transportation, the Federal Communications Commission, and private industry; and it is hoped that it can be tested in the near future. This is an example of an urban utility which can jointly serve the needs of municipal agencies, commercial interests, and private individuals and illustrates the value of HUD research in nonhousing areas.

STEPHEN J. KAHNE
Department of Electrical Engineering,
University of Minnesota,
Minneapolis 55455

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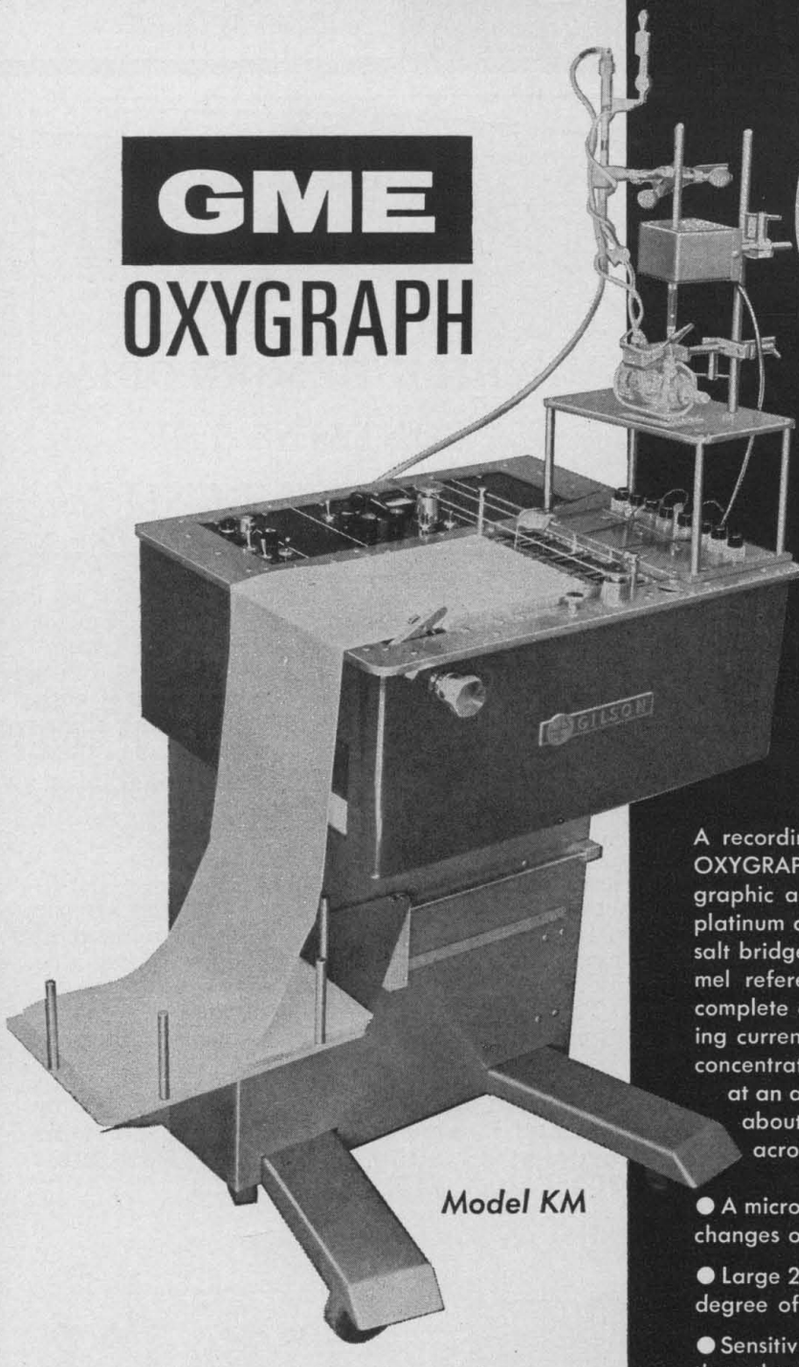
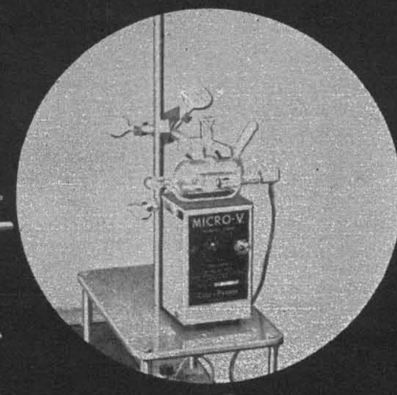


Model KM



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23 May 1969, Volume 164, Number 3882 **SCIENCE**

Identifying and Moving toward National Goals

The central role of science and technology in shaping this nation's future has been emphasized by leading scientists and politicians. Nevertheless, while spending some $18 billion a year on research and development, the federal government has not provided dynamic leadership. William Carey, for many years a key figure in the Bureau of the Budget, has said, "The United States has no science policy." One measure of the inertness of the government is the fact that there have been only minor changes in emphasis and expenditures for R & D during the last 6 years.

In the meantime, this nation has encountered a great new set of domestic problems—social and environmental. We also face very important shifts in the nature of international competition. The Japanese and the West Germans have emerged as the real victors of the Cold War and the Vietnamese conflict.

Scientists and engineers alone cannot solve all the problems of society, but they can contribute significantly to the solution of many of them, if organized to do so. A useful analysis of ways in which science and technology can be mobilized to meet the needs of society has been provided in a thoughtful report by the Science Council of Canada.*

The Science Council has approached the matter in a logical way. It began with the axiom that the value of any scientific enterprise to a society is determined by the social, cultural, and economic goals that society seeks. The council members then proceeded to identify a set of goals that appeared to contain the main aspirations of their fellow countrymen—for example, national prosperity and physical and mental health. They then sought to identify the various factors on which attainment of each goal will depend. They found that, in moving toward the nation's major goals, science and technology might be expected to make important contributions. The council then considered how science and technology might best be organized to meet Canada's needs effectively. The recommendations necessarily take into account the special situation in Canada—its population, its resources, and the fact that most of its major industry is dominated by foreign-owned companies. To avoid frittering away resources by competing in every area, the council has recommended that Canada should concentrate on a limited number of major efforts. It proposes that "most new undertakings in Canadian science be organized as large multidisciplinary, mission-oriented projects having as a goal the solution of some important economic or social problem and in which all sectors of the scientific community must participate on an equal footing."

As a rationale for choosing this approach, the report points to the advantage of a national focus for efforts. "Ideally each program will give cohesion to the efforts of all levels of government, of industry and of the universities as they work towards a common goal. . . . Today it should be a measure of a nation's maturity that it can apply its problem-solving resources on the national scale to progress on matters affecting the public interest other than the defence of sovereignty by military means."

Policies that are well suited to Canada cannot be totally applicable to other countries. However, the Science Council has created an instructive precedent and erected a high standard of excellence for others. Leaders of its larger but less alert neighbor can learn much from the exercise that has been conducted. In the United States a searching analysis of national goals and of policies for science and technology now seems overdue.—PHILIP H. ABELSON

* "Towards a National Science Policy for Canada," *Science Council of Canada Report No. 4* (1968) (Queen's Printer and Controller of Stationery, Ottawa, Canada; 75¢).

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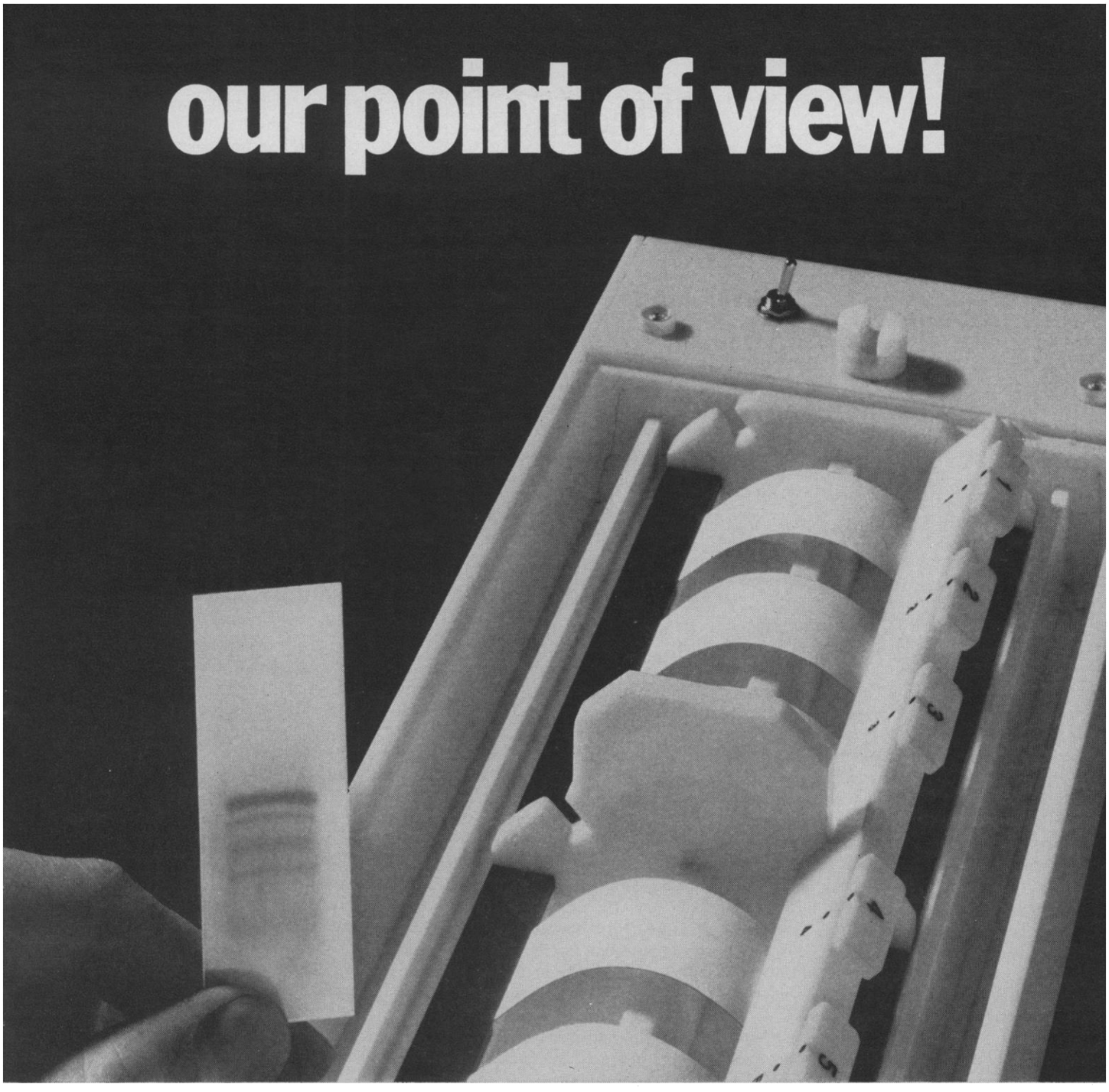

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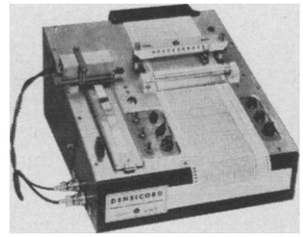

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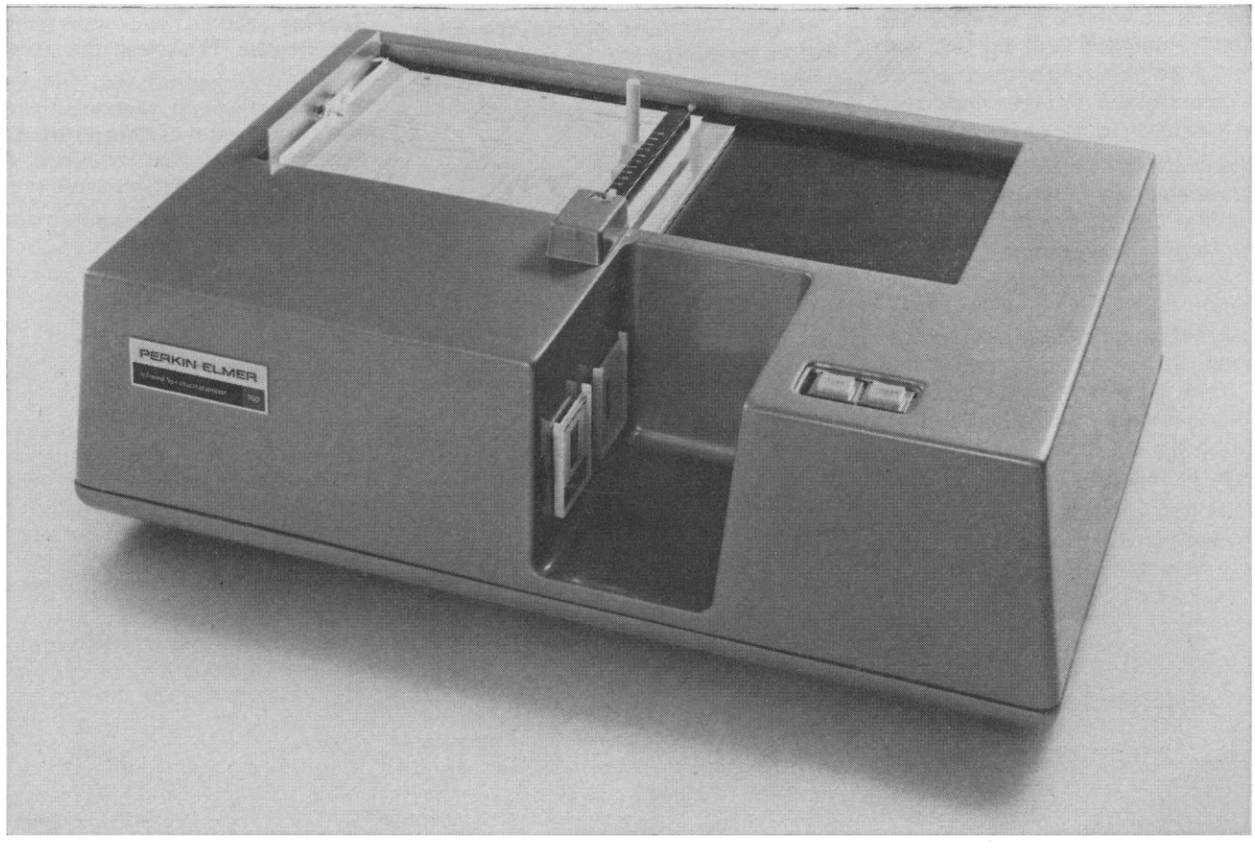

fading kinetics between gamma and neutron exposed glasses have been observed (K. Becker and J. S. Cheka, ORNL). These glasses also exhibit thermoluminescence (D. F. Regulla, München).

Luminescence characteristics such as the thermal quenching (S. G. Gorbics *et al.*, NRL), the intrinsic sensitivity of TL phosphors (W. H. Lucke, NRL), and the optical spectrum of thermoluminescence (B. G. Oltman and J. Kastner, ANL; A. M. Strash and R. Madey, Clarkson College; S. J. Fleming, Oxford) were subjects of another session. A computer program for the analysis of LiF glow-curves based on the Randall-Wilkins model has been developed (R. M. Grant, Jr., and W. S. Stowe, Denison University).

In the instrumentation field, several new developments have been reported, in particular a fast sample changer for TLD readers (L. Bötter-Jensen, Risö) and a semiautomatic TLD reader based on the use of hot nitrogen gas for heating the sample (K. R. Petrock and D. E. Jones, Livermore). J. Kastner *et al.* (ANL) improved their technique of predose suppression in RPL glasses by delayed measurement after pulsed excitation through the use of an electrooptical Pockels shutter instead of the expensive pulsed ultraviolet laser previously employed. By allowing the "predose" luminescence to die away before measuring the longer lived RPL signal, the practical range of silver-activated glass can be extended to less than 1 milliroentgen.

Applications of RPL and TL dosimetry in personnel dosimetry are rapidly becoming routine. In the NRTS in Idaho Falls, for example, several thousand workers are regularly monitored with a badge containing LiF (J. P. Cusimano *et al.*), and in Karlsruhe, glass dosimeters whose encapsulation flattens the energy response or makes it similar to that of critical organs, are used for the same purpose (E. Piesch). Both TL and RPL dosimeters were shown to be more accurate and less expensive than film badges. More sophisticated solid-state badges (A. R. Jones, Chalk River) and automatic reading equipment are under development in several laboratories.

Another application of thermoluminescence is that of dating ancient pottery. New results on the improvement of the methods were reported from Risö (V. Mejdahl) and Oxford (D. W. Zimmerman). The head of the Oxford group, M. J. Aitken, was the banquet

speaker and gave an impressive description of other methods used for the dating of ancient pottery and the detection of antique forgeries.

In a session on the medical applications of luminescence dosimetry, attention was drawn to the high toxicity of ingested LiF (C. M. Dettmer and B. M. Galkin, Stein Research Center) and the changes that occur in nonencapsulated, implanted LiF dosimeters used for in vivo studies. In some circumstances, implanted detectors were totally disintegrated or dissolved in body fluids. Some prepacked LiF dosimeters have been used for clinical routine measurements with excellent precision of ± 3 percent (N. Suntharalingam, Stein Research Center).

In a final panel discussion, moderated by J. H. Schulman (NRL), the conference chairman J. R. Cameron and panel members F. H. Attix, K. Becker, J. F. Fowler, V. Mejdahl, and Z. D. Spurny, summarized their impressions of the conference and outlined desirable future work. Their individual statements may be summarized as follows:

1) It is undesirable and unsatisfying to spend further basic research efforts on commercial LiF materials of unknown composition. Instead, systematic studies with well-defined, reproducible materials should be conducted. The characteristics of commercial phosphors may, however, be worthy of critical study because of practical aspects.

2) The increasing use of TL and RPL detectors for routine applications makes the development of improved devices such as more sophisticated (but easy to handle) personnel dosimetry badges and automatic readers desirable.

3) Unnecessary duplication of work could be avoided and research stimulated by the creation of an information center for the efficient collection and rapid distribution of all relevant information.

4) The problem of sensitive, reasonably energy-independent fast neutron dosimetry needs to be solved. Detectors with a high sensitivity for high-LET radiation should be developed.

5) The promising method of thermally stimulated exoelectron emission dosimetry may in the future provide considerable improvements in solid-state techniques as well as in the understanding of the basic processes involved.

Finally, the reviewers concluded that researchers in luminescence dosimetry

should meet at approximately 2- or 3-year intervals. This small but vigorous conference has, without doubt, stimulated many to change their studies in various ways to make them more productive. The full text of the papers and discussions is available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

K. BECKER
J. A. AUXIER

Health Physics Division,
Oak Ridge National Laboratory,
Oak Ridge, Tennessee

Calendar of Events

Courses

Fluid Mechanics, Urbana, Ill., 11–15 August. It will cover fundamental aspects of fluid mechanics and the principal applications to the paper industry. (H. O. Teeple, Technical Association of the Pulp and Paper Industry, 360 Lexington Ave., New York 10017)

Trace Element Analysis, Harwell, England, 30 June–4 July. Will emphasize nuclear techniques in trace element analysis, including neutron, charged particles and gamma-ray activation analysis, autoradiography, and mass spectrometric isotopic dilution analysis. It should appeal to chemists and metallurgists working in such fields as ferrous and non-ferrous metals, refractories, glass, plastics, and so forth. (Education Officer, Royal Institute of Chemistry, 30 Russell Square, London, W.C.1, England)

Automatic Control Theory, St. Louis, Mo., 11–16 August. The course will cover foundations of modern control theory, finite automatia and dynamical systems, stability—operator theoretic methods, foundations of optimal control theory, differential games and minimax problems, optimal control of distributed parameter systems, linear and nonlinear filtering, stochastic optimal control, and new developments in designing large linear systems. The prerequisite mathematical level of students will be a good M.S. level of preparation; however, the lectures will be conducted in a manner suitable for stimulating even the advanced research worker. (Dr. G. L. Esterson, Box 1048, Division of Continuing Professional Education, Washington University, St. Louis 63130)

Biology of Aging, University of California, San Diego, at La Jolla, 22 June–11 July. Is intended for senior predoctoral and early postdoctoral students in order to interest them in research on the biology of aging. The course content will include the aging process, environment and aging, mammalian aging, cellular aging, and subcellular and molecular aging. Costs will be paid by the Adult Development and Aging Branch, National Institute of Child Health and Human Development. (Dr. Gabe Maletta, Adult

Development and Aging Branch, National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Md. 20014)

X-ray Spectrometry, Albany, N.Y., 9–13 June. Is a basic course in x-ray spectrometry covering the fundamentals of theory and experimental techniques. Is intended for those who are working or plan to work in x-ray spectrometric analysis. *Fee*: $250. (X-ray Clinic, State University of New York at Albany, Albany)

Thermochemistry of Gas-Metal Reactions and High-Temperature Oxidation of Metals, Los Angeles, Calif., 23–27 June. For engineers and scientists actively engaged in the winning, processing, and use of metals, alloys, and other inorganic solids at high temperatures. Is intended to acquaint participants with principles and use of thermochemistry in high-temperature chemical processes, and with the kinetics, mechanisms, and crystal structural aspects of high-temperature oxidation of metals and alloys. *Fee*: $275. (P.O. Box 24901, Department K, University Extension, University of California, Los Angeles 90024)

Statistical Method in Modern Experimentation, Cambridge, Mass., 7–18 July. The course will focus on factorial designs with each factor at two or at three levels. (Director of the Summer Session, Room E19-356, Massachusetts Institute of Technology, Cambridge, Mass. 02139)

National Meetings

June

2–3. International Symp. on **Molecular Biology**, New York, N.Y. (E. G. Bassett, Research Products Div., Miles Labs., Inc., Elkhart, Ind. 46514)

2–4. **Composite Materials** Symp. and Workshop, Rolla, Mo. (C. E. MacNeil, Inst. for Composite Materials, P.O. Box 1536, Stow, Ohio)

2–6. American College of **Allergists**, Washington, D.C. (E. Bauers, Dain Tower, Minneapolis, Minn. 55402)

2–6. **PCM Telemetry Systems**, Lafayette, Ind. (P. A. Wintz, School of Electrical Engineering, Purdue Univ., Lafayette 47907)

2–6. **Relativity** Conf. in the Midwest, Cincinnati, Ohio. (L. Witten, Physics Dept., Univ. of Cincinnati, Cincinnati 45221)

3–13. International Conf. on **Arid Lands in a Changing World**, Tucson, Ariz. (Intern. Conf. on Arid Lands, % Dept. of Geochronology, Univ. of Arizona, Tucson 85721)

5–6. American **Chemical** Soc., 3rd Great Lakes mtg., De Kalb, Ill. (3rd Great Lakes Meeting, % Dept. of Chemistry, Northern Illinois Univ., De Kalb 60115)

5–6. Association for **Precision Graphics**, Dallas, Tex. (W. G. Reiman, The Association, 8163 Willow Glen Rd., Hollywood, Calif. 90046)

5–11. International Assoc. of **Forensic Sciences**, 5th, Toronto, Ont., Canada. (D. M. Lucas, 8 Jarvis St., Toronto 2)

8–12. **Health Physics** Soc., 14th, Pittsburgh, Pa. (R. F. Cowing, Executive Secretary, The Society, 194 Pilgrim Rd., Boston, Mass. 02215)

9. **X-ray Spectrometry** Clinic, 5th, Albany, N.Y. (H. Chessin, Dept. of Physics, State Univ. of New York, 1400 Washington Ave., Albany 12203)

9–11. American **Neurological** Assoc., 94th, Los Angeles, Calif. (S. A. Trufant, Cincinnati General Hospital, Cincinnati, Ohio 45229)

9–13. **Propulsion**, 5th joint specialist conf., Colorado Springs, Colo. (American Inst. of Aeronautics and Astronautics, 1290 Sixth Ave., New York 10019)

10–12. Society for **Industrial and Applied Mathematics**, Washington, D.C. (R. K. Windsor, 33 S. 17 St., Philadelphia, Pa. 19103)

10–12. **Tissue Culture** Assoc., 12th, Detroit, Mich. (R. G. Brackett, Research Labs., Parke-Davis and Co., Detroit 48232)

11–13. Pacific Northwest **Plastics** Conf., 6th, Pullman, Wash. (R. Raff, Program Chairman, Washington State Univ., Pullman 99163)

12–13. Symposium on **Kinetic Equations**, Ithaca, N.Y. (R. L. Liboff, Applied Physics, Cornell Univ., Ithaca 14850)

12–13. **Nutritional Developments** Relative to Animals in Biomedical Research, New Brunswick, N.J. (R. M. Grey, Inst. of Comparative Medicine, Columbia Univ., New York 10032)

12–23 Aug. **Fertilization and Gamete Physiology**, Woods Hole, Mass. (C. B. Metz, Inst. of Molecular Evolution, Univ. of Miami, 521 Anastasia, Coral Gables, Fla. 33134)

14–17. **Lepidopterist** Soc., 12th, East Lansing, Mich. (J. P. Donahue, Dept. of Entomology, Michigan State Univ., East Lansing 48823)

15–18. Northeastern Section of the **Botanical** Soc. of America, Cortland, N.Y. (R. K. Zuck, Dept. of Botany, Drew Univ., Madison, N.J. 07940)

15–18. Harry Steenbock Symp. on the **Fat Soluble Vitamins**, Madison, Wis. (H. F. DeLuca, Biochemistry Dept., Univ. of Wisconsin, Madison 53706)

15–18. **Marine Technology** Soc., Miami Beach, Fla. (M. H. Simons, 1730 M St., NW, Washington, D.C. 20036)

15–18. American **Proctologic** Soc., Boston, Mass. (Administrative Secretary, The Society, 320 W. Lafayette, Detroit, Mich. 48226)

15–19. National **Industrial Pharmaceutical Research** Conf., Land O'Lakes, Wis. (W. L. Blockstein, University Extension, 190 Pharmacy Bldg., Univ. of Wisconsin, Madison 53706)

15–21. American **Astronautical** Soc., Denver, Colo. (G. W. Morgenthaler, Box 179, Mail No. 1609, Martin-Marietta Corp., Denver 80201)

16. **Rocky Moutain National Park** Seminar, Estes Park, Colo. (T. C. Thomas, Executive Secretary, Rocky Mountain Nature Assoc., Box 147, Estes Park 80517)

16–18. **Cryogenic Engineering** Conf., Los Angeles, Calif. (R. A. Cliffe, Executive Secretary, National Acad. of Sciences, 2101 Constitution Ave., NW, Washington, D.C. 20418)

16–18. International Symp. on **Computer Applications in the Earth Sciences**, Lawrence, Kan. (D. F. Merriam, Kansas Geological Survey, Univ. of Kansas, Lawrence 66044)

16–18. **Rock Mechanics**, 11th symp., Berkeley, Calif. (Continuing Education in

Engineering, Univ. of California Extension, 2223 Fulton St., Berkeley 94720)

16–20. American **Carbon** Committee, 9th biennial conf., Boston, Mass. (A. I. Medalia, 9th Carbon Conference, Cabot Corp., Billerica, Mass. 01821)

16–20. **Technical Writers'** Inst., 17th, Troy, N.Y. (J. R. Gould, Rensselaer Polytechnic Inst., Troy 12180)

16–27. **Engineering Systems Analysis**, Cambridge, Mass. (Center for Advanced Engineering Study, Room 9-257, Massachusetts Inst. of Technology, Cambridge)

18–20. American **Physical** Soc., Rochester, N.Y. (E. Efran, Office of Public Relations, Univ. of Rochester, Rochester 14627)

18–20. **Bibliographical** Soc. of America, Philadelphia, Pa. (W. H. Bond, Houghton Library, Harvard Univ., Cambridge, Mass. 02138)

18–21. Western Soc. of **Malacologists**, 2nd, Pacific Grove, Calif. (P. O. Hughes, 12871 Foster Rd., Los Alamitos, Calif. 90720)

19. **Marine Temperature Measurements**, Miami Beach, Fla. (A. E. Wheeler, Chairman, Oceanographic Instrumentation Committee, North American Rockwell Corp., 350 S. Magnolia Ave., Long Beach, Calif. 90802)

19–21. American Assoc. of **Bioanalysts**, New Orleans, La. (The Society, 805 Ambassador Bldg., St. Louis, Mo. 63101)

20–22. Graduate Research Conf. in **Genetics and Cell Biology**, Middletown, Conn. (Research Conf. Committee, Shaklin Lab. of Biology, Wesleyan Univ., Middletown 06457)

20–22. American Assoc. of **Neuropathologists**, New Haven, Conn. (S. M. Aroson, Dept. of Pathology, Downstate Medical Center, 450 Clarkson Ave., Brooklyn, N.Y. 11203)

22–26. **Air Pollution Control** Assoc., 62nd, New York, N.Y. (B. Oliver, Hotel Americana, Seventh Ave. at 52nd St., New York)

22–27. American Soc. of **Medical Technologists**, Philadelphia, Pa. (S. B. Friedheim, Executive Director, The Society, Suite 1600, Hermann Professional Bldg., Houston, Tex. 77025)

22–27. Institute of Electrical and Electronic Engineers Summer **Power** Mtg., Dallas, Tex. (R. S. Miner, Dallas Power & Light Co., 1506 Commerce St., Dallas 75201)

22–27. American Soc. for **Testing and Materials**, 72nd, Atlantic City, N.J. (T. A. Marshall, Jr., The Society, 1916 Race St., Philadelphia, Pa. 19103)

23–25. Workshop on **Computer-Based Chemical and Biological Information**, Athens, Ga. (Chemical and Biological Information, Retrieval Workshop, Computer Center, Univ. of Georgia, Athens 30601)

23–25. American **Water Resources** Assoc., 3rd symp., Edmonton, Alberta, Canada. (A. H. Laycock, Dept. of Geography, Univ. of Alberta, Edmonton)

23–26. American Soc. for **Engineering Education**, 77th, University Park, Pa. (The Society, Suite 838, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

23–26. **Law of the Sea** Inst., 4th conf., Kingston, R.I. (L. M. Alexander, Univ. of Rhode Island, Kingston 02881)

23–26. American **Orthopaedic** Assoc., Hot Springs, Va. (A. B. Ferguson, 125 Desoto St., Pittsburgh, Pa. 15213)

23–28. Regional Conf. on **Automata Theory and Computational Complexity**, Plattsburgh, N.Y. (W. E. Hartnett, Dept. of Mathematics, State Univ. of New York, College of Arts and Science, Plattsburgh 12901)

24–26. **Navigation in a Changing Environment**, 25th, Houston, Tex. (R. Freeman, Inst. of Navigation, 711 14th St., NW, Washington, D.C. 20005)

24–26. **Trace Substances in Environmental Health** Conf. Columbia, Mo. (D. D. Hemphill, 1-43 Agriculture Bldg. Univ. of Missouri, Columbia 65201)

25–27. Art of **Glassblowing**, 14th symp., Albany, N.Y. (J. W. Baum, 200 Highland Ave., Rensselaer, N.Y. 12144)

27–29. **Endocrine** Soc., New York, N.Y. (N. L. Mattox, 1211 N. Shartel, Oklahoma City, Okla. 73103)

30–1. Applications of **Continuous System Simulation Languages**. San Francisco, Calif. (M. Burwen, Basic Computing Arts, Inc., 2680 Bayshore Frontage Rd., Mountain View, Calif. 94040)

30–2. Action of **Hormones from Molecules to Population Control**, Detroit, Mich. (P. Zuckerman, 6767 W. Outer Dr., Detroit 48235)

30–2. **Rudolfs Research** Conf., 5th, New Brunswick, N.J. (R. Locandro, Office of Resident Instruction, Room 206, Rutgers—The State Univ., New Brunswick 08903)

July

5–11. Tri-Organizational **Science and Clinical Rehabilitation** Conf., 13th, Albany, N.Y. (J. Timmerman, 1520 Van Hoesen Rd., Castleton-on-Hudson, N.Y. 12033)

6–10. **Forest Products** Research Soc., 23rd, San Francisco, Calif. (K. E. Huddleston, The Society, 2801 Marshall Court, Madison, Wis. 53705)

7–18. Conference on **Environmental Effects on Antenna Performance**, Boulder, Colo. (P. Blacksmith, AFCRL (CRD), L. G. Hanscom Field, Bedford, Mass. 01730)

7–18. **Science for Clergymen**, Oak Ridge, Tenn. (Special Projects Office, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge 37830)

8–11. **Nuclear and Space Radiation Effects**, University Park, Pa. (E. A. Burke, AFCRL (CRWH), Stop 30, L. G. Hanscom Field, Bedford, Mass. 01730)

9–12. National Soc. of **Professional Engineers**, Kansas City, Mo. (P. H. Robbins, The Society, 2029 K St., NW, Washington, D.C. 20006)

10–13. American **Therapeutic** Soc., 70th, New York, N.Y. (R. T. Smith, The Society, 37 Narbrook Park, Narberth, Pa. 19072)

12–13. Society for **Surgery of the Alimentary Tract**, 10th, New York, N.Y. (J. V. Prohaska, The Society, 950 E. 59 St., Chicago, Ill. 60637)

12–13. Society for **Vascular Surgery**, New York, N.Y. (R. M. Nelson, Surgical Research Lab., Latter-Day Saints Hospital, Salt Lake City, Utah 84103)

13–16. **Physiology and Biochemistry of Muscle as a Food**, Madison, Wis. (E. J. Briskey, Muscle Biology Lab., College of Agricultural and Life Sciences, Univ. of Wisconsin, Madison 53706)

13–17. American **Medical** Assoc., New York, N.Y. (W. E. Burmeister, The Asso-

ciation, 535 N. Dearborn St., Chicago, Ill. 60610)

14–16. **Sanitary Engineering Research, Development, and Design**, 2nd natl. symp., Ithaca, N.Y. (A. W. Lawrence, 219 Hollister Hall, Cornell Univ., Ithaca 14850)

14–18. Symposium on the **Nature, Induction and Utilization of Mutations in Plants**, Pullman, Wash. (J. H. Kane, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

14–18. **Persistence of Food Habits**: Problem in the War on Hunger, Milwaukee, Wis. (Engineering Foundation Research Conf., Room 308, 345 E. 47 St., New York 10017)

16–18. **Electron Probe Analysis** Soc. of America, 4th, Pasadena, Calif. (A. A. Chodos, Geology Dept., California Inst. of Technology, Pasadena 91109)

18–19. Rocky Mountain **Cancer** Conf., Denver, Colo. (D. G. Derry, Colorado Medical Soc., 1809 E. 18th Ave., Denver 80218)

20–25. Association for the **Advancement of Medical Instrumentation**, Chicago, Ill. (J. J. Post, 19 Brook Rd., Needham Heights, Mass. 02194)

21. Group Representations in **Mathematics and Physics**, Seattle, Wash. (R. S. Paul, Battelle Memorial Inst., 4000 NE 41st St., Seattle 89105)

21–25. **Transportation Systems Analysis**, Milwaukee, Wis. (Engineering Foundation Research Conferences, Room 308, 345 E. 47 St., New York 10017)

23–25. Montana **Radiological** Soc. Symp., Glacier National Park. (C. H. Agnew, 1231 N. 29th St., Billings, Mont. 59101)

25–26. **Linguistic** Soc. of America, Urbana, Ill. (R. B. Lees, Dept. of Linguistics, Univ. of Illinois, Urbana 61801)

28–29. Society of **Research Administrators**, San Francisco, Calif. (K. Hartford, Biology Dept., Yale Univ., 102 Kline Biology Tower, New Haven, Conn. 06520)

28–1. **Instrumentation Science,** research conf., Geneva, N.Y. (T. E. Tremellen, Education and Research Services, Instrument Soc. of America, 530 William Penn Pl., Pittsburgh, Pa. 15219)

28–1. **Quality Engineering and Research**, Milwaukee, Wis. (Engineering Foundation Research Conferences, Room 308, 345 E. 47 St., New York 10017)

August

3–6. National **Heat Transfer** Conf., 11th, Minneapolis, Minn. (D. C. Kelly, American Inst. of Chemical Engineers, 345 E. 47 St., New York 10017)

3–7. Society for **Cryobiology**, 6th annual, Buffalo, N.Y. (R. E. Greco, 3175 Staley Rd., Grand Island, N.Y. 14072)

4–5. **Aerospace Structures Design** Conf., Seattle, Wash. (J. R. Fuller, Boeing Co., P.O. Box 707, Orgn. 6-8650, M/S 77-89, Renton, Wash. 98055)

4–6. **Deterioration and Preservation of Library Materials**, 34th annual conf., Chicago, Ill. (H. W. Winger, Graduate Library School, Univ. of Chicago, 1116 E. 59 St., Chicago 60637)

4–8. **Molecular Biology and Pathology**, 2nd conf., Saratoga Springs, N.Y. (K. T. Lee, Dept. of Pathology, Albany Medical College, Albany, N.Y. 12208)

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5–8. World Conf. on **Records,** Salt Lake City, Utah. (S. E. Beesley, 1030 S. Orchard Dr., Bountiful, Utah 84010)

6–8. Applications of **X-Ray Analysis** Conf., Denver, Colo. (B. L. Henke, Div. of Metallurgy, Denver Research Inst., Denver 80210)

10–13. **Soil Conservation** Soc. of America, Fort Collins, Colo. (H. W. Pritichard, 7515 N.E. Ankeny Rd., Ankeny, Iowa 50021)

11–13. Symposium on **Crystal Growth,** Washington, D.C. (H. S. Peiser, Room B316, Bldg. 223, National Bureau of Standards, Washington, D.C. 20234)

11–14. Society of **Photo-Optical Instrumentation Engineers,** 14th annual technical symp., San Francisco, Calif. (H. L. Kasnitz, SPIE Symposium, P.O. Box 288, Redondo Beach, Calif. 90277)

12. American **Astronomical** Soc., Albany, N.Y. (G. C. McVittie, Univ. of Illinois Observatory, Urbana 61801)

17–22. **Animal Behavior** Soc., Burlington, Vt. (B. Dane, Tufts Univ., Medford, Mass.)

17–22. American Inst. of **Biological Science,** Burlington, Vt. (J. R. Olive, 3900 Wisconsin Ave., NW, Washington, D.C. 20016)

17–22. American Soc. of **Zoologists,** Burlington, Vt. (J. R. Shaver, Dept. of Zoology, Michigan State Univ., East Lansing 48823)

18. American Soc. of **Pharmacognosy,** Corvalis, Ore. (P. Catalfomo, School of Pharmacy, Oregon State Univ., Corvallis 97331)

18–20. **Genetics** Soc. of America, Madison, Wis. (B. Wallace, Dept. of Genetics, Cornell Univ., Ithaca, N.Y. 14850)

18–21. American **Hospital** Assoc., Chicago, Ill. (E. L. Crosby, 840 N. Lake Shore Dr., Chicago 60611)

18–22. New England Assoc. of **Chemistry Teachers,** 31st summer conf., Plymouth, N.H. (M. P. Olmsted, Publicity Chairman, NEACT, 9 Brookmont Dr., Wilbraham, Mass. 01095)

18–22. **Marine Biomedicinals** Symp., 10th annual, Corvallis, Ore. (P. Catalfomo, School of Pharmacy, Oregon State Univ., Corvallis 97331)

18–22. American **Phytopathological** Soc., Spokane, Wash. (J. P. Fulton, Dept. of Plant Pathology, Univ. of Arkansas, Fayetteville 72701)

18–22. National Goals in **Water Pollution Control,** Santa Barbara, Calif. (F. A. Butrico, Coordinator of Environmental Sciences Programs, Battelle Memorial Inst., Columbus Labs., Washington, D.C.)

19. **Biometric** Soc., western North American regional, Pullman, Wash. (J. S. Williams, Statistical Lab., Colorado State Univ., Fort Collins)

19–22. **Biometric** Soc., eastern North American regional, New York, N.Y. (D. G. Gosslee, P.O. Box 713, Oak Ridge, Tenn. 37830)

19–22. American Assoc. of **Clinical Chemists,** 21st natl. mtg., Denver, Colo. (J. Preston, P.O. Box 18323, Capitol Hill Station, Denver 80218)

19–22. Western **Electronic** Show and Convention, San Francisco, Calif. (D. W. Martin, WESCON, 3600 Wilshire Blvd., Los Angeles, Calif. 90005)

19–22. American Soc. for **Horticultural**

Science, 44th annual, Pullman, Wash. (C. Blackwell, The Society, 615 Elm St., St. Joseph, Mich. 49085)

19–22. American **Statistical** Assoc., 129th, New York, N.Y. (D. C. Riley, The Association, 810 18th St., NW, Washington, D.C. 20006)

19–23. American **Fern** Soc., Seattle, Wash. (A. M. Evans, Dept. of Botany, Univ. of Tennessee, Knoxville 37916)

20–22. American Soc. of **Civil Engineers**, Hydraulics Conf., Logan, Utah. (ASCE Hydraulics Conf., % Utah Water Research Lab., Utah State Univ., Logan 84321)

21–23. American **Nature Study** Soc., Pullman, Wash. (J. Geisler, Milewood Rd., Verbank, N.Y. 12585)

24–25. **Programming Languages Definition**, San Francisco, Calif. (J. A. Painter, IBM Corp., Research Lab., Dept. 978, Bldg. 025, Monterey and Cottle Rds., San Jose, Calif. 95114)

24–27. **Alaska Div., AAAS**, College. (V. Fisher, Inst. of Social, Economic and Government Research, Univ. of Alaska, College 99701)

24–27. **Defects in Electronic Materials for Devices**, Boston, Mass. (D. P. Seraphim, IBM Components Div., Bldg. 300, Hopewell Junction, N.Y. 12533)

24–27. Conference on **Food-Drugs from the Sea**, Kingston, R.I. (G. F. Greene, Jr., % Professional Services, Abbott Labs., North Chicago, Ill. 60064)

24–29. **Gerontological** Soc., Washington, D.C. (E. Kaskowitz, The Society, 660 S. Euclid St., St. Louis, Mo. 63110)

24–2. **Botanical** Soc. of America, Seattle, Wash. (R. C. Starr, Dept. of Botany, Indiana Univ., Bloomington 47401)

25–27. **Applied Mechanics** Western Conf., Albuquerque, N.M. (A. B. Conlin, Jr., Technical Depts., 345 E. 47 St., New York 10017)

25–27. **Mathematical** Assoc. of America, Eugene, Ore. (A. B. Willcox, The Association, 1225 Connecticut Ave., NW, Washington, D.C. 20036)

25–28. **Chromosphere-Corona Transition**, Boulder, Colo. (J. W. Evans, Sacramento Peak Observatory, Sunspot, N.M. 88349)

26–28. Engineering Applications of **Electronic Phenomena** Conf., Ithaca, N.Y. (H. J. Carlin, School of Electrical Engineering, Cornell Univ., Ithaca 14850)

26–29. **Electron Microscope** Soc. of America, St. Paul, Minn. (G. G. Cocks, Olin Hall, Cornell Univ., Ithaca, N.Y. 14850)

28–1. Society of **Petroleum Engineers**, Denver, Colo. (J. B. Alford, 6200 N. Central Expressway, Dallas, Tex. 75206)

31–4. **Psychometric** Soc., Washington, D.C. (W. B. Schrader, Educational Testing Service, Princeton, N.J. 08540)

31–6. **Quantum Solids: Hydrogen and Helium**, Aspen, Colo. (J. C. Raich, Colorado State Univ., Fort Collins 80521)

International and Foreign Meetings

July

2–4. **Lasers in Medicine**, London, W.1, England. (Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1)

2–10. Soc. of **Protozoologists,** Leningrad, U.S.S.R. (D. M. Hammond, Dept. of Zoology, Utah State Univ., Logan 84321)

6–9. Canada **Paediatric** Soc., Montreal, P.Q. (J. H. V. Marchessault, The Society, 14 Green Ave., St. Lambert, P.Q.)

6–11. **Barley Genetics,** intern. symp., Pullman, Wash. (R. A. Nilan, Dept. of Agronomy, Washington State Univ., Pullman 99163)

7–10. British **Medical** Assoc., Aberdeen, Scotland. (Executive Officer, The Association, Tavistock Sq., London W.C.1, England)

7–11. **Heterocyclic Chemistry,** intern. congr., Montpellier, France. (N. H. Cromwell, Dept. of Chemistry, Univ. of Nebraska, Lincoln 68508)

8–10. **Rational Development and Application of Drugs,** Nijmegen, Netherlands. (E. J. Ariens, Geert Grooteplein 21, Nijmegen)

12–19. International Inst. of **Welding,** 22nd, Kyoto, Japan. (P. D. Boyd, The Institute, 54 Princes Gate, Exhibition Rd., London, S.W.7, England)

13–19. **Clinical Pathology,** 7th intern. congr. Montreal, Canada. (VII Intern. Congr. of Clinical Pathology, P.O. Box 8, Station "G" Montreal 18)

14–16. **Non-conventional Electron Microscopy,** Oxford, England. (Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W. 1, England)

14–17. International **Turfgrass Research** Conf., Yorkshire, England. (J. B. Beard, Dept. of Crop Sciences, Michigan State Univ. East Lansing)

14–18. International **Atomic Absorption Spectroscopy** Conf., Sheffield, Yorks, England. (Conference Secretary, Soc. for Analytical Chemistry, 9-10, Saville Row, London, W.1, England)

14–18. **Chemical Control of the Human Environment,** intern. symp., Johannesburg, South Africa. (Intern. Union for Pure and Applied Chemistry, CSIR, Box 395, Pretoria, South Africa)

14–18. **Pharmacology,** 4th intern. congr., Basel, Switzerland. (F. J. Bové, Congr. on Pharmacology 1969, Postfach 30, 4000 Basel 4)

15–18. **Nuclear Reactions Induced by Heavy Ions,** Heidelberg, Germany. (H. v. Buttlar, Dept. of Physics, Ruhr Univ., D 463 Bochum, Federal Republic of Germany)

21–24. International Conf. on **Clustering Phenomena in Nuclei,** Bochum, Federal Republic of Germany. (P. Kramer, Theoretical Physics Dept., Gartenst vasse 47, D 74 Tubingen, Federal Republic of Germany)

27–2. **Psychology,** 19th intern. congr., London, England. (Secretariat, 19th Intern. Congr., 17 Gordon Sq., London W.C.1)

27–3. **Hemorheology,** 2nd intern. conf., Heidelberg, Germany. (G. Bugliarello, PH 123-C, Carnegie-Mellon Univ., Pittsburgh, Pa. 15213)

28–30. **Computational Physics,** Berkshire, England. (B. McNamara, United Kingdom Atomic Energy Agency, Culham Lab., Culham, near Abingdon, Berkshire)

28–1. **Fission,** Vienna, Austria. (H. v. Buttlar, Dept. of Physics, Ruhr Univ., D 463 Bochum, Federal Republic of Germany)

28–2. International Conf. on the **Physics**

of Electron and Atomic Collisions, Cambridge, Mass. (I. Amdur, Dept. of Chemistry, Massachusetts Inst. of Technology, Cambridge 02139)

August

4–7. International Conf. on **Raman Spectroscopy**, Ottawa, Ont., Canada. (J. A. Koningstein, Chemistry Dept., Carleton Univ., Ottawa)

4–9. International **Rhinologic** Soc., Mexico, D.F. (G. H. Drumheller, 1515 Pacific, Everett, Wash. 98201)

4–15. **Vertebrate Evolution: Mechanism and Process**, Istanbul, Turkey. (M. K. Hecht, Dept. of Biology, Queens College, Flushing, N.Y. 11367)

10–14. International Conf. on **Medical Physics**, 2nd, Boston, Mass. (E. W. Webster, Dept. of Radiology, Massachusetts General Hospital, Boston 02114)

10–15. **Chemotherapy**, 6th intern. congr., Tokyo, Japan. (W. P. Boger, P.O. Box 265, Princeton, N.J. 08540)

11–15. International Conf. of **Medical Physics**, Boston, Mass. (W. T. Maloney, Suite 620, 6 Beacon St., Boston 02108)

12–15. International **Photoconductivity** Conf., 3rd, Palo Alto, Calif. (G. S. Picus, Hughes Research Labs., 3011 Malibu Canyon Rd., Malibu, Calif. 90265)

17–21. International Assoc. of **Milk, Food and Environmental Sanitarians**, Louisville, Ky. (H. L. Thomasson, Box 437, Shelbyville, Ind. 46176)

20–21. International **Electronic Circuit Packaging** Symp., San Francisco, Calif. (IECPS Papers Selection Committee, % WESCON, 3600 Wilshire Blvd., Los Angeles, Calif. 90005)

20–27. International Union of **Pure and Applied Chemistry**, 22nd, Sydney, Australia. (J. R. Price, Box 2249U, G.P.O. Melbourne, Australia 3001)

21–28. International Symp. on **Statistical Ecology**, New Haven, Conn. (G. P. Patil, Dept. of Statistics, 302 McAllister Bldg., Pennsylvania State Univ., University Park, Pa. 16802)

24–26. Laurentian **Hormone** Conf., Mont Tremblant, P.Q., Canada. (Laurentian Hormone Conf. Office, 222 Maple Ave., Shrewsbury, Mass. 01545)

24–28. **Mobilizing Canada's Agricultural Resources**, 49th, Saskatoon, Sask. (R. H. Burrage, 1969 AIC Convention Committee, Box 800, Sub. P.O. No. 6, Saskatoon, Sask.)

24–29. **Gerontology**, 8th intern. congr., Washington, D.C. (N. W. Shock, 9650 Rockville Pike, Bethesda, Md. 20014)

24–29. **Neuropathology**, 6th intern. congr., Copenhagen, Denmark. (E. Christensen, Universitets Psykiatriske Lab., Rigshospitalet, Copenhagen)

25–29. International **Agricultural Aviation** Congr., 4th, Kingston, Ont., Canada. (K. M. Ward, National Research Council of Canada, Ottawa, Ont.)

25–29. International Conf. on **Luminescence**, Newark, Del. (F. Williams, Dept. of Physics, Univ. of Delaware, Newark 19711)

25–30. International Symp. on **Space Technology and Science**, 8th, Tokyo, Japan. (T. Hayashi, Dept. of Aeronautics, Univ. of Tokyo, Bunkyo-ku, Tokyo 113, Japan)

BOOKS RECEIVED

(*Continued from page 943*)

the Western Caribbean—the Bonacca Expedition, edited by Alexander R. McBirney; Other Papers on Florida and British Honduras, by Manuel N. Bass and Donald E. Cebulski. American Association of Petroleum Geologists, Tulsa, Okla., 1969. vi + 358 pp., illus. + 2 maps. $21.

Biological Membranes. Robert M. Dowben, Ed. Little, Brown, Boston, 1969. xiv + 306 pp., illus. $13.50.

Biologie de l'Amérique Australe. Vol. 4, Documents biogéographiques et écologiques. Delamare Deboutteville and Eduardo Rapoport, Eds. Éditions du Centre National de la Recherche Scientifique, Paris, 1968. 482 pp., illus. + 10 plates. 120 F.

Completely O-Simple Semigroups. An Abstract Treatment of the Lattice of Congruences. Kenneth M. Kapp and Hans Schneider. Benjamin, New York, 1969. x + 118 pp. Cloth, $12.50; paper, $3.95. Mathematics Lecture Note Series.

Comprehensive Biochemistry. Marcel Florkin and Elmer H. Stotz, Eds. Vol. 23, Cytochemistry. Elsevier, New York, 1968. xii + 168 pp., illus. $12.75.

Direct Current Geoelectric Sounding. Principles and Interpretation. P. K. Bhattacharya and H. P. Patra. Elsevier, New York, 1968. x + 138 pp., illus. + 10 enclosures. $10.75. Methods in Geochemistry and Geophysics, vol. 9.

Education and Urban Renaissance. National Conference on the Educational Dimension of the Model Cities Program, Chicago. Roald F. Campbell, Lucy Ann Marx, and Raphael O. Nystrand, Eds. Wiley, New York, 1969. xii + 148 pp., illus. $5.95.

Educational Research in Britain. H. J. Butcher and H. B. Pont, Eds. Elsevier, New York, 1968. 408 pp., illus. $11.50.

VIII Biennial Symposium on Animal Reproduction. Urbana, Illinois, 1967. A. V. Nalbandov and D. E. Becker, Eds. American Society of Animal Science, Albany, 1968. vi + 222 pp., illus. Paper, $10. *Journal of Animal Science*, vol. 27, Supplement 1.

Emergency Medical Guide. John Henderson. Illustrated by Neil Hardy. McGraw-Hill, New York, ed. 2, 1969. x + 558 pp. Cloth, $7.95; paper, $3.95.

Environmental Influences. Proceedings of a conference, New York, 1967. David C. Glass, Ed. Rockefeller University Press, New York; Russell Sage Foundation, New York, 1968. xii + 308 pp., illus. $7.50. Biology and Behavior Series, vol. 3.

Experiment at Berkeley. Joseph Tussman. Oxford University Press, New York, 1969. xvi + 144 pp. Cloth, $5; paper, $1.75.

Fossil Vertebrates of Southern California. Theodore Downs. Illustrated by Mary Butler and Pamela Immel. University of California Press, Berkeley, 1968. 64 pp., illus. + 8 plates. Paper, $1.75. California Natural History Guides, No. 23.

Foundations of Modern Physics. Paul A. Tipler. Worth, New York, 1969. xiv + 530 pp., illus. $11.50.

Fundamentals of Mycology. J. H. Bur-

nett. St. Martin's, New York, 1968. xiv + 546 pp., illus. + 10 plates. $13.95.

Gas Dynamics. Ernst Becker. Translated from the German edition (Stuttgart, 1966) by E. L. Chu. Academic Press, New York, 1968. xviii + 302 pp., illus. $15.

Guide to the Community Control of Alcoholism. Jay N. Cross. American Public Health Association, New York, 1968. 128 pp., illus. Paper, $3.

Heredity and Environment in the Functional Psychoses. An Epidmiological-Clinical Twin Study. Einar Kringlen. Universitetsforlaget, Boston, 1968. ii + 202 pp. Paper, $8. Norwegian Monographs on Medical Science.

Introduction to Modern Physics. C. H. Blanchard, C. R. Burnett, R. G. Stoner, and R. L. Weber. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1969. xiv + 498 pp., illus. $9.95.

Introduction to Optimal Control. Ian McCausland. Wiley, New York, 1969. xiv + 258 pp., illus. $12.

Kirk-Othmer Encyclopedia of Chemical Technology. Vol. 17, Radioactive Drugs and Tracers to Semiconductors. Herman F. Mark, John J. McKetta, Jr., Donald F. Othmer, and Anthony Standen, Eds. Interscience (Wiley), New York, ed. 2, 1968. xiv + 886 pp., illus. $50.

A Laboratory Manual for Modern Organic Chemistry. Gottfried Brieger. Harper and Row, New York, 1969. xiv + 226 pp., illus. $9.95. Harper's Chemistry Series.

Leonardo's Legacy. An International Symposium, Los Angeles, 1966. C. D. O'Malley, Ed. University of California Press, Berkeley, 1969. x + 230 pp., illus. $15.

Men Who Play God. The Story of the H-Bomb and How the World Came To Live with It. Norman Moss. Harper and Row, New York, 1969. 352 pp. $6.95.

Microbiological Applications. A Laboratory Manual in General Microbiology. Harold J. Benson. Brown, Dubuque, Iowa, 1969. xii + 196 pp., illus. Spiral bound, $3.95. Short edition.

Nomogenesis, or Evolution Determined by Law. Leo S. Berg. Translated from the Russian edition (1922) by J. N. Rostovtsov. M.I.T. Press, Cambridge, Mass., 1969. xxiv + 488 pp., illus. Paper, $3.95. Reprint, with a new foreword by Theodosius Dobzhansky, of the 1926 edition.

Non-Elastic Processes in the Mantle. Proceedings of the International Upper Mantle Committee Symposium, Newcastle upon Tyne, England, 1966. D. C. Tozer, Ed. Published for the Royal Astronomical Society by Blackwell Scientific Publications, Oxford, 1968. x + 450 pp., illus. + 17 plates. $25. Reprinted from the *Geophysical Journal* of the Royal Astronomical Society, vol. 14, 1967.

Organic Functional Group Preparations. Stanley R. Sandler and Wolf Karo. Academic Press, New York, 1968. xii + 580 pp., illus. $18.50. Organic Chemistry, vol. 12.

The Problems of Birds as Pests. Proceedings of a symposium, London, 1967. R. K. Murton and E. N. Wright, Eds. Published for the Institute of Biology by Academic Press, New York, 1968. xvi + 256 pp., illus. $9.50. Symposia of the Institute of Biology, No. 17.

Problems of International Literary Understanding. Proceedings of the Sixth Nobel

Symposium, Stockholm, 1967. Karl Ragnar Gierow, Ed. Interscience (Wiley), New York; Almqvist and Wiksell, Stockholm, 1968. 128 pp. $9.95.

Programming Languages. NATO Advanced Study Institute, Villard-de-Lans, France, 1966. F. Genuys, Ed. Academic Press, New York, 1968. x + 398 pp., illus. $15.

Purposive Systems. Proceedings of the First Annual Symposium of the American Society for Cybernetics, Gaithersburg, Md., 1968. Heinz von Foerster, John D. White, Larry J. Peterson, and John K. Russell, Eds. Spartan, New York, 1969. xxvi + 182 pp., illus. $10.

Quantum Mechanics. Leonard I. Schiff. McGraw-Hill, New York, ed. 3, 1968. xx + 556 pp., illus. $12.50. International Series in Pure and Applied Physics.

Quantum Physics and the Philosophical Tradition. Aage Petersen. MIT Press, Cambridge, 1968. x + 202 pp. $7.50.

Repair and Regeneration. The Scientific Basis for Surgical Practice. A Centennial Symposium, San Francisco, 1968. J. Englebert Dunphy and Walton Van Winkle, Jr., Eds. McGraw-Hill, New York, 1969. xii + 372 pp., illus. + 4 plates. $29.50.

Schizophrenia. Research and Theory. William E. Broen, Jr. Academic Press, New York, 1968. xii + 246 pp., illus. $11. Personality and Psychopathology, vol. 4.

Scientific American Resource Library. Readings in the Earth Sciences. Vol. 1, Offprints 801–843 (xiv + 306 pp., illus. $10); vol. 2, Offprints 844–874 (xii + pp. 307–622, illus. $10). Freeman, San Francisco, 1969.

Textbook of Histology. William F. Windle. McGraw-Hill, New York, ed. 4, 1969. xvi + 560 pp., illus. $13.50.

Textbook of Physiology and Biochemistry. George H. Bell, J. Norman Davidson, and Harold Scarborough. Williams and Wilkins, Baltimore, ed. 7, 1968. viii + 1268 pp., illus. + plates. $16.

Topics in Nonlinear Physics. Proceedings of the Physics Session, International School of Nonlinear Mathematics and Physics (NATO Advanced Study Institute), Munich, 1966. Norman J. Zabusky, Ed. Springer-Verlag, New York, 1968. xxxii + 728 pp., illus. $13.50.

Transformation of Petroleum in Nature. P. F. Andreev, A. I. Bogomolov, A. F. Dobryanskii, and A. A. Kartsev. Translated from the Russian edition (Leningrad) by Robert B. Gaul and Bruno C. Metzner. E. Barghoorn and S. Silverman, Transl. Eds. Pergamon, New York, 1968. xvi + 468 pp., illus. $18. International Series of Monographs in Earth Sciences, vol. 29.

Transmission Lines for Digital and Communication Networks. An Introduction to Transmission Lines, High-frequency and High-speed Pulse Characteristics and Applications. Richard E. Matick. McGraw-Hill, New York, 1969. xxiv + 360 pp., illus. $14.50.

Wissenschaftliche Abhandlungen. Ludwig Boltzmann. Fritz Hasenöhrl, Ed. Vol. 1 (x + 652 pp., illus.); vol. 2 (vi + 596 pp., illus.); vol. 3 (viii + 706 pp., illus.). $39.50. Reprint of the 1909 edition.

X-ray Diffraction. B. E. Warren. Addison-Wesley, Reading, Mass., 1969. x + 382 pp., illus. $15. Addison-Wesley Series in Metallurgy and Materials.