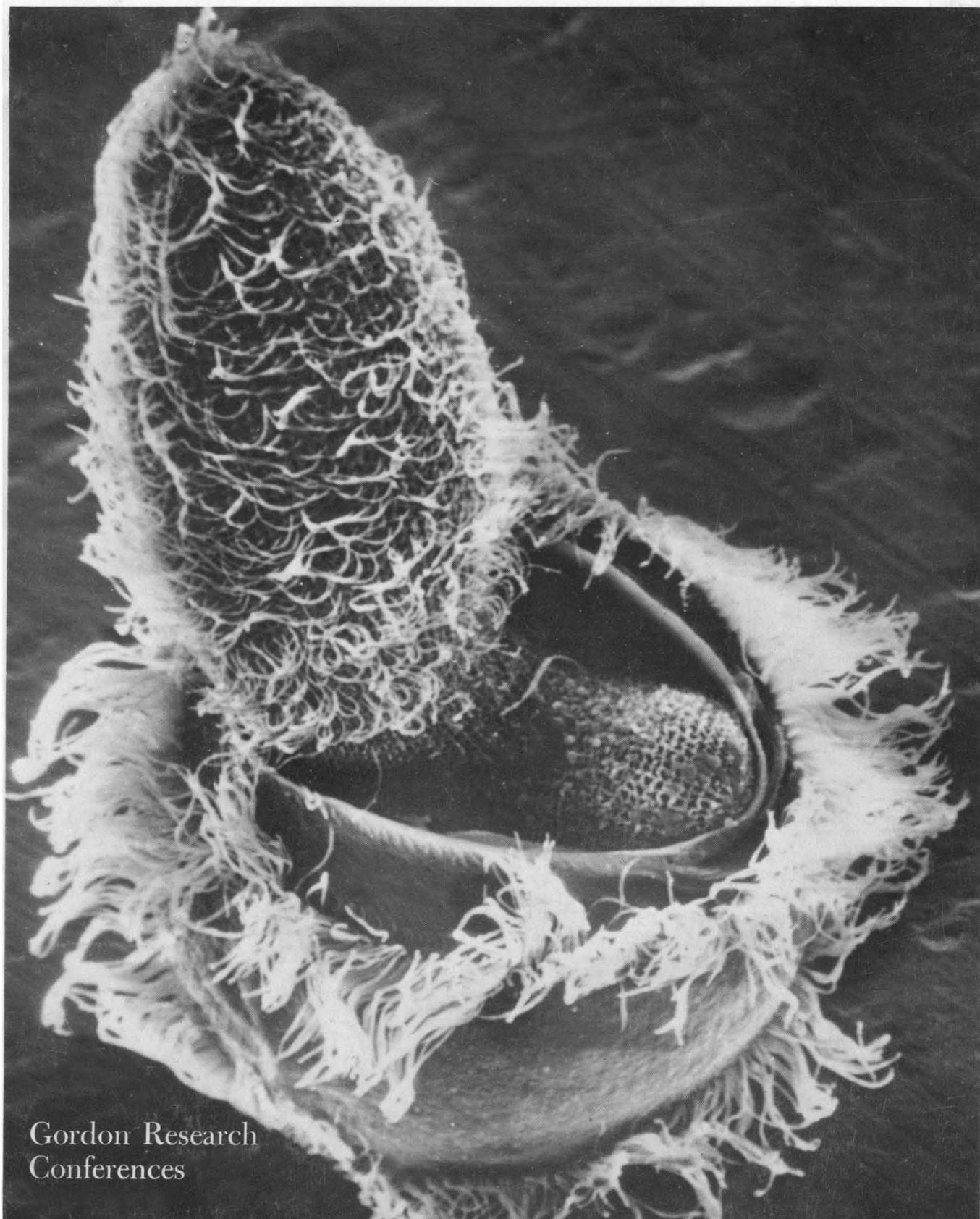


SCIENCE

7 March 1969

Vol. 163, No. 3871

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Gordon Research
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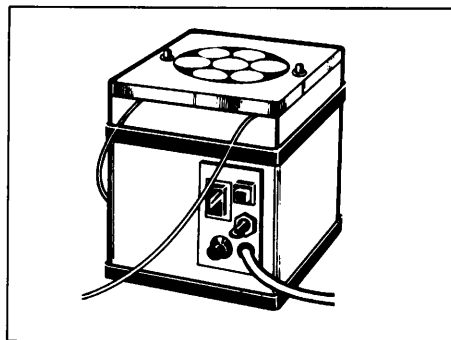
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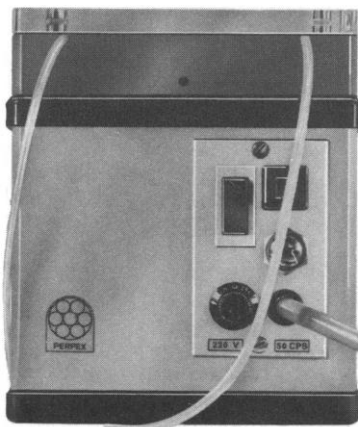
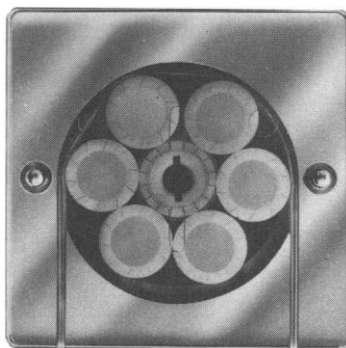
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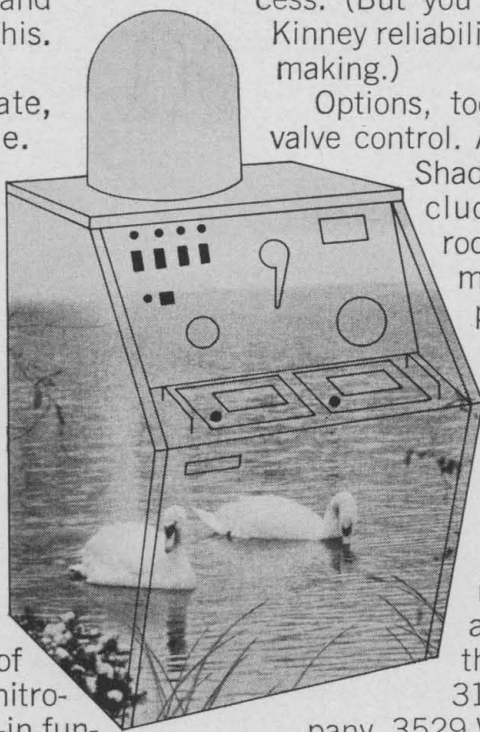
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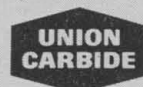


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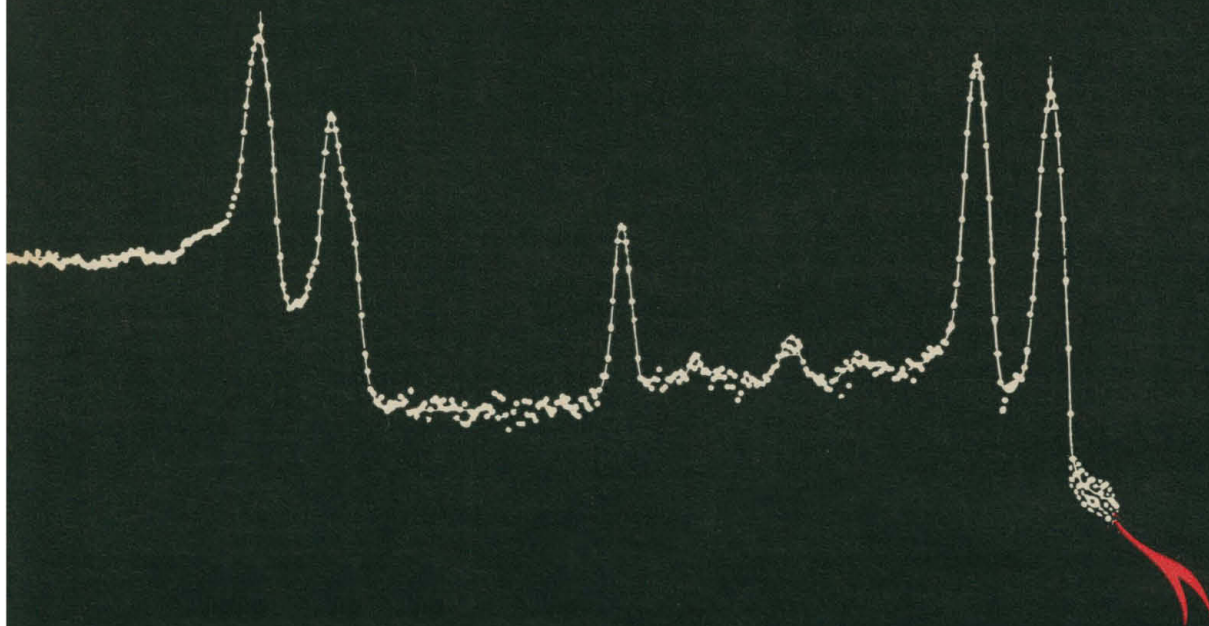
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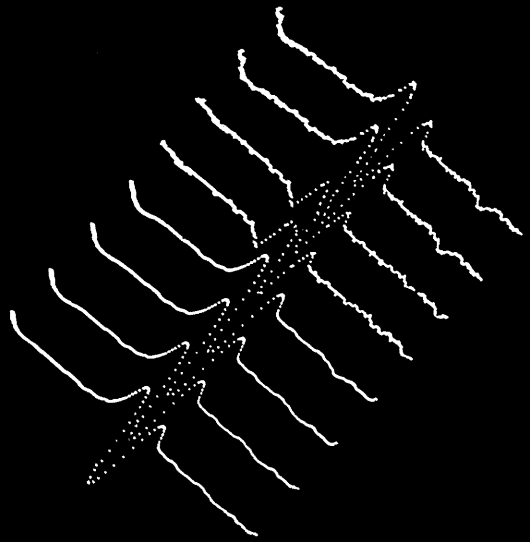
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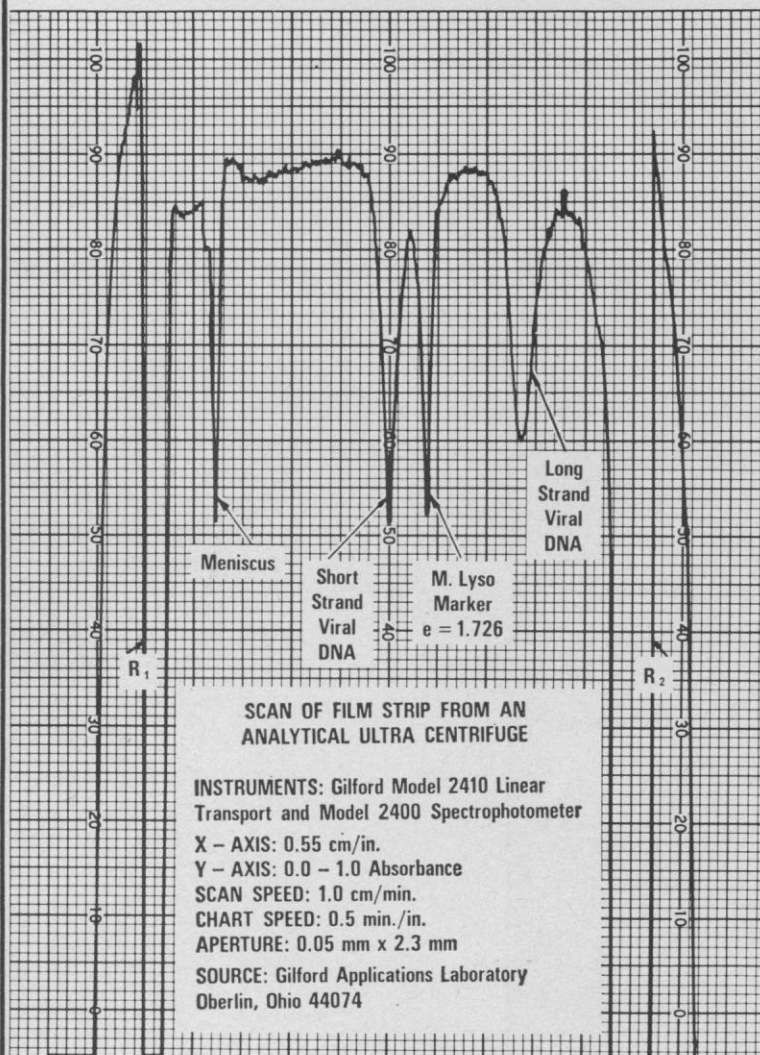
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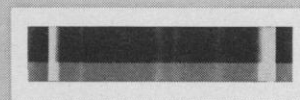
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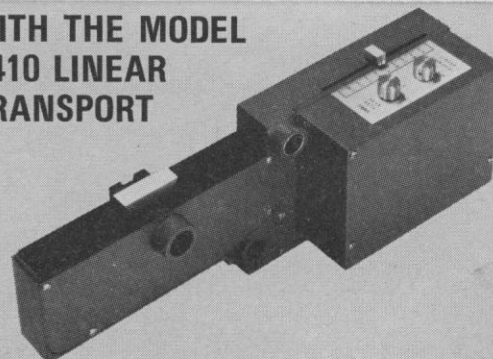
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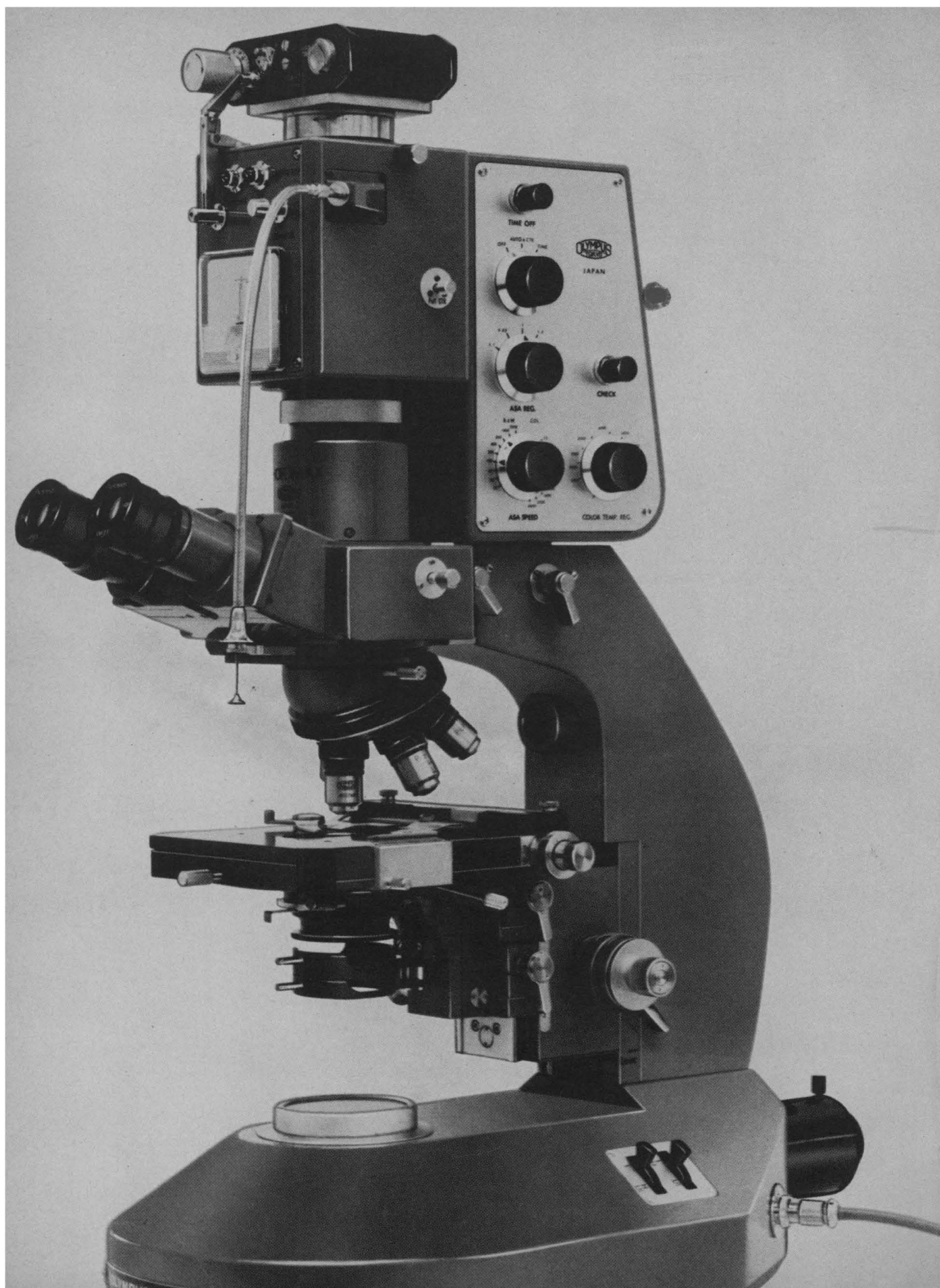
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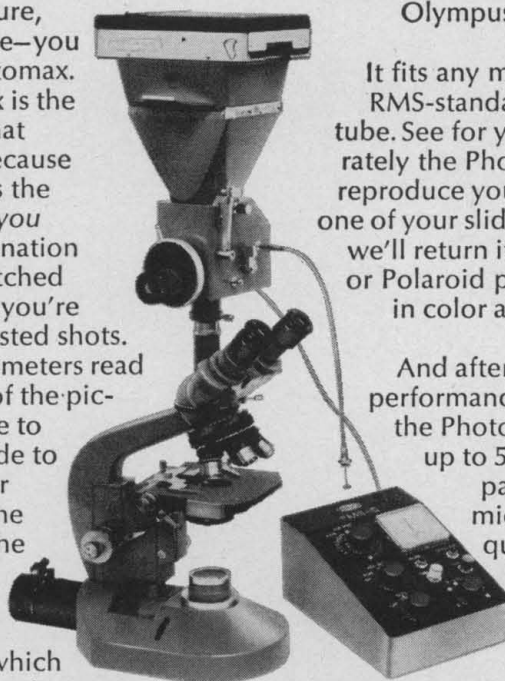
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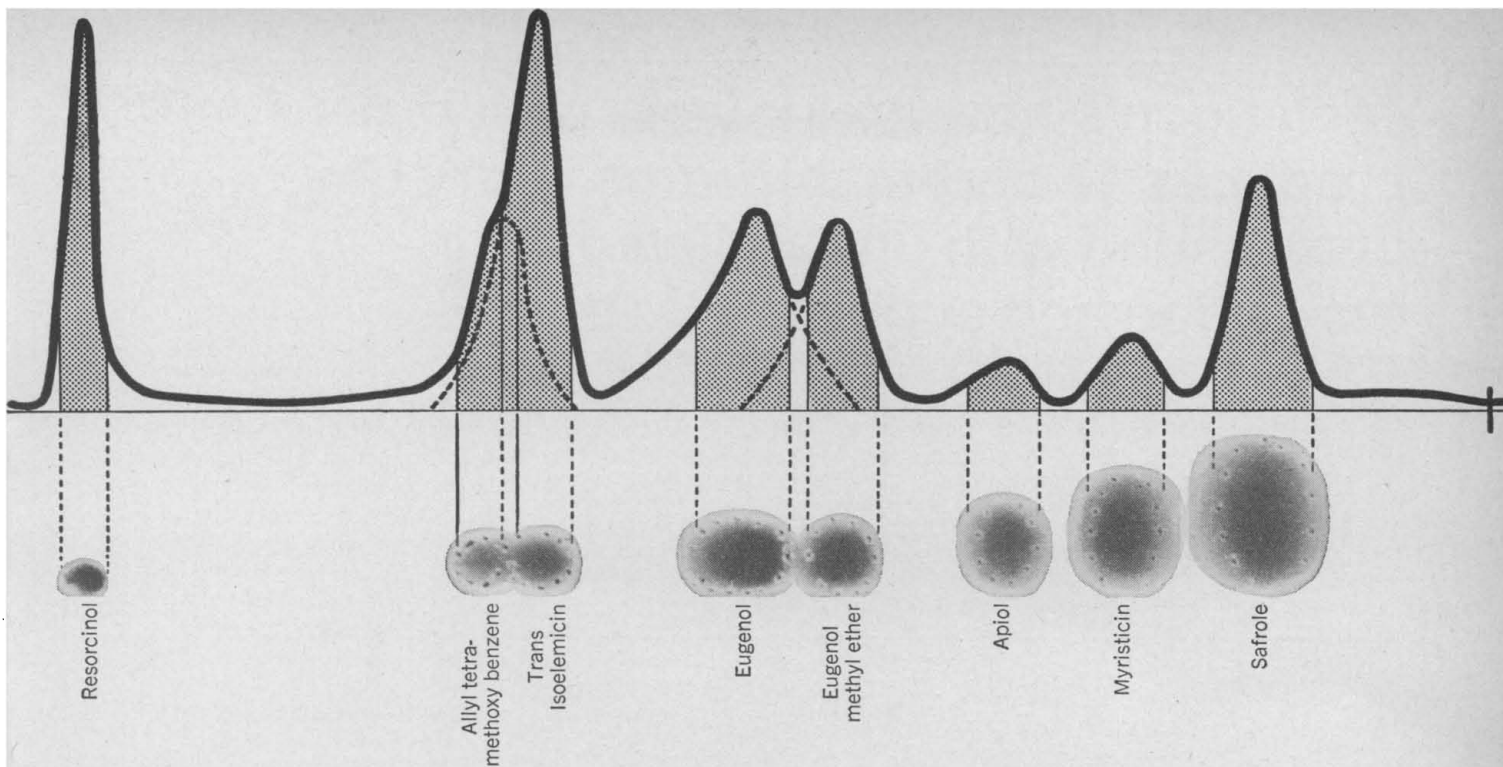


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There's a lot more information contained in a thin-layer chromatogram than you can learn by just looking at it. And there's an easy, accurate and reliable way of extracting that information—non-destructively.

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.

Service nationwide.

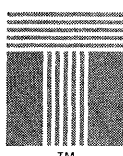
ZEISS
THE GREAT NAME IN OPTICS



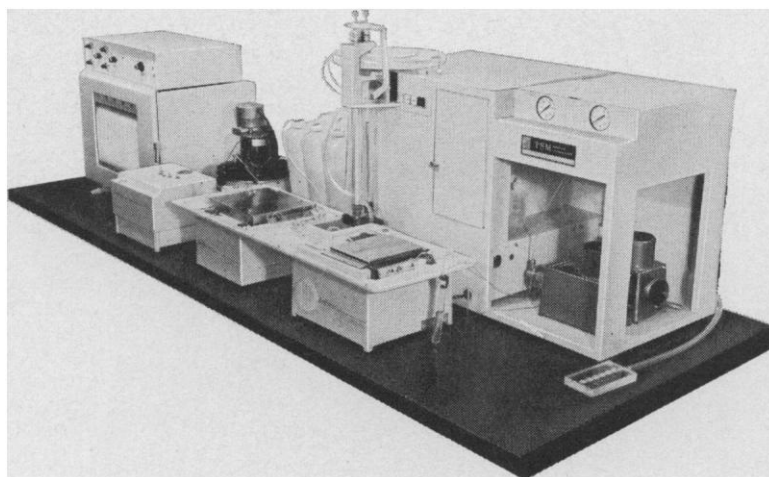
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ATLANTA, BOSTON, CHICAGO, COLUMBUS, DENVER, HOUSTON, LOS ANGELES, PHILADELPHIA, ST. LOUIS, SAN FRANCISCO, SEATTLE, WASHINGTON, D.C.

Technicon's new amino acid analyzer produces 12 chromatograms every day... unattended with unparalleled resolution and accuracy.



■ Automatic sequential sample introduction utilizing our 40 place sampler... once loaded it advances unattended, handling a 3 day workload or a single sample with equal facility. Completely automatic repetitive cycles of column elution and regeneration...only possible with Technicon's new, infinitely flexible, programmed multichannel valve. ■ Thanks to our unique FAIL-SAFE devices, there is no risk of losing valuable samples in the event of something as unlikely as power failure or mechanical misadventure in your absence. What's more these are not "blue sky" statements. The TSM Amino Acid Analyzer is now operating as stated, with unparalleled resolution, and unmatched sensitivity and accuracy in some of the world's leading research institutions. For details write Dept. X, Technicon Corporation, Ardsley, New York 10502.



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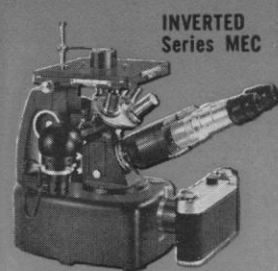
UNITRON... your complete source for Microscopes with the Metallurgists' Stamp of Approval



STUDENT
MODEL MMA
\$154



LABORATORY
MODEL MMU
\$312



INVERTED
Series MEC

Monocular Model \$416
Binocular Model \$719



SERIES TM
UNIVERSAL
MEASURING
\$1070 up



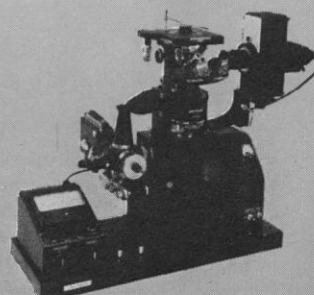
ROLLSCOPE
DMR
For large
surfaces

\$415

"SERIES N" METALLOGRAPHS

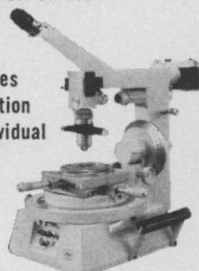
New budget-priced models with flatfield objectives, widefield eyepieces, coaxial stage controls, and many optional accessories. Models with combined xenon-tungsten or tungsten illumination available.

From
\$1398 up

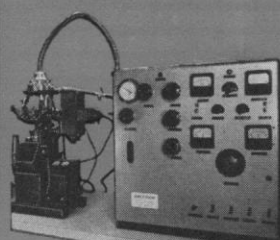


MICROGONIOMETER

Measures
orientation
of individual
grains



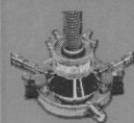
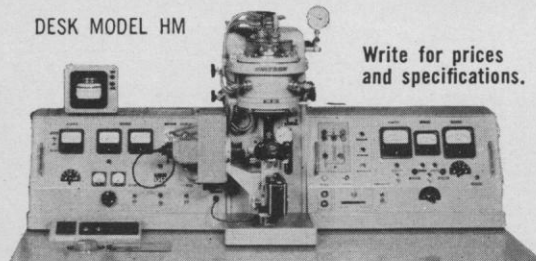
HTL HIGH TEMPERATURE LABORATORY INSTALLATION



UNITRON'S HIGH-TEMPERATURE RESEARCH METALLOGRAPH

DESK MODEL HM

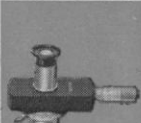
Write for prices
and specifications.



HHS Vacuum
Heating Stage for
1500°C... \$625



Austenite Grain
Size Eyepieces:
Turret Type \$76
Ke10X\$25



Widefield Filari
Micrometer \$105



Stereoscopic
MSL.....\$110



Stereoscopic
MSF.....\$145



Stereoscopic
MSHL.....\$267



PILLAR STAND FOR
STEREOSCOPIC MODELS.....\$75

10 DAY FREE TRIAL

A salesman's demonstration gives you only about 30 minutes to examine a microscope... hardly the best conditions for a critical appraisal. But UNITRON's Free 10 Day Trial allows you to evaluate the microscope in your own lab, and prove its value to you, in your own work, before you decide to purchase.

WRITE FOR OUR FREE CATALOG

The UNITRON catalog is your buying guide to a complete line of microscopes and accessories for every application. Write for your copy and see why UNITRON Microscopes have The Metallurgists' Stamp of Approval.

- ☐ Please send UNITRON's Microscope Catalog No. F-4
☐ I want a FREE, no-obligation, trial of Model...

NAME _____ DEPT. _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

MICROSCOPE SALES DIVISION
UNITRON
INSTRUMENT COMPANY

66 NEEDHAM STREET
NEWTON HIGHLANDS
MASS. 02161

Are you using photography for recording *quantitative data*? Should you?

The Joyce, LoebI Double-Beam Automatic Recording Microdensitometer Mark IIICS provides a quick, easy, reliable way to get a lot more out of film than just a picture. Whereas your eye tells you one spot is relatively "bright", the Microdensitometer tells you exactly how bright, and how much brighter one spot is than another.

It scans a negative or positive along straight or circular lines, accurately measuring and recording optical density throughout the scan...

prints out graphs of density vs. position on the specimen. Information about brightness, physical density, thickness, temperature, or *any* phenomena that you can record as a variation of photographic density can now be measured and recorded. The reliable double-beam, null balance design makes the Joyce, LoebI Microdensitometer unusually stable and repetitive. It is clearly established as the leading instrument of its kind, for such diverse applications as measuring mountains on the moon — radiography — cell research — high resolution mass spectrography —

X-ray diffraction and U.V. absorption studies — air reconnaissance and meteorology. It's available with many helpful accessories including computer interface equipment.

Better than ever through Tech/Ops national sales and service organization.

To find out exactly what these remarkable measuring tools can do for you, write to Joyce, LoebI & Co., Inc., an affiliate of Technical Operations, Incorporated, Department K-3, Bldg. 3, South Avenue, Burlington, Mass. 01803.



The Joyce, LoebI Double-Beam Microdensitometer

...for recording a wide range of increments of optical density in film

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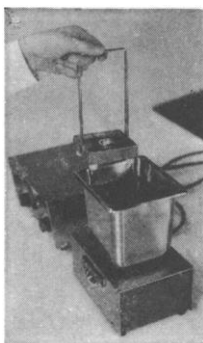


PLANNING A NEW LABORATORY OR SCIENCE BUILDING?

Let us help you by putting you in touch with the manufacturers whose equipment you will need. Write a letter on your organization letterhead to the address below. We will forward copies of it to all appropriate manufacturers.

SCIENCE MAGAZINE
Room 1740
11 West 42 Street
New York, N.Y. 10036

BLACKSTONE ULTRASONIC KIT



The BPO Probe is ideally suited for cell disruption of small biological samples, dispersal of steroids, degassing and de-aeration of oils and other viscous fluids, emulsification of liquids and acceleration of chemical reactions.

The CT.5 Cleaning Tank enables precision ultrasonic scrubbing for contaminated small parts and instruments in aqueous solutions.

Individual units may be purchased separately or together as a complete system.

FREE ASSISTANCE: As a pioneer in Ultrasonics, Blackstone is happy to supply recommendations and engineering assistance to help solve your specific cleaning problem. Write us about your application.



UCON® SOLVENTS

BLACKSTONE ULTRASONICS, INC.
720 Center St., Sheffield, Pa. 16347
Phone: 814-968-3221

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Readers' Service Card

7 March 1969 (Expires 7 June 1969)

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Readers' Service Card

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Are you a member of the AAAS? Yes _____ No _____
Please print and include title

new Sepharose®

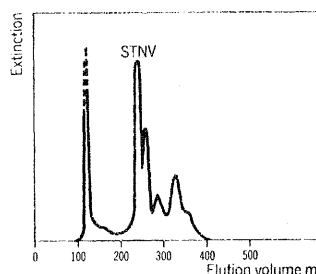
Extends gel filtration separation and fractionation of high molecular weight substances: viruses, nucleic acids, proteins, polysaccharides

The new "bead form" of agarose—Sepharose—now extends the gel filtration method to the separation and fractionation of molecules with molecular weights in the millions. Sepharose is prepared in the "bead form" from agarose, the neutral portion of agar. By altering the concentration of agarose during preparation, Sepharose gels with different fractionation ranges are produced. Sepharose gels complement the present series of Sephadex® gels, and together they extend the limits of the gel filtration method for the fractionation of molecules with molecular weights ranging from essentially zero to approximately 25 million.

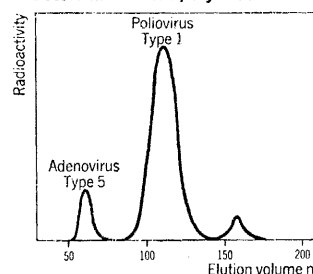
SEPHAROSE

Sepharose Type	Particle Size Microns	Percent Agarose	Fractionation Range
2B	60-250	2	2x10 ⁶ to 25x10 ⁶ *
4B	40-190	4	3x10 ⁵ to 3x10 ⁶ *

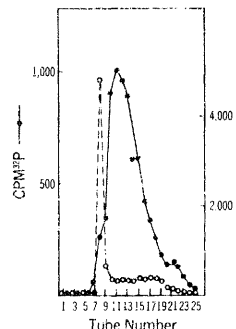
*Determined with polysaccharides.



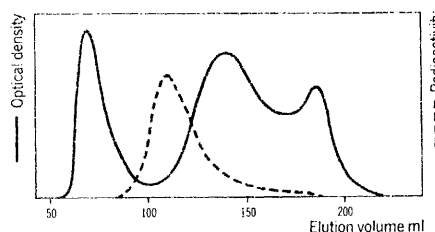
Chromatography of a crude preparation of satellite tobacco necrosis virus on Sepharose 4B.



Separation of ³²P-labeled adenovirus and poliovirus on Sepharose 2B.



Separation of the replicative RNA intermediate (first peak) synthesized in RNA phage-infected cells from single stranded cellular RNA (second peak) on Sepharose 4B. Erikson and Gordon, Biochem. Biophys. Res. Commun. 23 (1966) 422-428.



Separation of a mixture of KB-cell nucleic acids and ³²P-labeled poliovirus RNA on Sepharose 2B. The first peak contains KB-cell DNA, followed by poliovirus RNA, KB-cell r-RNA and KB-cell s-RNA.

For additional technical information on SEPHAROSE, write to



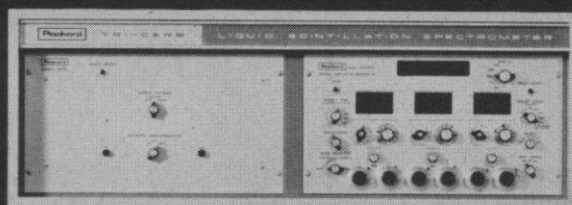
PHARMACIA FINE CHEMICALS INC.
800 Centennial Avenue, Piscataway, N.J. 08854
Pharmacia (Canada) Ltd., 110 Place Crémazie,
Suite 412, Montreal 11, P.Q.

(Inquiries outside U.S.A. and Canada should be directed to PHARMACIA FINE CHEMICALS, Uppsala, Sweden.)

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Don't let its features fool you—

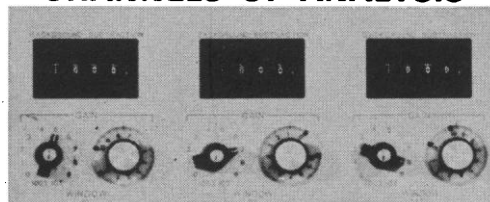
this liquid Scintillation Spectrometer is low-priced



Packard

The Model 3320 Tri-Carb® Spectrometer is loaded with the kind of features you'd expect in the most expensive instruments. Yet it's priced among the lowest. When you examine its capabilities, you'll find features like three simultaneous channels of analysis, controlled and ambient temperature operation (you select the method you want), automatic external standardization that works with *all* degrees of quenching and *all* types of quenching agents, outstanding counting performance and 200-sample capacity. It has built-in capabilities for gamma counting and continuous flow analysis, which together with the optional data processing capability let you upgrade it to meet virtually all your future needs. For more details call your Packard Sales Engineer or write for Bulletin 1057U to Packard Instrument Company, Inc., 2200 Warrenville Road, Downers Grove, Illinois 60515 or Packard Instrument International S.A., Talstrasse 39, 8001 Zurich, Switzerland.

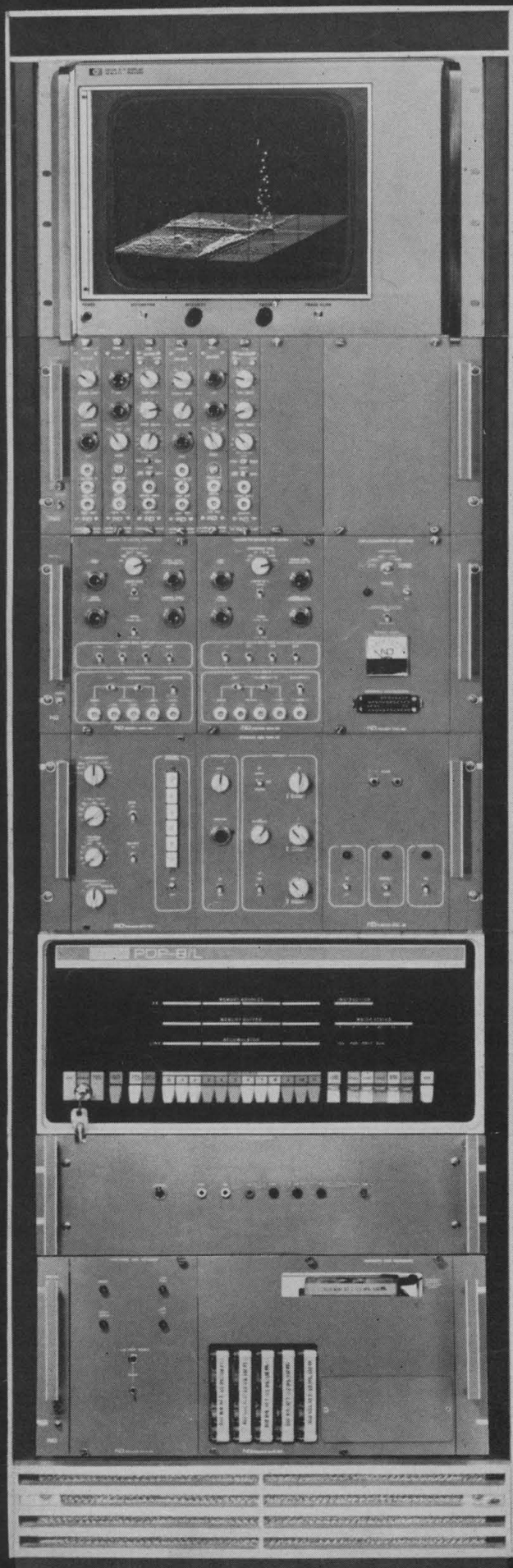
THREE INDEPENDENT CHANNELS OF ANALYSIS



Model 3320 incorporates Packard's patented arrangement of three completely separate channels of pulse-height analysis, each with precisely adjustable linear amplification and continuously variable discrimination levels. You count each sample only once, and collect data in all three channels simultaneously.

Packard offers stimulating career opportunities for scientific and technical personnel. We are an equal opportunity employer.

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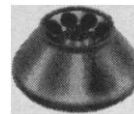


The 50/50 System

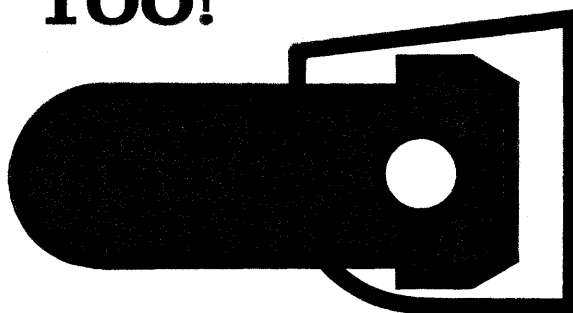
The all new integrated 50/50 system uniquely blends software and hardware. Memory includes 12,288 words. Data processing on line or off. Hard wired flickerless display provides heretofore unobtainable display flexibility. A comprehensive software package offers unsurpassed data manipulation and processing capabilities. Call it Fifty-fifty. We do.

ND
NUCLEAR DATA INC

SORVALL knows all the centrifuge angles...

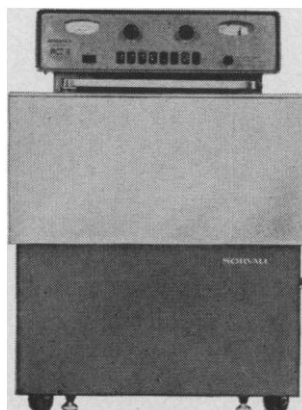


**...AND
THE
HORIZONTALS,
TOO!**

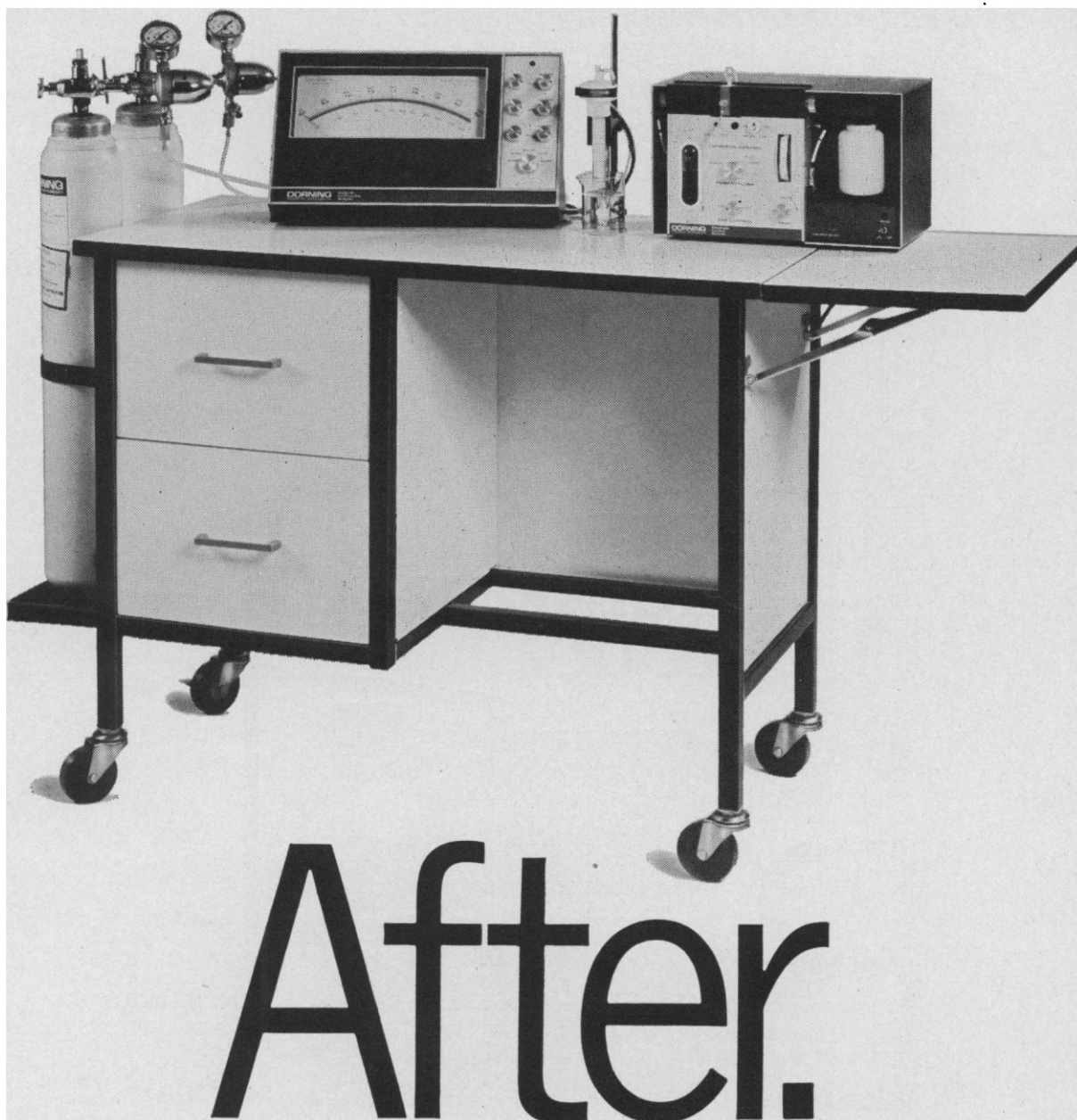


Whether you centrifuge at superspeeds with an Angle Rotor (up to 49,500 x G — 48,200 x G with standard 8 x 50 ml Angle Rotor), or at lower speeds with a Horizontal Rotor, we can meet your requirements. Take our HB-4 Rotor, for instance. Of Titanium alloy and aluminum construction, the HB-4 offers four 50 ml buckets, and accepts most of the tubes and adapters normally used with our standard 8 x 50 ml Angle Rotor. And you can use a lot of other SORVALL Rotors in both refrigerated and non-refrigerated SORVALL Centrifuges. It's a fact — we offer more versatility and reliability where it counts — in performance — than any other manufacturer. You know this if you have a SORVALL Centrifuge. If you don't, you owe it to your lab work to get one. The instrument illustrated is our well-known RC2-B Automatic Superspeed Refrigerated model. Literature? Just write: Ivan Sorvall, Inc., Norwalk, Connecticut, 06852.

SORVALL®



For additional information ask
for Bulletin SC-3/ARC-2



The new CORNING® Model 16 pH, Pco₂, Po₂ System does the same things as before. Only better.

Like that small German car, you have to operate it to appreciate all the improvements, to find all the ways we've made it better.

Better calibration time. A new, single-unit bubble chamber gives you faster equilibration time of your calibrating gases.

Better aspiration. Now there's a switch that automatically turns on the pump only when it's needed. There's no overheating or loss of vacuum when cleaning the sample chamber.

Better sampling. For standard samples, a new spill tray keeps the module's face clean. For the small ones, a new micro-capillary adapter simply plugs into the sample chamber entrance for greater speed.

Better membrane check. A new locking disc prevents accidental polarization of electrodes.

Better protection. A new relief valve prevents blowout if sample is introduced in start position.

Better electrodes. There's now a non-stick Teflon* strip in the tubing of the Model R blood pH electrode to make

aspiration smooth and sure. The Po₂ membrane is now polypropylene, so no spacer is needed; speeds up setup and calibration time. The Pco₂ electrode is a new design that adds stability, cuts drift.

Better see it for yourself. There are a lot more advances in the new Model 16. Send the coupon for full details, and see the real thing by asking for a free demonstration. The only thing we can't show you is a "before" unit. They've all been replaced with "afters." On us. That's part of the Corning promise.

*Teflon is a Du Pont trademark



Before these improvements and advances, the CORNING® Model 16 System was already the best way to measure blood pH. And P_{CO_2} . And P_{O_2} . Simply, quickly.

There's no water bath mess or delay. The Model 16 controls temperature electronically.

As little as a 150 lambda sample is enough to measure all three parameters.

Sample is at temperature inside 15 seconds. And held there, automatically. Within $0.01^{\circ}C$. of your setting between $36^{\circ}C$. and $38^{\circ}C$.

An automatic aspiration service draws samples into the pH electrode and the P_{CO_2} and P_{O_2} chamber. It also flushes them clean, cutting down the time between tests.

Our special control valve lets you switch instantly from one calibrating gas to another.

The solid-state meter has a full 10" scale. Reads easily to 0.005 pH (pH 6.6 through 8.2) and to 0.5 mmg on the P_{CO_2} and P_{O_2} scales.

Before, the CORNING Model 16 was the best blood pH system available. Then, we improved it. Send the coupon for all the data.

**Corning Glass Works
Laboratory Products Dept. SC-3
Medfield, Mass. 02052**

- ☐ Please send information on the new Corning Model 16 Blood pH System.
- ☐ Please call to arrange a demonstration.

Name

Title

Firm

Address

City, State, Zip

Telephone

CORNING
SCIENTIFIC INSTRUMENTS

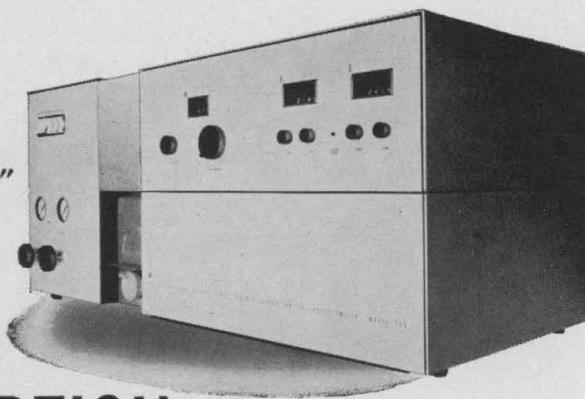
THIS IS A LIST OF OPTIONS YOU WON'T NEED (THEY'RE BUILT-IN)

- *Dual channel — double beam
- Digital concentration readout (2)
- True mathematical integrator
- Recorder and computer outputs
- *Push-button automatic zero control
- *Servo-automatic recalibration
- *Reads 2 elements simultaneously, or
Read one element w/internal standard
- Push-button fail-safe flame ignition
- Gas control system (3 gases)
- *Push-button fail-safe N_2O conversion
- *Gas and flame safety monitor
- *Simplified hollow cathode zone balance (2)
Six tube hollow cathode turret
- *Preset independent hollow cathode current
- Curved slits on monochromator
- Constant head drain system
- Flame emission capability
- *All solid-state modular electronics
- Stabilized voltage regulation
- *External electronic test circuit
- Single, integrated package — 18" x 40" x 20"

*Exclusive features

THIS IS A LIST OF OPTIONS YOU CAN ORDER SEPARATELY

- Nitrous oxide burner
- Total consumption burner
- UV-Vis spectrophotometer attachment
- Recorder (if needed)



ATOMIC ABSORPTION WITH THE OPTIONAL EXTRAS LEFT IN!

Add up the "optional extras" that are really necessary for safe, easy, dependable and precise analysis by atomic absorption. Then write for further information about the Model 153.

Instrument Leasing Program details upon request.

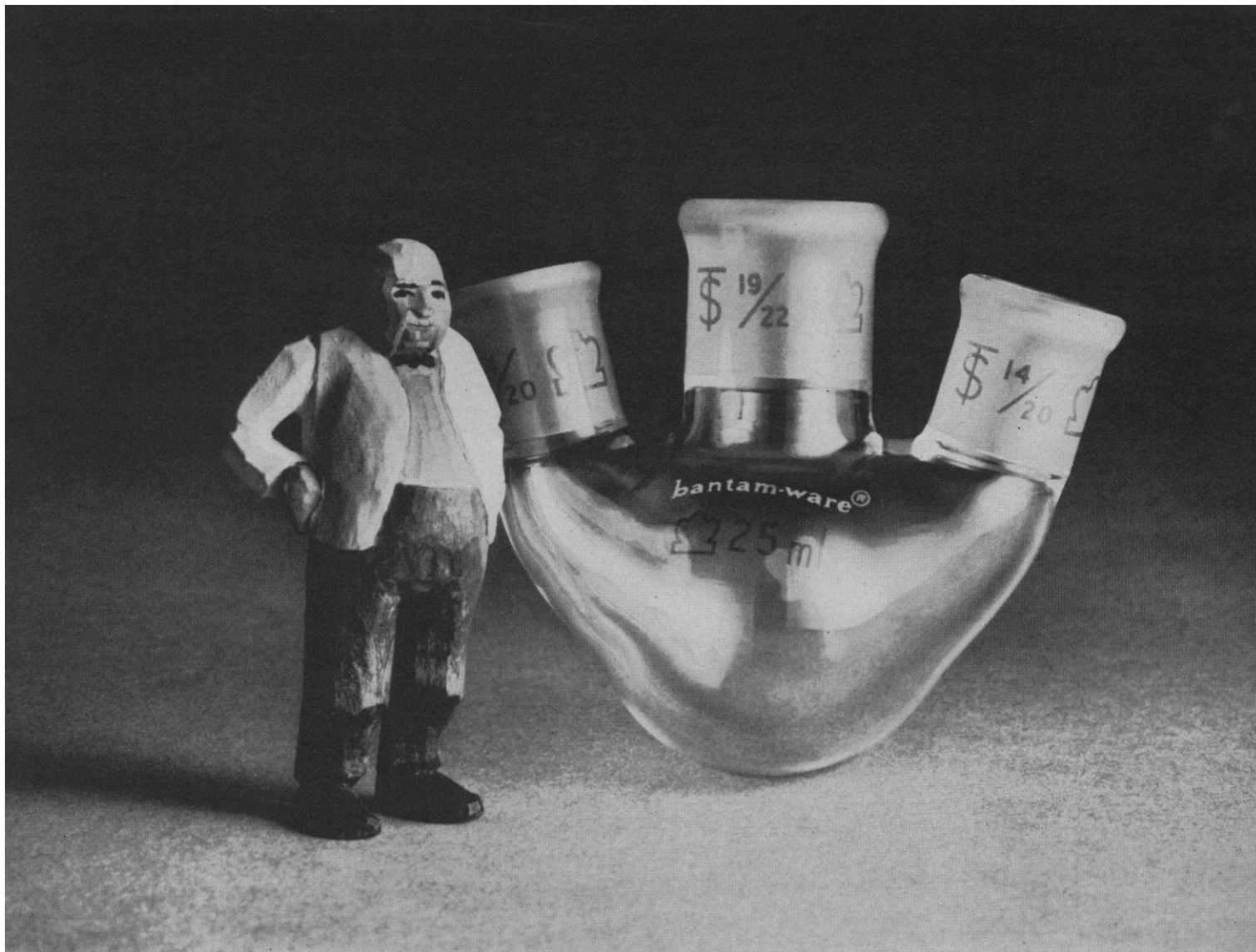


INSTRUMENTATION LABORATORY INC. 113 HARTWELL AVE. LEXINGTON, MASS. 02173

OFFICES IN: ATLANTA • BALTIMORE • BOSTON • CHICAGO • CLEVELAND • DALLAS • DENVER • DETROIT • HOUSTON • LOS ANGELES
NEWARK • NEW YORK • PHILADELPHIA • SAN FRANCISCO • ST. LOUIS • WASHINGTON • TORONTO • MONTREAL • VANCOUVER • ZURICH

Circle No. 18 on Readers' Service Card

Circle No. 44 on Readers' Service Card →



Our man in Lilliput

Once upon a time in Lilliput* there lived a man skilled in organic chemistry. But he had problems with glassware—not all small ones (unfortunately).

Such problems as the waste of large amounts of solutions; ground joints that leaked minutely under vacuum; product hold-up; breakage and awkward design. (The height of chromatographic columns gave him nosebleeds, and he had to bicycle from boiling flask to recovery flask on a large scale distillation set-up).

Then one day, he was looking through a new Kontes Catalog (TG-20) and he spied a listing of an entire group of glassware called . . . Bantam-ware®. It was small enough for him (semi-micro), and

very strong (proportionately radiused bends, support rods, and heavy borosilicate throughout), beautifully designed (functionally), and very complete (the completest).

Swiftly . . . he ordered a Bantam-ware fractional distillation unit (a unique item with nothing in vertical alignment) and chromatographic column apparatus (with changeable porosity discs).

In use, it **was** small, strong, well-designed, and very, very good.

Bantam-ware pleased the little chemist so much he told all his little friends. And the word must have spread, because there's more Bantam-ware semi-micro glassware in labs throughout this coun-

try (and Lilliput) than any other. (We even hear they smuggled a few into Brobdingnag for ultra-micro work).

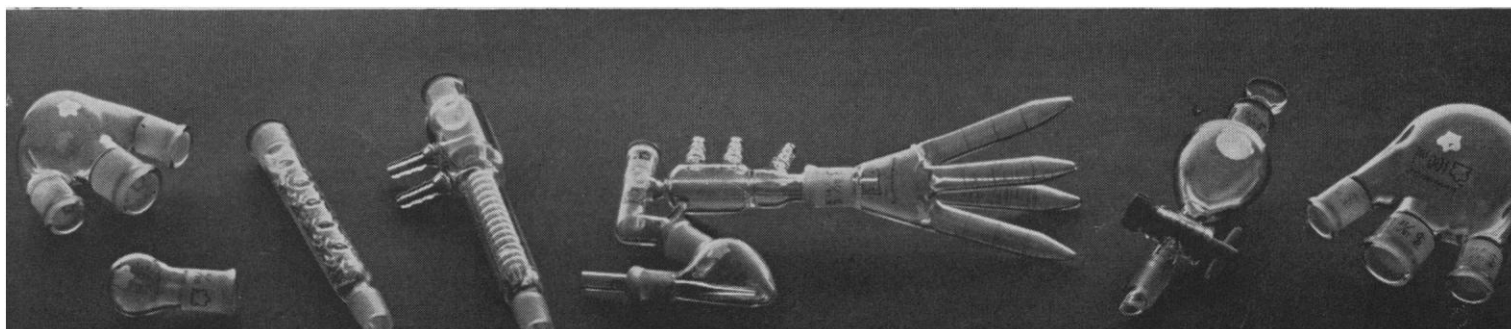
All stories should have a happy ending. You can help by writing in for our complete 300-page catalog, TG-20 bw.

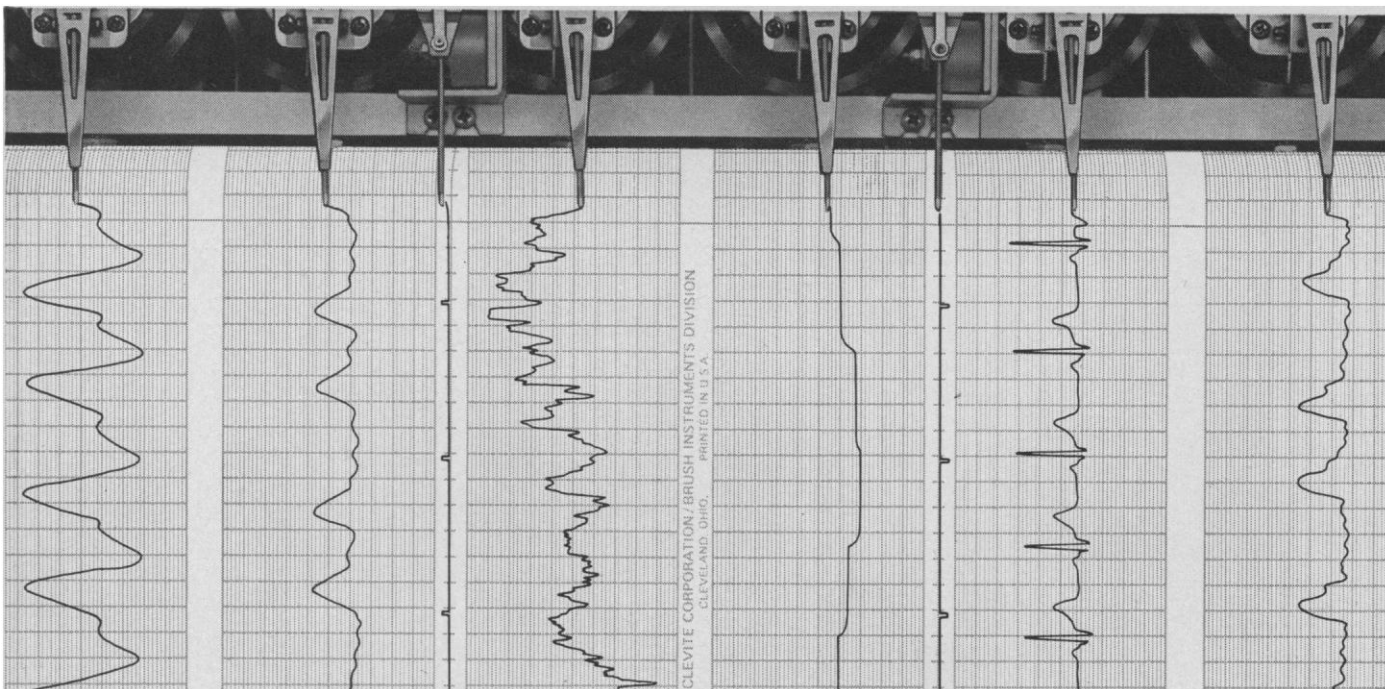
Or contact our man in **your area**.

©Trademark of Kontes
*Courtesy of Messrs. Gulliver and Swift

KONTES 
Vineland, New Jersey

Regional Distributors: **KONTES OF ILLINOIS**, Franklin Park, Illinois • **KONTES OF CALIFORNIA**, Berkeley, California





Close-up of a Brush medical recorder shows trace clarity, sharpness and high resolution that contribute to superb accuracy of Brush instruments.

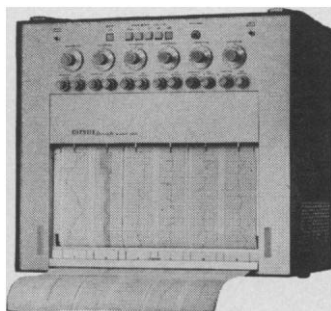
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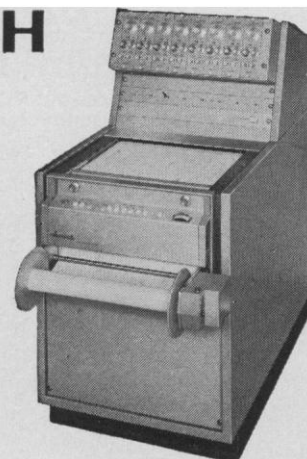


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There are Brush medical recorders with 1, 2, 3, 4, 5, 6, 7, and 8 channels for physiological data acquisition. Illustrated are the Mark 200 lowboy and the Mark 260.

The Mark 200 lowboy (right) is an eight-channel system that combines solid-state electronics with modular construction to economically meet your specific requirements. Choice of channel widths and bio-medical front ends. Range of chart speeds 0.05 to 200 mm/sec. Patented pressure-fluid writing system.

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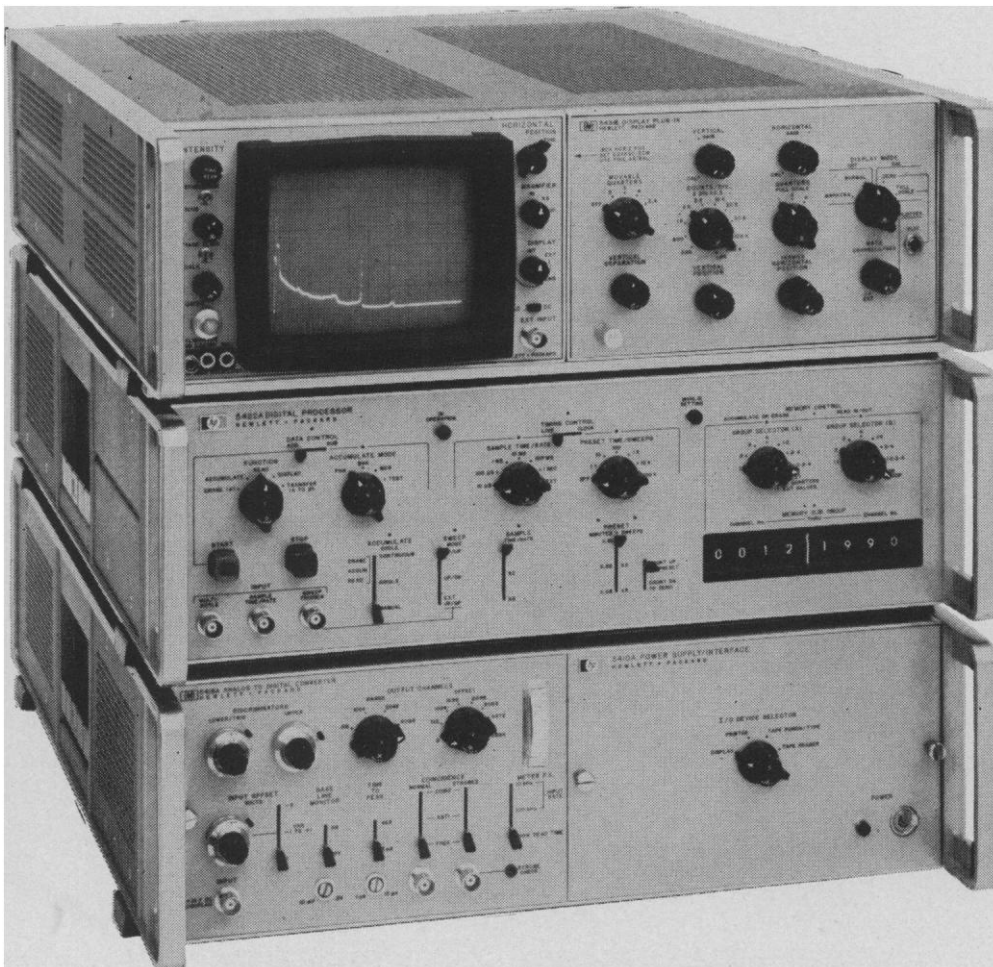
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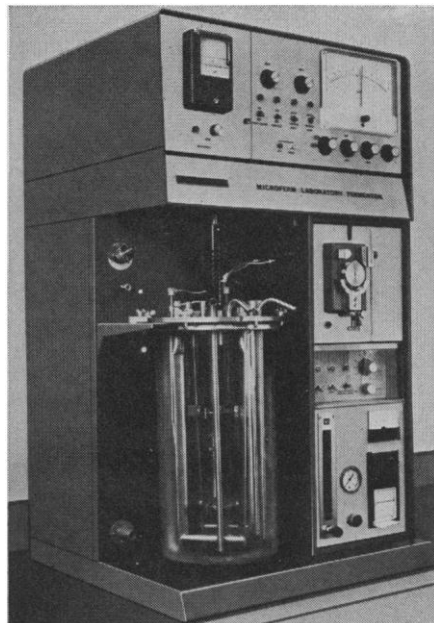
A low cost device for sampling and inoculation in mold, fungal and bacte-

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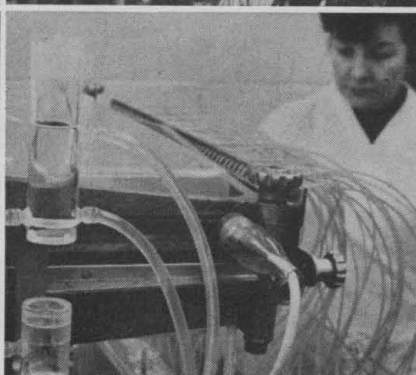
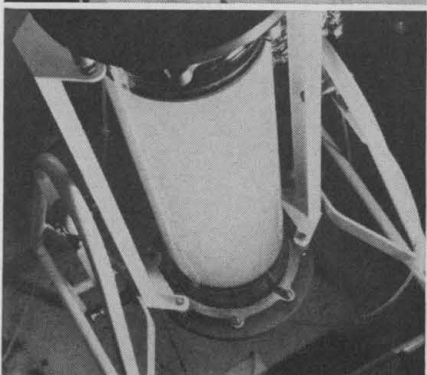
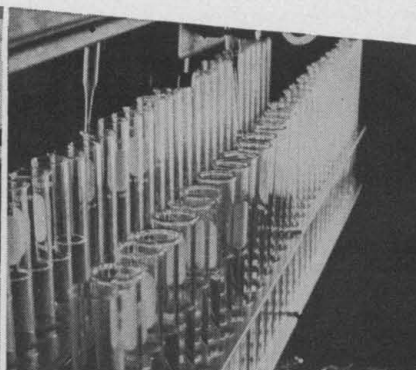
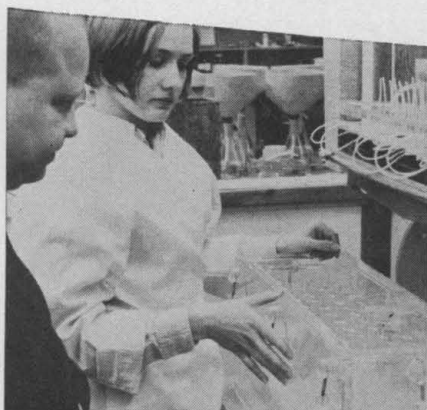
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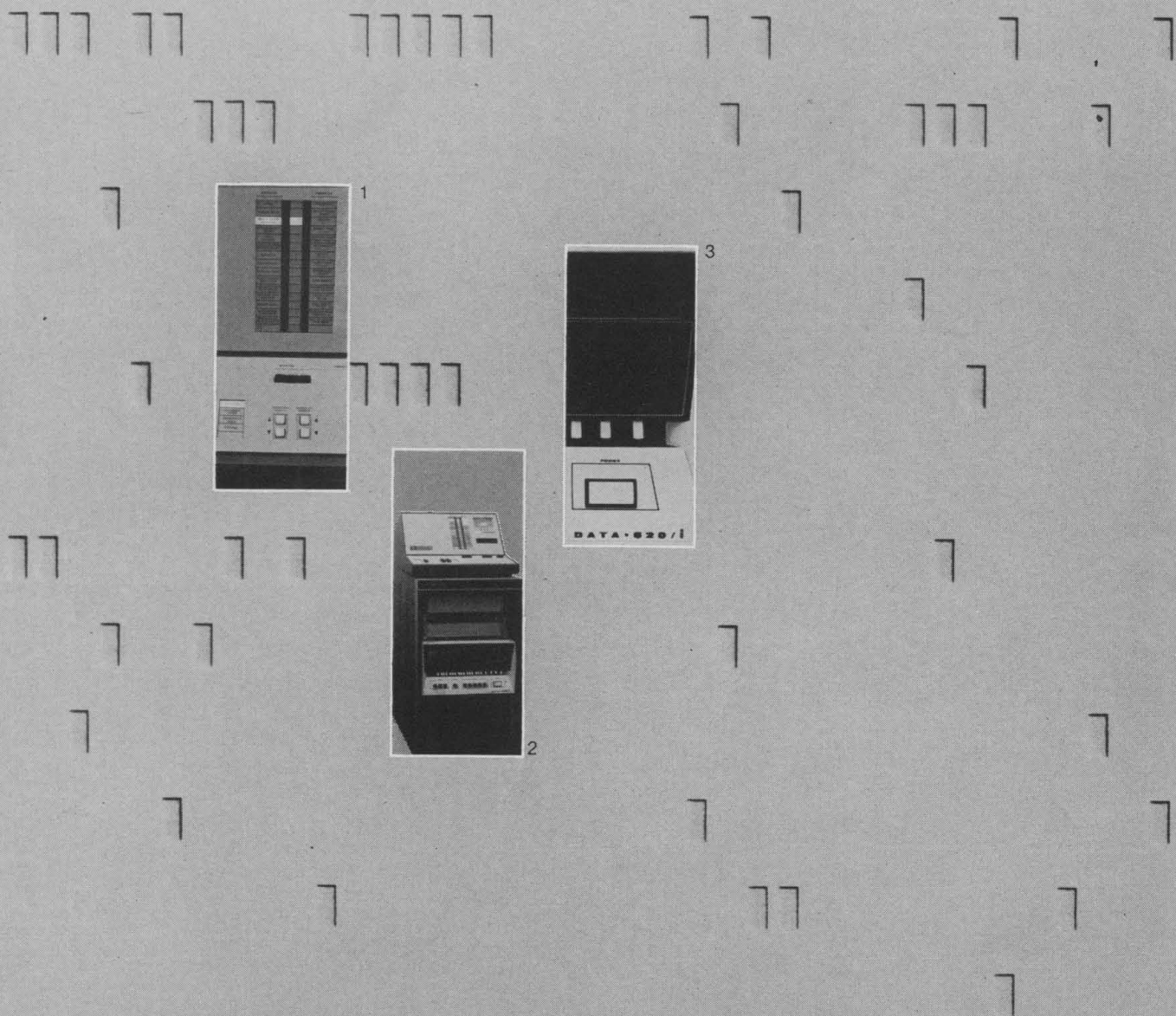
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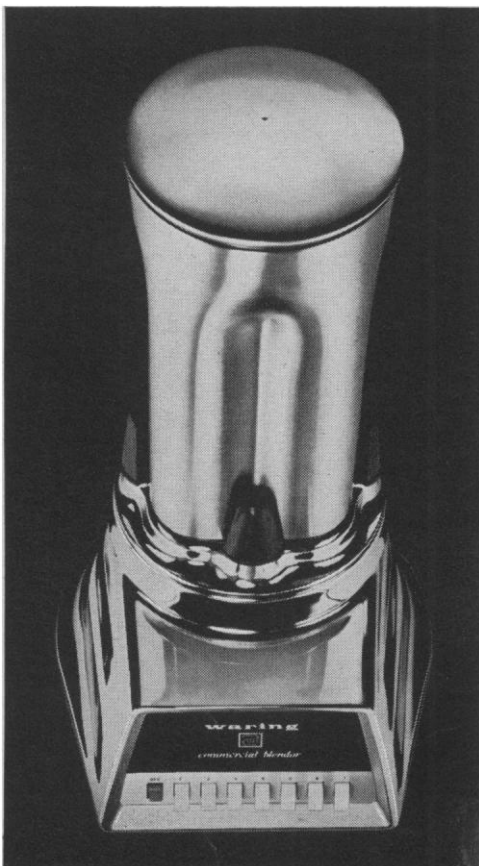
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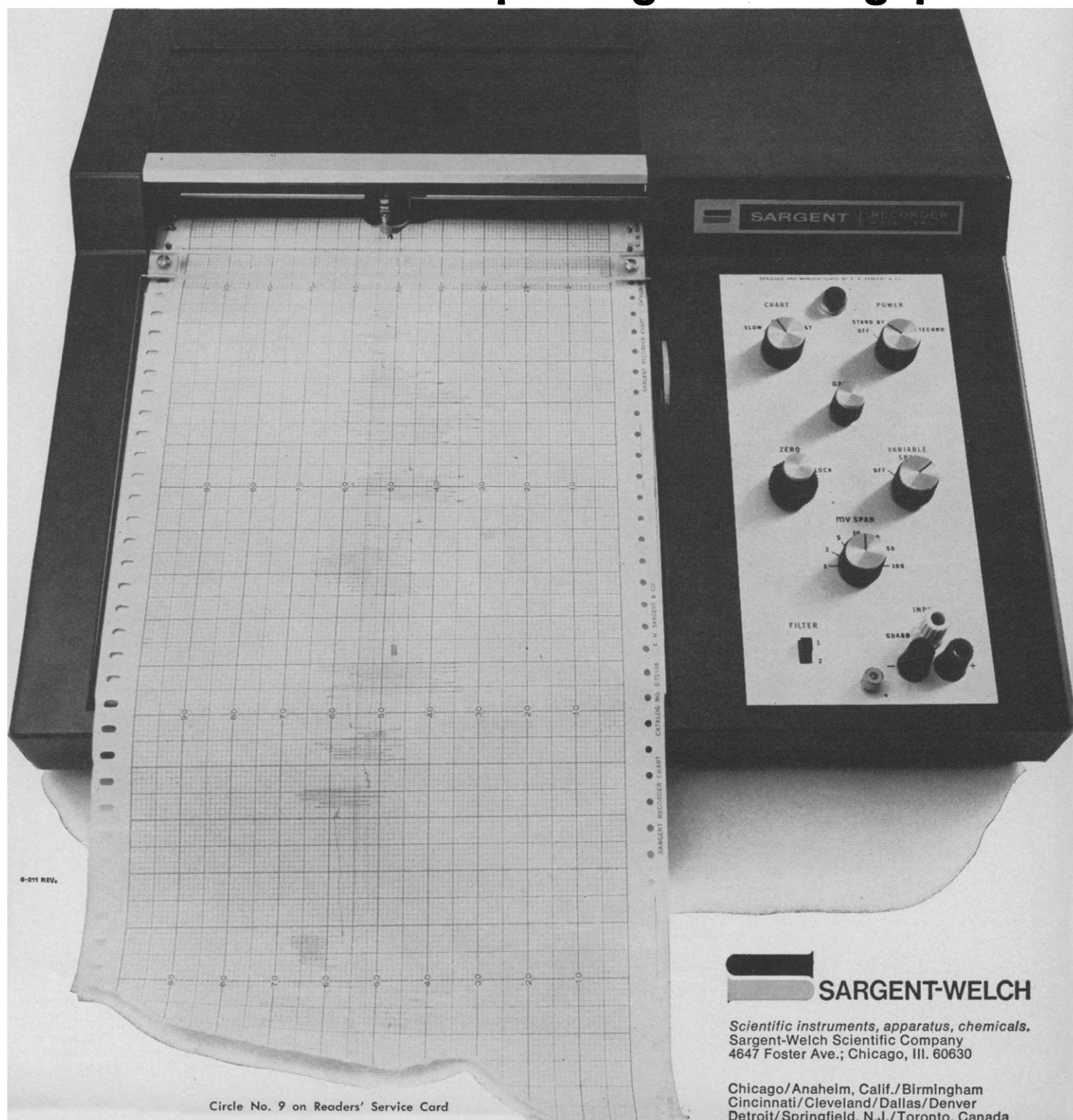
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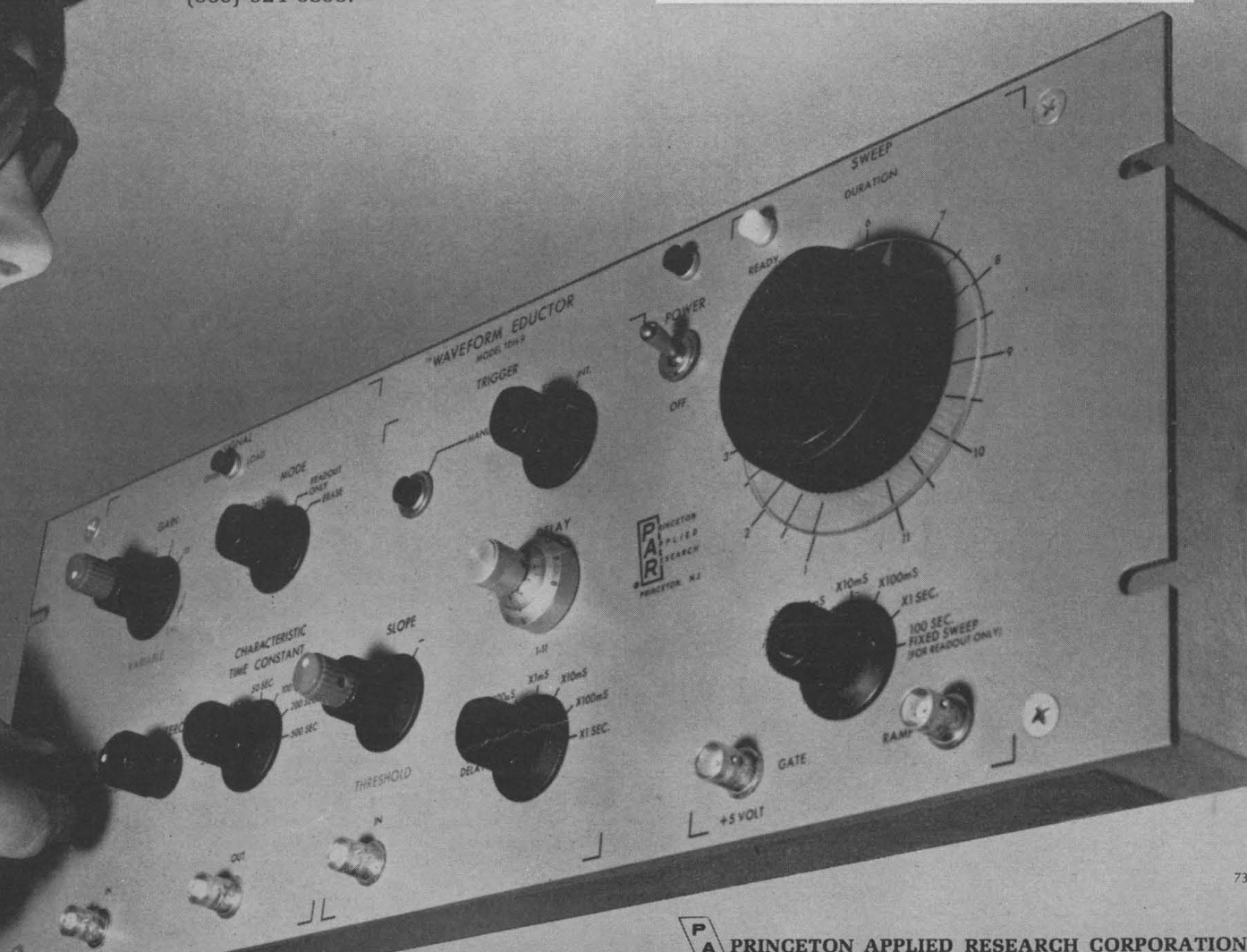
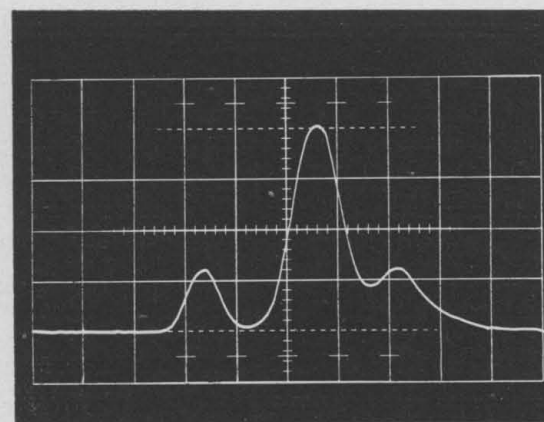
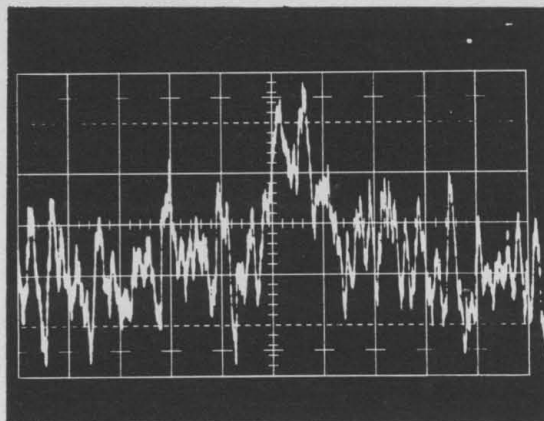
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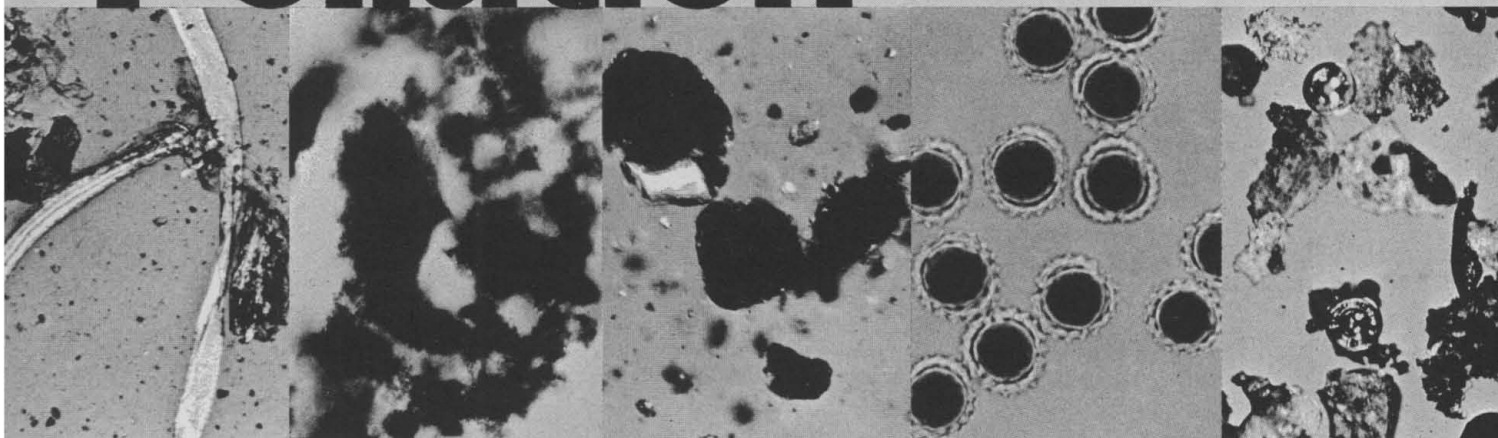
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The University and Student Dissent

There are a number of ways of viewing the present crisis on the campus. For a relatively senior teacher, one of the more painful ways is to regard it as evidence of an almost complete failure of communication between teacher and student. For the more one listens to the student activists, the more it becomes clear that they have developed a picture of the modern university completely different from the one held by the senior faculty. The students tend to identify the university with everything they dislike about modern society—its elaborate and "suppressive" regulations, its indifference to moral and esthetic values, its preoccupation with bits and pieces of life to the exclusion of overall purpose or meaning. Worst of all is the apparent role of the university as a supporter of the military industrial complex through its engagement with weapons research and its "complicity" with such military enterprises as the ROTC and the draft.

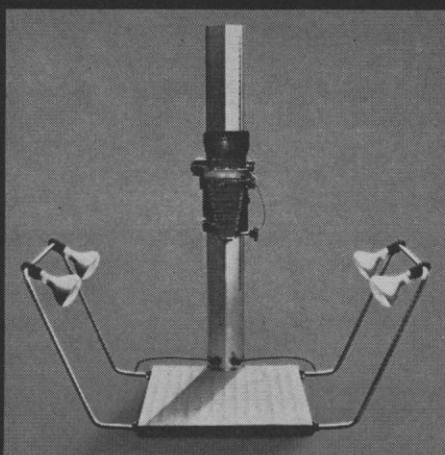
The senior faculty, on the other hand, loves the university as the inheritor and transmitter of the great tradition of individual freedom and of the liberating belief that disinterested investigation of problems will ultimately lead to their solution. Far from seeing the university as collaborating with the nefarious purposes of society at large, they see it as society's most significant critic.

In spite of all the talk, however, there is really not much of a generation gap about such fundamentals as freedom, love, war, and race prejudice. The gap involves the methods to be used in achieving the desirable and avoiding the undesired ends. At one extreme are those who believe that the large problems must be attacked all at once and as a whole. To many of them, moral fervor about the ends and purposes replaces a pedestrian concern with objective methodology. At the other extreme are those who disclaim any concern for the ends to which their discoveries are put and who view any prior commitment as a dangerous impediment to detached investigation.

About both of these attitudes there hovers a kind of self-righteousness that does not lead to the best classroom teaching. If the radicals are too self-satisfied about their moral commitments, conventional scholars may be dangerously smug about the magnificence of their detachment from human concerns. As scientists we might in fact be more effective teachers if we began by admitting that we too are against war, poverty, and hate and that we really went into science, at least in part, because it offered the best available means of overcoming these evils. Our seeming failure to grapple with the big problems all at once is not a sign of indifference or lack of commitment. Rather it stems from the perhaps deplorable but still undeniable fact that the scientific method has achieved almost all its successes by breaking big unmanageable problems down into little, controllable ones.

These views are sure to be unwelcome to those who feel that reforms which fall short of immediate total revolution are nothing more than "little finky changes" unworthy of men of virtue and vision. It may be, however, that the survival of universities that include the right of student dissent depends on the transmission of our belief that the only revolutions worth having come as the slowly accumulating sum of those same "little finky changes."—ROBERT S. MORISON, *Director, Division of Biological Sciences, Cornell University, Ithaca, New York*

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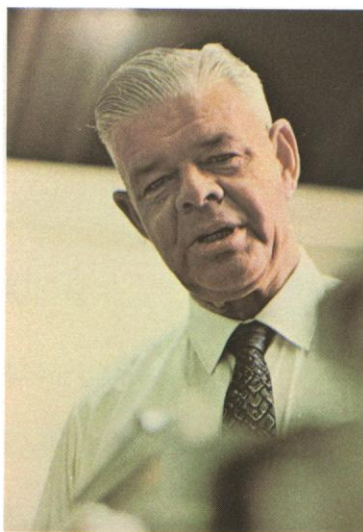
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There are other differences, of course. For instance, the 14 is more versatile than the narrower-ranged (1850-8000Å) 15. But because it was designed to perform specific tasks, the 15 is easier to operate. Then there's price. The Cary 14 sells for about \$18,000, while the Cary 15 costs a little over \$12,000. The additional \$6,000 becomes a worthwhile investment when you consider the variety and quality of the studies routinely available with this instrument whose range extends from 1860Å to 2.65 microns. Studies like hydrogen bonding investigations in the near infrared. Or quantitative protein analyses in the ultraviolet.

CONSERVATIVE DESIGN: WHAT & WHY

One similarity between the two instruments is the fact that both are conservatively designed. By conservative design we mean (1) that at no point in the instrument system are the electrical or mechanical components operated near their tolerance limits, and (2) that performance specifications are greater than required under normal sample conditions. This design philosophy produces acceptable performance even under the most rigorous sampling conditions. Just as important, it insures longer instrument life and complete confidence in

outperform the Cary 14 is the Cary 15. And, vice-versa.

the quality of the recorded information.

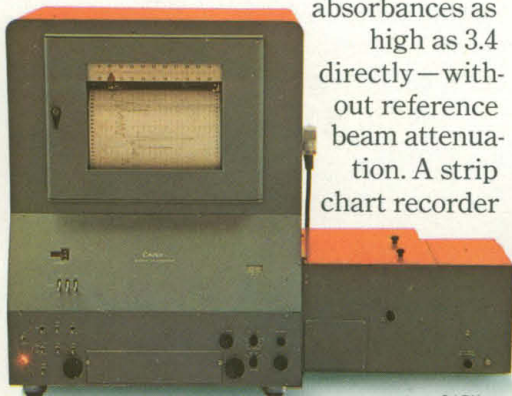
PHOTOMETRIC ACCURACY

While the electronics of the Cary 14 and 15 differ, the photometric accuracy of each is competitively unsurpassed.

The Cary 14 uses a prism-grating double monochromator, plus a dual beam sampling system and a single detector. Reference and sample beams are separated by time then compared and the ratio recorded on a chart which is effectively 20 inches wide. Measurements are accurate within 0.002 abs between zero and 1 abs; 0.005 near 2 abs. At high absorbance levels of 4, or even 5, valid measurements can be obtained using reference beam attenuation.

The Cary 15 employs a two-prism double monochromator and two detectors. Sample and reference beams are separated in space and measured simultaneously by the matched detectors.

From zero to 1 abs the accuracy is between 0.002 and 0.005 abs; at 2 it's 0.008. Because of the dual detector photometric system, the 15 measures at absorbances as high as 3.4 directly—without reference beam attenuation. A strip chart recorder



mechanically coupled to the monochromator records the information.

STRAY LIGHT

The double monochromator and optical design of the 14 and 15 hold stray light to a negligible amount—less than 0.0001% (14) and 0.001% (15) over most

of the range; 0.1% at range limits for both instruments.

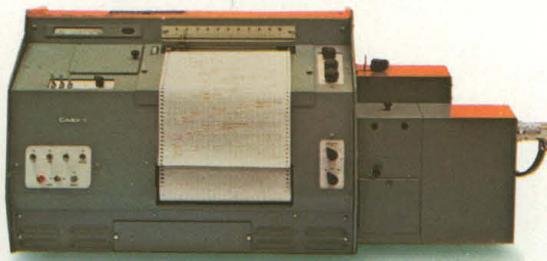
Because of this low stray light, both the 14 and 15 can work at high absorbances without sacrificing photometric accuracy—an extremely useful asset in most spectrophotometric work.

RESOLUTION

Another notable contribution of the double monochromator is the ability to achieve resolution as good as or better than any other recording spectrophotometer (at the same signal-to-noise ratio) in one-half to one-fourth the scanning time.

Some people, no doubt, may feel that they'll never need the high resolution offered by the Cary 14 and 15. What they fail to realize is that much of the "unneeded" resolving power can be exchanged for additional energy (resulting in better accuracy) when working with very dense or micro samples.

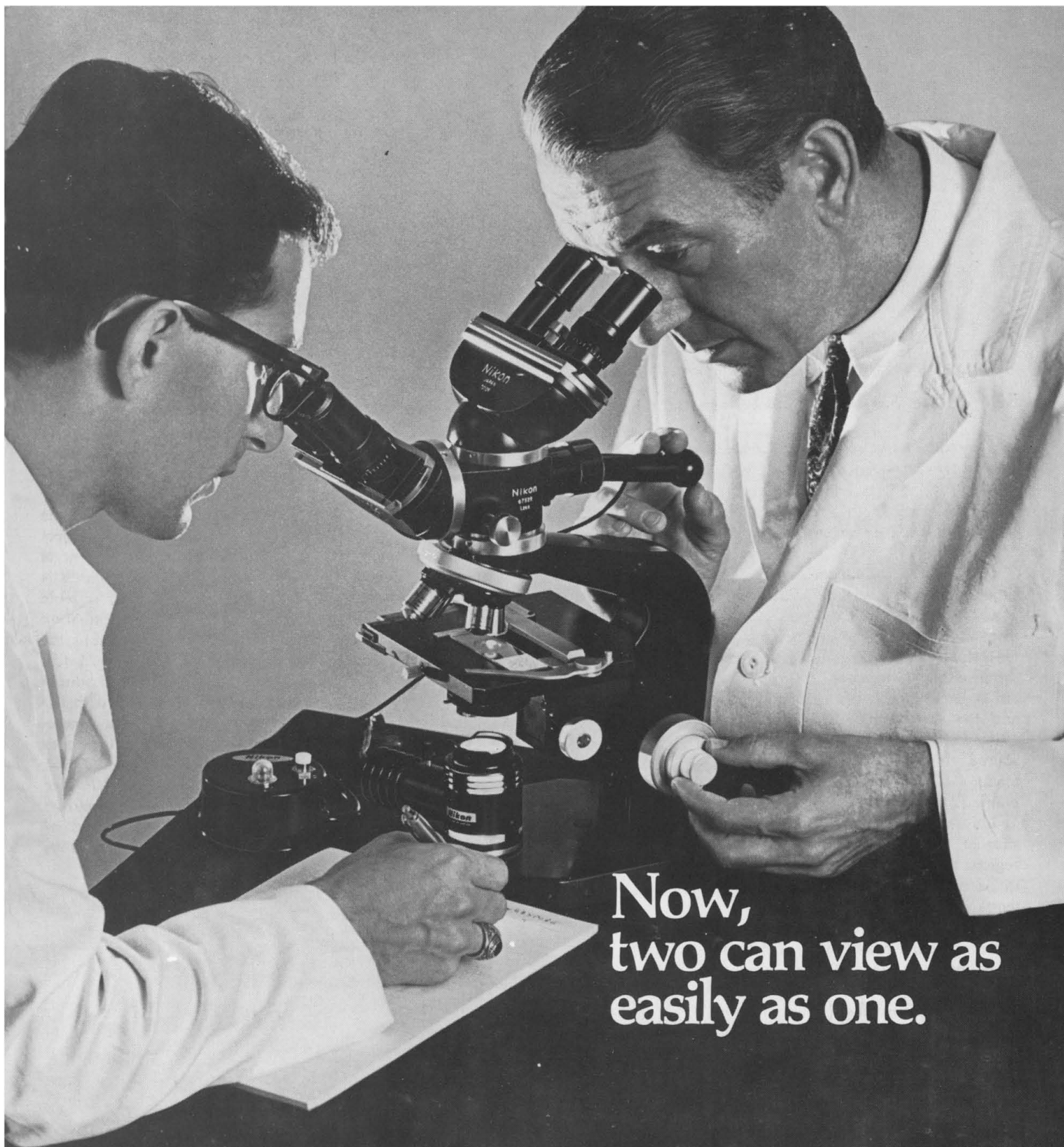
There's a lot more to tell about the Cary 14 and 15. Like the wide variety of accessories available for each. Or the fact that we've made instrument drift just about obsolete. For now, just remember that the 14 is unexcelled in the UV-visible-to-near infrared, while the



15 outdoes itself in the UV-visible range.

We have a catalog which describes the spectrophotometers. If you'd like a copy, write Cary Instruments, 2724 So. Peck Road, Monrovia, California 91016. Ask for data file E805-78.

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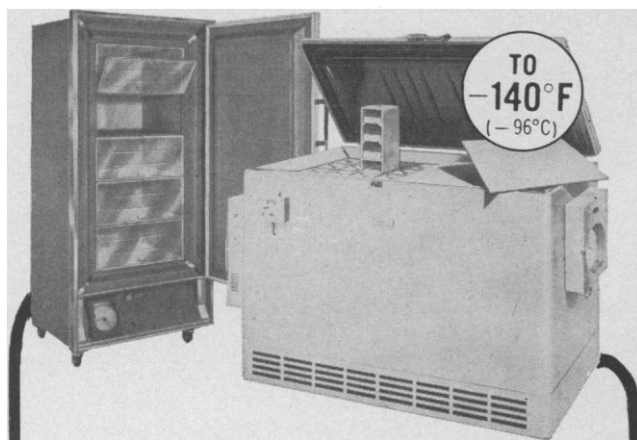
The Teaching Head attachment also embodies a

movable arrow pointer whose image, projected onto the same plane as the specimen, can be manipulated by the teacher to single out any detail for the student's attention. For increased contrast and perception, the arrow image may be tinted red or green, or left clear. A turret filter arrangement is provided for this purpose.

The Teaching Head attachment can be easily removed to make the microscope available for conventional use.

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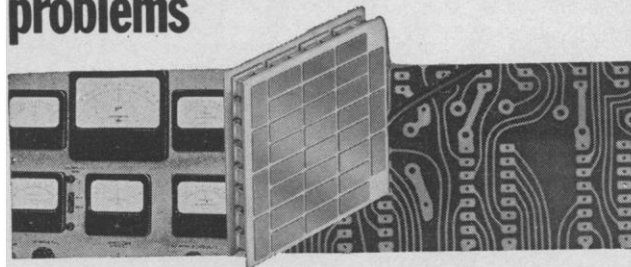
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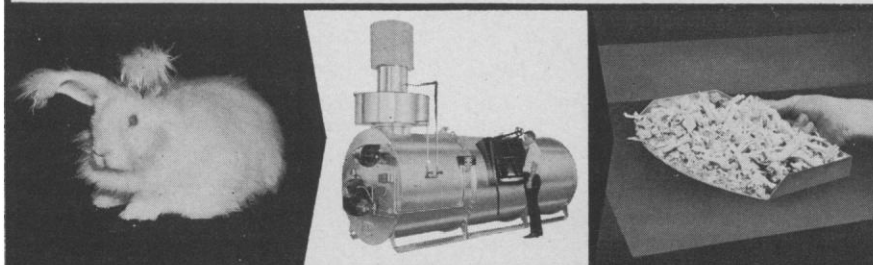


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W. Giertz, "The matrix model structure of paper."

24 July. (J. Kenneth Craver, discussion leader): Philip Luner, "Organization of wood polymers at interfaces"; Hans Schott, "Clay-cellulose interaction"; Egon Matijević, "Particle-ion interaction."

25 July. (Howard S. Gardner, discussion leader): John W. Vanderhoff and E. B. Bradford, "The simulation of binder migration in latex-base coatings using a model system"; James V. Robinson, "Particle size and scattering coefficient of pigments."

Biomathematics

Julia T. Apter, chairman; Derek Fender, vice chairman.

28 July. (Fred Grodins, discussion leader): Stephen Kahne, "Optimization techniques"; C. K. Gordon, "Topological methods in biologic and behavioral sciences." (D. Fender, discussion leader): Hans Bremermann, "Evolution, optimization and the problem of numerical effort"; Robert Taylor, "Strategic problems in parameter estimation"; Julia T. Apter, "Some biological examples using parameter estimation."

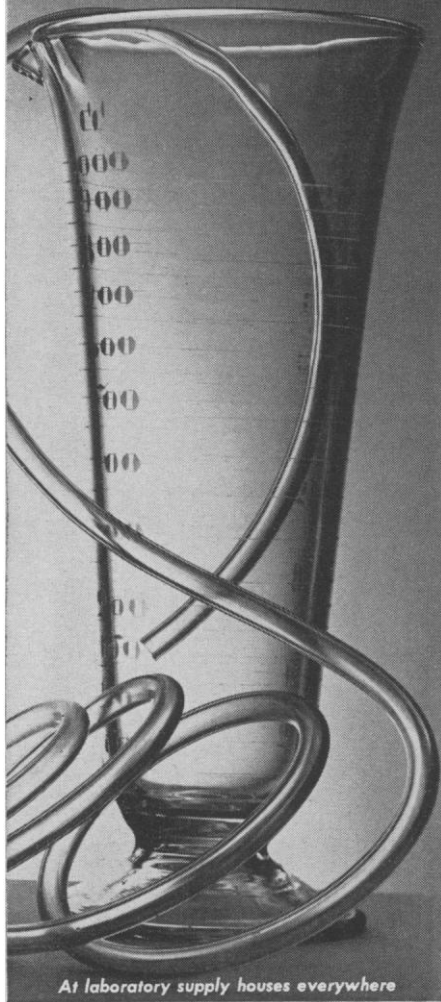
29 July. (Hans Bremermann, discussion leader): F. Charette, "Optimization in endocrine systems"; R. Kalaba, "Fitting non-linear models of drug metabolism to experimental data." (Otto Schmitt, discussion leader): John Outerbridge, "Optimal saccade generation in the vestibulo-ocular system"; D. Fender, "How does the oculomotor control system decide on the optimum strategy for a particular tracking task."

30 July. (R. Kalaba, discussion leader): G. C. Cheng, "Neuronal topology"; Fred Grodins, "Respiratory system control." (Julia T. Apter, discussion leader): Otto Schmitt, keynote speaker, "A new mathematics for biologists—the next five years of biomathematics." Participants selected from audience, "Current problems in biomathematics."

31 July. (E. C. DeLand, discussion leader): P. Green, "Problems of sensorimotor structure"; Gerhard Werner, "Topology of body representation in primate cerebral cortex." (Robert Taylor, discussion leader): L. Slobodkin, "How animals minimize the probability of extinction"; Lee B. Lusted, "Receiver operating characteristic curves in decision making"; E. R. S. W. Crossman, "Optimization in socio-technical systems."

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1 August. (Gerhard Werner, discussion leader): D. McRuer, "Optimization of human behavior among control systems"; G. Bekey, "Optimization in manual control systems"; R. Ledley, "Optimization and homeostasis."

Holderness School

Photosynthetic Organelles

Donald L. Keister, chairman;
Anthony San Pietro, vice chairman.

Structure, Function, and Control Mechanisms

29 June. Martin D. Kamen, Introductory lecture.

30 June. Chloroplast structure and composition (L. P. Vernon, chairman): R. B. Park, L. P. Vernon. Membrane structure and development (L. Bogorad, chairman): P. Siekevitz, J. Schiff, P. Levine, A. Kahn, J. Lascelles.

1 July. Bacterial photosynthesis (R. K. Clayton, chairman): C. Sybesma, D. Fleischman, D. Mauzerall, D. Keister, J. Thornber. Control mechanisms in photosynthesis (H. Gest, chairman): D. Shemin, S. Kaplan, M. Gibbs, J. Preiss, J. Gibson.

2 July. Chloroplast photosystem II (B. Kok, chairman): H. T. Witt, G. Chéniaie. Chloroplast photosystem I (G. Hoch, chairman): (speakers to be announced).

3 July. Membrane function and energy transduction (A. Jagendorf, chairman): B. Rumberg, R. McCarty, N. Good, J. Kahn, R. Dilley, A. Crofts. Special lectures: "The concept of the photosynthetic unit"; W. A. Arnold, "The physical approach"; H. Gaffron, "The biological approach."

4 July. Special topics.

Chemistry and Physics of Isotopes

William Spindel, chairman; V. J. Shiner, vice chairman.

21 July. Atom-molecule reactions—($H + H_2$) (Jacob Bigeleisen, chairman): D. J. LeRoy, "Experiments"; K. Morokuma, "Theory." Anharmonic isotope effects (Jacob Bigeleisen, chairman): John Overend, "Anharmonicity of the vibrations of polyatomic molecules"; V. W. Laurie, "Isotope effects on dipole moments."

22 July. Isotope effects on energy transfer (Max Wolfsberg, chairman): Clyde Hutchison, "Isotope effects on energy transfer in organic crystals"; E.

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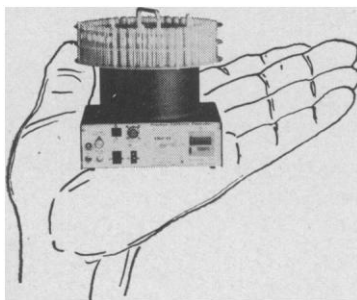
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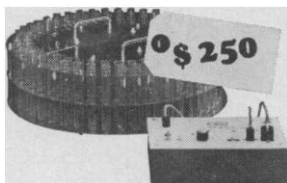
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K. C. Lee, "Deuterium isotope effects observed in photochemical systems"; W. Siebrand, "Isotope effects on radiationless transitions." Isotope effects in geochemical processes (Sam Epstein chairman).

23 July. Cosmochemistry of isotopes (Dieter Heymann, chairman): R. O. Pepin, "Isotopic abundances of rare gases in the solar system"; T. P. Kohman, "Isotopic abundance variations in the solar system due to nuclear processes." P. A. Seegar, "Stellar nucleosynthesis and solar abundances." Isotope separation (Walter J. Haubach, chairman): E. von Halle, "A new German process for isotope separation"; Georghe Vasaru, "Isotope separation in Romania"; Walter J. Haubach, "Thermal diffusion research at Mound Laboratory."

24 July. Isotope effects in bio-organic systems (Stanley Seltzer, chairman). Y. Pocker, "Deuteron transfer in enzyme catalysis"; H. Bright, "Kinetic isotope effects in flavoprotein reactions." Contributed reports on research in progress (W. Spindel, chairman). Contributions should be sent to the Chairman at Belfer Graduate School of Science, Yeshiva University, 186th Street and Amsterdam Avenue, New York, New York 10033.

25 July. Present status of tunnelling effects (R. E. Weston, chairman): R. E. Weston, "Brief summary of evidence for tunnelling in gas-phase reactions"; E. F. Caldin, "Experimental work on tunnelling in proton transfer reactions in solution"; R. E. Davis, "A quest for quantum tunnelling."

Chemistry and Physics of Liquids

Cornelius J. Pings, chairman; Benjamin Widom, vice chairman.

11 August. (B. Widom, discussion leader): F. P. Buff, "Statistical mechanical theory of fluid interfaces"; J. Straub, "Measurements of surface tension of pure fluids in the critical region." (D. McIntyre, discussion leader): W. W. Webb, "Diffuse interface in critical liquid mixtures"; U. Ingard, "Light scattering from thermal fluctuations of liquid surfaces."

12 August. (G. M. Pound, discussion leader): H. Riess, "A critique of current nucleation theory"; P. P. Wegener, "Homogeneous nucleation of water and ethanol in supersonic flow." (P. A. Egelstaff, discussion leader): S. A. Rice, "Electronic states of van der Waals

liquids"; J. E. Enderby, "Electronic states of liquid metal."

13 August. (W. H. Stockmayer, discussion leader): D. S. Eisenberg, "Structure and properties of water"; J. A. Barker, "Structure of liquid water by Monte Carlo calculations." (H. L. Friedman, discussion leader): F. H. Stillinger, Jr., "Statistical mechanical theories of water"; P. G. de Gennes, "Liquid crystals."

14 August. (C. J. Pings, discussion leader): Status reports—A. Levitt Sengers, "Scaling laws and critical exponents"; A. Rahman, "Molecular dynamics"; J. C. Thompson, "Metal-ammonia systems"; J. S. Rowlinson, "Mixtures"; B. Chu, "Scattering in the critical region"; R. Zwanzig, "Transport." (G. S. Rushbrooke, discussion leader): Open session for brief reports of current important work; speakers will be announced after the opening of the conference.

15 August. (F. H. Stillinger, Jr., discussion leader): M. E. Fisher, "Survey of theories of exponent renormalization at plait points"; R. B. Griffiths, "Boundness of heat capacities and compressibilities at plait point curves"; W. I. Goldberg, "The effect of impurities on light scattering near the critical point."

Operations Research and Management Science

Sidney W. Hess, chairman; Richard E. Colgate, vice chairman.

18 August. Probabilistic forecasting (Milton L. Godfrey, chairman): George J. Feeney. Decision analysis (Sigurd L. Andersen, chairman): Ronald A. Howard.

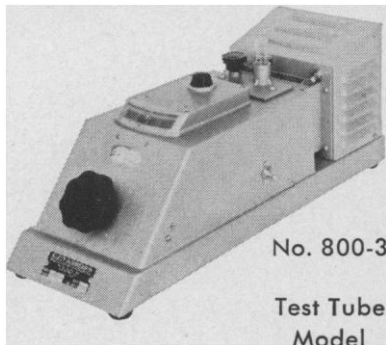
19 August. Decision theory (George T. Foradori, chairman): Peter C. Fishburn. Long range planning (Keith Coad, chairman): Franz Edelman.

20 August. Non-linear programming (Donald S. McArthur, chairman): Kenneth Kortanek. O. R. at the local government level (George M. Parks, chairman): Louis C. Santone.

21 August. Are we solving the right problems? (Gifford H. Symonds, chairman): C. West Churchman. The profession and our societies (John F. Magee, chairman): Thomas E. Caywood and Robert M. Thrall.

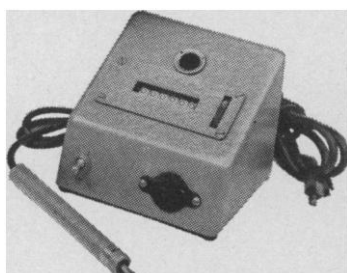
22 August. Application of search theory to large scale operations including Mediterranean H-bomb search (Fred Schneider, chairman): Henry H. Richardson.

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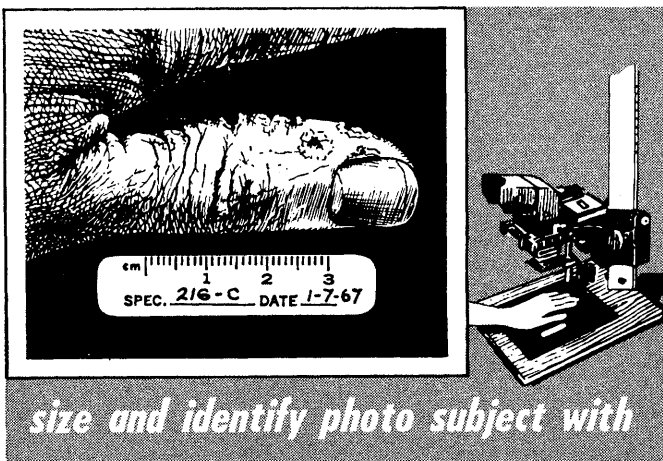
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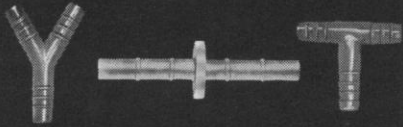
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Geochemistry

Brian J. Skinner, co-chairman; Heinrich D. Holland, co-chairman.

Ore Deposits

25 August. Sulfide melts and sulfides in melts: B. J. Skinner, "Solubility controls of sulfides in hydrous and anhydrous magmas"; A. J. Naldrett, "Sulfide-oxide melts"; W. H. MacLean, L. A. Clark, and H. Shimazaki, "Liquidus phase relations in the system $\text{FeS-FeO-Fe}_3\text{O}_4\text{-Na}_2\text{O-SiO}_2$ and their geologic applications."

26 August. Water in silicate intrusions: H. P. Taylor, Jr., "Isotopic evidence for the origin of water in igneous rocks"; S. M. F. Sheppard, "Hydrogen and oxygen isotope studies of hydrothermal deposits"; B. B. Hanshaw, "Linear and convective hydrologic flow models near intrusives."

27 August. Experimental evidence for the composition of hydrothermal fluids: H. C. Helgeson, "Mass transfer among silicates, sulfides and hydrothermal solutions"; J. L. Haas, Jr., "The solution geochemistry of iron"; H. D. Holland, "The sulfur content of hydrothermal solutions"; J. J. Hemley, "The stability relations of alunite and compositional limits on hydrothermal solutions producing strong proton metasomatism."

28 August. Observational evidence for the origin and composition of hydrothermal fluids: E. Roedder, "Validity of T, P, and X data on ore fluids from fluid inclusion studies"; R. O. Rye and F. J. Sawkins, "Fluid inclusion and isotopic studies of the ores at Providencia, Mexico"; H. Ohmoto, "Fluid inclusion and isotopic studies of the ores at the Bluebell Mine, British Columbia."

29 August. Metallogenic provinces: R. E. Zartman, "The use of lead isotopes to distinguish between 'Laramide' and Precambrian mineralization in northwestern Montana and northern Idaho"; U. Petersen, "South American metallogenic provinces."

Providence Heights College

Plasma Physics

Burton D. Fried, co-chairman; Richard F. Post, co-chairman.

Nonlinear Phenomena in Collisionless Plasmas

23 June. Thomas Dupree, "Trapped particles and particle-wave interac-

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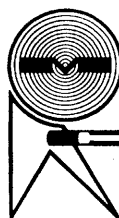
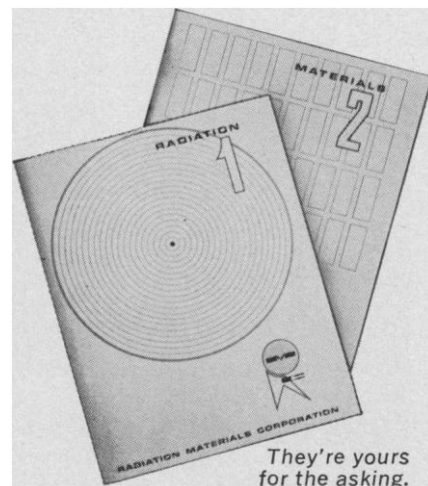
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tions"; Thomas M. O'Neil, "Large amplitude waves."

24 June. Marshall N. Rosenbluth and Ravinandra Sudan, "Mode coupling"; John Dawson, "Particle simulation and computer experiments."

25 June. Alec Galeev and Richard E. Aamodt, "Saturation effects on instabilities"; Paul H. Rutherford, "Fluctuations and anomalous diffusion."

26 June. Lonya Rudakov and Igor Alexeff, "Turbulent heating"; Roy Bickerton and Charles Kennel, "Collisionless shocks."

27 June. Roy Gould, "Plasma echoes."

Environmental Sciences: Air

August T. Rossano, Jr., chairman; James J. Morgan, vice chairman.

Atmospheric Aerosols

30 June-4 July. Introduction. Sources of atmospheric aerosols. Physical and chemical properties of atmospheric aerosols. Behavior and fate of atmospheric aerosols: dispersion; sinks; weather modification; atmospheric reactions; visibility reduction. Sampling and analysis of atmospheric aerosols. Effects of aerosols on biological systems; vegetation; animals; human. Social and economic effects of atmospheric aerosols. Air quality goals and criteria for atmospheric aerosols. Control of aerosol sources. Research needs.

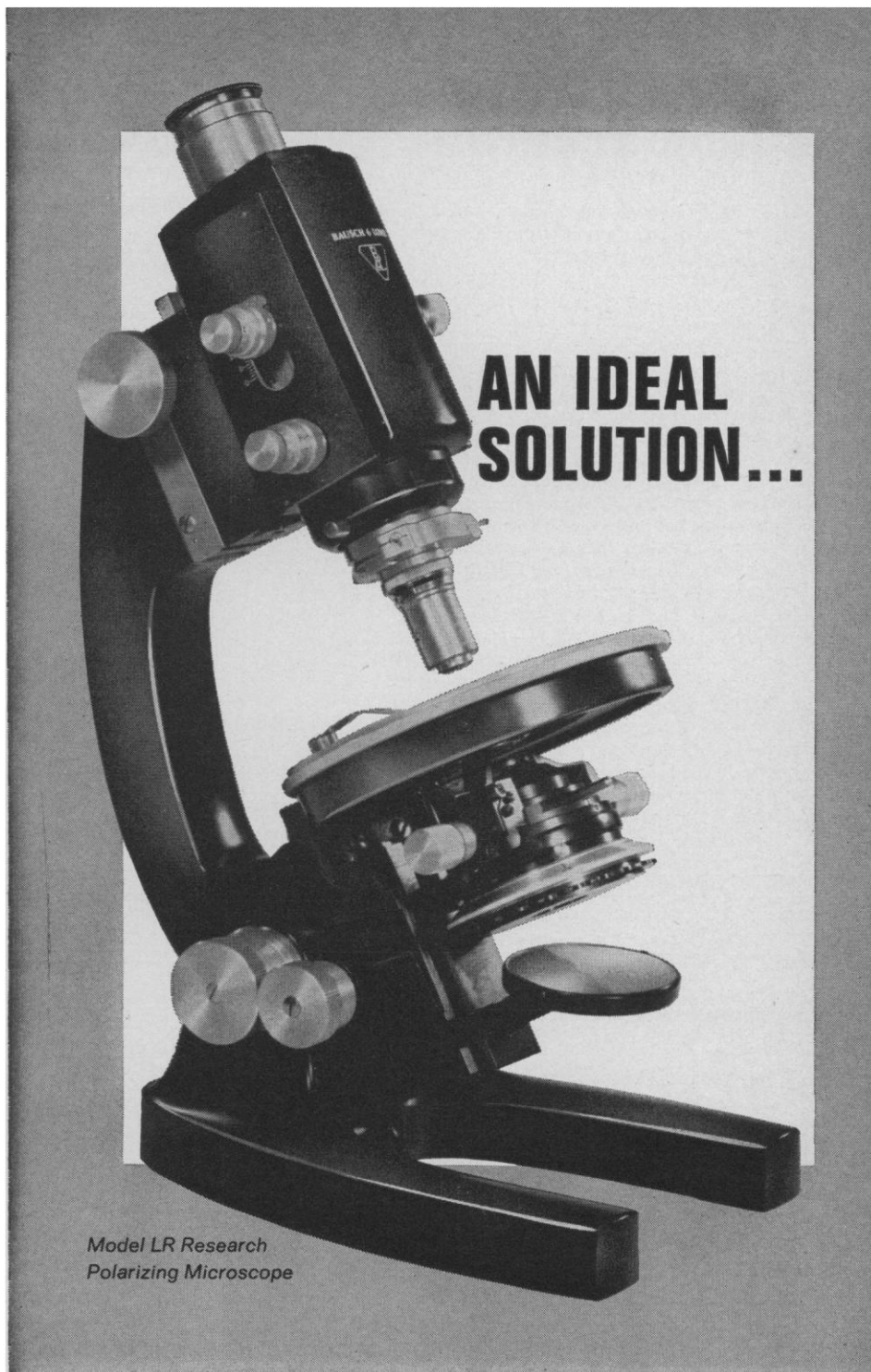
Physical Metallurgy

J. Weertman, chairman; J. E. Hilliard, vice chairman.

7 July. (John Dorn, discussion leader): O. Sherby, "Creep of metals and metallic alloys above $0.4 T_m$ "; Henry Eyring, "Significant structures influencing viscous and plastic flow." (James C. M. Li, discussion leader): C. Barrett and W. Nix, "Experimental data on effective stress concept in high temperature creep of metals"; L. J. Cuddy, "Relationship between the internal stresses and structures developed during creep."

8 July. (W. J. McG. Tegart, discussion leader): G. B. Gibbs, "Theory of glide controlled by local obstacles: application to low and high temperature creep"; D. H. Avery, "Unidirectional and alternating strain behavior in a superplastic material." (John Hirth, discussion leader): T. Alden, "Recovery

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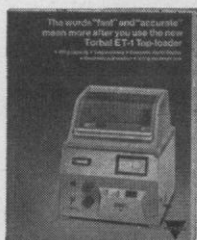
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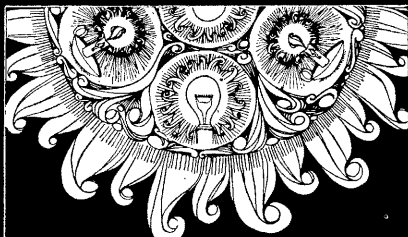
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creep and grain boundary sliding theories of superplasticity"; Wayne Hayden, "Dislocation processes during superplastic deformation of Fe-Ni-Cr alloys."

9 July. (D. T. Griggs, discussion leader): Neville Carter, "Preliminary results on hot creep of olivine"; C. B. Raleigh, "Mechanisms of creep in rocks"; H. C. Heard, "Steady-state flow in NaCl and CaCO₃"; (with formal discussion by N. Carter and C. B. Raleigh). (David Fischback, discussion leader): W. Green and E. Zukas, "High temperature creep of graphite"; A. Clauer, M. Seltzer and B. A. Wilcox, "High temperature creep of oxides."

10 July. (John Hockett, discussion leader): R. Arsenault, "The effects of internal stress on low temperature creep of BCC metals"; H. Conrad and G. Sargent, "Stress relaxation and thermally activated deformation in titanium at low temperatures"; Mark Meier, "The flow of glaciers: creep, slip, and gallop."

11 July. (N. J. Grant, discussion leader): George S. Ansell, "Steady-state creep of two phase systems"; B. H. Kear and G. R. Leverant, "Creep mechanisms in γ/γ' nickel base alloys."

Molecular Pathology

Robert M. O'Neal, chairman; Henry C. Pitot, vice chairman.

14 July. R. V. Rice, "Ultrastructure of the smooth muscle cell and its contractile proteins"; J. Marshall, "Physiology of the smooth muscle cell"; J. Kendrick-Jones, "Assembly of paramyosin molecules and the filamentous organization of invertebrate smooth muscle"; B. Panner, "Contractile protein in smooth muscle."

15 July. R. Nachman, "Contractile proteins in platelets"; G. Gasic, "Contractile properties of the cell membrane"; H. Puchtler, "Histochemistry of smooth muscle"; B. Lane, "Structure and function of smooth muscle."

16 July. R. Ross, "Hormonal response of the myometrium"; W. A. Thomas, "Cultured smooth muscle cells"; M. Ross, "Physiologic conversion of undifferentiated cells to smooth muscle"; R. Ellis, "The myoepithelial cell."

17 July. D. Haust, "Alternate potentials of the smooth muscle cell in health and disease"; J. Wiener, "Smooth muscle cells in experimental vascular disease"; R. Wissler, "Role of the



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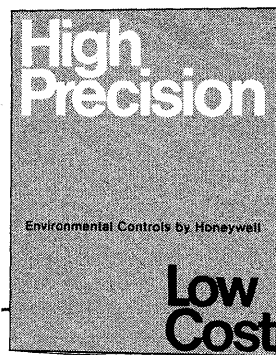
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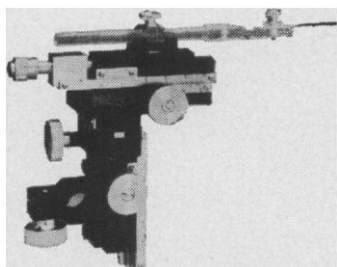
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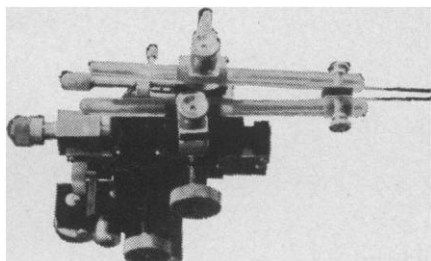


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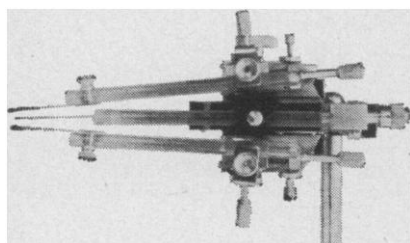
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smooth muscle cell in atherosclerosis."

18 July. G. Majno, "Contractility of endothelial cells"; C. Becker, "Demonstration of contractile protein in endothelium, cells of heart valves, endocardium, intima, arteriosclerotic plaques, and in Aschoff bodies of rheumatic heart disease."

Quantum Solids and Fluids

A. S. Barker, co-chairman; Gerald D. Mahan, co-chairman.

Optical Properties of Metals

21 July. Introduction. (Speaker to be announced.) Photoemission (H. D. Hagstrum, chairman): D. E. Eastman, "Photoemission in metals." Alkali metals: N. V. Smith, "Optical studies of alkali metals."

22 July. Optical spectra (H. Philipp, chairman): U. Gerhardt, "Electronic structure of Cu and Ni from piezoreflexivity"; G. F. Dresselhaus, "One electron theory of interband transitions"; H. E. Bennett, "Optical plasmons and anomalous skin effect in silver"; A. J. Sievers, "Far infrared absorption in metals."

23 July. Surface plasmons (P. A. Wolff, chairman): D. Beaglehole, "The optical excitation of surface plasmons"; R. H. Ritchie, "Surface plasmons." Light scattering (E. Burstein, chairman): A. Mooradian, "Light scattering from electrons in solids"; P. M. Platzman, "X-ray scattering from electrons in metals."

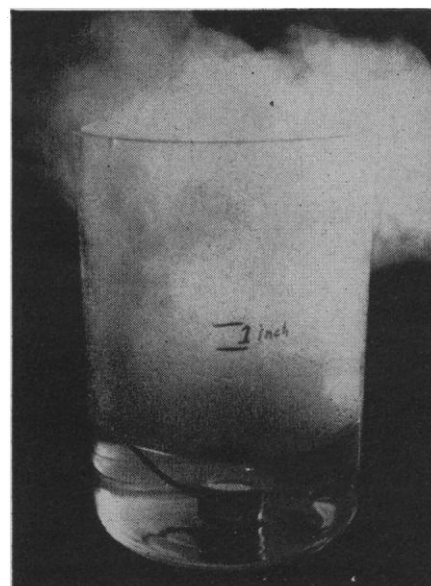
24 July. Alloys (F. Abéles, chairman): S. Schnatterly, "Optical reflectivity studies of magnetic alloys"; B. I. Halperin, "Optical studies of antiferromagnetism in chromium and its alloys."

25 July. Electron energy loss: H. Raether, "Electron energy loss in metals."

Animal Cells and Viruses

George K. Hirst, chairman; James Darnell, vice chairman.

28 July-1 August. Boyce W. Burge, "Arboviruses"; R. Walter Schlesinger, "Adenoviruses"; Walter Eckhart, "DNA tumor viruses"; Peter K. Vogt, "RNA tumor viruses"; Donald F. Summers, "Polioviruses"; W. K. Joklik, "Reoviruses"; Purnell Choppin, "Myxoviruses"; Howard Green, "Cell fusion"; Leonard Warren, "Animal cell membranes."



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SCIENCE, VOL. 163

Chemistry and Physiology of Odor and Flavor

Lloyd M. Beidler, chairman; David Moulton, co-vice chairman; Amos Turk, co-vice chairman; Irwin Hornstein, co-vice chairman.

4-8 August. Anatomical correlates of taste and odor. Selection of primary odors. Isolation of receptor proteins. Odor selection and purity. Molecular structure in taste and odors. Volatile analysis. Organoleptic evaluation. Recent advances in taste enhancers and modulators. Odors and animal behavior.

Biochemistry in Agriculture

A. Carl Leopold, chairman; Edward F. Rogers, vice chairman.

11 August. (G. F. Stewart, discussion leader): R. D. O'Brien, "An approach to the isolation of acetylcholine receptors"; R. J. Magee, "Chemical factors relating to organophosphorus insecticides"; Y. P. Sun, "Toxic interactions-insecticides"; G. C. LaBrecque, "Recent developments in insect population control with chemosterilants"; G. P. Georgiou, "Genetic bases of resistance to insecticides."

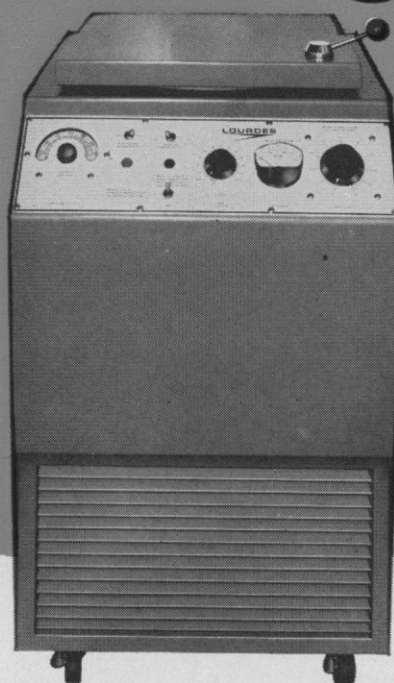
12 August. (E. F. Rogers, discussion leader): B. G. von Schmeling, "The search for systemic fungicides; their specificity, structure and activity relationships"; D. C. Erwin, "Possibilities and problems in control of verticillium wilt with chemotherapeutants"; J. W. McFarland, "Modern anthelmintic agents in agriculture"; T. A. Hymas, "Coccidiostats—past, present, and future."

13 August. (R. E. Cleland, discussion leader): A. B. Pardee, "Membrane transport proteins"; J. B. Hanson, "Ion transport in plant mitochondria"; E. Epstein, "Ion transport across plant cell membranes"; W. R. Benson, "Some current chemical research on pesticides at F.D.A."

14 August. (A. C. Page, discussion leader): L. Rappaport, "Regulation of dormancy in buds"; P. F. Wareing, "Absciscic acid and its action in plants"; H. N. Cathy, "Synthetic chemicals which limit plant growth"; J. Heslop-Harrison, "Some aspects of reproductive development in plants."

15 August. (A. C. Leopold, discussion leader): W. D. Mitchell, "Regulation of photoperiodic flowering"; C. E. Hess, "Naturally occurring growth substances regulating root initiation."

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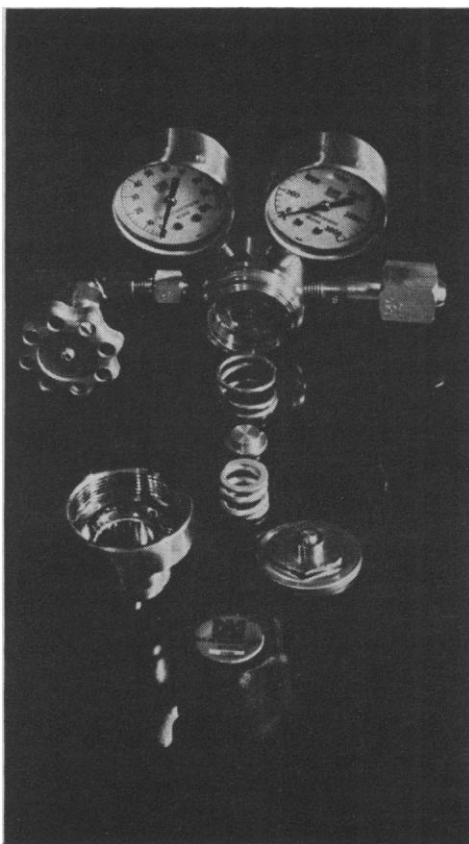
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Postharvest Physiology

P. H. Heinze, chairman; H. K. Pratt, vice chairman.

18 August. Physiological phenomena of maturation and senescence (general) (J. B. Biale, discussion leader): A. C. Hulme. External control of maturation and senescence (R. Ulrich, discussion leader): L. L. Morris.

19 August. Physiological and biochemical problems in the postharvest handling of crops: metabolic disturbances, chilling, etc. (J. M. Lyons, discussion leader): I. Uritani and B. McGlasson.

20 August. The role of ethylene in senescence and other aspects of metabolism (M. Lieberman, discussion leader): H. Pratt and H. Imaseka. Hormonal control of aging (F. Abéles, discussion leader): Daphne Osborne and A. C. Leopold.

21 August. Protein and nucleic acid metabolism during maturation and senescence (J. E. Varner, discussion leader): D. R. Dilley and A. Richmond. Enzyme regulatory mechanisms of maturation and senescence (G. C. Laties, discussion leader): Roy Young and Joseph Sacher.

22 August. Membranes and organelles: structure, composition and changes during maturation and senescence (F. W. Mercer, discussion leader): W. Thomson and P. Mazliak.

Laser Interaction with Matter

Harlow G. Ahlstrom, co-chairman; Petras V. Avizonis, co-chairman.

25 August. Laser glass (Alex Glass, chairman): G. Young, "American Optical glass"; H. Lee, "Owens-Illinois glass"; (speaker to be announced), "C.G.E. glass"; J. Swain, "Survey of laser glasses." Laser devices (R. J. Collins, chairman): J. Swain, "Disk lasers"; E. D. Jones, "Picosecond lasers"; R. Rudder, "Subnanosecond lasers."

26 August. Nanosecond pulse heating (R. Kidder, chairman): D. H. Polk, (speaker to be announced), J. L. Bobin. Picosecond pulse heating (R. Osborne, chairman): R. Kidder, J. Shearer, and M. J. Lubin.

27 August. Injection (A. Bishop, chairman): P. Saunders, E. Fabre, M. J. Lubin, A. Haught, and W. J. Fader. Diagnostics (F. Ribe, chairman): M. A. Duguay and S. T. Shapiro, "Picopulses"; A. G. Englehardt, "Thomson scattering." Business meeting.

28 August. Long wavelength plasma

heating (A. Kolb, chairman): John Dawson, R. Kidder, and A. Hertzberg. Colliding plasmas (John Walsh, chairman): G. J. Yevick and (speaker to be announced).

29 August. Lasers and CTR in panel discussion (P. V. Avizonis and H. G. Ahlstrom, moderators): panel: J. Dawson, R. Kidder, A. Hertzberg, J. Tuck, P. Veyrie, A. Bishop, N. Basov, A. Haught.

Calendar of Events

National Meetings

March

20-22. American Acad. of **Facial Plastic and Reconstructive Surgery**, New Orleans, La. (J. R. Anderson, 111 Tulane Ave., New Orleans 70112)

23-29. American **Crystallographic Assoc.**, Seattle, Wash. (W. L. Kehl, Gulf Research and Development Co., P.O. Box 2038, Pittsburgh, Pa. 15230)

24-25. **Basis of Decision**, Brooklyn, N.Y. (C. McC. Brooks, Downstate Medical Center, State Univ. of New York, 450 Clarkson Ave., Brooklyn 11203)

24-25. **Laser Safety Conf. and Workshops**, 2nd, Cincinnati, Ohio. (L. Goldman, Laser Lab., Children's Hospital Research Foundation of the Medical Center of the Univ. of Cincinnati, Cincinnati)

24-27. American **Physical Soc.**, Philadelphia, Pa. (W. W. Havens, Jr., The Society, 335 E. 45 St., New York 10017)

24-28. **Desalination: Methods and Applications**, Berkeley, Calif. (Continuing Education in Engineering, Univ. Extension, Univ. of California, 2223 Fulton St., Berkeley 94720)

25-27. American **Laryngological, Rhinological and Otolological Soc.**, Inc., New Orleans, La. (V. R. Alfaro, 917 20th St., NW, Washington, D.C. 20006)

26-28. National **Business Aircraft Mfg. and Engineering Display**, Wichita, Kan. (A. J. Favata, SAE Headquarters, 2 Pennsylvania Plaza, New York 10001)

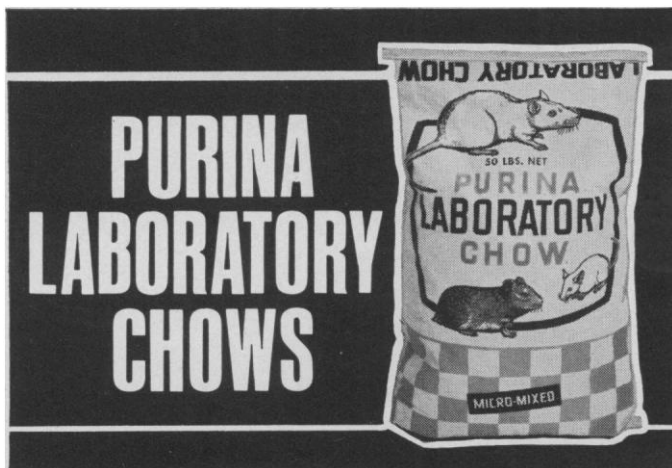
26-28. Symposium on the **Engineering Aspects of Magnetohydrodynamics**, 10th, Cambridge, Mass. (J. Klepeis, Arrangements Committee, Avco Everett Research Lab., 2385 Revere Beach Parkway, Everett, Mass. 02149)

26-28. **George H. Hudson Symp.**, 4th, Plattsburgh, N.Y. (M. H. Tourin, State Univ. College of Arts and Sciences, Plattsburgh 12901)

27. **Biochemistry, Assay and Nutritional Value of Vitamin E**, Rosemont, Ill. (W. Davin, Dawes Labs., Inc., 450 State St., Chicago Heights, Ill. 60411)

27-28. **Technical Writing Inst.**, Lubbock, Tex. (M. Miles, Technical Writing Inst., Dept. of English, Texas Technological College, Lubbock 79409)

27-29. **Geological Soc. of America**, South-Central Section, Lawrence, Kans., "Basement Rocks of the Mid-Continent" and "Paleo-Environmental Implications of Palynology." (W. M. Merrill, Dept. of Geology, Univ. of Kansas, Lawrence 66044)



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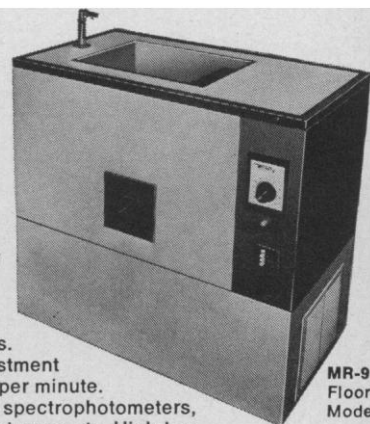
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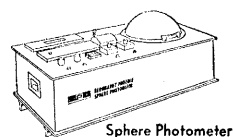
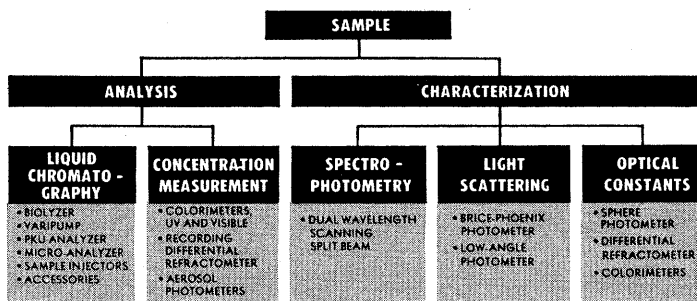
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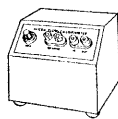
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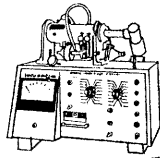
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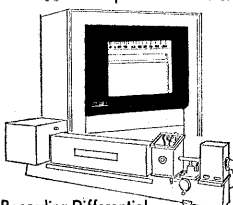
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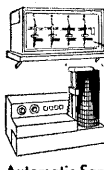
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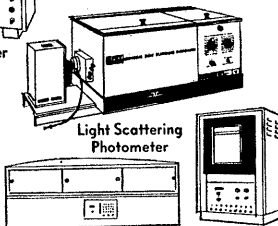
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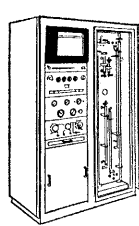
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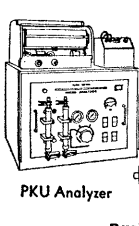
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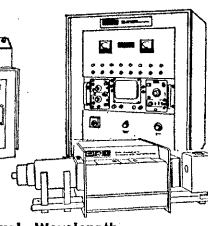
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28-29. American Otolological Soc., Inc., New Orleans, La. (W. H. Bradley, 1100 E. Genesee St., Syracuse, N.Y.)

28-30. American Psychosomatic Soc., Inc., 26th, Cincinnati, Ohio. (H. Weiner, 265 Nassau Rd., Roosevelt, N.Y. 11575)

28-2. Seminar of the American Cancer Soc. for Science Writers, 11th, New Orleans, La. (J. Clark, American Cancer Soc., 219 E. 42 St., New York 10017)

30-2. American Orthopsychiatric Assoc., New York, N.Y. (M. F. Langer, Room 1313, 1790 Broadway, New York 10019)

31. American Astronomical Soc., Honolulu, Hawaii. (G. C. McVittie, Univ. of Illinois Observatory, Urbana 61801)

31-2. **Advances in Water Quality Improvement**—Physical and Chemical Processes, Austin, Tex. (Center for Research in Water Resources, Univ. of Texas, Rt. 4, Box 189, Austin 78757)

31-2. **Metals Engineering Conf.**, Washington, D.C. (R. J. Cepluch, Hartford Steam Boiler Inspection and Insurance Co., 56 Prospect St., Hartford, Conn. 06102)

31-2. **Education for the Peaceful Uses of Nuclear Explosives**, Tucson, Ariz. (L. E. Weaver, Dept. of Nuclear Engineering, Univ. of Arizona, Tucson 85721)

31-2. American Assoc. of Thoracic Surgery, San Francisco, Calif. (T. B. Ferguson, Suite 311, 7730 Carondelet Ave., St. Louis, Mo. 63110)

April

1. Arkansas Acad. of Science, Fayetteville, Ark. (G. E. Templeton, Dept. of Plant Pathology, Univ. of Arkansas, Fayetteville 72701)

1-2. **Advanced Techniques in Real-Time Simulation**, Philadelphia, Pa. (University City Science Center, Science Center Bldg. No. 1, 3401 Market St., Philadelphia 19104)

1-3. **Numerical Control Soc.**, 6th, Cincinnati, Ohio. (P. Senkiw, Advanced Computer Systems, Inc., 2185 S. Dixie Ave., Dayton, Ohio 45409)

1-4. American Assoc. of Anatomists, Boston, Mass. (R. T. Woodburne, Dept. of Anatomy, Univ. of Michigan, East Medical Bldg., Ann Arbor 48104)

2. **Oral Cancer Symp.**, 7th, Poughkeepsie, N.Y. (Sister M. A. Elizabeth, Poughkeepsie, N. Y.)

2-4. **Picture Bandwidth Compression**, Cambridge, Mass. (E. E. Witchi, Boston Section, IEEE, 31 Channing St., Newton, Mass. 02158)

3-4. American Soc. for Engineering Education, Fayetteville, Ark. (E. H. Wright, The Society, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

3-5. Southern Soc. for Philosophy and Psychology, Miami, Fla. (D. Browning, Dept. of Philosophy, Univ. of Miami, Coral Gables, Fla.)

3-5. National Conf. on Schizophrenia, Topeka, Kan. (Dept. of Education, Menninger Foundation, Box 829, Topeka 66601)

7-9. **Operations Research Seminar**, Cleveland, Ohio. (Office of Public Relations, Case Western Reserve Univ., University Circle, Cleveland 44106)

7-11. **Public Health Aspects of Peaceful Uses of Nuclear Explosives**, Las Vegas, Nev. (Symp. Committee, Southwestern

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8-9. **High Performance Composites**, 4th symp., St. Louis, Mo. (G. L. Esterson, Box 1048, Washington Univ., St. Louis 63130)

8-11. **Acoustical Soc. of America**, 71st, Philadelphia, Pa. (B. Goodfriend, 335 E. 45 St., New York 10017)

9-10. **American Assoc. of Planned Parenthood Physicians**, 7th, San Francisco, Calif. (G. C. Denniston, The Association, 515 Madison Ave., New York 10022)

9-11. **Textile Research Inst.**, 39th, New York, N.Y. (P.O. Box 625, Princeton, N.J.)

9-12. **Geological Soc. of America**, southeastern section, Columbia, S.C. (D. J. Colquhoun, Dept. of Geology, Univ. of South Carolina, Columbia 29208)

10. **Health Conf. on Diet, Exercise, and Cardiovascular Disease**, Philadelphia, Pa. (R. L. Kunes, Heart Assoc. of Southeastern Pennsylvania, 318 S. 19 St., Philadelphia)

10-12. **Population Assoc. of America**, Atlantic City, N.J. (A. L. Ferriss, Russell Sage Foundation, 1755 Massachusetts Ave., NW, Washington, D.C. 20036)

10-16. **American Leprosy Missions**, 10th PHS seminar, Carville, La. (American Leprosy Missions, 297 Park Ave. South, New York 10010)

11-12. **American Soc. for Engineering Education** (North Central Section mtg.), Windsor, Ont., Canada. (E. H. Wright, The Society, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

12. **New Jersey Acad. of Science**, East Orange. (F. F. Katz, Seton Hall Univ., South Orange, N.J. 07079)

12-16. **American Soc. of Abdominal Surgeons**, Las Vegas, Nev. (B. F. Alfano, 675 Main St., Melrose, Mass. 02176)

12-13. **National Guild of Catholic Psychiatrists**, Washington, D.C. (P. A. Santucci, 4962 Hampden Lane, Bethesda, Md. 20014)

12-13. **Histochemical Soc.**, 20th, Atlantic City, N.J. (G. M. Lehrer, Div. of Neurochemistry, Mount Sinai Medical School, 11 E. 100 St., New York 10029)

13-16. **Plant Engineering and Maintenance**, 12th conf., Pittsburgh, Pa. (B. J. Cross, Lederle Labs., Pearl River, N.Y. 10965)

13-17. **American Assoc. of Cereal Chemists**, 54th, Chicago, Ill. (R. Tarleton, 1955 University Ave., St. Paul, Minn. 55104)

13-17. **Pacific Coast Oto-Ophthalmological Soc.**, San Francisco, Calif. (F. A. Sooy, Dept. of Otolaryngology, Univ. of California Medical Center, San Francisco 94122)

13-18. **American Socs. for Experimental Biology**, Atlantic City, N.J. (J. F. A. McManus, FASEB, 9650 Rockville Pike, Bethesda, Md. 20014)

13-18. **American Soc. for Experimental Pathology**, Atlantic City, N.J. (R. E. Knott, 9650 Rockville Pike, Bethesda, Md. 20014)

13-18. **American Inst. of Nutrition**, Atlantic City, N.J. (J. Waddell, 9650 Rockville Pike, Bethesda, Md. 20014)

13-18. **American Soc. for Pharmacology and Experimental Therapeutics, Inc.**, Atlantic City, N.J. (E. B. Cook, Executive Officer, The Society, 9650 Rockville Pike, Bethesda, Md. 20014)

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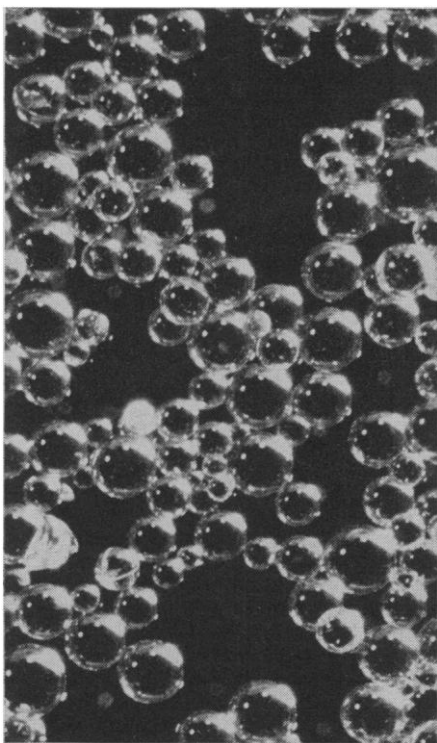
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Falls, Iowa. (R. Hanson, Dept. of Science, Univ. of Northern Iowa, Cedar Falls 50613)

18-20. American Soc. of **Internal Medicine**, Chicago, Ill. (A. V. Whitehall, 3410 Geary Blvd., San Francisco, Calif. 94118)

20-23. Institute of **Environmental Sciences**, 15th, Anaheim, Calif. (Technical Program Committee, The Institute, 940 E. Northwest Highway, Mount Prospect, Ill. 60056)

20-23. West Virginia Acad. of **Ophthalmology and Otolaryngology**, Greenbrier. (J. E. Blaydes, Jr., 107 Federal St., Bluefield, W.Va.)

20-23. Assoc. for **Research in Ophthalmology**, Sarasota, Fla. (H. E. Kaufman, Office of Secretary-Treasurer, Dept. of Ophthalmology, Univ. of Florida Medical College, Gainesville 32601)

20-24. American **Oil Chemists' Soc.**, San Francisco, Calif. (C. H. Hauber, The Society, 35 E. Wacker Drive, Chicago, Ill. 60601)

20-25. Society of **Motion Picture and Television Engineers**, 105th, Miami Beach, Fla. (Executive Secretary, 9 E. 41 St., New York 10017)

21-22. American Soc. for **Artificial Internal Organs**, Atlantic City, N.J. (E. F. Bernstein, Dept. of Surgery, Univ. of Minnesota Medical School, Minneapolis 55455)

21-22. **Temperature Measurements Soc.**, 6th, Hawthorne, Calif. (C. L. Vaughn, Paper Selection Committee, % The Society, P.O. Box 156, Palos Verdes Estates, Calif. 90274)

21-23. **Effective Use of Computers in the Nuclear Industry**, Knoxville, Tenn. (B. F. Maskewitz, Oak Ridge Natl. Lab., P.O. Box X, Oak Ridge, Tenn. 37830)

21-24. American **Industrial Health Conf.**, Houston, Tex. (American Industrial Health Conf., 55 E. Washington St., Chicago, Ill. 60602)

21-25. **Astrodynamics and Related Planetary Sciences**, Washington, D.C. (J. W. Siry, NASA Goddard Space Flight Center, Code 550, Greenbelt, Md. 20771)

21-25. American College of **Physicians**, 50th, Chicago, Ill. (E. C. Rosenow, Jr., 4200 Pine St., Philadelphia, Pa.)

21-25. **Solid State Chemistry Conf.**, 2nd, Scottsdale, Ariz. (L. Eyring and M. O'Keeffe, Dept. of Chemistry, Arizona State University, Tempe 85281)

21-26. American Acad. of **Neurology**, Washington, D.C. (S. A. Nelson, 4005 W. 65 St., Minneapolis, Minn. 55435)

22-23. National **Relay Conf.**, 17th, Stillwater, Okla. (D. D. Lingelbach, School of Electrical Engineering, Oklahoma State Univ., Stillwater 74074)

22-24. **Telemetry Conf.**, Washington, D.C. (R. W. Rochelle, NASA Goddard Space Flight Center, Code 710, Greenbelt, Md. 20771)

22-25. American College **Health Assoc.**, Oklahoma City, Okla. (J. W. Dilley, 2807 Central Ave., Evanston, Ill. 60201)

22-25. National **Pollution Conf.**, Houston, Tex. (The Conference, 4710 Greeley St., Houston 77006)

23-24. **Electric Process Heating in Industry**, Inst. of Electrical and Electronics Engineers, Philadelphia, Pa. (G. Bobart, Westinghouse Electric Corp., Box 300, Sykesville, Md. 21784)

23-25. Institute of **Electrical and Electronics Engineers Conv.**, San Antonio,



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Tex. (W. H. Hartwig, Dept. of Electrical Engineering, Engineering Science Bldg. 439, University of Texas, Austin 78712)

23-25. **Nondestructive Evaluation of Components and Materials in Aerospace, Weapons Systems, and Nuclear Applications**, San Antonio, Tex. (C. E. Lautzenheiser, Southwest Research Inst., 8500 Culebra Rd., San Antonio 78228)

24-26. American Acad. of **Physical Medicine and Rehabilitation**, Chicago, Ill. (C. C. Herold, 30 N. Michigan Ave., Chicago 60602)

24-26. New York **Roentgen Soc.**, New York, N.Y. (S. H. Madell, 1 E. 82 St., New York 10028)

24-26. Illinois State Acad. of **Science**, Decatur, Ill. (K. Harmet, Dept. of Biology, Northern Illinois Univ., DeKalb 60115)

24-26. Ohio Acad. of **Science**, Delaware. (J. H. Melvin, Ohio Acad. of Science, 505 King Ave., Columbus 43210)

24-26. Annual **Wildflower Pilgrimage**, 19th, Gatlinburg, Tenn. (Gatlinburg Chamber of Commerce, Box 527, Gatlinburg, Tenn. 37738 or E. E. C. Clebsch, Dept. of Botany, Univ. of Tennessee, Knoxville 37916)

24-27. Association of **Clinical Scientists**, Mobile, Ala. (R. P. MacFate, 125 N. Rutledge St., Pentwater, Mich. 49449)

25-26. American Soc. for **Engineering Education**, Rocky Mountain Section mtg., Logan, Utah. (E. H. Wright, The Society, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

25-26. American Society of **Group Psychotherapy and Psychodrama**, New York, N.Y. (A. Manzoello, P.O. Box 311, Beacon, N.Y. 12508)

25-26. Nebraska Acad. of **Science**, Lincoln. (C. B. Schultz, 101 Morrill Hall, University Museum, Univ. of Nebraska, Lincoln 68508)

25-26. South Dakota Acad. of **Science**, Vermillion. (T. Van Bruggen, Dept. of Botany, Univ. of South Dakota, Vermillion 57069)

26. American Soc. for **Engineering Education**, Illinois-Indiana Section Mtg., Terre Haute, Ind. (E. H. Wright, The Society, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

26-27. **Eye Bank Assoc. of America**, New Orleans, La. (W. Clark, 211 S. Saratoga St., New Orleans 70112)

27-30. American Soc. of **Maxillofacial Surgeons**, San Francisco, Calif. (D. Goul-ian, Jr., 116 E. 68 St., New York 10021)

27-30. **Southwestern and Rocky Mountain Div. of AAAS**, Colorado Springs, Colo. (M. G. Anderson, Dept. of Biology, New Mexico State Univ., Las Cruces 88001)

28. National **Cystic Fibrosis Research Foundation**, Atlantic City, N.J. (W. H. Boyer, 202 E. 44 St., New York 10017)

28-29. **Photo-Optical Techniques in Simulators**, South Fallsburgh, N.Y. (Photo-Optical Techniques in Simulators Seminar Committee, % SPIE Natl. Office, P.O. Box 288, Redondo Beach, Calif. 90277)

28-30. American Inst. of **Aeronautics and Astronautics**, Cincinnati, Ohio. (J. Lukasiewicz, ARO, Inc., Arnold Engineering Development Center, Arnold Air Force Station, Tenn. 37389)

28-30. Association of **Iron and Steel Engineers**, Detroit, Mich. (Managing Direc-

SCIENCE, VOL. 163

tor, The Association, 1010 Empire Bldg., Pittsburgh, Pa.)

28-30. American Radium Soc., Philadelphia, Pa. (J. V. Blady, 2201 Benjamin Franklin Parkway, Philadelphia 19130)

28-30. American Vacuum Soc., Los Alamos, N.M. (D. G. Schreiner, New Mexico Section, AVS, P.O. Box 11451, Albuquerque 87112)

28-30. Water and Air Conf., 6th, Assoc. of the Pulp and Paper Industry, Jacksonville, Fla. (H. O. Teeple, 360 Lexington Ave., New York 10017)

28-1. American College of Obstetricians and Gynecologists, Bal Harbour, Fla. (M. Newton, 79 W. Monroe St., Chicago, Ill. 60603)

28-1. American Physical Soc., Washington, D.C. (W. W. Havens, Jr., The Society, 335 E. 45 St., New York 10017)

29. American Federation for Clinical Research, Atlantic City, N.J. (The Federation, 2000 P St., NW, Washington, D.C. 20036)

29. Cystic Fibrosis Club, 10th, Atlantic City, N.J. (W. W. Waring, Tulane Univ. Medical School, 1430 Tulane Ave., New Orleans, La. 70112)

29. American Soc. of Therapeutic Radiologists, Philadelphia, Pa. (C. R. Bogardus, Jr., Univ. of Oklahoma Medical Center, Oklahoma City 73114)

29-1. Society of Aerospace Material and Process Engineering, Los Angeles, Calif. (Mail Station D-133, Hughes Aircraft Co., Centinela Ave. and Teale St., Culver City, Calif. 90230)

29-2. American Chemical Soc. (Div. of Rubber Chemistry), Los Angeles, Calif. (G. G. Winspear, R. T. Vanderbilt Co., Inc., 230 Park Ave., New York 10017)

29-3. Student American Medical Assoc., Chicago, Ill. (C. Hewitt, 2635 Flossmoor Road, Flossmoor, Ill. 60422)

30-2. Chemical Marketing Research Assoc., New York. (R. H. Mattson, Glidden-Durkee, Div. of SCM Corp., 900 Union Commerce Bldg., Cleveland, Ohio 44115)

30-2. Electronic Components Conf., Washington, D.C. (J. A. O'Connell, Electronic Components Conf., ITT Headquarters, 320 Park Ave., New York 10022)

30-2. American Surgical Assoc., Cincinnati, Ohio. (C. R. Hanlon, 1325 S. Grand Blvd., St. Louis, Mo. 63104)

30-3. Midwest Anesthesiology Conf., Chicago, Ill. (A. P. Winnie, Illinois Soc. of Anesthesiologists, 1825 W. Harrison St., Chicago 60612)

30-3. American Assoc. of Plastic Surgeons, San Francisco, Calif. (R. M. McCormack, 260 Crittenden Blvd., Rochester, N.Y. 14620)

30-4. Continual Education of the American Acad. of Oral Medicine, 23rd, San Juan, Puerto Rico. (W. M. Greenhut, 124 E. 84 St., New York 10028)

International and Foreign Meetings

April

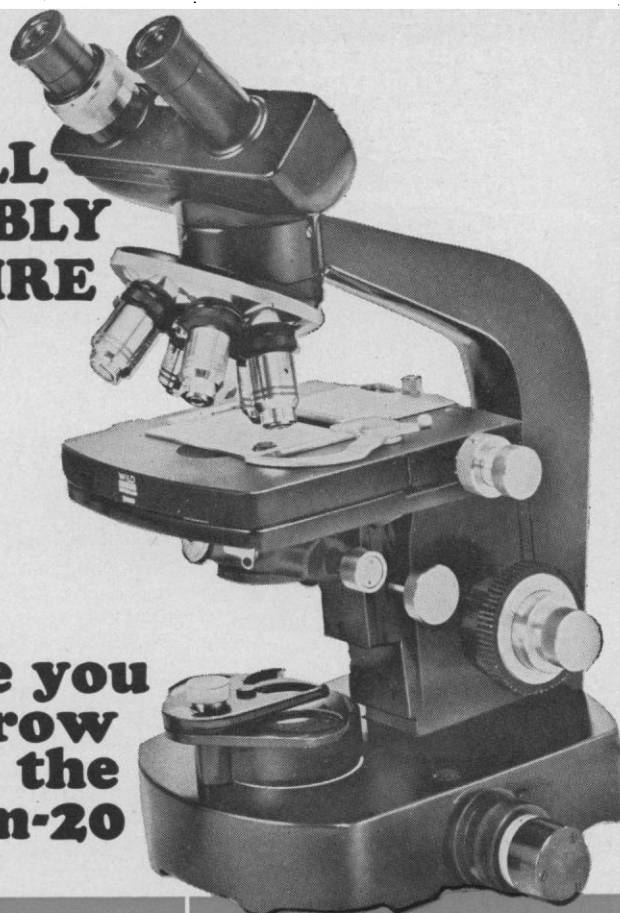
7-11. Federation of European Biochemical Societies, 6th, Madrid, Spain. (Secretariat, Centro de Investigaciones Biologicas, Velazquez, 144, Madrid 6)

8-11. International Symp. on Laboratory Animals, Washington, D.C. (B. F. Hill,

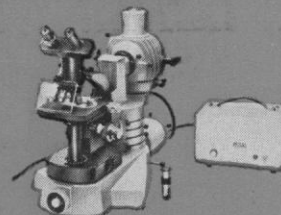
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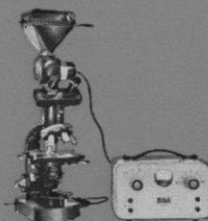
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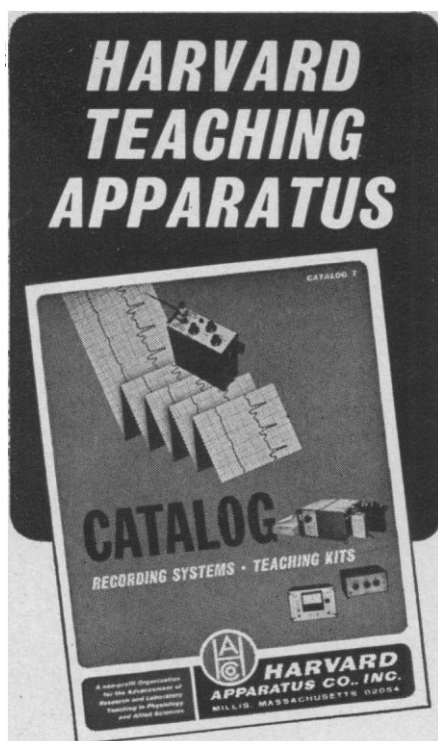
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9-12. **British Medical Assoc.**, clinical mtg., Valletta, Malta. (British Medical Assoc. House, Tavistock Sq., London, W.C.1, England)

14-17. **Cleft Palate**, intern. congr., Houston, Tex. (B. J. McWilliams, Cleft Palate Research Center, Univ. of Pittsburgh, 313 Salk Hall, Pittsburgh, Pa. 15213)

15-17. **Civil Engineering Problems of the South Wales Valleys**, Cardiff, England. (Institution of Civil Engineers, Great George St., London, S.W.1, England)

15-18. **International Magnetism Conf.**, Amsterdam, Netherlands. (T. Holtwijk, Philips Research Labs., Eindhoven, Netherlands)

17-18. **British Inst. of Radiology**, London, England. (British Inst. of Radiology, 32 Welbeck St., London, W.1)

19-27. **Yugoslav Seminar and Exhibition of Regulation, Measuring and Automation-Jurema 1969**, 14th, Zagreb. (Jurema, Unska U1, P.O.B. 123, Zagreb)

21-23. **Canadian Inst. of Mining and Metallurgy**, 71st, Montreal, Canada. (Executive Director, The Institute, Suite 906, 1117 St. Catherine St. W., Montreal 2)

21-25. **Switching Techniques for Telecommunication Networks**, London, England. (Conference Dept., Institution of Electrical Engineers, London, W.C.2)

21-26. **Canadian Pulp and Paper Assoc.**, 10th, Vancouver, B.C. (W. K. Voss, Ontario Paper Co. Ltd., Thorold, Ont.)

22-25. **Cotton Textile Research**, 1st intern. symp., Paris, France. (Institut Textile de France, 23 rue des Abondances, 92, Boulogne, France)

22-29. **Hydrology of Deltas**, intern. symp., Bucharest, Rumania. (A. I. Johnson, Water Resources Div., U.S. Geological Survey, Denver, Colo. 80225)

28-2. **Symposium on Radiation-Induced Carcinogenesis**, Athens, Greece. (R. N. Mukherjee, Unit of Radiation Biology, Intern. Atomic Energy Agency, Karntner Ring 11-13, A-1010 Vienna, Austria)

May

5-8. **Instrumentation in Aerospace Simulation Facilities**, 3rd intern. congr., Farmingdale, N.Y. (C. R. Spitzer, MS-236, NASA Langley Research Center, Hampton, Va. 23365)

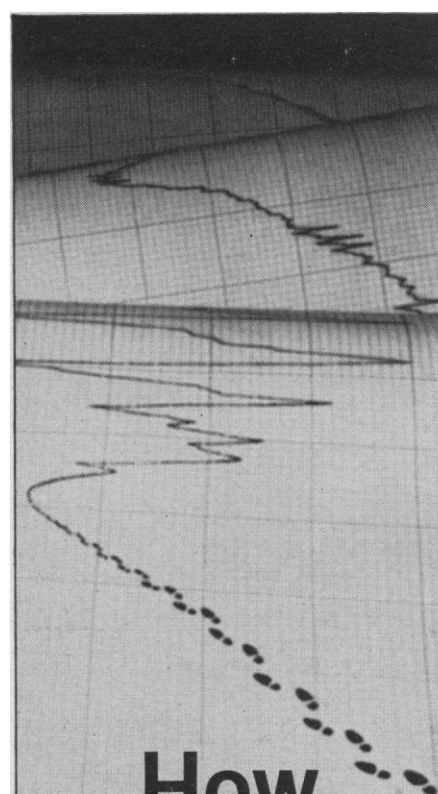
5-8. **International Microwave Symp.**, Dallas, Tex. (J. B. Horton, MS 905, Texas Instrument Co., Box 5012, Dallas 75222)

5-9. **Commonwealth Mining and Metallurgical Congr.**, 9th, London, England. (Congress Secretary, Commonwealth Council of Mining and Metallurgical Institutions, 44 Portland Pl., London, W.1)

6-8. **Nuclear Electronics Symp.**, Ispra, Italy. (L. Stanchi, C.C.R. Euratom, 21020 Ispra)

6-8. **Power Thyristors and Their Applications**, London, England. (Conference Dept., Institution of Electrical Engineers, Savoy Pl., London, W.C.2)

6-8. **Radiosensitizing and Radioprotective Drugs**, 2nd intern. symp., Rome, Italy. (H. Moroson, Sloan-Kettering Inst. for Cancer Research, Donald S. Walker Lab., 145 Boston Post Rd., Rye, N.Y.)



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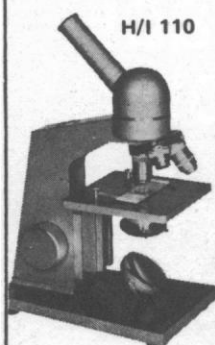
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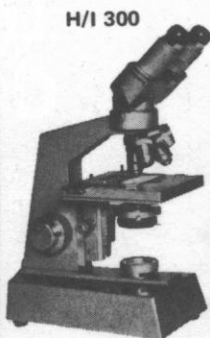


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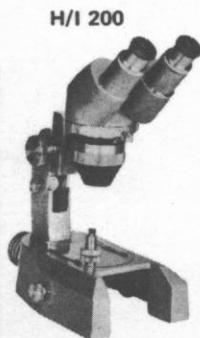


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BOOKS RECEIVED

(Continued from page 1054)

and W. West. Interscience (Wiley), New York, ed. 2, 1968. x + 486 pp., illus. \$16.95. *Technique of Organic Chemistry*, vol. 9.

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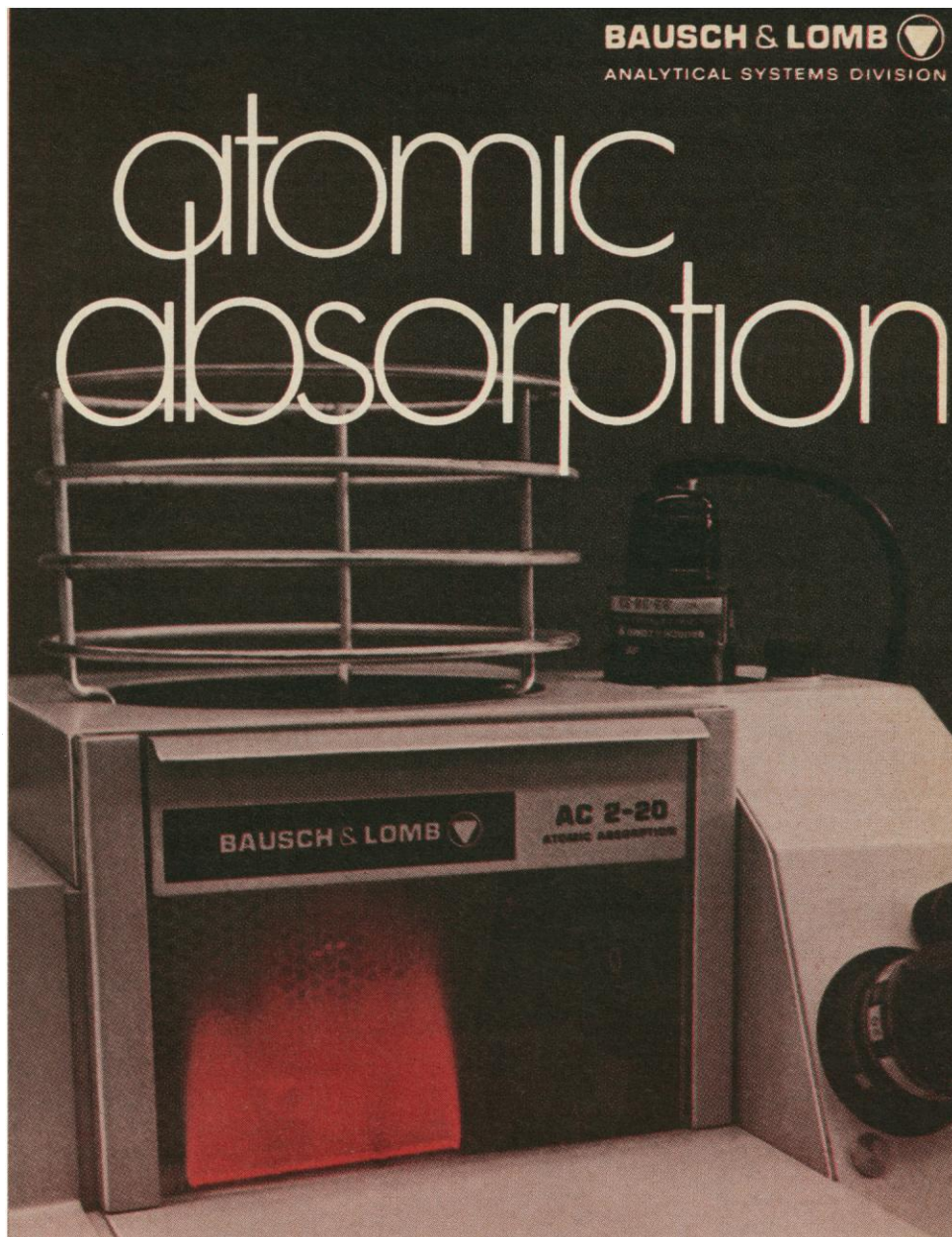
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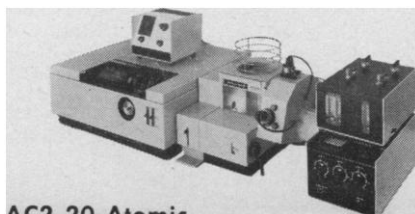
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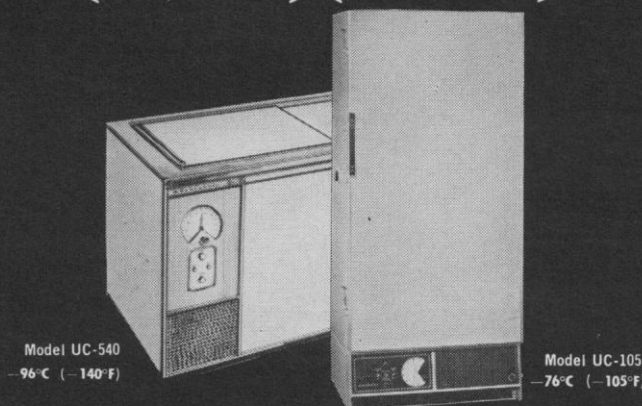
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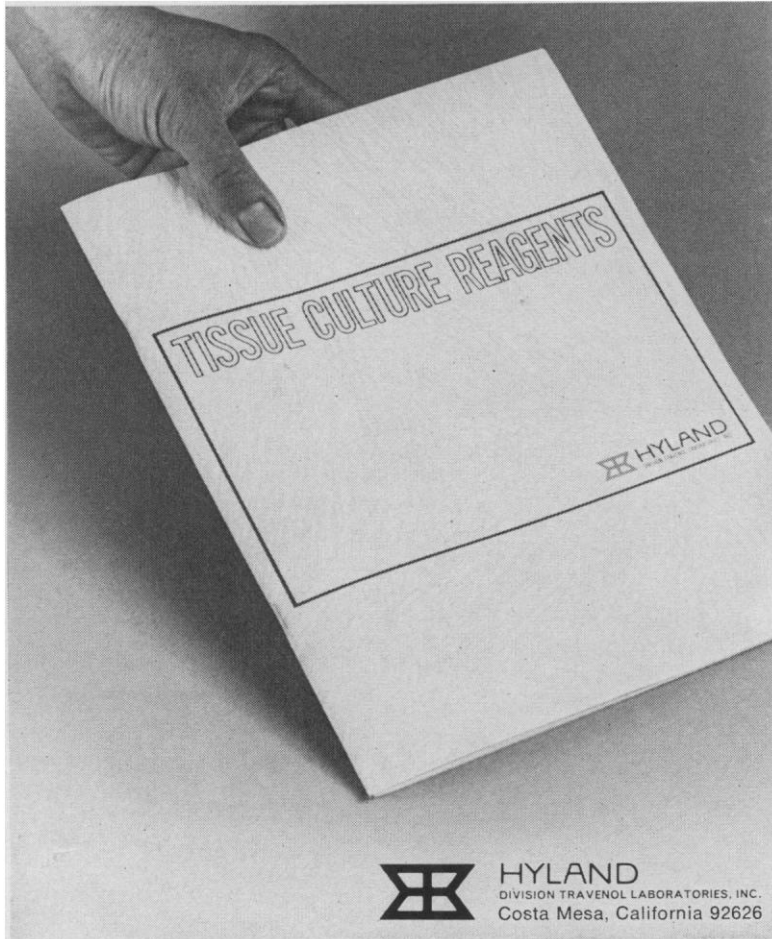
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Overlive. Power, Poverty, and the University. William M. Birenbaum. Delacorte, New York, 1968. xiv + 210 pp. \$4.95.

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A Preliminary Archaeological Survey of Guaymas, Sonora, Mexico. Part 1, Ensenada Bocoichibampo to San José de Guaymas (contd.). George E. Fay. Mu-

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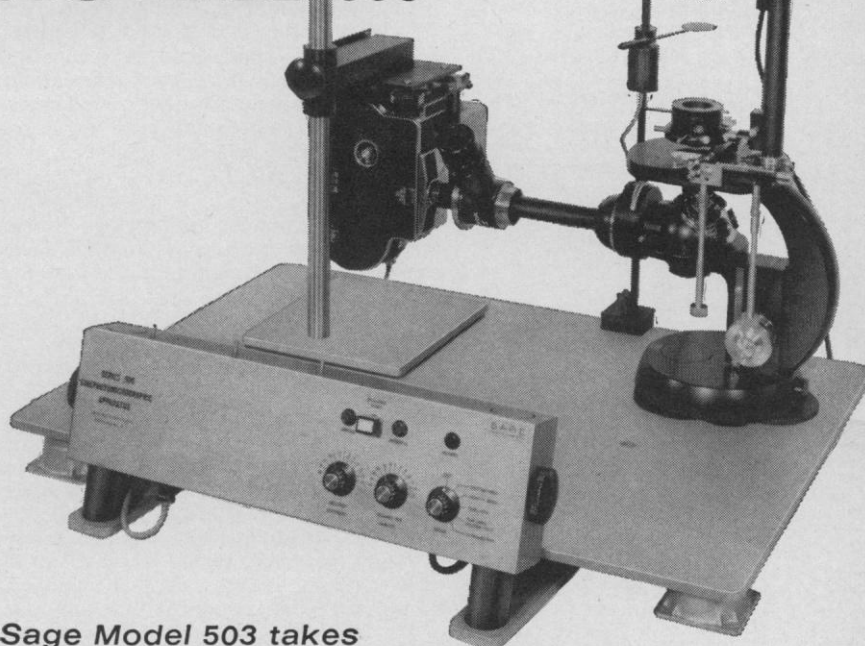
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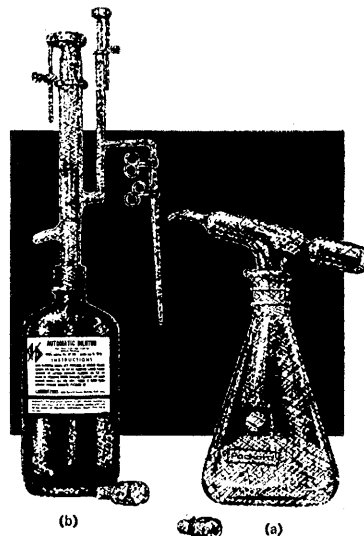
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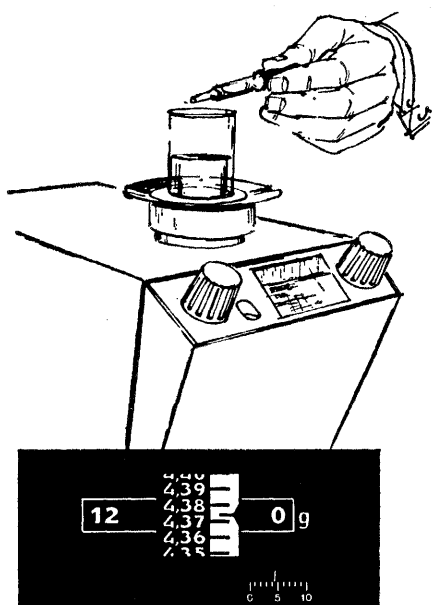
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