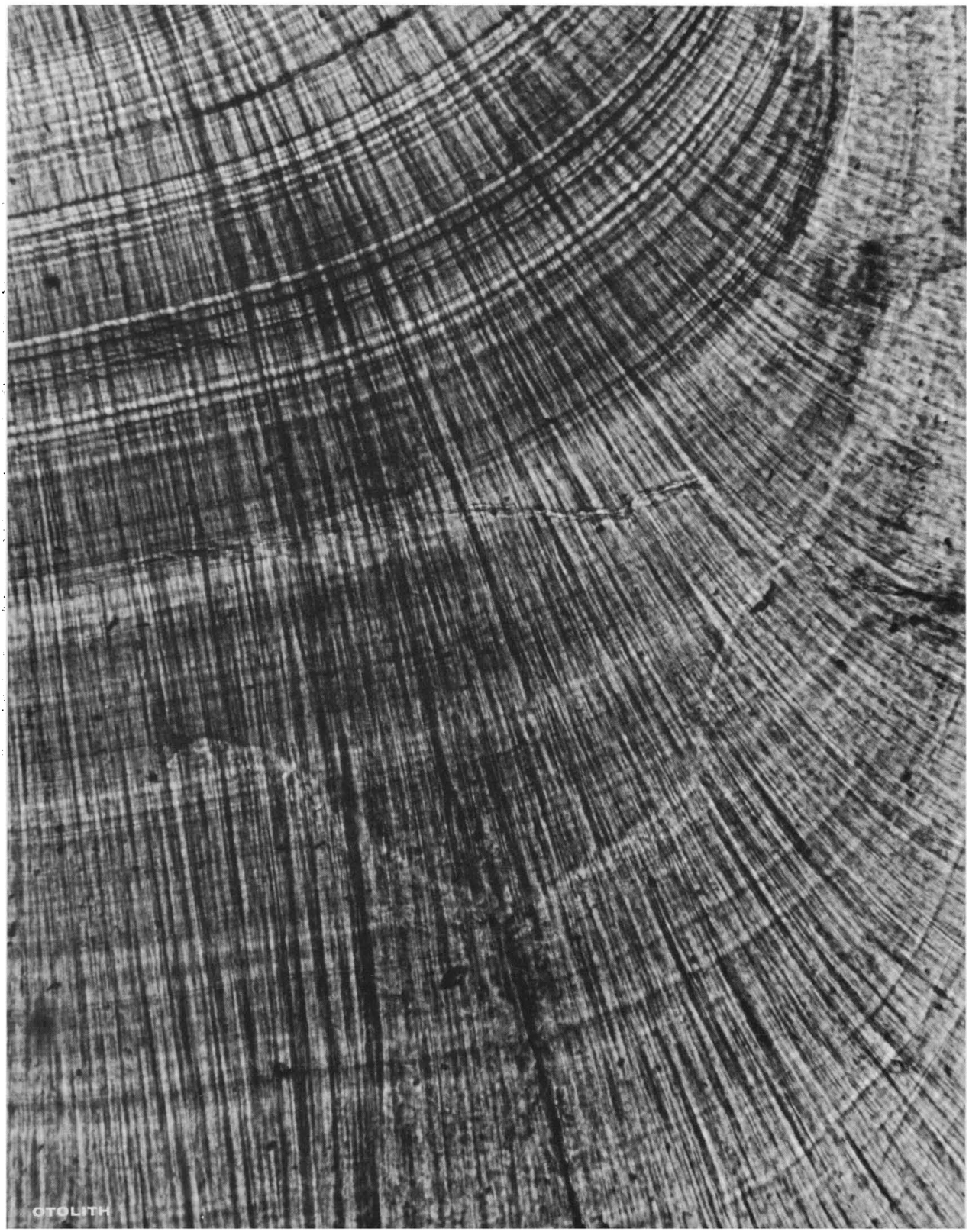
SCIENCE

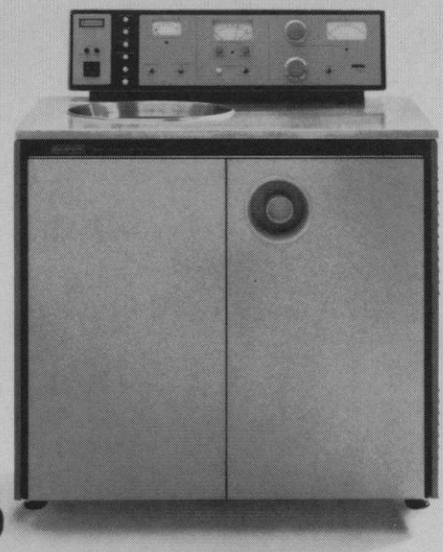
20 October 1967

Vol. 158, No. 3799

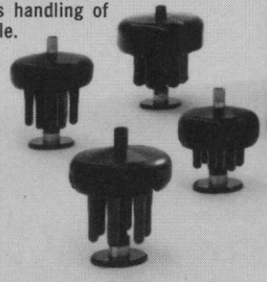
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



The ten new shapes in ultracentrifugation



New swinging bucket rotors—four of them—shaped to hold six buckets, to carry six samples to forces as high as 420,000 *g*. Buckets are designed to hook onto the body of the rotor—a convenience that also minimizes handling of the sample.



New B-14 and B-15 Rotors—The squat round shape identifies them as the rotors that bring large scale zonal capabilities to the standard preparative ultracentrifuge. Internal compartments are sector-shaped to minimize convective disturbances.

New Beckman Model L2-65B—with a crisp new external design reflecting the many innovations inside. As a result of those innovations the new L2-65B provides such remarkable control over experimental conditions that better band resolution and peak movement can be demonstrated. With its new rotors, the L2-65B can also do more work faster, so it is an investment in economy as well as in excellence.

Features of the L2-65B include infrared radiometric temperature control, independent electronic overspeed control, removable rotor stabilizer, solid state circuitry throughout, 65,000 rpm drive and large, extra-strength rotor chamber. Counting the nine new rotors shown here, the new Model L2-65B can handle twenty-three Beckman rotors to serve an unprecedented range of applications.

Whatever the scope of your work—traditional preparative, density gradient, large scale zonal—Beckman can offer you the instrument and the rotors. To get more information, call your local Spinco Division representative or write for Data File L2-65B.

New high-performance fixed angle rotors—three of them. The multi-planed sides readily distinguish these rotors from their predecessors. The new design enables them to operate on a higher level of force and capacity than has ever been attained before.

Beckman® INSTRUMENTS, INC.

SPINCO DIVISION

PALO ALTO, CALIFORNIA • 94304

INTERNATIONAL SUBSIDIARIES: GENEVA; MUNICH; GLENROTHES, SCOTLAND; TOKYO; PARIS; CAPETOWN; LONDON; MEXICO CITY

20 October 1967
Vol. 158, No. 3799

SCIENCE

SCIENCE is published weekly on Friday and on the fourth Tuesday in November by the American Association for the Advancement of Science, 1515 Massachusetts Ave., Washington, D.C. 20005. Now combined with **The Scientific Monthly®**. Second-class postage paid at Washington, D.C. Annual subscriptions $8.50; foreign postage, $1.50; Canadian postage, 75¢; single copies, 50¢ (back issues, $1), except **Guide to Scientific Instruments**, which is $2. School year subscriptions: 9 months, $7; 10 months, $7.50. New rates effective 1 January 1968: Annual subscriptions $12.00; foreign postage: Americas, overseas $5; single copies, 50¢ (back issues, $1), except **Guide to Scientific Instruments**, which is $2. School year subscriptions: 9 months, $9; 10 months, $10. Provide 4 wee

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Otolith of the nototheneid fish, *Trematomus bernacchii*. The thin section, about 50 microns thick, illustrates the complex but orderly structure of the otolith (about × 11). See page 368. [L. R. Kittleman, University of Oregon]

New From Ace!

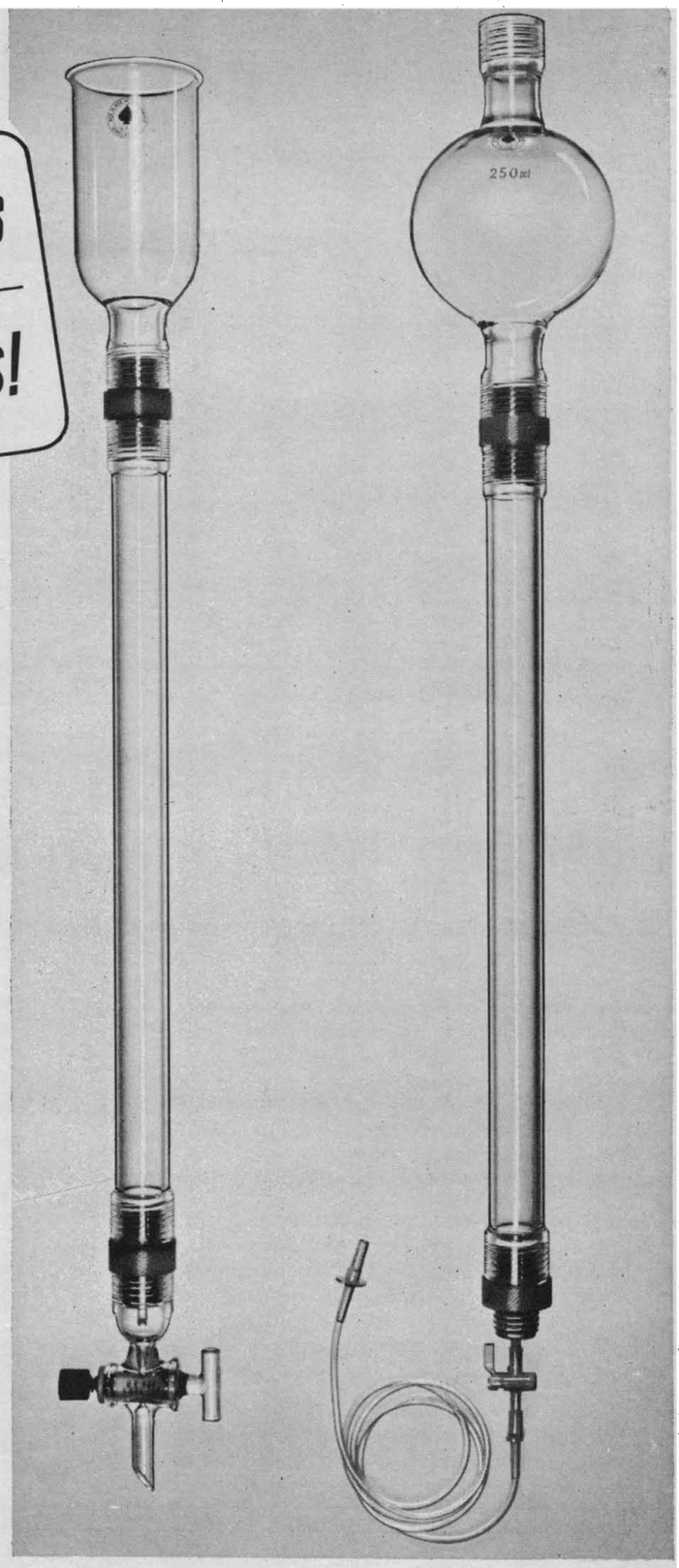
Threaded Glass/Nylon Couplings

No Clamps! No Springs!

A complete system of liquid chromatography

chemical and biological

preparative and determinative



Unique threaded glass-to-plastic fittings interchangeable within each diameter couple leak-tight by hand pressure by means of inert "O" ring seal

Easy assembly without springs or clamps. Internally threaded glass parts and nylon "O" ring couplings screw together in firm but not rigid engagement to make a positive seal at pressures far above those normally used for chromatography. The system features an unusual variety of end fittings which provide means for the introduction of controlled atmospheres or pressure drop controls. Syringe introduction of samples is possible through a septum side arm; eluent samples can be withdrawn by the same means. The septum can be removed and replaced with a side arm feed tube for dual or alternate flow. Platinum wire electrodes can be introduced. Adjustable height feed tubes allow various packing heights to be employed with one column. A polyethylene float receives the droplets and prevents agitation at the surface. The rapid flow porous polyethylene or Teflon® standard packing support has straight through holes which retard mixing. The stopcocks are Teflon clad and require no lubricant. All components are described in the Ace October bulletin—send for your copy.

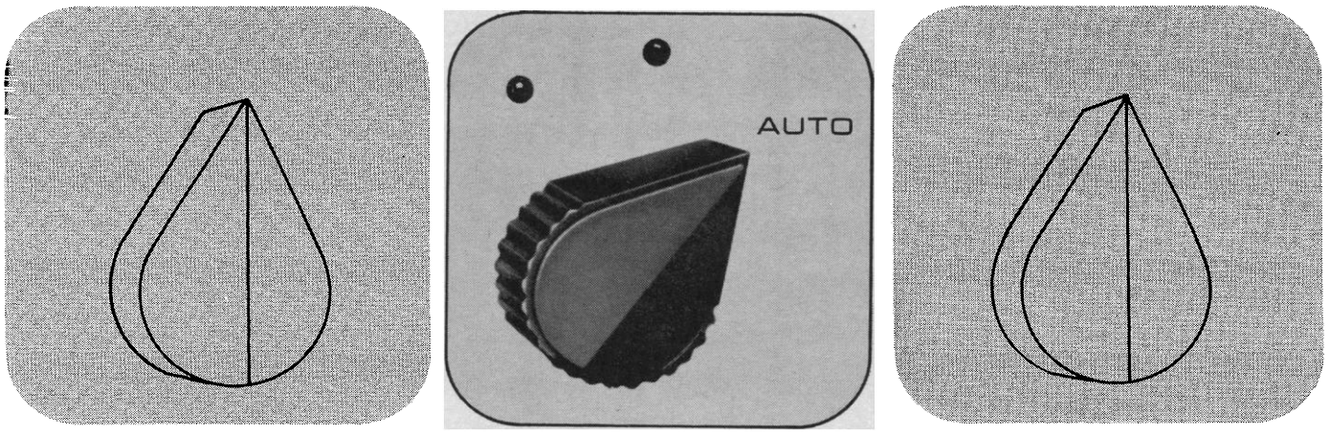
®Teflon is a Reg. TM E. I. DuPont

CHEMICAL & LABORATORY GLASSWARE

ACE GLASS INCORPORATED

Vineland, New Jersey

Louisville, Ky. Springfield, Mass.



Why are Canalco's UV flow monitors the only ones with automatic scale expansion?

Frankly, we can't imagine why no other manufacturer offers this feature. After all, it's the only way you can have maximum usable sensitivity at all times—even in unattended, overnight operation—with perfect assurance that the recorder's pen won't go off scale and lose vital information.

In addition to automatic 3X expansion, Canalco Wide-Track UV Flow Analyzers also have six other important features that combine to give you extra sensitivity of detection plus reliable, versatile, drift-free performance. Among them are:

■ dual phototube ratio circuitry for accurate linear Transmittance recording, in spite of line voltage or lamp intensity fluctuations. (By the way, linear T recording gives *twice the pen deflection* of linear Absorbance recording at low optical densities, just where you need sensitivity the most. Furthermore, the Wide-Track 3X scale gives direct quantitation; over this chart range, linear T and linear A differ less than 1% T.)

■ both single-cuvette and dual-cuvette models are available. With two cuvettes, you can flatten your baseline out even if solvent absorption changes, as in gradient elutions;

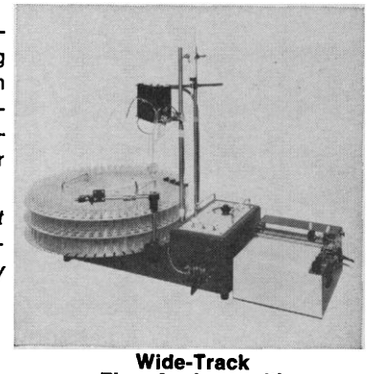
■ you have a choice of *five* optical path lengths, up to 20 millimeters (twice the length, four times the sensitivity our competitors offer);

■ Canalco Wide-Tracks come complete with wide-chart recorder (7½ inches of calibrated grid), including side-of-chart event marking pen to correlate peaks with fraction collector tubes. (Marker pen connection plugs directly into Canalco, Warner-Chilcott and Research Specialties fraction collectors; connection to other makes is also simple.)

■ single-wavelength operation gives optimum sensitivity for both proteins and nucleotides, eliminates filter and source changing;

■ extension cable kits facilitate mounting sensing heads in cold rooms, with recorder conveniently outside. No temperature compensators are required for coldroom use.

Get the full facts about the four models in Canalco's Wide-Track family Write today!

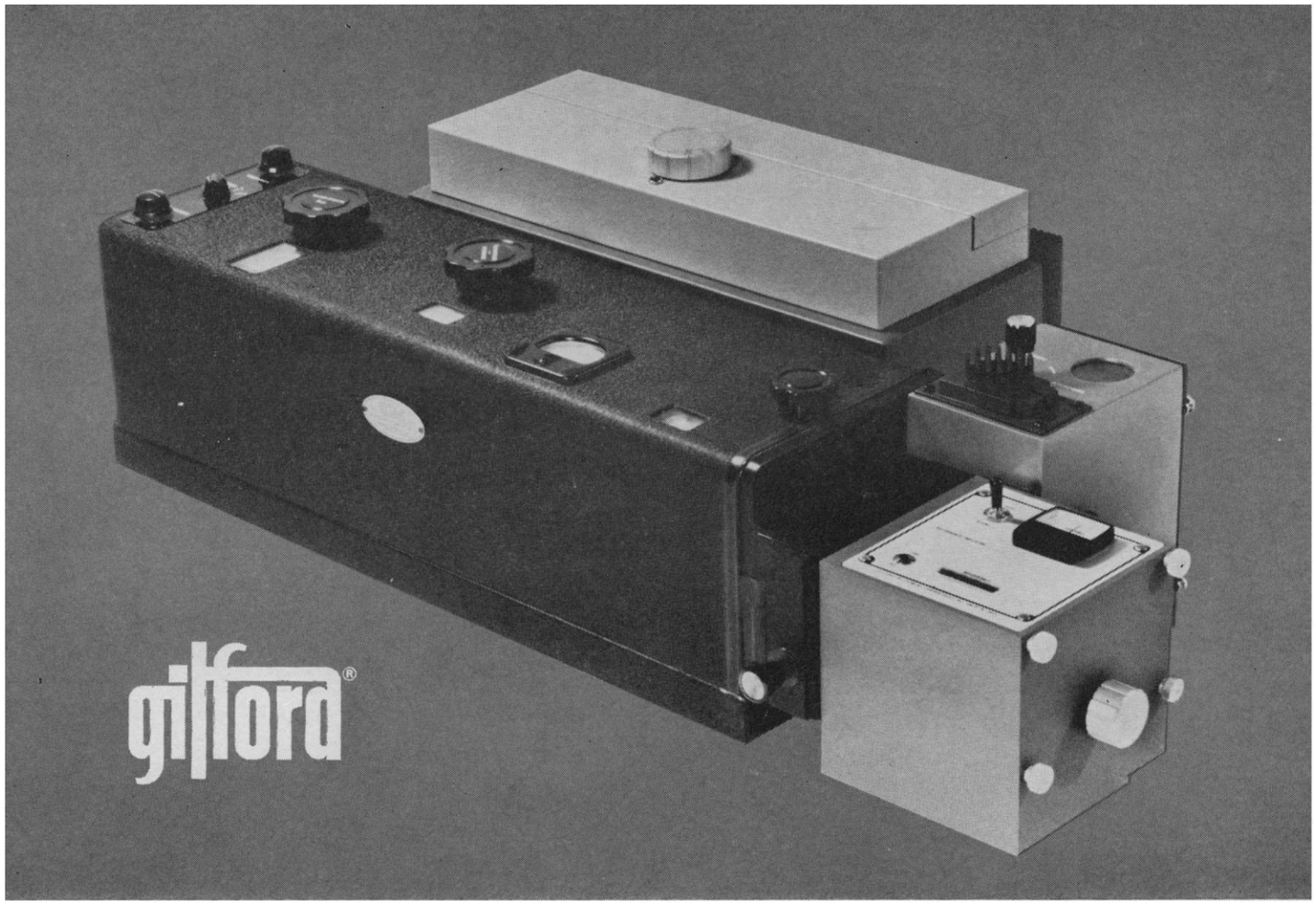


Wide-Track Flow Analyzer with Canalco Fraction Collector

CANALCO

CANAL INDUSTRIAL CORPORATION
5635 Fisher Lane Dept. S-10W
Rockville, Maryland 20852/(301) 427-1515

Sales Offices in: Boston • Chicago • Cincinnati • Cleveland • Denver • Houston • Los Angeles • Minneapolis • New York • Ottawa • Philadelphia • Pittsburgh • San Francisco • Washington, D.C.



Up-Date Your Spectrophotometer For Increased Accuracy, Greater Productivity

Many older spectrophotometers have excellent optics, but the usefulness is limited by outmoded surrounding electronics.

Now you can change all that!

The investment made in hundreds of these units has been protected by the Gilford Spectrophotometer Modernization Program. Accuracy has been up-graded, operation made simpler, and chance for error in readings reduced.

Gilford has developed Model 222 equipment just for this purpose. It may be used with most leading makes of spectrophotometric monochromators.

The Model 222 solid-state power supply smooths out and regulates power for both the input light source and the output sensing equipment. This assures accuracy and dependability of light input and three decade output reporting.

The Gilford 222 Photometric Unit reports absorbance directly with linear digital indication from zero to 3 A. Sensitivity to 0.001 A. Drift less than 0.005 A per hour.

Find out how little it will cost you to bring your present spectrophotometer up-to-date. Complete and mail the coupon below, or better still, telephone us at:

Area 216 — 774-1041

Gilford Instrument Laboratories, Inc.
Oberlin, Ohio 44074

Gentlemen:
We have a (Make and Model)_____ Spectrophotometer.
Please send us your full information and estimate of the cost of up-dating this instrument with Gilford 222 equipment.

Name _____

Address _____

City _____ **State** _____ **Zip** _____

Now—control spill-over in dual label scintillation counting automatically.

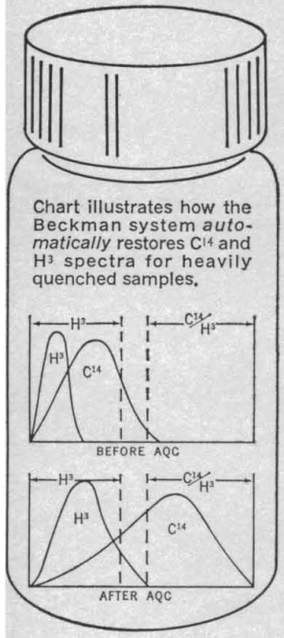


Chart illustrates how the Beckman system *automatically* restores C^{14} and H^3 spectra for heavily quenched samples.

Beckman introduces Automatic Quench Calibration (AQC) – an exclusive capability which permits each isotope to be counted in its optimum window regardless of quench level – automatically.

With the problem of spill-over between channels brought under precise control, double-label experiments under varying quench conditions are practical for the first time. Available now on our LS-150 and LS-250 Counters, AQC automatically compensates for varying quench between samples by adjusting system gain to the optimum setting for each sample before it is counted. It eliminates the laborious task of maintaining a constant quench for all samples. You have *no manual adjustments* to make after initial calibration–the system is completely automatic. Just punch the START button and leave the instrument unattended. Your 100 or 200 sample load will be fully analyzed in significantly faster time–*with guaranteed higher accuracy*–than previously possible. For single isotope analysis with samples of widely varying quench-again, nothing need be touched but the START button to receive optimum counting performance, automatically.

No competing system even approaches the LS-150 and LS-250 in solving the spill-over problem and simplifying other complexities of scintillation counting – for more details and demonstration of their exclusive benefits, contact your Beckman Sales Representative or write for Data File #400D. Automatic Quench Calibration is...

another reason why Beckman leads the liquid scintillation field on every count.

Beckman®

INSTRUMENTS, INC.

SCIENTIFIC INSTRUMENTS DIVISION

FULLERTON, CALIFORNIA • 92634

INTERNATIONAL SUBSIDIARIES: GENEVA; MUNICH; GLENROTHES, SCOTLAND; TOKYO; PARIS; CAPETOWN; LONDON; MEXICO CITY

Hook up a spectrophotometer, densitometer, or similar instrument to Sargent's SRL Recorder. You'll get a continuous, true-potentiometric plot of transmittance on a linear scale.

Replace the linear pen-drive gears with our precision log gears and plot absorbance directly on a *linear* scale.

In fact, the SRL can be used to record, either linearly or logarithmically, any variable that has a DC-voltage analog. Or any variable (such as temperature, pH, or thermal conductivity) that will produce a potential by means of transducers.

The SRL always produces a sharp, faithful plot, because its full-scale response is less than 1 second. Accuracy is ±¼% or 10 microvolts (whichever is greater) on the linear scale and ±0.003 at 0.4 absorbance on the log scale.

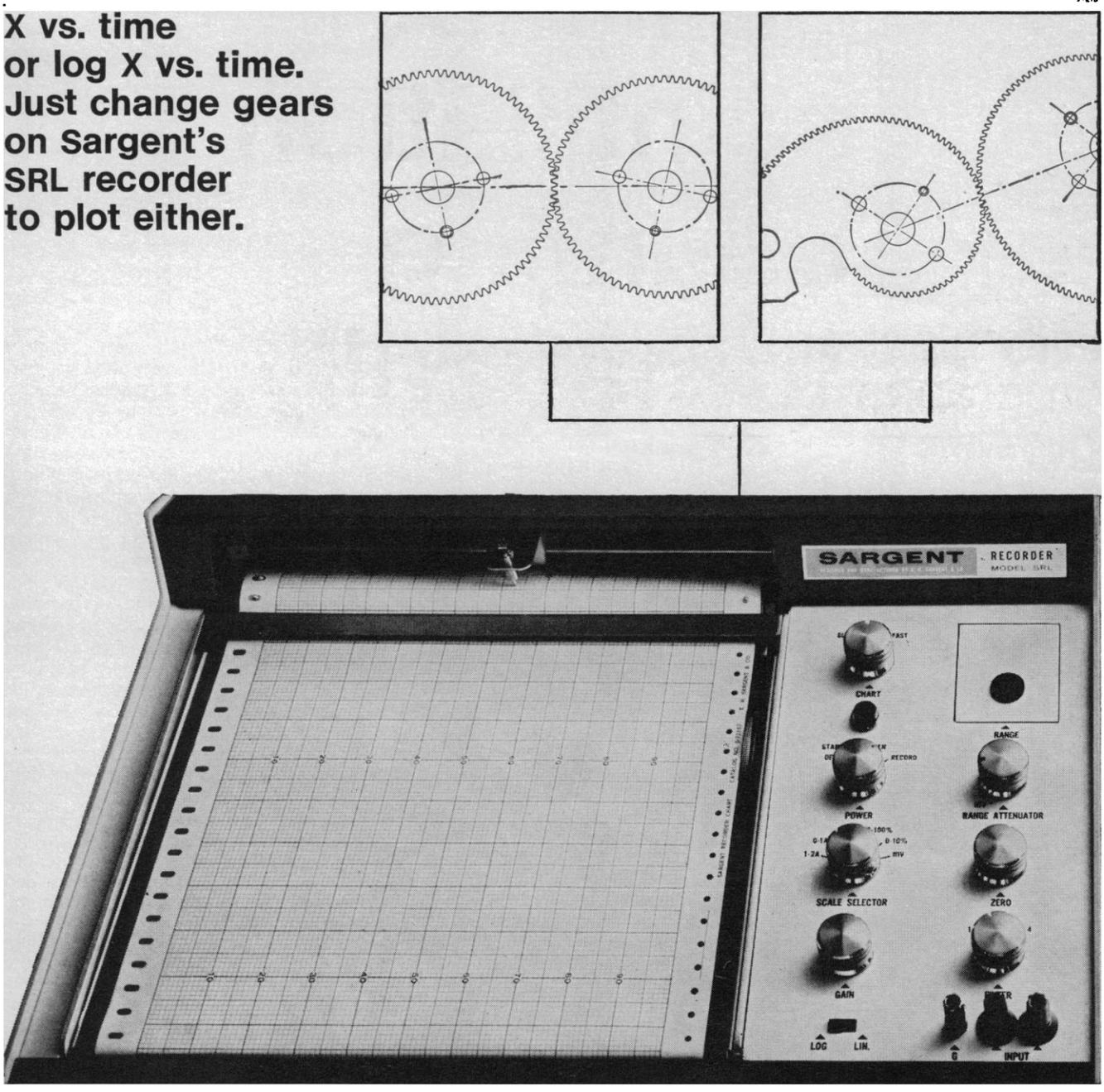
There's more: A 240-mm-wide chart for accurate, convenient reading. Precalibrated range plugs for 1.0 to 120 mv and full-scale range attenuation control for both linear and log range. Electrically switched, 3-speed chart drive. Synchronous switching for simultaneous driving of chart and associated instrument (such as spectrophotometer). Filter switch to eliminate undesirable AC voltages. DC Zener power supply.

The SRL Linear-Log Potentiometric Recorder is designed and manufactured by E. H. Sargent & Co. With pen, paper, range plugs, and connecting cables, it's priced at $1075. With disc integrator installed, the SRL costs $1800.

Please call your Sargent man or write to us to arrange for a demonstration of the SRL Recorder.

7-215

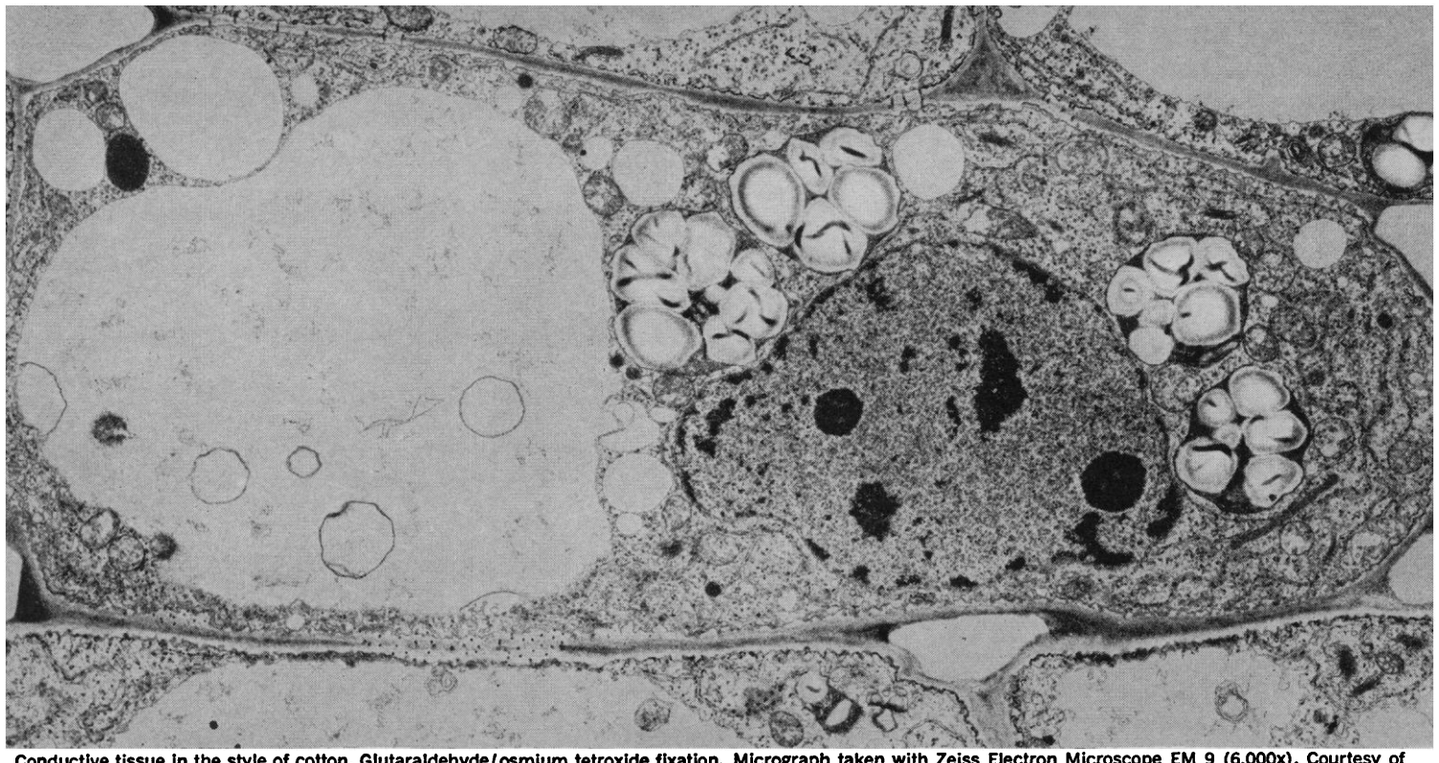
X vs. time or log X vs. time. Just change gears on Sargent's SRL recorder to plot either.



SARGENT®

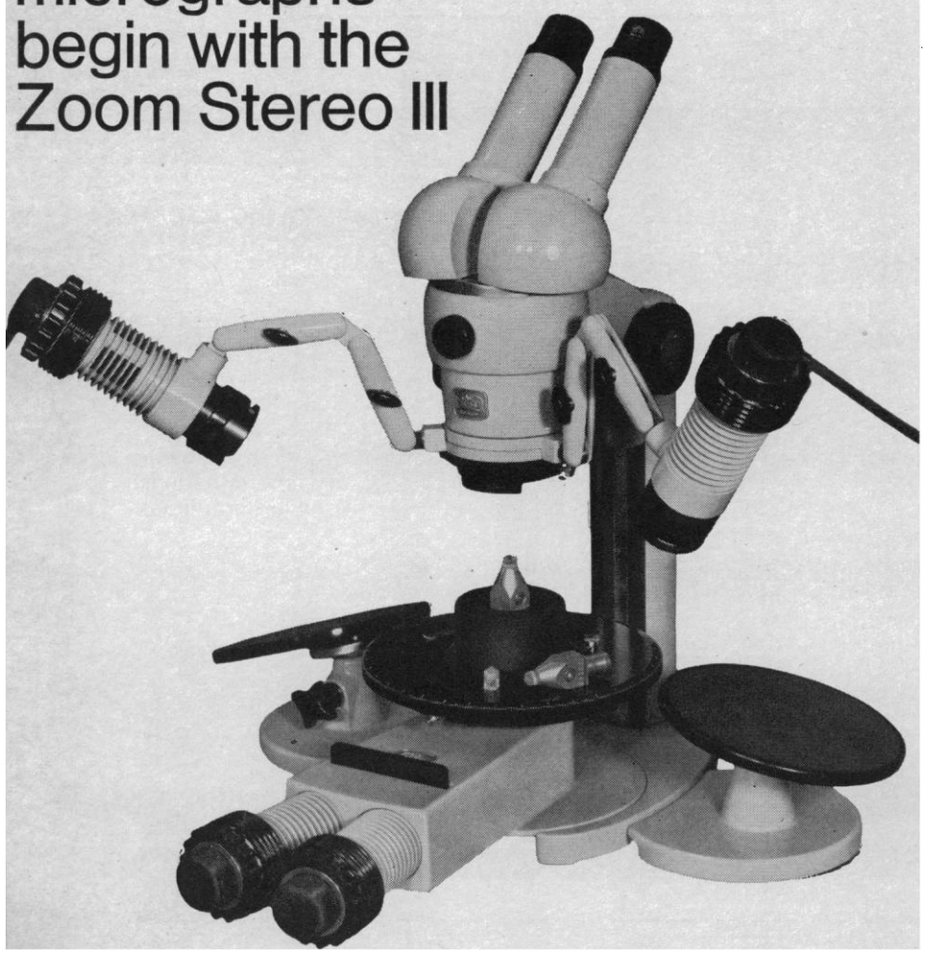
Scientific laboratory instruments, apparatus, chemicals. E. H. Sargent & Co.
4647 Foster Ave., Chicago, Ill. 60630

Chicago/Anaheim, Calif./Birmingham
Cincinnati/Cleveland/Dallas/Denver
Detroit/Springfield, N.J./Toronto, Canada



Conductive tissue in the style of cotton. Glutaraldehyde/osmium tetroxide fixation. Micrograph taken with Zeiss Electron Microscope EM 9 (6,000x). Courtesy of Professor William A. Jensen, Botany Department, University of California, Berkeley.

Quality electron micrographs begin with the Zoom Stereo III



In specimen preparation for electron microscopy, the Carl Zeiss Stereomicroscope III is a valuable tool in *every* phase of your work. Block trimming is simplified. Because with auxiliary lenses, you can accomplish block facing within fractions of a millimeter.

The instrument's unique substage light source provides Köhler illumination to both objectives, useful in tissue culture and cell isolation. The result is uniformity of illumination unequalled by any other stereomicroscope. The Stereo III can also be used with transmitted light, reflected light, or both simultaneously. For qualitative examinations in polarized light, a combination of polarizer and simple analyzer is available. The attachment camera, either 35mm or Polaroid®, is an indispensable accessory for the documentation of cell division.

Stereo III offers continuous magnification from 2 to 200x and working distances from 1 to 5 inches depending on the lens combination. The binocular body can be rotated 360° and is attachable to special stands to equip the instrument for many routine as well as specialized laboratory applications. In addition, different stages, measuring and drawing devices extend the versatility of the instrument.

For detailed information contact Carl Zeiss, Inc., 444 Fifth Ave., New York, N.Y. 10018. (212) 736-6070. Complete service facilities available.

ZEISS

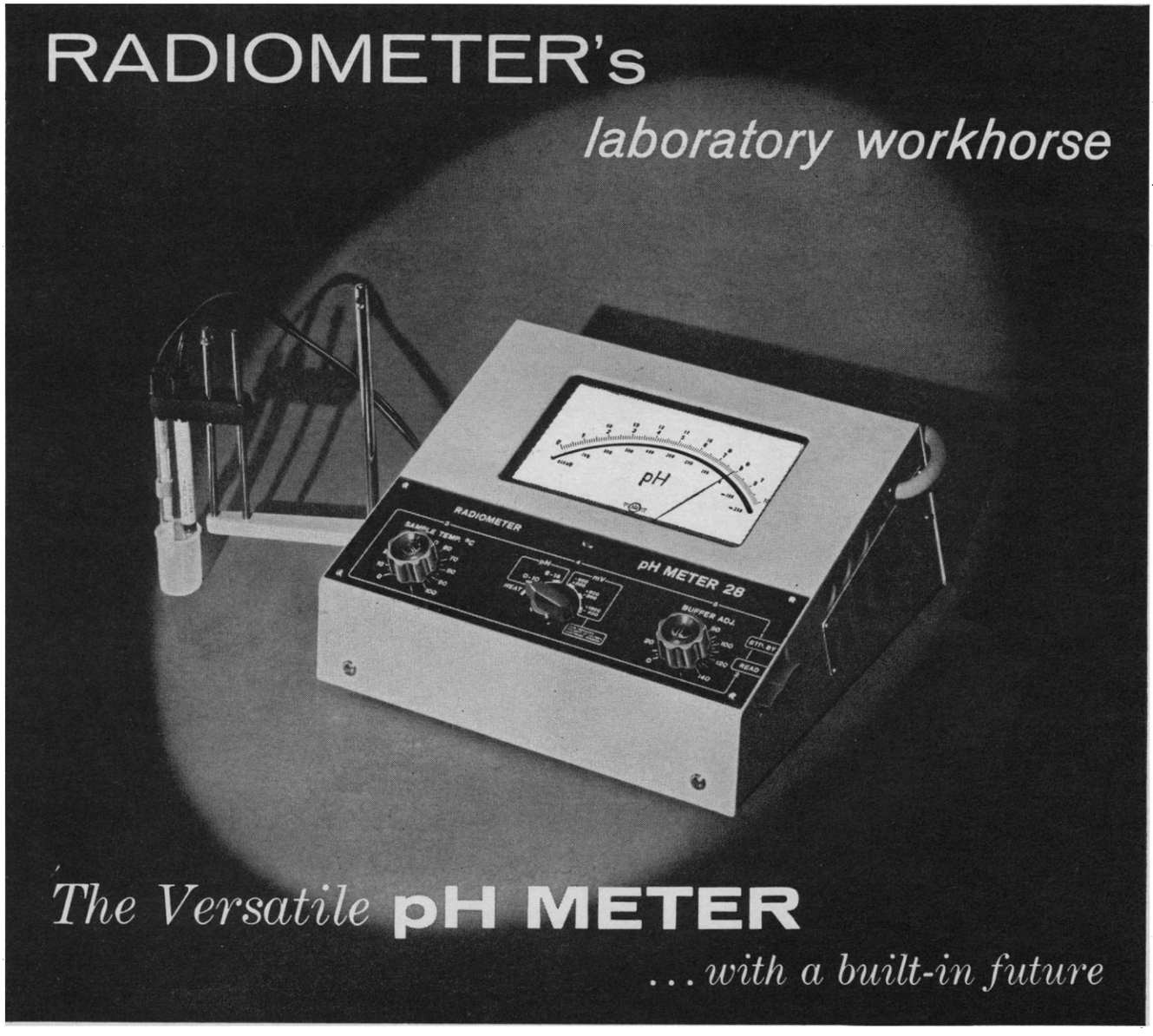
THE GREAT NAME IN OPTICS

CARL ZEISS WEST GERMANY

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

RADIOMETER's

laboratory workhorse



The Versatile **pH METER**

... with a built-in future

pHM28

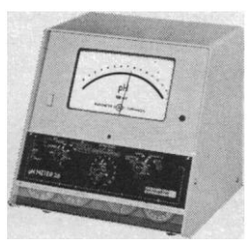
The pHM28 — a product of Radiometer's 30 years of experience and leadership in pH meter design and production — meets the many requests for a lower priced, high quality, general purpose instrument.

It provides the **versatility** to perform all routine pH measurements with excellent readability, accuracy and stability. It is ideal for diversified pH determinations, potentiometric measurements, titrations (including Karl Fischer) and continuous pH monitoring over long periods.

The large mirrored meter, with its dual measuring ranges of 0 to 10 pH and 6 to 14 pH, is easily read, with reproducibility of ±0.02 pH.

The pHM28 also provides **modular adaptability** for growth into automatic titration, control and recording systems by the addition of the TTT11 Controller and other Radiometer components.

Get the facts now . . . Write - Wire - Phone (or use the coupon).



If your application requires the very finest for research and highly specialized scientific projects, ask for a demonstration of our Model pHM26.

THE LONDON COMPANY 811 Sharon Drive Westlake, Ohio 44091

RADIOMETER COPENHAGEN

Please send me the facts on Radiometer pH meters.

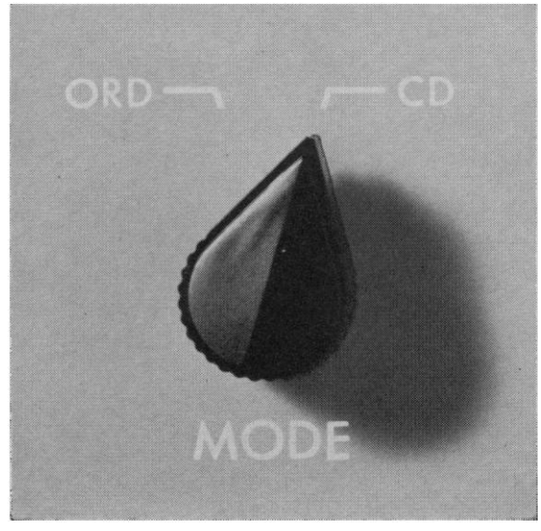
Name_____ Title_____

Company_____ Dept._____

Address_____

Developing a CD measuring capability for a spectropolarimeter isn't something you rush. At least if you want to do it right. First we had to make certain that circular dichroism was recorded with a performance comparable to our present ORD capabilities – that the CD accessory performed as well as the basic Optical Rotatory Dispersion instrument, with the same minimum detectable optical activity in either mode. And that it was done over a range of 1850 to 6000Å.

Then we considered the chemist himself. Would it be simple for him to use. Problems associated with molecular conformation and stereochemical studies are difficult enough, so we tried to help him get his data as easily as possible. Only two new controls were added, and the CD unit was designed for quick installation. Change-over time, from one mode of operation to the other, is only a matter of minutes. Now all the convenience and versatility of our ORD controls, which allow quick adaptation of instrument parameters to sample requirements, are also available for CD.



Both CD and ORD utilize the same adjustable slit program, for constant energy or resolution; the same strip chart recorder, for maximum flexibility of presentation; the same constant temperature system, for stability; and, the same double monochromator, for providing low stray light and high resolution.

All the controls are grouped together to keep the versatility of the instrument convenient and easy.

Finally, we wanted the CD equipment to adapt easily to CARY 60 Spectropolarimeters in the field. That way a laboratory would have one instrument which was unsurpassed in either its ORD or CD capabilities.

It was worth the wait.

For details, write Cary Instruments, a Varian Subsidiary, 2724 S. Peck Road, Monrovia, California 91016. Ask for Data File E702-107

CARY 60
SPECTROPOLARIMETER

Now Cary's Model 60 has CD. Better late.

The Olympus Photomax recording microscope

It comes complete with a panel of experts

Behind the control panel built into the new Olympus Photomax is a photographic control center that guarantees you a perfect record of your visual observations. Perfectly exposed. Perfectly focused. And rendered with absolutely accurate color balance.

Dial any black and white ASA film speed from 10 to 4000 (or color films from 10 to 8000 ASA); when you see what you want in the matched, wide-field eyepieces, press the cable release.

The Photomax control center continuously monitors image brightness, automatically controls the built-in electromagnetic shutter for exposure times from 1/100 second to five minutes—*and compensates automatically for reciprocity failure in black and white film.*

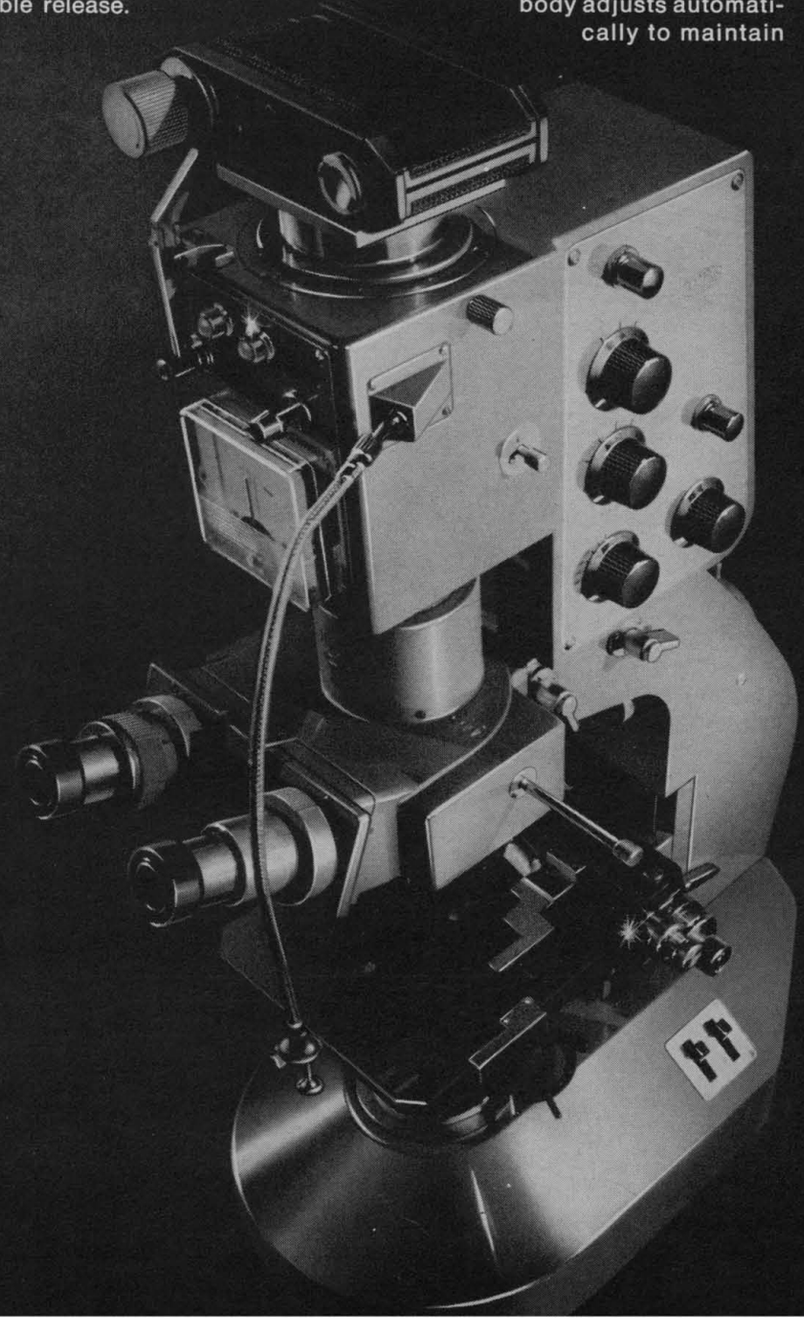
And it monitors color temperature, too, over a range of 2854°-6000° Kelvin, to match any and every color film.

The inclined binocular body adjusts automatically to maintain constant optical tube length for all interpupillary distances, ensuring parfocality with the film plane at all times. Eyepieces with built-in camera finder masks are available for the Photomax; wide-field, high-eye point 10X eyepieces with diopter adjustment are standard.

A built-in magnification changer (1X, 1.5X and 2X) gives the five standard objectives a magnification range from 28X to 1400X for photography, 40X to 2000X for visual observation. Optional eyepieces and objectives extend the photographic range down to 9.1X, offer visual observation at as little as 6.5X or as much as 4000X.

In addition, the Photomax offers a full range of dovetail-mounted, interchangeable stages and condensers, and features a built-in substage illuminator effective for all objectives from 1.3X to 100X.

Complete information on the Olympus Photomax—or on other Olympus microscopes to suit your particular application—is yours for the asking.



OLYMPUS CORPORATION OF AMERICA
PRECISION INSTRUMENT DIVISION

OLYMPUS CORPORATION OF AMERICA
PRECISION INSTRUMENT DIV.
P. O. Box 8968 Westgate
Rochester, N. Y. 14624

S

Send information on Olympus microscopes. My applications include:

_____

_____

Name_____

Title_____

Organization_____

Address_____

City_____

State_____ Zip_____

The stable one.

People who have used our new Hitachi Perkin-Elmer MPF-2A tell us it has the kind of performance they never expected to see in a fluorescence spectrophotometer.

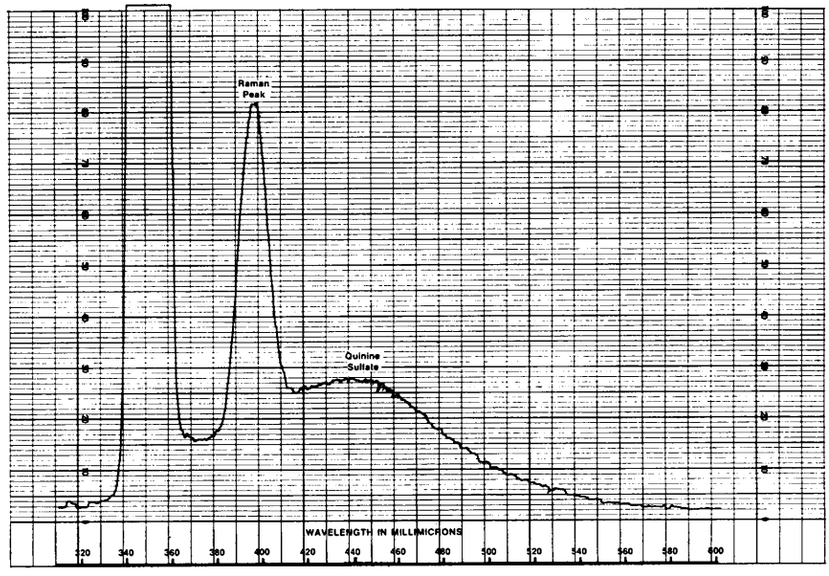
It starts with a unique feature that makes high stability possible—ratio recording. With ratio recording if source energy changes, the sample emission changes; the ratio remains constant, and the recorded signal does not reflect any source fluctuation. In addition, the xenon power supply is carefully stabilized.

What does this mean in the lab? Just that you won't have to keep running your standards over and over to make sure your specimen results aren't drifting. Once or twice a day will be enough to run your standards, and you'll be astonished at their repeatability. The measured precision is 0.24 standard deviation in 85.9 units of pen deflection for 16 repeated spectra of 0.1 ppm anthracene.

Real sensitivity

Without stability, high sensitivity doesn't do you much good. The MPF-2A gives you both.

Even under high-resolution (narrow-bandpass) conditions, sensitivity is exceptional, as the recording shows. You can detect 2 parts per billion of quinine sulfate and completely separate the H_2O Raman peak. If you don't restrict the spectral bandpass, you can actually detect *2 parts per hundred billion!*



It has everything

The MPF-2A has everything you need to get right to work on high-resolution fluorescence and phosphorescence studies; 5 Angstrom resolution can be achieved with both the emission and excitation monochromators.

You get a ratio-recording instrument with dual, high-energy grating monochromators. Built-in filters assure spectral purity.

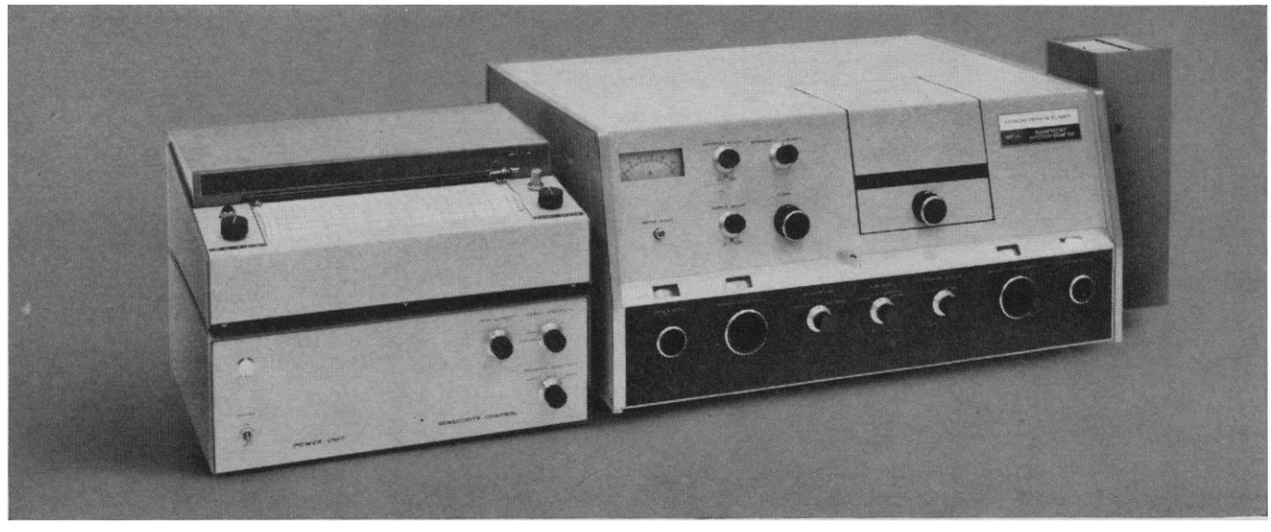
The recorder is included.

We give you high-precision slits that you can set precisely (1 to 40 millimicrons). No more fixed slits—throw away those tweezers.

There's a huge sample compartment—far bigger than any other instrument's. It isn't wedged down between two monochromators, but sits up front where you can get at it. It has a 4-position cell holder you can dial from the outside... you don't even have to lift the cover.

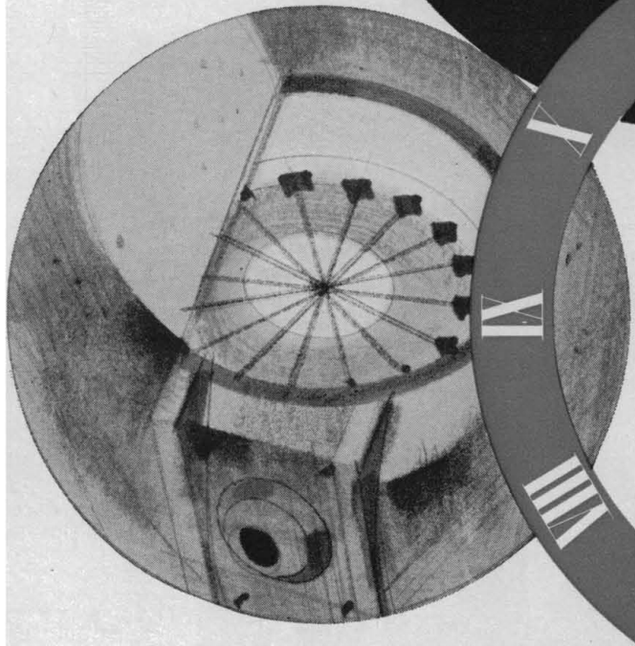
Stability, precision, sensitivity, repeatability, resolution—all the good words apply in abundant measure to this new instrument. We want you to know more about it. Write to: Instrument Division, Perkin-Elmer Corporation, 723 Main Avenue, Norwalk, Conn. 06852—or your nearest Perkin-Elmer office.

PERKIN-ELMER



HARSHAW *MANUFACTURES* DENSITY GRADIENT MATERIALS

and we ship any of these within 24 hours!



Sterile sucrose solutions
Cesium chloride
Cesium sulfate
Cesium formate
Cesium hydroxide
Rubidium iodide
Rubidium chloride
Rubidium bromide
Potassium citrate
(60% solution)

FAST SERVICE . . . Orders are shipped the *same day received*, or early next day. Telephone orders accepted.

RELIABILITY . . . Harshaw's experience in the production of absorption free* materials for over 30 years guarantees you extremely high purity analytical tools.

UNIFORMITY . . . Harshaw continuous quality control assures you of a high degree of uniformity from lot to lot.

COMPLETE LINE . . . A complete stock of Harshaw Density Gradient Materials is available to meet your requirements.

Complete specifications and prices are available on request. Special consideration will be given to blanket orders.

** Below specified value at critical wave length. Specific values available on request.*

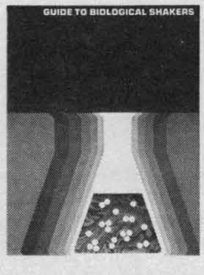
HARSHAW

THE HARSHAW CHEMICAL COMPANY
DIVISION OF KEWANEE OIL COMPANY
CRYSTAL-SOLID STATE DEPARTMENT
1945 East 97th Street • Cleveland, Ohio 44106 • Telephone 216 721-8300
Utrecht, Netherlands—Harshaw Chemie N. V.
Frankfurt, W. Germany—Harshaw Chemie GmbH

THE NO-SHAKE SHAKER

This new Gyrotory shaker shakes large quantities of flasks... not your lab, not the room next door. It runs smoother and longer and quieter than all its predecessors... yet it doesn't get bolted to the floor. Just set the shaker anywhere and run it at 300 rpm. With a full load of 432 flasks, it won't budge, won't creep, won't vibrate. Set the electronic speed controller and forget it. A year later this New Brunswick shaker will still be humming in the same old place at the same old speed.

To eliminate vibration and prolong bearing life, we lowered the shaker's center of gravity, reducing stress and wear on moving parts. A multi-planed counterbalancing system was developed for still smoother operation at any rpm and with any workload. Mechanical components have been replaced by solid state electronic circuitry to expand the range of speed and eliminate maintenance problems. A new centralized lubrication system has also been added so you can grease the bearings from the outside.



Choose from a selection of 18 NBS shakers to meet virtually any shaking requirement. Send for your copy of *"Guide to Biological Shakers"*.

GS 107/10207

19

NEW BRUNSWICK SCIENTIFIC CO., INC.

1130 SOMERSET ST. • P.O. BOX 606, NEW BRUNSWICK, NEW JERSEY 08903

Now the right eye knows what the left eye is doing

And we don't do it with mirrors

Fact is, we use high quality optical glass prisms. All Nikon stereo microscopes do. But that's only part of it.

The real secret behind the performance of the Nikon SMZ stereoscopic zoom microscope is in the flawlessly matched right and left eye optical systems, their precise alignment, and the provision for independent dioptric compensation on each eyepiece.

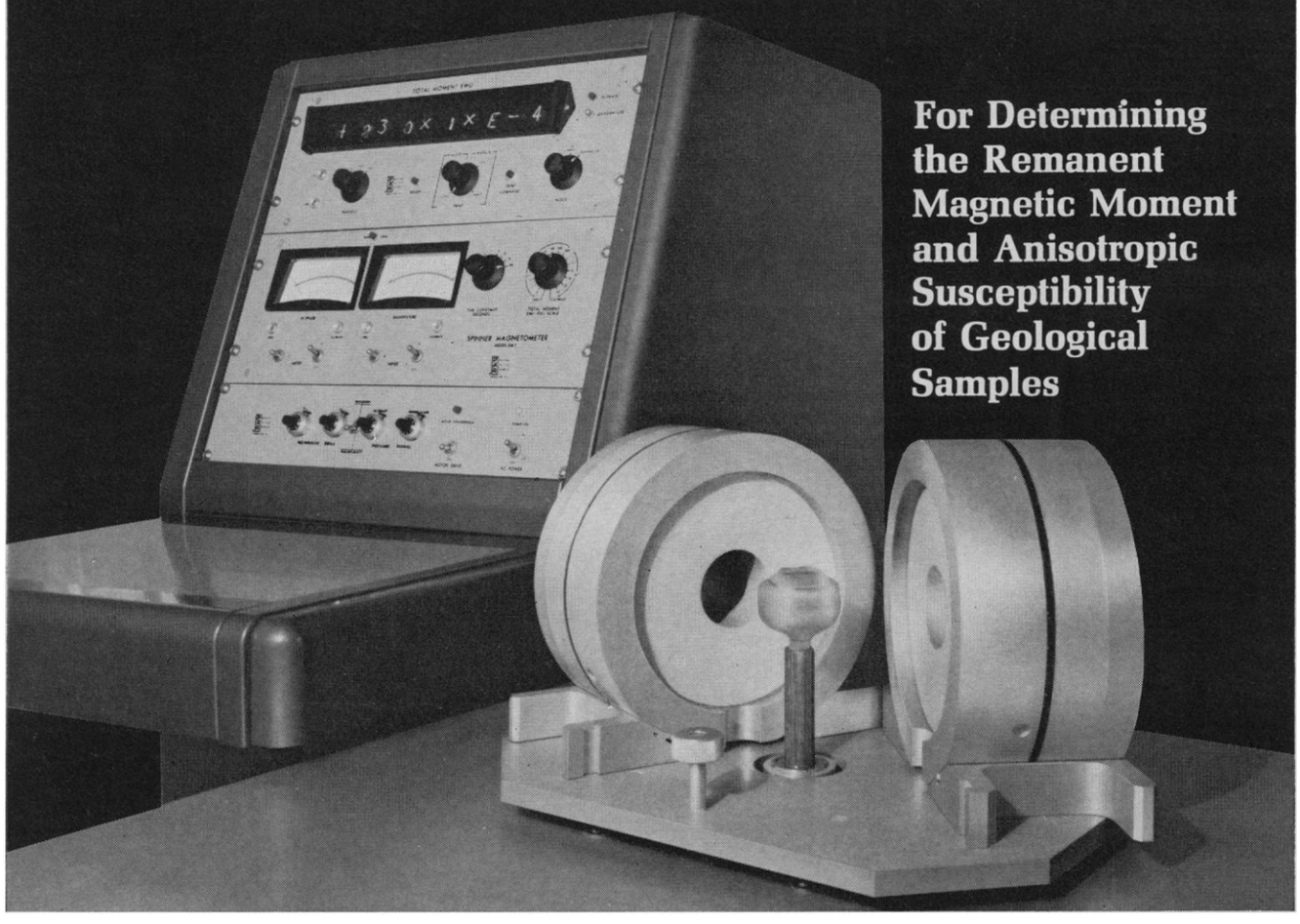
The result is clarity beyond anything you've ever seen – brilliant, 3-dimensional perception without eyestrain or fatigue, even with prolonged use. Once the specimen has been brought into sharp focus, it stays critically sharp in both optical systems, over the entire 5-time zoom range. There is no shift in image focus or image position. Your eyes are not laboring to accommodate. They are relaxed at all times.

The full magnification range of the SMZ extends from 4x to 120x, using different ocular and supplementary objective lens combinations. Each gives you another 5-time zoom range. With 10x eyepieces, for instance, using no supplementary lenses, you get continuous zoom from 8x through 40x without change in focus or working distance.

Standard equipment for the Nikon SMZ includes the plain stand, with reversible black-and-white disc insert, and clips. Optional equipment: universal stands, sub-stage base for transmitted light observation, illuminators, micrometer stages, reticles, polarizing attachment, half reflecting-mirror attachment for shadowless surface illumination, photomicrographic attachments and other accessories for a variety of applications.

For complete stereo microscope catalog or for demonstration, write: Nikon Inc., Instrument Division, Garden City, N. Y. 11533. Subsidiary of Ehrenreich Photo-Optical Industries, Inc. (In Canada: Anglophoto, Ltd. Rexdale, Ontario)

Spinner Magnetometer



For Determining the Remanent Magnetic Moment and Anisotropic Susceptibility of Geological Samples

Recent results in paleomagnetic research have pointed out the importance of remanent magnetic moment studies in dating events in the Earth's history. This new application of remanent moment measurement together with earlier uses in drilling core orientation and studies of continental drift, polar wandering and magnetic anomalies have greatly increased interest in this technique. To facilitate work in these fields, PAR™ is making available its Model SM-1 Spinner Magnetometer. This instrument, which incorporates the results of PAR's wide experience in small-effect measurement and weak signal processing, has been designed to increase measurement sensitivity to the limits imposed by the thermal noise of the pick-up coils.

The Model SM-1 simultaneously measures and displays two orthogonal components of the magnetic moment in the spin-plane of the sample. Operation is simple and straightforward, and can be carried out by non-technical personnel. Low noise and freedom from drift and spurious pick-up allow quick and accurate measurement of samples having very weak moments. Earth field-canceling Helmholtz coils are included on two axes to eliminate problems associated with anisotropic susceptibility. These coils also allow the determination of the anisotropic susceptibility of the sample.

Brief Specifications:

Minimum Detectable Signal: Will detect changes in magnetic moments smaller than 7×10^{-9} EMU/cc.

Sensitivity Ranges: 21 full scale ranges calibrated in TOTAL MOMENT from 0.5×10^{-6} to 5 EMU in a 1, 2, 5 sequence.

Calibration Accuracy: The system is factory calibrated to within $\pm 0.5°$ phase and within 1% magnitude.

Sample Size: Cylinder 2.54 cm diameter, 2.28 cm length. Slightly larger or smaller samples can be accommodated.

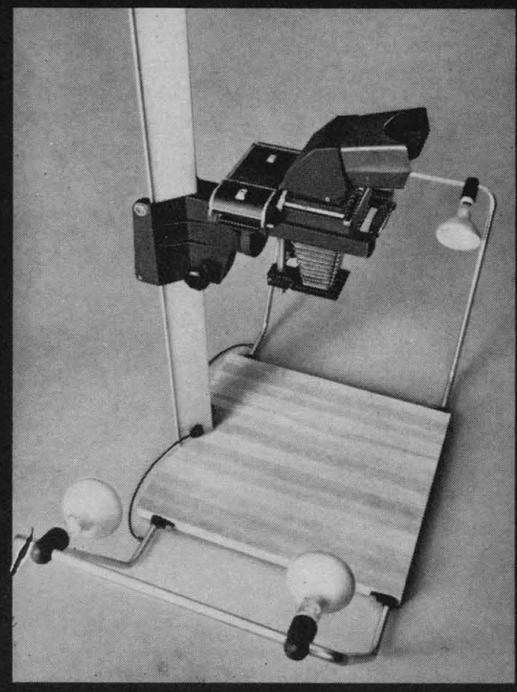
Sample Rotational Speed: 105 Hz (52.5 for anisotropic susceptibility measurements). 105/15 Hz unit available at additional cost.

Price: $9,600 for complete system; with automatic digital readout (as show in the photograph) to monitor the orthogonal components of the moment alternately, $11,350. Export price approximately 5% higher, except Canada.

Write for Bulletin No. T-157 to Princeton Applied Research Corp., Dept. G, P.O. Box 565, Princeton, N. J. 08540. Telephone: (609) 924-6835.

PRINCETON APPLIED RESEARCH CORP.

Complete photo studio: $824



We know. It sounds incredible. But isn't that what you said the first time you heard about finished pictures in seconds?

You see, with our photo studio, you don't need a darkroom and all the stuff that has to go with it. Because our whole photo studio is one Polaroid camera. The MP-3 Industrial View Land camera.

And here's what it can give you:

Black and white photomicrographs, macrophotographs, close-ups, line copy slides, prints of artwork, X-ray copies, infrared pictures, and originals of almost any subject in 15 seconds.

Black and white 4x5 prints *and* negatives in 20 seconds.

Full-color pictures in 60 seconds.

And continuous-tone slides in 2 minutes.

If you don't need all of the above, you can start with a minimum setup for $666. If you want every lens and attachment we make, the maximum studio comes to only $1,264. (That's still a lot less than installing a studio and darkroom in your office.)

Write to Industrial Marketing, Dept. 86, Polaroid Corporation, Cambridge, Massachusetts 02139, for more information. At any price.

Polaroid MP-3 Industrial View Camera.

Polaroid®

jects believed the booms to be a needless and uncivilized outrage, if they had no place of refuge, and if the booming were to continue for the rest of their lives? And what about the musician making a valuable recording, or the surgeon performing a delicate operation?

WILLIAM A. SHURCLIFF
19 Appleton Street,
Cambridge, Massachusetts 02138

References

1. K. S. Pearsons and K. D. Kryter, *NASA (Nat. Aeron. Space Admin.) Rep. No. CR-187* (1965).
2. "Sonic Boom Experiments at Edwards Air Force Base by National Sonic Boom Evaluation Office," *Interim Rep. No. ETU-6065* (28 July 1967).

. . . What happens when an SST going at 1800 miles per hour passes a Concorde going at 1200 miles per hour in the opposite direction? Which cancels out: the superbooms or the superplanes?

ROBERT F. MARSCHNER
18427 Stewart Avenue,
Homewood, Illinois 60430

The Right to Breathe Pure Air

In a recent appearance I made on television to discuss the social and psychological effects of smoking, I mentioned that whenever a student came into my office with a lighted cigarette I asked him to put it out. A colleague asked me why. I responded that I found the odor of smoke distasteful and that I did not care to have the air in my office polluted. He said that I was interfering with student rights, and that in an office provided for by taxpayers, I had no cause to inject my personal biases. Our conversation became heated, but he did cause me to do some thinking.

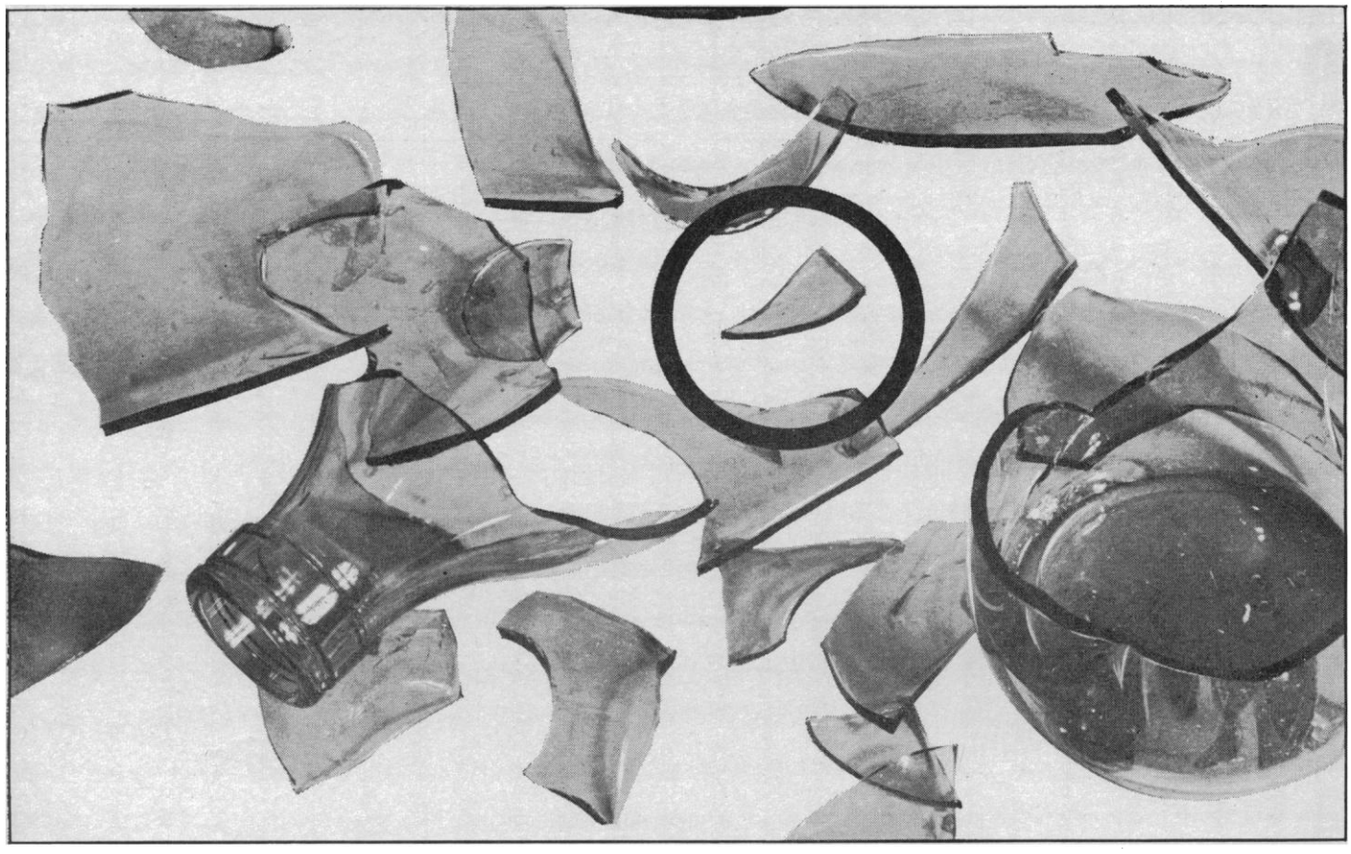
Is smoking by students or anyone else a right? May they smoke on any public property except where smoking is expressly forbidden for reasons of fire safety? From a philosophical point of view, one person's rights end where another individual's rights begin. If students have a right to smoke, certainly I have a right to breathe pure air in my office. Since I have to spend the most hours at my desk, my right to pure air would surely outweigh anyone's questionable right to smoke at my place of public employment. When I have been breathing smoke-filled air, I acquire a headache, my eyes smart, I cough, and my mental efficiency perforce must decline. Thus a student smoking in my office would deprive other students of their right to expect a maximum performance from me.

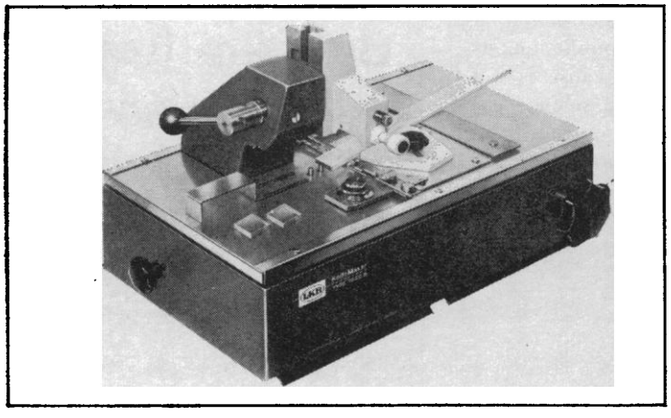
Assuming that my office is a "public facility" and at the disposal and use of taxpayers, I wonder why the university issues me a key so that I am responsible for what takes place in it. Are all tax-supported facilities "public"? Could my colleague exercise his "right" to smoke in President Johnson's office at the White House? And I don't think that an executive of a private company necessarily has a greater right to privacy than a similarly situated individual at a state-supported institution. All necessary expenses of doing business at the private company are tax-deductible. This means that the rest of the public must then pay more taxes. For that reason, the public has a vested interest in the private sector of the economy as well as in the public part.

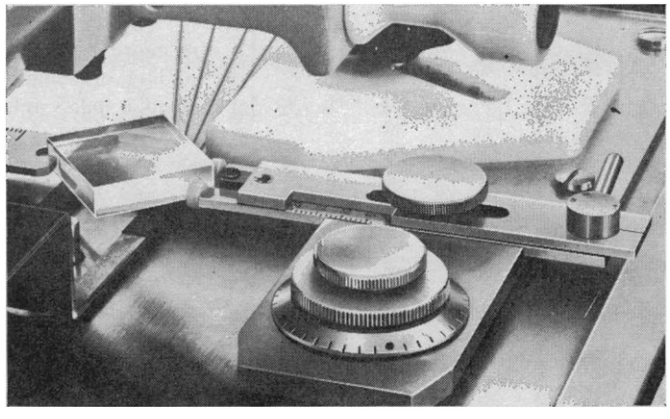
My own view is that the right to inhale pure air predominates over the right to pollute it. Every trip I take by air is marred by the smoke-filled air in the cabin of the plane. Couldn't the airlines, while passing out free cigarettes, also set up smoking compartments? Even an outdoor event, such as a football or baseball game, doesn't assure the spectator a supply of unpolluted oxygen. Aside from the ever-present industrial and domestic pollutants, a pall of tobacco smoke hangs over most of our occupied stadiums. Sometimes visibility is seriously impaired.

Columbia University recently announced its interest in a new cigarette filter. Aside from the obvious point that all filters are virtually useless in preventing the consumption of such substances as carbon monoxide, aldehydes and phenols, many of us nonsmokers are wondering if the filter developers aren't barking up the wrong tree. What we really need is a filter to protect us from the smoker. With all our research into the causes of air pollution, haven't we overlooked smoking as one of the prime causes? We might make a start by restricting smoking to private homes and to public smoking lounges, but such a proposal is not within the bounds of reason at this time.

GUS TURBEVILLE
Department of Sociology, Wisconsin State University, Superior 54881







"History in the Breaking!"

In 1950 the first glass knife for ultramicrotomy was made, by methods which were rather unconventional and did not exactly guarantee reproducibility, by breaking a bottle.

In 1964 glass was still being broken to make knives for ultramicrotomy but LKB had produced the KnifeMaker. The KnifeMaker revolutionized the production of glass knives for ultramicrotomy by making it possible to produce knives easily, quickly, with a choice of predictable edge angle, economically, and with reproducibility.

Now in 1966, LKB has once again made history in breaking glass for knives, by introducing the unique. Damping Device that adds even greater sensitivity (and more working edge per knife), to an instrument that has proved its reliability in ultramicrotomy laboratories and research establishments throughout the world.

Don't have a smashing time! Write today for further information on the KnifeMaker with the unique Damping Device that will give you a third more usable edge on your knives than you have ever had before!

LKB

LKB INSTRUMENTS INC. • 12221 PARKLAWN DRIVE • ROCKVILLE Md. 20852

OTHER HEADQUARTERS FOR SALES AND SERVICE

SWEDEN
LKB-Produkter AB
Box 76,
Stockholm—Bromma 1

UK
LKB Instruments Ltd.
232 Addington Rd.
S. Croydon, Surrey CR2 8YD

NETHERLANDS
LKB-Produkten N.V
Zeekant 35,
The Hague

DENMARK
LKB Instrument A/S
Amagerbrogade 34.
Copenhagen S

Weightlessness in Space

Certainly astronauts, whether near or remote from the earth, appear weightless because they are in a free-fall condition. However, whether they really are weightless or not depends on one's definition of weight. Mueller's claim (Letters, 28 July), that the reason for weightlessness during an earth-moon trajectory has nothing to do with decreasing gravitation, is consistent with his definition of weight; however, this definition is not the only one given by dictionaries. For example, the fourth edition of the *Concise Oxford Dictionary* defines weight first as "Force with which body tends to centre of attraction," and, as an example of the word in context, gives the phrase: "the weights of the planets." Since the planets are not restrained from accelerating, they would be excluded from having weight by Mueller's definition. According to the *Concise Oxford Dictionary*, weight is reduced with decreasing gravitation, and very much so during a trip to the moon.

It is not important which definition, if either, is on higher authority. My earlier letter (9 June) was written in the cause of aiding the public understanding of science. This cause is not helped if press releases on science use a common word in an unusual sense without a note of explanation.

F. E. M. LILLEY
Department of Geodesy and Geophysics, Cambridge, England

Prominent Noses

In his paper discussing variation in solar ultraviolet at different latitudes as a possible basis of racial differentiation in man (4 Aug., p. 501), Loomis limits himself to the question of skin pigment. It has occurred to me that his theory might be extended to another anatomical feature roughly associated with skin color and with latitude, namely, the prominence of the nose. As so many people on occasion are painfully aware, the nose is without question an outstanding receptor of solar rays. In fact, it is difficult to imagine what other evolutionary reason there could be for the sharply thrust-out nose in the latitudes of lesser solar intensity. . . . As Loomis suggests, the early hominids moving northward into Europe, particularly during warm interglacial periods, may have lost much

of their body hair and skin pigmentation half a million years ago. But when it got cold they had to cover most of their skin to keep warm (or else retreat), and it is perhaps at this time that the nose came into prominence.

DONALD V. MCGRANAHAN
47, chemin Moise Duboule,
Geneva, Switzerland

Writers: Fancies and Foibles

We have had considerable discussion of "freight trains" in scientific writing. Another trick of poor writing perhaps deserves christening. Since it encourages freight trains to emerge, it might be called "verb switching." The principle behind verb switching is very simple: whenever a verb with a reasonably definite meaning threatens to appear, the poor writer carefully converts it to a noun or gerund and inserts a weak, essentially vacuous verb to fill out the grammar. Thus, instead of saying that some step improves the accuracy of a measurement, the writer will say that it "makes an improvement in..." or "aids in improving...." In place of "isolate," he will write "produce isolation." And so on. Once the principle has been grasped, endless examples can be constructed.

Verb switching is often aggravated by gerund phobia. Presumably, the victim was once frightened by a dangling participle and now avoids words ending in -ing whenever he can. Thus, instead of writing about calibrating the equipment, he will write, "the calibration of the equipment." This habit might be called "tioning."

PAUL I. RICHARDS
Technical Operations, Inc.,
Burlington, Massachusetts 01803

Bad grammar is unfortunately not restricted to authors. It (and pedantry) are also to be found, although more rarely, among editors. In this latter case the problem is of course more serious. In addition to letting some of the bad grammar of their authors pass through, they sometimes make good grammar into bad or change correct but free sentences into stilted ones. It is disconcerting to have one's writing altered to a style one deliberately avoids using, or to have qualifiers such as "perhaps" omitted.

For example, in a paper of mine published in another journal in the past year the editor changed "The insecti-

vore *Protentomodon ursirivalis* is . . ." so that the species was set off by commas, as if it were the only known insectivore. In a more recent paper "now" was changed to "presently," which is not of Anglo-Saxon origin and so more "scientific," but which usually means "in the near future." Neither editor would reverse himself.

The main function of grammar is, after all, to reduce ambiguity. Wider use of such a criterion might help in communication.

LEIGH VAN VALEN
Department of Anatomy, University of Chicago, 1025 East 57 Street, Chicago, Illinois 60637

Information Distribution: A Plea for Efficiency

Harvey Brooks's comments ("Applied science and technological progress," 30 June, p. 1706) focus on many of the ramifications of basic-versus-applied science emphasis. In speaking of the transfer of federally-supported technology to private industry, he cites the encouragement provided by the Atomic Energy Act, and the desirability in government of a more hospitable attitude generally toward this objective.

It must also be remembered that the entire initial product of any research is information, and the dissemination of information generated at public expense has been of concern in many quarters. Often vast amounts of money and expertise have been expended in that research, but its product will not be utilized if there is no effort to make it available. The generating effort of the research is to a great extent wasted if the concluding step of efficient dissemination—good reporting and accessibility to the reports—is omitted.

Aside from some agencies (notably AEC and NASA), there has been lagging interest in such dissemination. Except for holders of defense contracts, it is a difficult and slow process for the general public to (i) learn what usable technology results from Department of Defense–sponsored research, and (ii) to examine or obtain copies of potentially interesting reports. Despite efforts to produce better announcement and indexing media, the jumbled jargon of identifying report numbers, the uncertainty of subject indication and long delays in obtaining copies are enough to discourage the belief that the govern-

ment is much interested in information transfer.

About 5 years ago, 12 organizations were asked to set up regional technical report centers, with some federal support. Located at eight universities and four public scientific library collections, these centers received from NASA, AEC, and DOD (through the Clearing House for Federal Scientific and Technical Information) copies of all unclassified reports resulting from government research. These reports were available for consultation, copies could be made on demand, and assistance given in unraveling the knots of literature and report citation. Despite withdrawal of support funds later, the host institutions felt sufficiently concerned with the basic need so as to continue these services at their own expense, while still receiving the reports (in microform).

Last fall, distribution of the DOD reports ceased (although AEC and NASA have continued). Now the public finds that cited reports are no longer to be had through local channels. One center alone has been handling over 2800 requests per year, at no cost to the government except the few cents per copy for microforms sent to the centers. In all centers, reference service comes to a standstill; reports are no longer available for consultation or loan; copies can no longer be had on a day-or-two notice. All in all, this modest program was a bargain to the government and especially to the taxpayer.

The State Technical Services Act of 1965 has as its goal "programs to place the findings of science usefully in the hands of American enterprise." Yet its benefits may be seriously undermined by discontinuance of the resources of the regional report centers. It is hoped that the Jennings Randolph Subcommittee on Science and Technology of the Senate Small Business Committee will note this gap in the transfer machinery, and that, as a result of its forthcoming hearings, will recommend restoration of this national network of information centers. To promote this service to public research interests, there has been formed a Council of Regional Technical Report Centers. Information users, too, of both basic and applied persuasions, can helpfully add their voices.

WILLIAM S. BUDINGTON
John Crerar Library,
35 West 33 Street,
Chicago, Illinois 60616

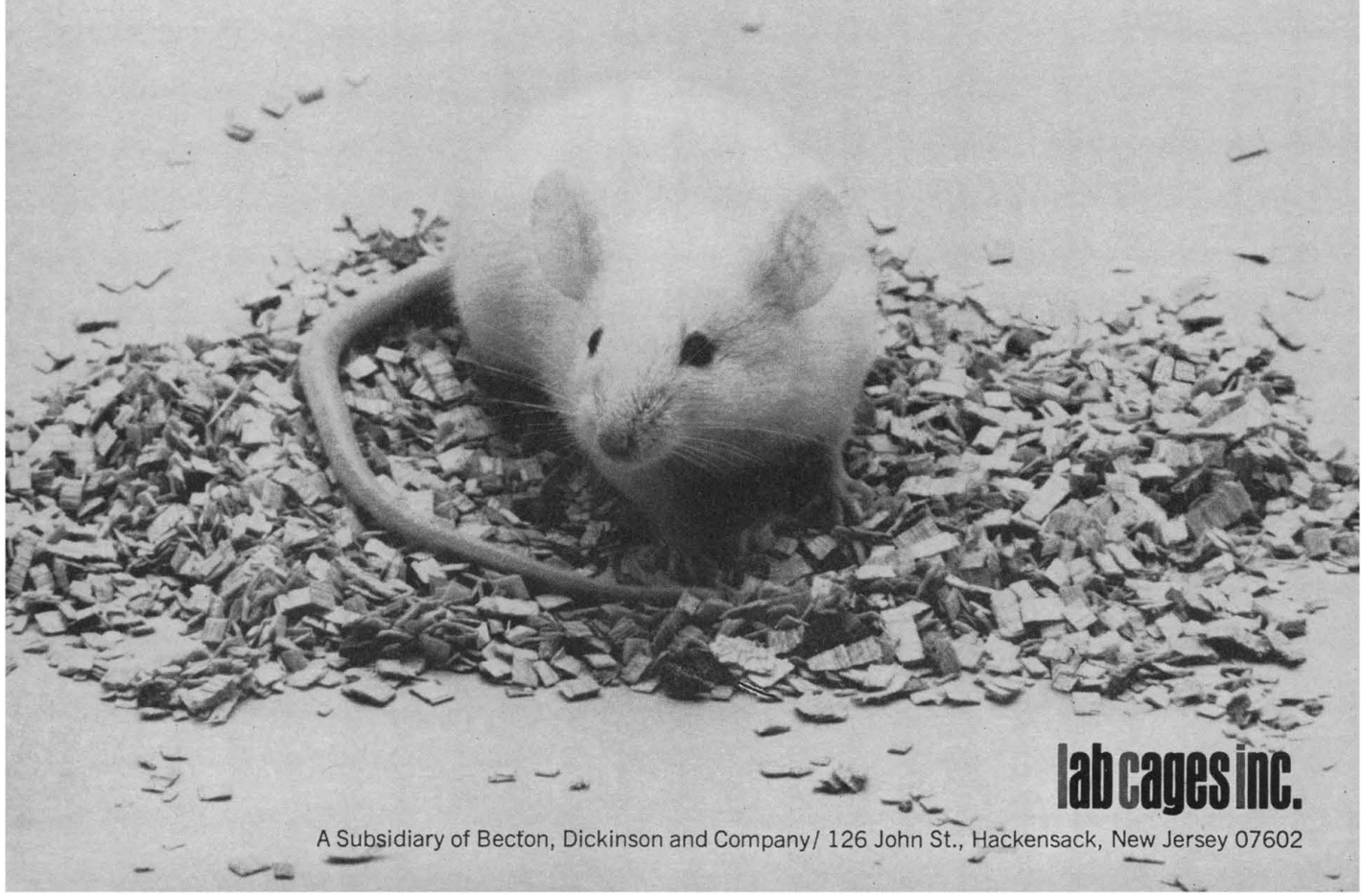
Free sample offer.

(But look for the catch.)

The Offer: to send you a free working sample of our AB-SORB-DRI laboratory animal bedding. This bedding was specifically developed as an animal bedding (as perusal of U.S. Patent 3,256,851 will attest) and is not merely a waste residue or byproduct of some other activity. Accordingly, the product was actually developed to conform to the basic needs of its users (that is, both the animals and their keepers).

The Product Story: AB-SORB-DRI is selected hardwood cut into uniform particles, heat-treated, and then screened, aspirated and packed into completely sealed, contamination-free bags. The heat treatment reduces the moisture content from 45% to about 4% and significantly reduces the microbiological population. The screening and aspiration result in a uniform particle size (max. 8 mesh, min. 30) and freedom from dust (nothing smaller than 500 microns). Since the small particles won't pile up, animals can't be hidden by it or mound it under water bottles. AB-SORB-DRI absorbs 1.5 times its own weight and is an effective natural waste and odor-absorbent with no additives of any kind. It stays drier longer and has a longer cage life because animal movement constantly exposes new, dry surfaces. And since it doesn't mat or pack and resists sticking to cages, it can easily be removed without annoying scraping. AB-SORB-DRI does not bridge in hoppers or clog vacuum systems.

Now Back To The Offer: just send us your name, title and institution for a free working sample of AB-SORB-DRI. (Oh yes, the catch. Our most effective sales tool for this product is not really a recitation of its many virtues as in the above. Rather, success has come from critical trials by potential users. Test use has been compelling and almost always leads to use. And *better* than that: experienced users of AB-SORB-DRI apparently see little reason to switch and so hardly ever do. So the catch is simply this: you may well be hooked if we can induce you to give the product a try.)



lab cages inc.

A Subsidiary of Becton, Dickinson and Company/ 126 John St., Hackensack, New Jersey 07602

20 October 1967, Volume 158, Number 3799 **SCIENCE**

Privacy

Science and technology have given man vastly enhanced powers to achieve socially desirable purposes, but the exercise of some options opens the way to dangerous abuses. A particularly worrisome development is the increasing use of science and technology in the invasion of privacy. The magnitude of the present problem and its future scope have been surveyed in a thoughtful volume* by Alan F. Westin, professor of public law and government at Columbia University.

The author begins by discussing the individual's basic need for a minimum of privacy. He links the human requirement to the well-known territorial behavior of many animals. He acknowledges the need for society to exert controls on individuals and groups. However, he points out that occasional privacy is essential to the health of individuals as well as to that of most organizations.

Many means for invading privacy are now available. These include new devices and techniques for physical surveillance, psychological surveillance, and data surveillance. These developments provide sophisticated help for the merely curious. They furnish technological assistance to modern peeping Toms. They can make life easier for a growing army of private detectives. The devices find wide application in business, both for legitimate surveillance and for industrial espionage. They are employed by many branches of government, sometimes in questionable ways. They provide governments with tools that one day may be used to bring about George Orwell's 1984.

Some of the techniques are old and familiar. They include wiretapping and use of hidden microphones and cameras. These methods have been improved, however, as technology has advanced. Thus, solid-state electronics permits miniaturization. Microphones the size of a sugar cube ($10) or the size of a pea ($100) are available.

Photographic techniques also have been improved. Special screens can be installed in walls, which seem opaque to persons inside a room but permit an observer outside the room to see and photograph events within it. A more advanced method is to employ infrared light, in conjunction with appropriate panels and cameras. This permits photography in what appears to be total darkness. A possible future development is the use of computers to analyze telephone conversations. In principle, all such conversations could be monitored and recorded. Computers might be used to identify characteristics of a person's voice. Then the computer could search out all phone conversations in which that individual took part, even when the call originated from a pay station. In a day when so much of society's business is transacted by phone, a powerful tool for the invasion of privacy would be available.

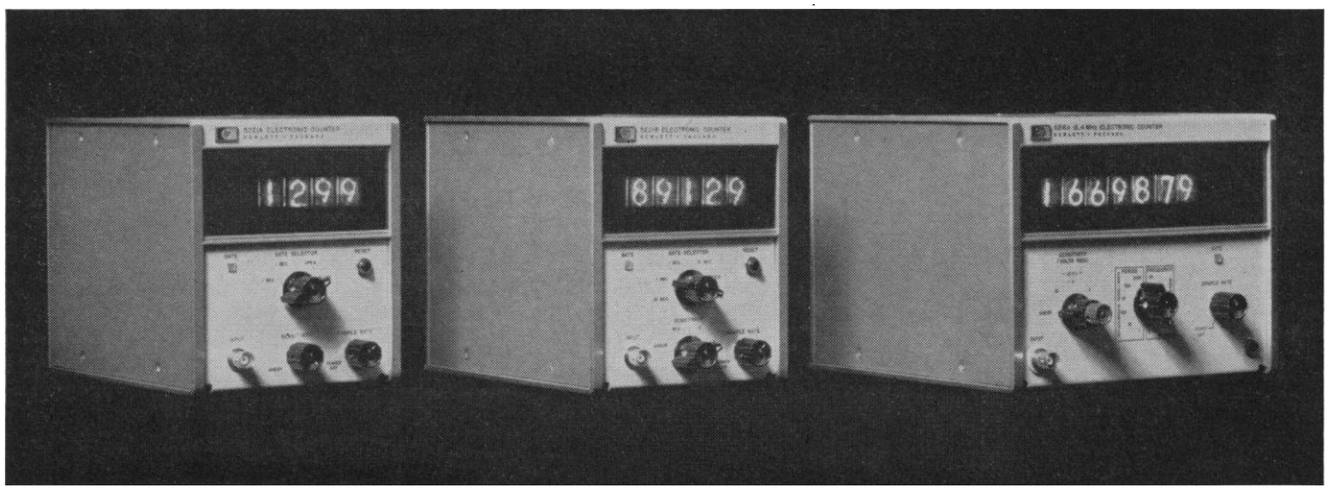
The computer is a key to a related kind of invasion of privacy, in that it quickly makes available detailed information about a large number of individuals. All of us have filled out dozens of forms. What is new is the ability of a centralized bank of computers to store the massive amounts of data and quickly retrieve them.

The ultimate extent and consequences of erosion of privacy can be only dimly perceived. However, it is clearly desirable to seek technical and legal means of curtailing the use of what might otherwise become instruments for the destruction of our freedom.—PHILIP H. ABELSON

*A. F. Westin, *Privacy and Freedom* (Atheneum, New York, 1967).

What are you looking for in low-cost counters?

It's probably in one of these.



The HP 5221A is the lowest cost frequency counter with a 5 Hz to 10 MHz counting range, and it's perfect if you only want to measure frequency or totalize. Time base is controlled by power line frequency. Gate times are 0.1 and 1 second. Maximum input sensitivity is 100 mV, with sensitivity control on the front panel. Input impedance is 1 MΩ/30 pF. It's only 6¼"Hx5⅛"Wx11"D. Four-digit readout is standard. Price: $350. Add $75 and $125 for 5- and 6-digit versions, respectively.

The new HP 5221B is a more accurate and versatile version of the 5221A. Five-digit readout is standard, and the time base is a crystal oscillator. Gate times are 0.01 to 10 seconds, and BCD output (for printers, etc.) is standard. For added convenience, there's a front-panel stepped attenuator for counting higher input voltages. Counting range is 5 Hz to 10 MHz. Price: $700. Add $75 for 6-digit version.

The HP 5216A offers a great versatility in an economical instrument. It measures frequency, time interval, period, multiple period average, frequency ratio, multiple ratios, and will totalize. It has 7-digit readout, 3 Hz to 12.5 MHz frequency range, 10 mV input sensitivity, 1 MΩ/50 pF input impedance and a crystal time base. Size is 6¼"H x 7¾"W x 11"D. Price: $925.

All models have readout storage for a non-changing display during each gate interval. And, for speed in reading, needless zeros to the left of the first significant figure are automatically suppressed by unique, HP integrated circuits.

For more information call your local HP field engineer or write Hewlett-Packard, Palo Alto, Calif. 94304; Europe: 54 Route des Acacias, Geneva.

HEWLETT hp PACKARD

ELECTRONIC COUNTERS

02719

Hering, thus resolving a controversy nearing its centennial. At the same time a dozen or so minor contending theories have been eliminated from competition.

The organization of excitatory and inhibitory input from retina to lateral geniculate neurons was scrutinized by G. F. Poggio. It was his conclusion that excitatory and inhibitory functional systems are operationally coextensive at least over the center region of the receptive fields, and that the two mechanisms have similar characteristics with respect to time course of action. During the discussion of this paper De Valois pointed out that, in his view, excitatory and inhibitory influences of opponent colors also extend over the entire receptive field of individual neurons.

In a general discussion of the method of coding of sensory quality in different afferent modalities, R. P. Erickson pointed out the similarities in the translation of colors and of tastes into neural signals. In both cases a limited number of parallel channels coming from a small area of the tongue, or retina, has to perform the discrimination of finely shaded qualitative stimulus differences. If individual color receptors were tuned to a narrow band of wavelengths, the number of available nerve fibers would be insufficient to distinguish all the shades of the visible spectrum (T. Young); hence the broad, overlapping sensitivities of the visual pigments and visual afferents. Similarly, broad tuning occurs in other sensory modalities in which quality is not represented topographically in the nervous system (taste, temperature, and vestibular sensitivity). Topographically organized modalities have sufficient numbers of neurons for each to be narrowly tuned (audition, visual, and somesthetic position).

The leading theme of a paper by I. C. Whitfield was that discrimination of pitch is dependent on the statistical distribution of excitation over a geometrically arranged array of first-order auditory nerve fibers. He pointed out that this is the most feasible system of detection of complex waveforms, such as occur in human speech. Speech sounds are recognized by the relative position of "formants," or dominating frequency bands. Several such bands are presented simultaneously, and recognition is independent of the particular pitch of the speaker's voice. On the basis of observations on the auditory cortex of waking, free moving ani-

mals, it was argued that this level is concerned with temporal patterns of stimuli and that responsiveness to a particular frequency is, if anything, more widespread than at lower levels. He claimed that there is no evidence in the normal intact auditory system for the view that specific stimuli eventually activate some unique area or group of cells, but rather that a many-many relationship probably exists between detectors and effectors at several neural levels.

The precise relation between sound waves and discharges of auditory nerve fibers was described by J. E. Hind. For frequencies lower than about 4000 hertz nerve impulses are phase-locked to the stimulating sound waves. Phase-locking occurs in spite of the fact that nerve fibers do not follow vibrations in a one-to-one relationship, even in the lowest audible frequencies. Phase-locking was also seen in Mountcastle's experiments with somatic vibration receptors. Hind also described experiments in which two tones of different frequency and intensity were presented simultaneously. In these cases, phase-locking followed rules reminiscent of psychophysical tonal masking. Hind noted that other studies have shown that the pulse-time coding in the auditory nerve is preserved at least in part at higher levels of the nervous system. The notion that such coding could provide a basis for pitch perception is at variance with that proposed by Whitfield.

The emphasis of the discussion shifted to the anatomical organization of sensory systems. The multiplicity of the sensory receiving areas of the cerebral cortex was discussed by C. N. Woolsey, who reviewed the discoveries of the Wisconsin school over the past two decades. He also presented a new and precise map of the topographical projection of the retina to the first and second visual areas. The question of the source of inputs to visual area I was raised during the discussion. It was the opinion of those speaking that this input originates from subcortical nuclei as well as from visual area II. The need for further study was stressed.

That multiplicity of representation is not synonymous with redundancy of function was emphasized by the presentation of W. D. Neff. He and his collaborators are continuing their effort to define precisely the defects resulting from removal of various parts of the auditory cortex, and sur-

rounding areas. For example, bilateral removal of auditory area I causes a deficiency in ability to locate a source of sound in space without loss of other auditory functions which were tested. Of special interest is the finding that removal of the insulotemporal areas of cats, sparing auditory areas I and II, caused a permanent loss of the ability to recognize sequential and tonal patterns without a deficit in discrimination of changes in frequency, and also some increase of spontaneous activity in the test situation. To your reporter, this syndrome was reminiscent of the apparent visual agnosia and compulsive exploratory behavior, described by Klüver and Bucy, after temporal lobe ablations in monkeys.

In hedgehogs the total removal of cortical visual area I was followed by severe visual deficit, but only moderate retrograde degeneration in the dorsal lateral geniculate nucleus. By contrast, tree shrews are apparently able to see quite well after complete bilateral removal of their very large striate cortex, even though severe degeneration was found in the lateral geniculate of the operated animals. These findings can be explained, according to I. T. Diamond, by assuming that during the evolution of mammals the ancient tectocortical visual projection was at first invaded by a new geniculo-cortical projection. Later the two systems become progressively separated. The more recent geniculostriate system is organized in a compactly point-to-point pattern of projection. The older connections from midbrain to cortex are diffuse, but not random or haphazard.

R. E. Myers presented anatomical evidence that the monkey's visual cortical mechanism consists of six distinct cortical areas. The striate area, striate-receptive area 19, and area 19 are free of commissural fibers; juxtastriate area 18, area 18 and areas 20 and 21 combined receive commissural fibers throughout. Only the striate area receives heavy projection from the thalamus, primarily from the lateral geniculate, but also from a portion of the pulvinar. Myers described experiments indicating that, in the cat, direct visual sensory input over the primary optic pathways is greatly more potent in memory induction than information indirectly received from the opposite hemisphere through the corpus callosum. Conflicting information fed into a hemisphere through

the corpus callosum is incapable of reversing the effects of direct sensory experience.

To sum up, the participants were largely in agreement concerning the nature of coding in receptor organs and the signaling of peripheral sensory nerves. Perhaps a critical voice would have been heard, had we been successful in securing the presence of G. Weddell. Debate was lively with occasional sparks, when the topic shifted to the mechanism of central information processing. Mountcastle stressed the need for adequate identification of the cells that are being observed in experiments using the essentially blind method of probing by microelectrodes. He also pointed out the difficulty of controlling stimulus parameters in free-moving animals. Whitfield reminded us that the dangers of drawing conclusions from the behavior of paralyzed animals may be quite as great as those from anesthetized animals, and that, from higher neural levels, any such results must be viewed with extreme caution.

The meeting was the third annual symposium sponsored by the Research Training Program in Sciences Related to the Nervous System of Duke University.

G. G. SOMJEN
Department of Physiology and Pharmacology, Duke University, Durham, North Carolina

Calendar of Events

Awards

The Lalor Foundation program of awards for 1968 emphasizes research in the field of reproductive physiology. The principal present aim of the foundation is to assist qualified investigators working on applied scientific and medical research directed to the study of uterine phenomena relevant to implantation and post-implantation birth control and to better and safer means of female sterilization.

The awards are open to all nationalities. Preference will be given to younger members of university or college faculty and staff with an upper age limit of 41 years. The work may be carried on at the applicant's own institution or elsewhere. The awards may be for a few months or up to 1 year and may range from $1300 to $8500, depending upon the scope and the duration of projects approved.

Requests for information and for application forms should be directed to the Lalor Foundation, 4400 Lancaster Pike, Wilmington, Del. 19805. *Deadline* for executed applications: 15 January 1968.

National Meetings

October

28–29. American College of **Dentists**, Washingon, D.C. (O. W. Brandhorst, American College of Dentists, 4326 Lindell Blvd., St. Louis, Mo. 63108)

28–2. American **Fracture** Assoc., annual mtg., Chicago, Ill. (H. W. Wellmerling, 610 Griesheim Bldg., Bloomington, Ill. 61701)

29–1. Association for **Research in Ophthalmology**, annual mtg., Chicago, Ill. (Secretary-Treasurer, Univ. of Florida, College of Medicine, Gainesville 32603)

29–4. American College of **Gastroenterology**, 32nd annual conv., Los Angeles, Calif. (D. Weiss, 33 W. 60 St., New York 10023)

30–2. American **Dental** Assoc., 108th annual mtg., Washington, D.C. (H. Hillenbrand, 211 E. Chicago Ave., Chicago, Ill.)

30–2. **Nuclear Science**, 14th symp., Los Angeles, Calif. (R. E. Emberson, 345 E. 47 St., New York 10017)

31–2. **Numerical Prediction**, conf., Monterey, Calif. (K. C. Spengler, 45 Beacon St., Boston, Mass. 02108)

31–3. Society for **Experimental Stress Analysis**, annual mtg., Chicago, Ill. (B. E. Rossi, 21 Bridge Sq., Westport, Conn.)

November

1–3. Northeast **Electronics Research and Engineering**, Boston, Mass. (E. Witschi, IEEE, 31 Channing St., Newton, Mass. 02158)

1–3. **Industrial Engineering and Management Clinic**, 31st annual, Chicago, Ill. (R. J. Mayer, 330 S. Wells St., Chicago, Ill.)

1–3. **Operations Research** Soc. of America, 32nd natl., Chicago, Ill. (T. E. Caywood, % Caywood, Schiller Assocs., 401 N. Michigan Ave., Chicago 60611)

1–3. American Soc. of **Tropical Medicine and Hygiene**, Philadelphia, Pa. (G. M. Jeffrey, P.O. Box 295, Kensington, Md. 02795)

1–4. **Irrigation and Drainage**, conf., Sacramento, Calif. (C. E. Lent, Jr., American Soc. of Chemical Engineers, 345 E. 47 St., New York 10017)

2–3. **Product Assurance** Conf., New York, N.Y. (J. Rayfield, EDO Corp., College Point, N.Y. 11356)

2–5. Association of **Clinical Scientists**, annual mtg. (R. P. Mac Fate, ACS, 300 N. State St., No. 5322, Chicago, Ill. 60610)

5–8. National **Agricultural Chemicals** Assoc., 34th annual mtg., Palm Springs, Calif. (National Agricultural Chemicals Assoc., 1145 19th St., NW, Washington, D.C. 20006)

5–8. American Society of **Plastic and Reconstructive Surgeons**, annual mtg., New York, N.Y. (P. Randall, ASPRS, 2850 Sixth Ave., Suite B, San Diego, Calif.)

5–9. American **Nuclear** Soc., Chicago, Ill. (O. J. Du Temple, Executive Secretary, American Nuclear Soc., 244 E. Ogden Ave., Hinsdale, Ill. 60521)

5–10. American Soc. of **Agronomy**, Washington, D.C. (Executive Secretary, 677 S. Segoe Rd., Madison, Wis. 53711)

5–10. **Crop Science** Soc. of America, Washington, D.C. (Executive Secretary,

677 S. Segoe Rd., Madison, Wis. 53711)

5–10. **Soil Science** Society of America, Washington, D.C. (Executive Secretary, 677 S. Segoe Rd., Madison, Wis. 53711)

6–8. **Applied Superconductivity**, conf. and exhibition, Austin, Tex. (G. D. Cody, Publicity Chairman, RCA Laboratories, Princeton, N.J. 08540)

6–8. **Ground-Water Hydrology**, natl. symp., San Francisco, Calif. (M. A. Marino, % AERA Hq., 1201 16th St., NW, Washington, D.C. 20006)

6–8. **Speech Communication and Processing**, annual conf., Cambridge, Mass. (G. Cushman, 555 Huntington Ave., Boston, Mass.)

6–8. **Weather Forecasting**, conf., Fort Worth, Tex. (K. C. Spengler, American Meteorological Soc., 45 Beacon St., Boston, Mass.)

6–9. Interstate **Postgraduate Medical** Assoc. of North America, annual mtg., Chicago, Ill. (R. T. Ragatz, Box 1109, Madison, Wis.)

7–9. **Automatic Support Systems for Advanced Maintainability**, 1967 symp., Clayton, Mo. (D. L. Reed, Box 4124, Jennings Station, St. Louis, Mo. 63136)

7–9. **Reliability Physics**, 6th symp., Los Angeles, Calif. [A. Coppola, Publicity Chairman, RADC (EMERS), Griffis AFB, New York 13440]

8–10. Eastern **Analytical** Symp., New York, N.Y. (E. G. Brame, Jr., Elastomer Chemistry Dept., duPont Experiment Sta., Wilmington, Del. 19898)

8–10. American **Water Resources** Assoc., 3rd annual conf., San Francisco, Calif. (A. A. Stone, International Engineering Co., 74 New Montgomery St., San Francisco 94105)

8–11. **Respiratory Therapy**, 4th annual conf., Boston, Mass. (M. J. Nicholson, 6 Beacon St., Suite 620, Boston 02108)

9–11. **Gerontological** Soc., Inc., 20th annual mtg., St. Petersburg, Fla. (Mrs. M. Adler, 660 S. Euclid St., St. Louis, Mo.)

10. **Laboratory Animal in Gerontologic Research**, symp., St. Petersburg, Fla. (R. H. Yager, Natl. Acad. of Sciences–Natl. Research Council, 2101 Constitution Ave., NW, Washington, D.C.)

11–12. American Acad. of **Psychotherapists**, annual conf., Warrenton, Va. (H. Rockberger, Conference Chairman, 44 South Munn Ave., East Orange, N.J. 07017)

11–15. American Soc. for **Cell Biology**, 7th annual mtg., Denver, Colo. (M. J. Moses, Box 2982, Duke Univ. Medical Center, Durham, N.C. 27706)

12–17. American Soc. of **Mechanical Engineers**, winter annual mtg., Pittsburgh, Pa. (A. B. Conlin, Jr., 345 E. 47 St., New York 10017)

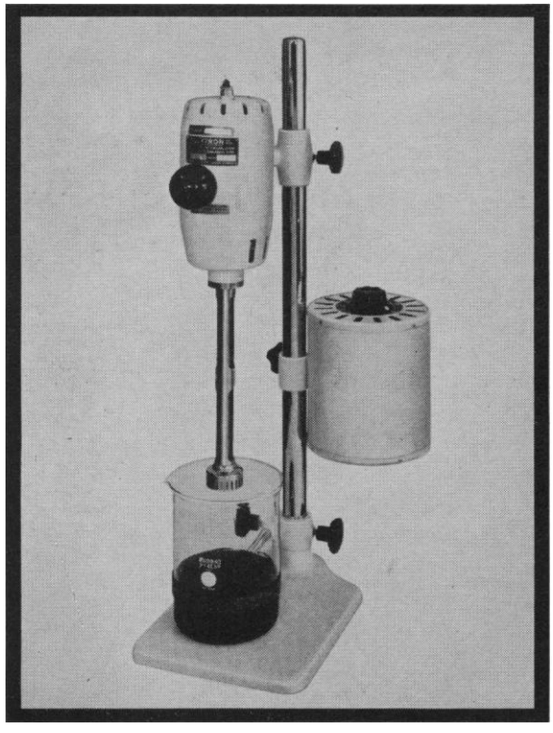
13–15. **Industrial Diamond** Revolution, technical conf., Columbus, Ohio (Conference Hq., 330 S. Wells St., Chicago, Ill. 60606)

13–15. American **Petroleum** Inst., 47th annual mtg., Chicago, Ill. (American Petroleum Inst., 1271 Ave. of the Americas, New York 10020)

13–16. **Engineering in Medicine and Biology**, 20th annual conf., Boston, Mass. (Professional Assocs., 6520 Clayton Rd., St. Louis, Mo. 63117)

14–16. American Federation of **Infor-**

disperser homogenizer emulsifier



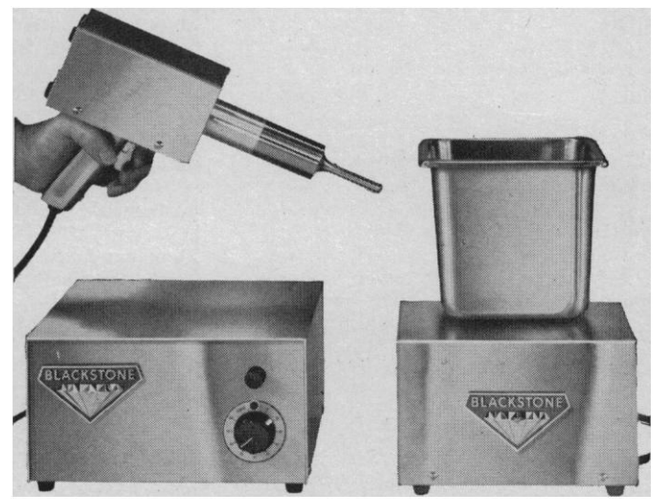
....succeeds where others fail

The Willems Polytron® instruments are based on a unique design which produces unequalled results through a kinematic high-frequency system combining sonic and ultrasonic forces. This approach is so effective in inducing chemical and physical change that it has already revolutionized numerous procedures in diverse fields of research, application and production—with materials whose consistency ranges from penicillin to bauxite, in solid, semi-solid, liquid or gas forms.

If you have such a problem, contact us and request a demonstration without obligation.

BRINKMANN INSTRUMENTS
CANTIAGUE ROAD, WESTBURY, N.Y. 11590/ED 4-7500

This little ultrasonic kit from Blackstone does a very large number of very small jobs.



And in very short order.

This kit is the perfect laboratory combination of ultrasonic probe and cleaner with an interchangeable single generator.

BPO Ultrasonic Probe is ideally suited for cell disruption of small biological samples, dispersal of steroids, degassing and deaeration of oils and other viscous fluids, emulsification of liquids and acceleration of chemical reactions. Compact design allows operator complete freedom of movement in reaching all areas of his work.

CT.5 Cleaning Tank, developed for use with a water-base detergent, enables precision ultrasonic scrubbing for contaminated small parts and instruments. Tank is detachable from transducer housing for ease in filling, emptying and cleaning.

Solid State Generator can be used interchangeably with either the BPO Probe or the CT.5 Cleaning Tank. 0 to 100% power control allows you to select the most efficient power output for your work, or for maximum cleaning efficiency.

Here are some actual applications:

- **Probe:** Disrupts pills with water-insoluble coating in one minute with 100% recovery for analysis. 5%-10% is lost in mortar and pestle grinding.
- **Cleaning Tanks:** Precision cleaning of delicate objects such as micro pipets, syringes, needles, clogged micro sieves, and spectrophotometer cells.

Tell us what you propose to do with the BPO/CT.5 kit, so we can tell you more about its capabilities for your laboratory.

BLACKSTONE ULTRASONICS, Inc.
600 Howard St. • Sheffield, Pa.

mation Processing Societies, fall joint computer conf., Anaheim, Calif. (Executive Secretary, 211 E. 43 St., New York 10017)

14–17. American **Acoustical** Soc., fall mtg., Miami Beach, Fla. (J. Steinberg, Inst. of Marine Science, Univ. of Miami, Miami 33149)

14–18. **Air-Conditioning and Refrigeration** Inst., annual mtg., Miami, Fla. (1815 N. Fort Myer Dr., Arlington, Va. 22209)

15–18. American Society of **Tool and Manufacturing Engineers,** semi-annual conv., Dearborn, Mich. (The Society, 20501 Ford Rd., Dearborn 48128)

16–18. American **Physical** Soc., New York, N.Y. (W. W. Havens, 538 W. 120 St., New York 10027)

16–19. National Soc. for **Crippled Children and Adults,** annual mtg., Los Angeles, Calif. (K. Bauer, Director of Public Relations, 2023 W. Ogden Ave., Chicago, Ill.)

17–18. **Computer Applications in Clinical Electrocardiography,** postgraduate program, Washington, D.C. (J. S. France, Assistant Director, American College of Cardiology, Bethesda, Md. 20014)

19–21. International College of **Surgeons,** 5th Western regional mtg., Las Vegas, Nev. (F. M. Turnbull, Jr., 1127 Wilshire Blvd., Los Angeles, Calif. 90017)

19–22. Association of **Military Surgeons** of the U.S., annual mtg., Washington, D.C. (Brig. Gen. F. E. Wilson, AMSUS, 1500 Massachusetts Ave., NW, Suite 132, Washington, D.C. 20005)

20–22. Society of **Economic Geologists,** New Orleans, La. (J. O. Kalliokoski, Dept. of Geology, Princeton Univ., Princeton, N.J. 08540)

20–22. American Physics Soc., annual **Fluid Dynamics** mtg., Bethlehem, Pa. (P. S. Klebanoff, Natl. Bureau of Standards, Connecticut Ave. at Van Ness St., NW, Washington, D.C. 20234)

20–22. **Geological** Soc. of America, annual mtg., New Orleans, La. (G. E. Murray, Texas Technical College, Box 4680, Technical Station, Lubbock, Tex., or Miss D. Curtis, Shell Oil Co., Box 60193, New Orleans 70160)

20–22. **Geochemical** Soc., annual mtg., New Orleans, La. (E. C. T. Chao, % U.S. Geological Survey, Washington, D.C.)

20–22. **Mineralogical** Soc. of America, New Orleans, La. (G. Switzer, % U.S. National Museum, Washington, D.C. 10025)

20–22. **Paleontological** Soc. of America, New Orleans, La. (R. L. Langenheim, Dept. of Geology, Univ. of Illinois, Urbana)

26–29. American **Medical** Assoc., clinical conv., Houston, Tex. (W. E. Burmeister, Director, Convention Services Dept., AMA, 535 N. Dearborn St., Chicago, Ill.)

26–30. American Inst. of **Chemical Engineers,** 60th annual mtg., New York, N.Y. (H. I. Wolff, Shell Chemical Co., 50 W. 50 St., New York 10020)

26–1. **Radiological** Soc. of North America, 53rd annual mtg., Chicago, Ill. (M. D. Frazer, RSNA, 713 East Genesee St., Syracuse, N.Y.)

27–29. American **Astronautical** Soc., natl. mtg., New York, N.Y. (N. Levin, Guidance and Control, Plt. 35, Grumman Engineering Corp., Bethpage, N.Y. 11714)

27–30. **Entomological** Soc. of America, annual mtg., New York, N.Y. (R. H. Nelson, ESA, 4603 Calvert Rd., College Park, Md.)

27–1. **Chemical Industries**, New York, N.Y. (International Exposition Co., 200 Park Ave., New York 10017)

28. American Soc. of **Therapeutic Radiologists**, Chicago, Ill. (J. A. Del Regato, Penrose Cancer Hospital, Colorado Springs, Colo. 80907)

29–30. Society for **Industrial and Applied Mathematics**, fall mtg., Santa Barbara, Calif. (H. B. Hair, 33 S. 17 St., Philadelphia, Pa. 19103)

29–1. **Wire and Cable** Symp., Atlantic City, N.J. (J. Spergel, USAEC, Fort Monmouth, N.J. 07703, attn: AMSEL-KL-EE)

30–3. American **Anthropological** Assoc., annual mtg., Washington, D.C. (C. Frantz, 1530 P St., NW, Washington, D.C. 20005)

International and Foreign Meetings

November

1–3. **Northern Development** Conf., 4th, Edmonton, Alberta, Canada. (Alberta and Northwest Chamber of Mines and Resources, Edmonton)

5–11. **Allergology**, 6th intern. congr., Montreal, Canada. (S. O. Freedman, 1390 Sherbrooke St., W., Montreal 25)

5–11. **Pharmaceutical** Federation, 4th Central American, San Salvador, El Salvador. (% International Pharmaceutical Federation, 11 Alexanderstraat, The Hague, Netherlands)

6–10. **Microbiological Standards and Testing** Methods for Irradiated Food, Vienna, Austria. (International Agency Liaison Branch, Office of the Director General, Food and Agriculture Organization, Via delle Terme di Caracalla, Rome, Italy)

6–11. Global Impacts of **Applied Microbiology**, 2nd intern. conf., Addis Ababa, Ethiopia. (A. Lemma, Faculty of Science, Haile Sellassie I Univ., Addis Ababa)

6–14. **Dentistry**, intern. symp., Quito, Ecuador. (O. C. Jaramillo, Decano, Facultad de Odontologia, Universidad Central, Quito)

6–24. **Meteorological** Instructors, regional seminar, Santiago, Chile. (World Meteorological Organization, 41, Av. Giuseppe Motta, Geneva, Switzerland)

7–10. Methods in **Soil Ecology**, symp., Paris, France (UNESCO, Pl. de Fontenoy, Paris 7)

8–10. **Electroplating**, intern. conf., Erfurt, Germany. (Dr. Burkhardt, PV Elektrotechnik, Pa 16, Galvanotechnik, Kammer der Technik, Torgauer Str. 76, 705 Leipzig 5, Germany)

9–10. American **Anthropological** Assoc., annual mtg., Toronto, Ontario, Canada. (Executive Secretary, 1530 P St., NW, Washington, D.C. 20005)

9–11. **Hematology**, 2nd natl. conf., Bucharest, Rumania. (I. Caloeneschu, Union of Medical Science Societies of the Socialist Republic of Rumania, 8 rue Progresul, Bucharest)

10–11. **Psychosomatic Disorders**, 11th annual conf., London, England. (A. H. Crisp, % Academic Psychiatric Unit, Middlesex Hospital, London, W.1)

NEW BOOKS

(Continued from page 367)

Annual Review of Astronomy and Astrophysics. vol. 5. Leo Goldberg, David Layzer, and John G. Phillips, Eds. Annual Reviews, Palo Alto, Calif., 1967. 702 pp. Illus. $8.50. Twenty-one papers.

The Bering Land Bridge. Based on a symposium given at the 7th Congress of the International Association for Quaternary Research (Boulder, Colo.), August–September 1965. David M. Hopkins, Ed. Stanford Univ. Press, Stanford, Calif., 1967. 511 pp. Illus. $18.50. Twenty-four papers.

Calcium in Reproductive Physiology: A Comparative Study of Vertebrates. K. Simkiss. Chapman and Hall, London; Reinhold, New York, 1967. 278 pp. Illus. $11.

Comprehensive Biochemistry. vol. 28. *Morphogenesis, Differentiation, and Development*. Marcel Florkin and Elmer H. Stotz, Eds. Elsevier, New York, 1967. 288 pp. Illus. $15. Six papers.

Computers and Management: The 1967 Leatherbee Lectures. Hershner Cross, Donald I. Lowry, A. R. Zipf, George Kozmetsky, and Robert N. Anthony. Harvard Univ. Graduate School of Business Administration, Boston, 1967. 129 pp. Illus. Paper, $3.50.

Conformation of Biopolymers. vol. 1. Papers read at an international symposium (Madras, India), January 1967. G. N. Ramachandran, Ed. Academic Press, New York, 1967. 439 pp. Illus. $19.25. Forty-seven papers.

Contemporary Change in Traditional Societies. vol. 2, *Asian Rural Societies*. Julian H. Steward, Ed. Univ. of Illinois Press, Urbana, 1967. 362 pp. Illus. $10. Five papers.

Countercurrent Separation Processes. H. R. C. Pratt. Elsevier, New York, 1967. 559 pp. Illus. $34.

Cyclobutadiene and Related Compounds. M. P. Cava and M. J. Mitchell. Academic Press, New York, 1967. 517 pp. Illus. $22.

Detection and Determination of Trace Elements. Maurice Pinta. Israel Program for Scientific Translations, Jerusalem. 1966; Davey, New York, 1967. 622 pp. Illus. $29.50.

The Development of Physical Theories. J. Gordon Stine, Jr. McGraw-Hill, New York, 1967. 496 pp. Illus. $10.50.

Diesel Fuel Oil. A symposium (Atlantic City, N.J.), June–July 1966. American Soc. for Testing and Materials, Philadelphia, 1967. 120 pp. Illus. Paper, $7.50. Seven papers.

Electrical Characteristics of Transistors. R. L. Pritchard. McGraw-Hill, New York, 1967. 731 pp. Illus. $19.50. McGraw-Hill Electronic Science Series.

Electrical Properties of Semiconductor Surfaces. Daniel R. Frankl. Pergamon. New York, 1967. 326 pp. Illus. $13.50. International Series of Monographs on Semiconductors, vol. 7.

Electrodynamics of Moving Media. Paul Penfield, Jr. and Hermann A. Haus. M.I.T. Press, Cambridge, Mass., 1967. 288 pp. Illus. $12.50.

Endogenous Factors Influencing Host-

Tumor Balance. Proceedings of an international symposium (Chicago), October 1966. Sponsored by the Argonne Cancer Research Hospital. Robert W. Wissler, Thomas L. Dao, and Sumner Wood, Jr., Eds. Univ. of Chicago Press, Chicago, 1967. 366 pp. Illus. $12.50. Twenty-one papers.

Euglenoid Flagellates. Gordon F. Leedale. Prentice-Hall, Englewood Cliffs, N.J., 1967. 256 pp. Illus. $6.95. Prentice-Hall Biological Science Series.

Extrusion Reactions. B. P. Stark, and A. J. Duke. Pergamon, New York, 1967. 200 pp. Illus. $10.

Fluid Dynamics of Multiphase Systems. S. L. Soo. Blaisdell (Ginn), Waltham, Mass., 1967. 544 pp. Illus. $16.

Fundamentals of Electronic Computers: Digital and Analog. Matthew Mandl. Prentice-Hall, Englewood Cliffs, N.J., 1967. 360 pp. Illus. $10.75. **Manual of Laboratory Experiments.** 109 pp. Illus. Paper, $3.95.

General Palaeontology. A Brouwer. Translated from the Dutch edition (Zeist, 1959) by R. H. Kaye. Univ. of Chicago Press, Chicago, 1967. 224 pp. Illus. $7.50.

Graphs, Dynamic Programming, and Finite Games. A. Kaufmann. Translated from the French edition (Paris, 1964) by Henry C. Sneyd. Academic Press, New York, 1967. 502 pp. Illus. $14.50.

High Field Transport in Semiconductors. Esther M. Conwell. Academic Press, New York, 1967. 307 pp. Illus. $12. Solid State Physics, Suppl. 9.

Kabloona and Eskimo in the Central Keewatin. F. G. Vallee. Canadian Research Centre for Anthropology, Ottawa, 1967. 244 pp. Illus. Paper, $5.

The Language of Science. Theodore H. Savory. Deutsch, London, ed. 2; Oxford Univ. Press, New York, 1967. 173 pp. $4.80.

Lehrbuch der theoretischen Physik. vol. 7, *Elastizitätstheorie.* L. L. Landau, E. M. Lifschitz, and Gerhard Heber, Eds. Akademie-Verlag, Berlin, 1965. 191 pp. Illus.

Models for the Perception of Speech and Visual Form. Proceedings of a symposium (Boston), November 1964. Sponsored by the Data Sciences Laboratory, Air Force Cambridge Research Laboratories. Weiant Wathen-Dunn, Ed. M.I.T. Press, Cambridge, Mass., 1967. 480 pp. Illus. $10. Fifty-two papers.

Modern Factor Analysis. Harry H. Harman. Univ. of Chicago Press, Chicago, ed. 2, 1967. 494 pp. Illus. $12.50.

Molecular Complexes. J. Rose. Pergamon, New York, 1967. 187 pp. Illus. $8.

Our Present Knowledge of the Universe. Sir Bernard Lovell. Harvard Univ. Press, Cambridge, Mass., 1967. 112 pp. Illus. Paper, $1.80; cloth, $2.95.

Outline of Histology. Gerrit Bevelander. Mosby, St. Louis, ed. 6, 1967. 84 pp. Illus. Paper, $6.50.

Penguin Science Survey 1967: The Biology of Sex. Anthony Allison, Ed. Penguin Books, Baltimore, 1967. 288 pp. Illus. Paper. Fifteen papers.

The Philosophy of the Inductive Sciences Founded upon Their History. vols. 1 and 2. William Whewell. With a new introduction by John Herivel. Johnson

Reprint, New York, 1967. vol. 1, 780 pp.; vol. 2, 693 pp. $35 for both volumes. Reprint of ed. 2, 1847. Sources of Science, No. 41.

Photoionization Processes in Gases. Geoffrey V. Marr. Academic Press, New York, 1967. 296 pp. Illus. $12.50.

Plant Anatomy. A. Fahn. Translated from the Hebrew edition by Sybil Broido-Altman. Pergamon, New York, 1967. 542 pp. Illus. $11.50.

Plants as Organisms: Laboratory Studies of Plant Structure and Function. Robert M. Page. Freeman, San Francisco, 1967. 93 pp. Illus. Paper, $2.75.

Portraits from a Shooting Gallery: Life Styles from the Drug Addict World. Seymour Fiddle. Harper and Row, New York, 1967. 378 pp. $7.50.

Practical Cytology. R. G. W. Taylor. Academic Press, New York, 1967. 160 pp. Illus. $7.

Progress in Theoretical Biology. vol. 1. Fred M. Snell, Ed. Academic Press, New York, 1967. 244 pp. Illus. $10. Five papers.

Protective Coatings for Metals. R. M. Burns and W. W. Bradley. Reinhold, New York, ed. 3, 1967. 477 pp. Illus. $25.

Psychotropic Drugs and Related Compounds. Earl Usdin and Daniel H. Efron. U.S. Department of Health, Education, and Welfare, Washington, D.C., 1967 (order from Superintendent of Documents, Washington, D.C.). 369 pp. Illus. $2.75.

Recent Progress in Hormone Research. vol. 23. Proceedings of the Laurentian Hormone Conference (Mont Tremblant, Quebec), August–September 1966. Gregory Pincus, Ed. Academic Press, New York, 1967. 701 pp. Illus. $28. Fourteen papers.

Remarks on the Foundations of Mathematics. Ludwig Wittgenstein. Translated by G. E. M. Anscombe. G. H. von Wright, R. Rhees, and G. E. M. Anscombe, Translation Eds. M.I.T. Press, Cambridge, Mass., 1967. 445 pp. Illus. Paper, $3.45. In English and German.

Research Problems in Function Theory. W. K. Hayman. Univ. of London Press, London; Oxford Univ. Press, New York, 1967. 64 pp. Illus. Paper, $2.

Sleep and Altered States of Consciousness. Proceedings of the Association for Research in Nervous and Mental Disease (New York), December 1965. Seymour S. Kety, Edward V. Evarts, and Harold L. Williams, Eds. Williams and Wilkins, Baltimore, 1967. 603 pp. Illus. $25.50. Twenty-four papers.

The Star Lovers. Robert S. Richardson. Macmillan, New York, 1967. 320 pp. Illus. $7.50.

Sugar-Beet Glossary. Including lists of diseases, pests, and weeds. In English, French, German, and Latin. Compiled and arranged by Institut International de Recherches Betteravières. Elsevier, New York, 1967. 188 pp. $11.

A Survey of the Parasites of Wild Mammals and Birds in Israel. Part 1, *Ectoparasites.* O. Theodor and M. Costa. Israel Acad. of Sciences and Humanities, Jerusalem; Davey, New York, 1967. 126 pp. Illus. Paper, $4.

The Theory of the Electric and Mag-

netic Properties of Molecules. D. W. Davies. Wiley, New York, 1967. 301 pp. Illus. $10.

Thermal Properties of Matter. vol. 2, *Thermodynamics and Statistics: With Applications to Gases*. Walter Kauzmann. Benjamin, New York, 1967. 338 pp. Illus. Cloth, $8.50; paper, $3.95. Physical Chemistry Monograph Series.

Thermoelectric and Thermomagnetic Effects and Applications. T. C. Harman and J. M. Honig. McGraw-Hill, New York, 1967. 410 pp. Illus. $17.50. Lincoln Laboratory Publications.

Travels and Traditions of Waterfowl. H. Albert Hochbaum. Univ. of Minnesota Press, Minneapolis, 1967. 313 pp. Illus. Paper, $2.95. Reprint, 1966 edition.

Ulrich's International Periodicals Directory. Second Annual Supplement. Marietta Chicorel, Ed. Bowker, New York, ed. 12, 1967. 136 pp. Paper, $6.95.

Universal Tables for Magnetic Fields of Filamentary and Distributed Circular Currents. Philip J. Hart. Elsevier, New York, 1967. 495 pp. Illus. $19.

The Vitamins. Chemistry, Physiology, Pathology, Methods. vol. 1. W. H. Sebrell, Jr., and Robert S. Harris, Eds. Academic Press, New York, ed. 2, 1967. 582 pp. Illus. $25.

VLF Radio Engineering. Arthur D. Watt. Pergamon, New York, 1967. 717 pp. Illus. $20. International Series of Monographs in Electromagnetic Waves, vol. 14.

Vorlesungen über Differential Geometrie and Geometrische Grundlagen von Einsteins Relativitätstheorie. Wilhelm Blaschke. Chelsea, New York, 1967. Two volumes in one. 322 and 267 pp. Illus. $10.95. Reprint of vol. 1 (ed. 3, 1930) and vol. 2 (ed. 2, 1923).

Wheat. B. P. Pal. Indian Council of Agricultural Research, New Delhi, 1966. 388 pp. Illus. Rs. 18.50.

The Wind and Beyond: Theodore von Kármán, Pioneer in Aviation and Pathfinder in Space. Theodore von Kármán with Lee Edson. Little, Brown, Boston, 1967. 384 pp. Illus. $10.

The Work of the Gods in Tikopia. Raymond Firth. Humanities Press, New York, 1967. Second edition, with new introduction and epilogue. 498 pp. Illus. $10. London School of Economics Monographs on Social Anthropology, Nos. 1 and 2.

Working with Psychology. Floyd L. Ruch, Neil Warren, and David S. Gorfein. Scott, Foresman, Glenview, Ill., ed. 7, 1967. 176 pp., $2.95; brief ed. 7, 144 pp., $2.50. Illus. Paper. A workbook for use with *Psychology and Life*.

World Climate from 8000 to 0 B.C. Proceedings of an international symposium, London, April 1966. J. S. Sawyer, Ed. Royal Meteorological Soc., London, 1967. 231 pp. Illus. Paper, $8.80.

World Marketing: A Multinational Approach. John K. Ryans, Jr., and James C. Baker. Wiley, New York, 1967. 403 pp. Illus. Paper, $5.95; cloth, $8.95. Wiley Marketing Series.

The Young Offender. D. J. West. International Universities Press, New York, 1967. 333 pp. $6.50.

Your Future in Oceanography. Norman H. Gaber. Rosen, New York, 1967. 143 pp. Illus. $4.