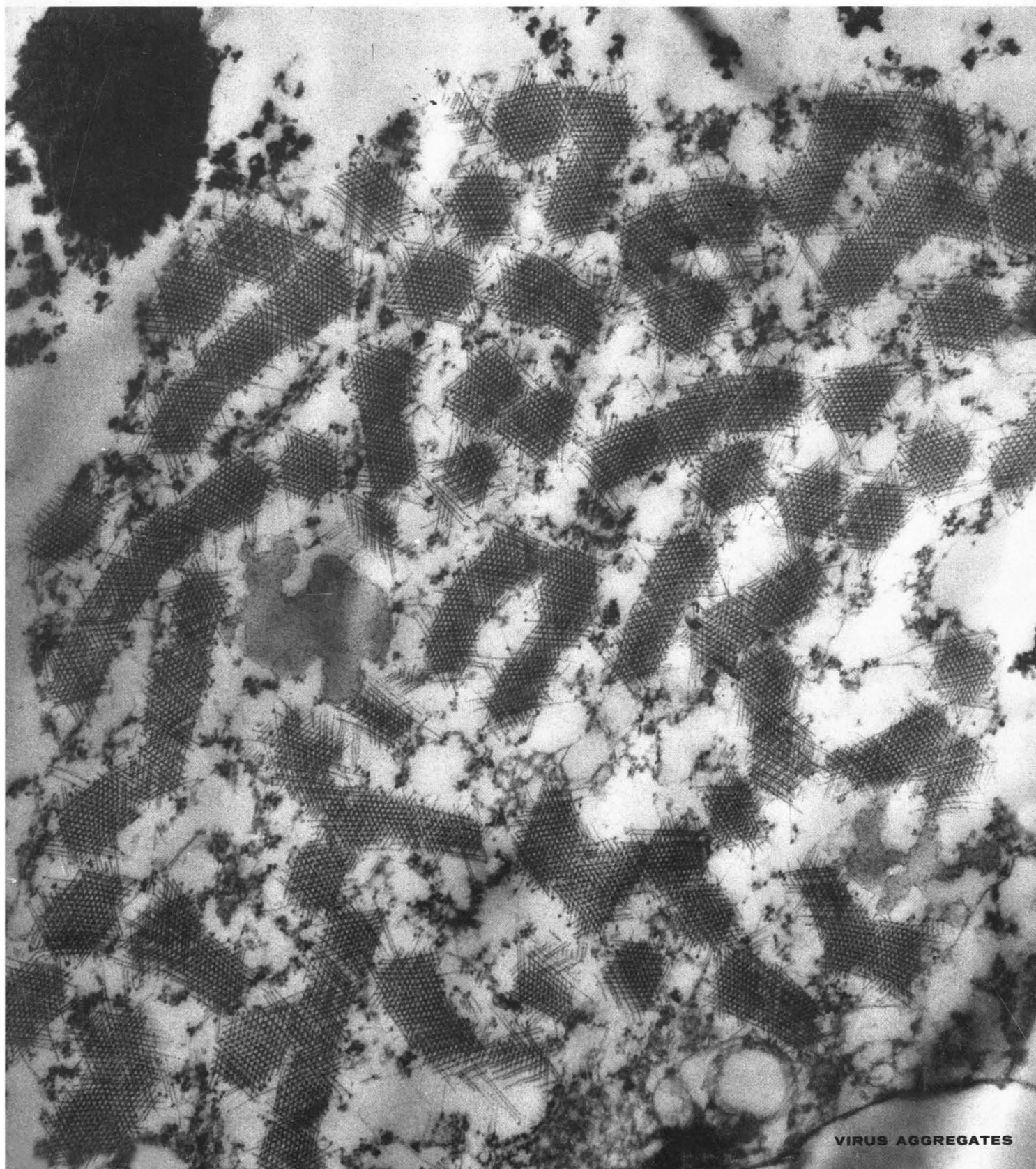


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14 April 1967

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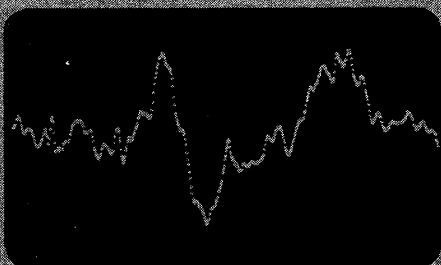
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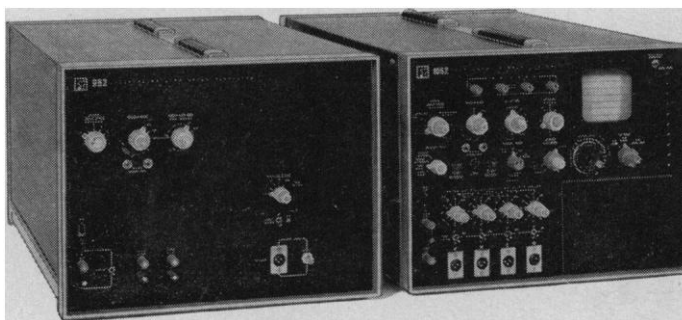
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Tobacco leaf infected with aucuba mosaic virus. The three-way, cross-hatched figures are sections of aggregates formed by layers of rod-like virus particles placed one over another at angles of 60 degrees (about  $\times 49,000$ ; osmium tetroxide fixation). See page 262. [H. E. Warmke, Plant Virus Laboratory, University of Florida, Gainesville]



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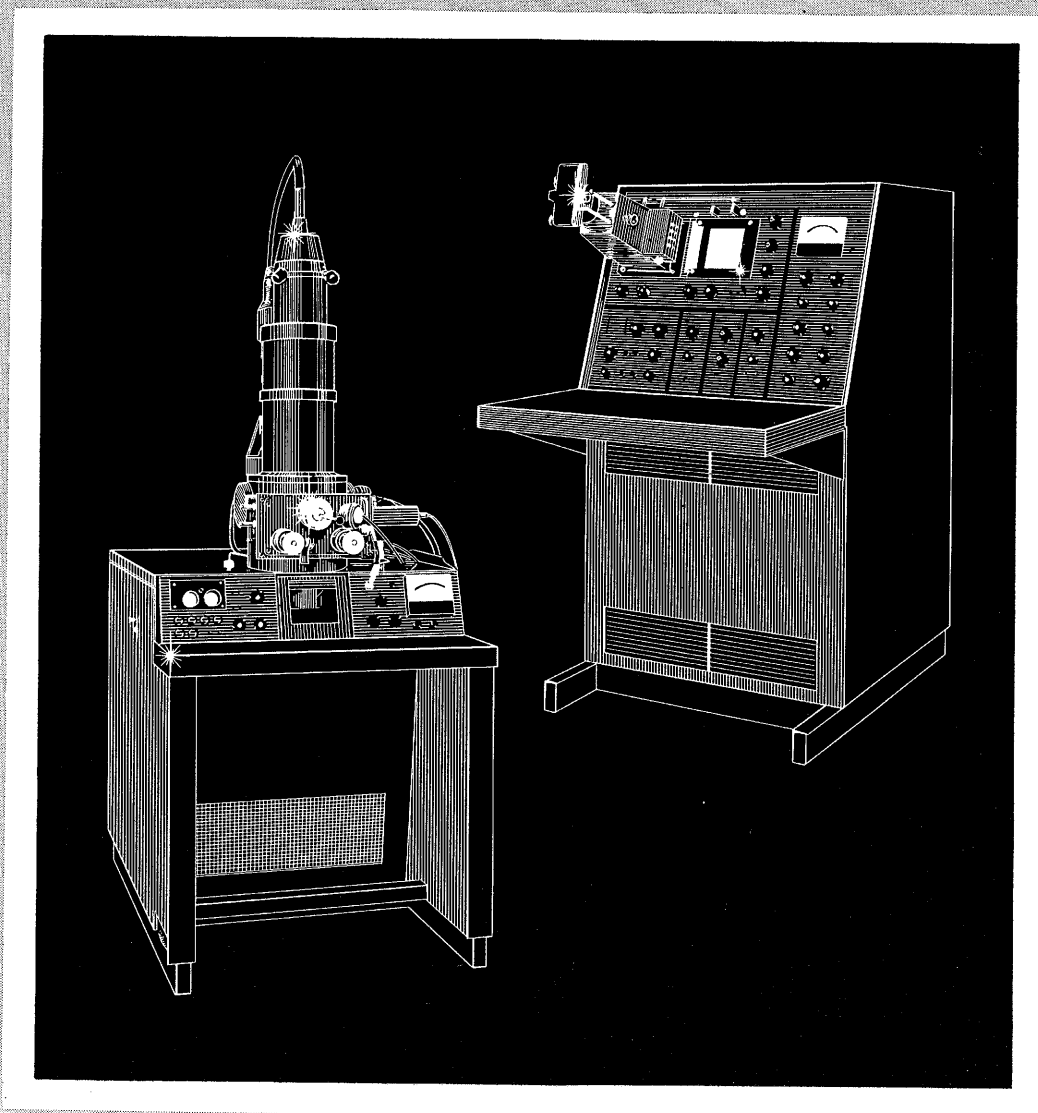
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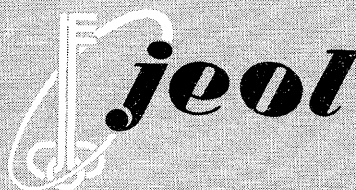


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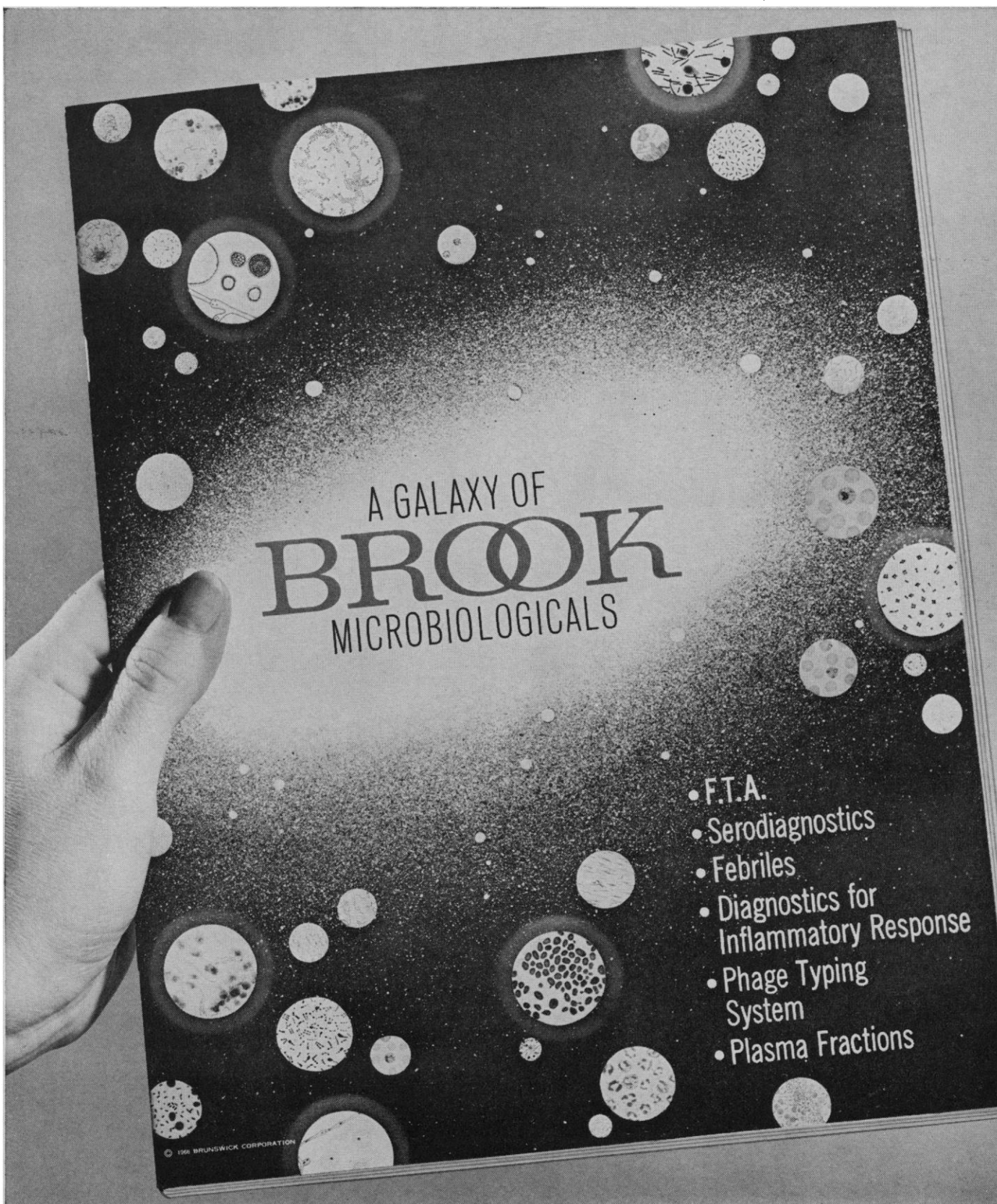
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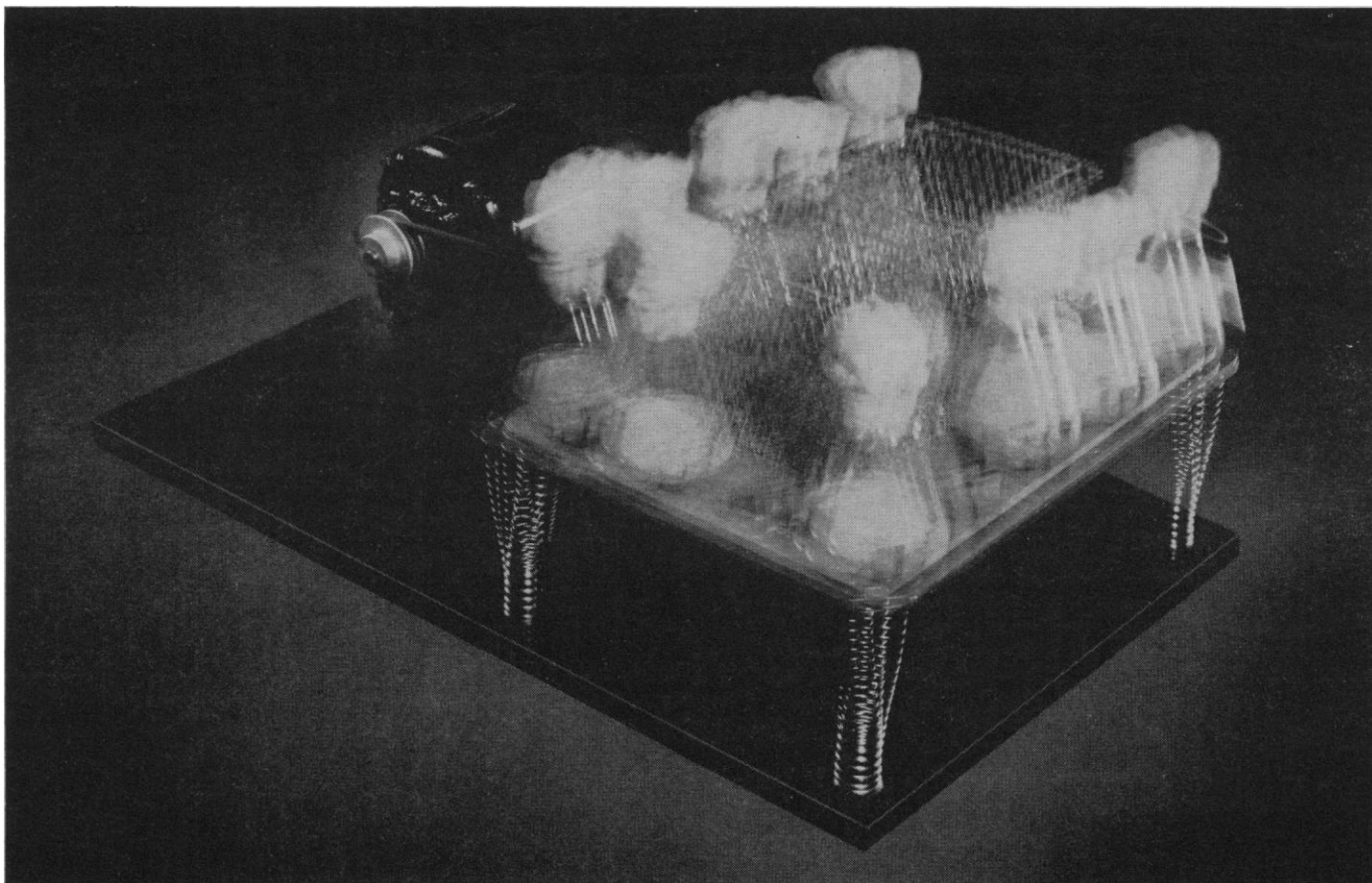
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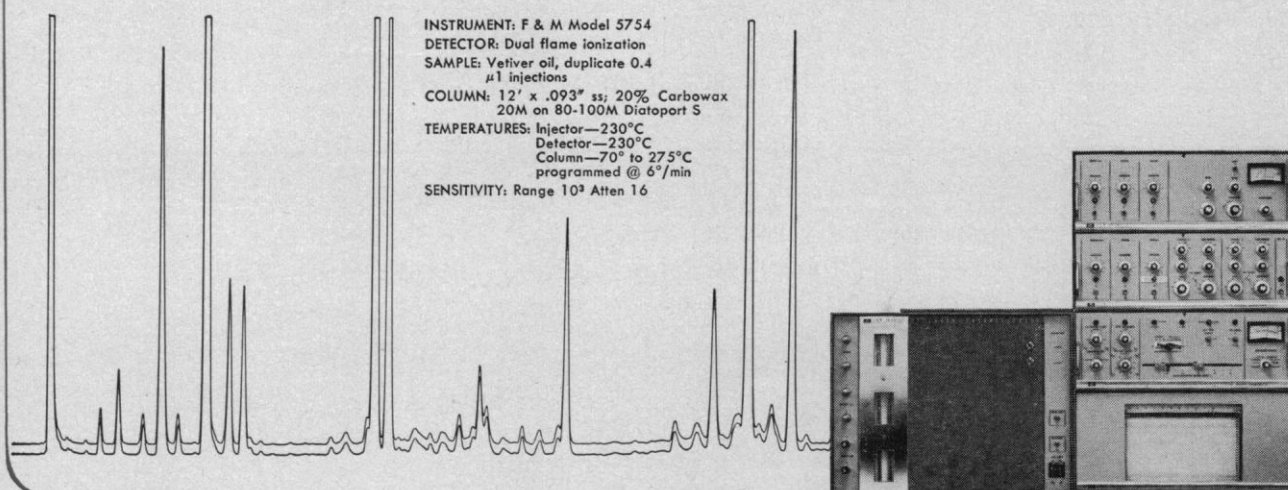
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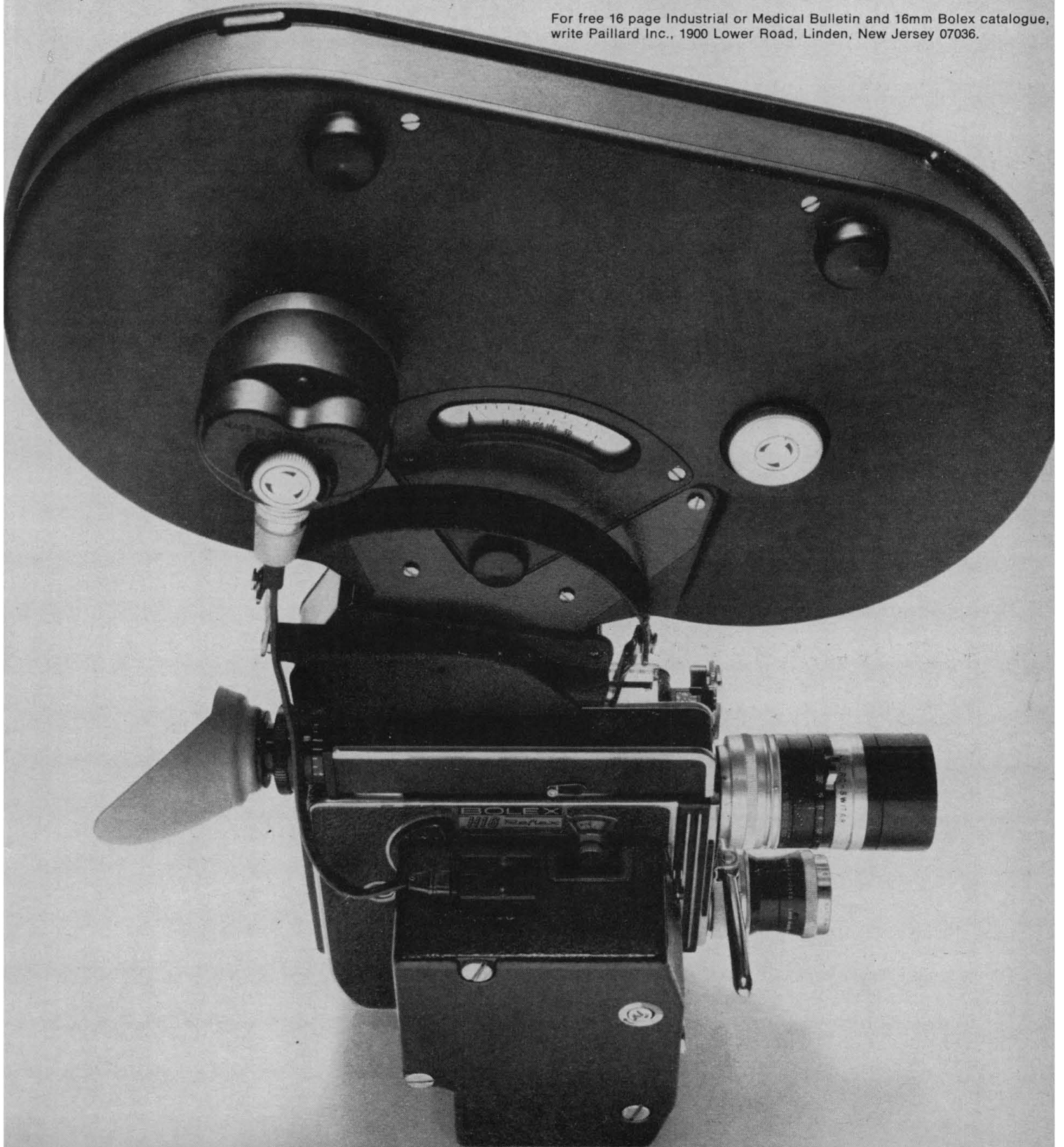
three or four extra magazines without breaking your back. (It also lets you buy them without denting your wallet.)

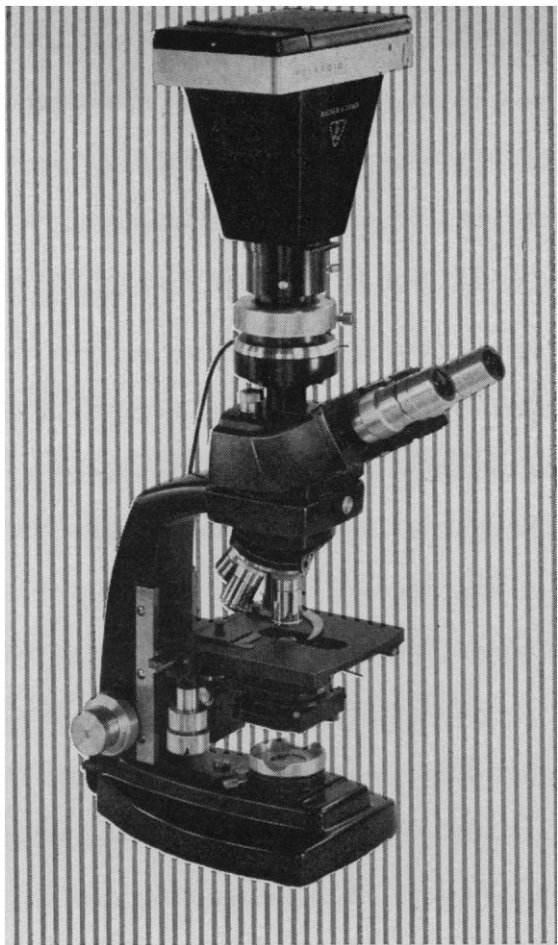
Our electric grip makes "hand-held" filming easier on the hands.

The 400-foot Bolex comes equipped with a sync-sound motor and lightweight rechargeable power pack. You can also build it into the most complete system you can buy. With prime lenses from 10mm to 150mm. Macrotelephotos. A full range of zooms, including automatic zoom. And anything else you can think of. (You can even use it as a 100-footer.)

Think about it. With the 400-foot Bolex, you might even plan to film your next spectacular non-stop.

For free 16 page Industrial or Medical Bulletin and 16mm Bolex catalogue, write Paillard Inc., 1900 Lower Road, Linden, New Jersey 07036.






## 21-jewel precision movement

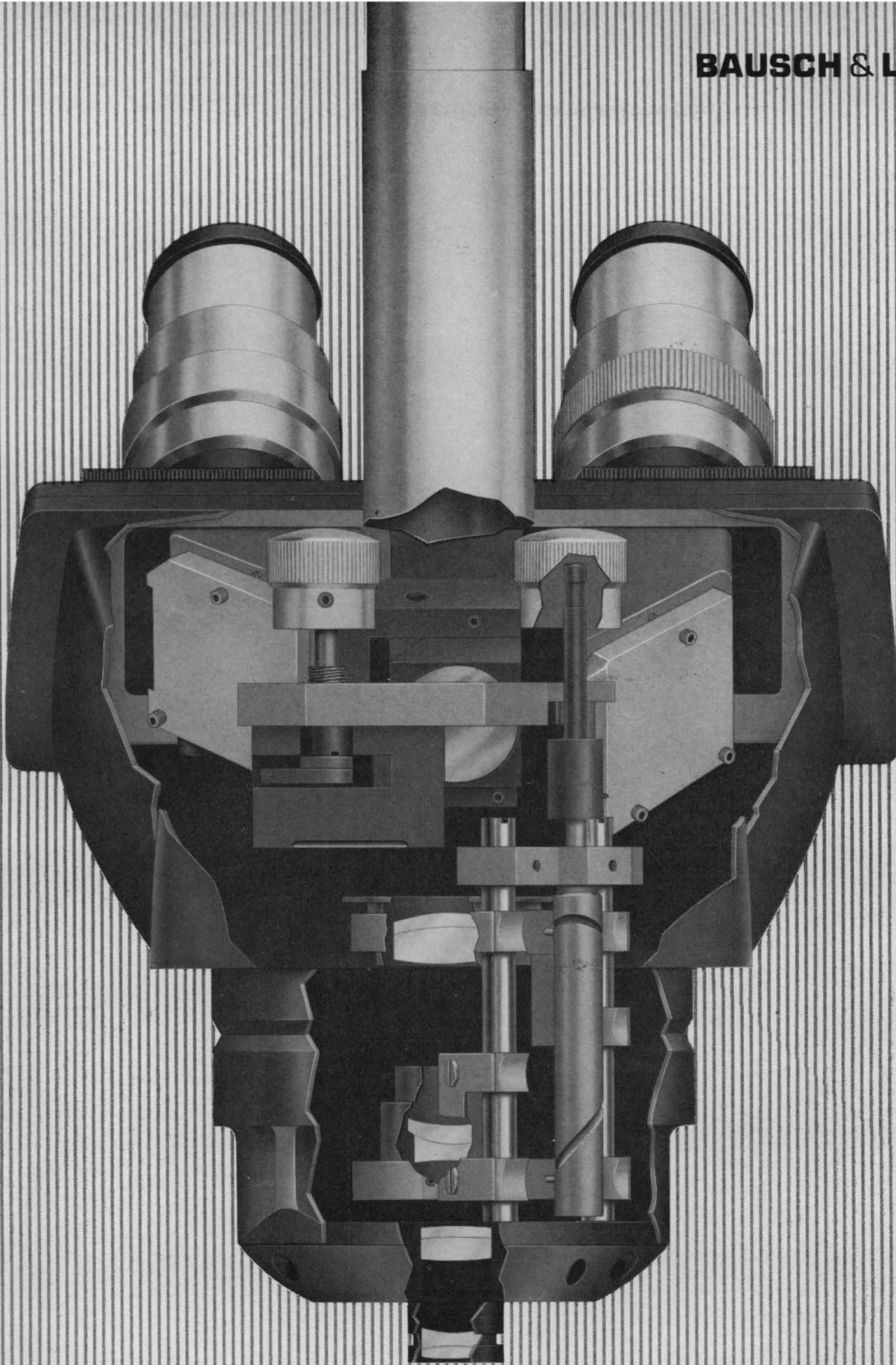
Borrowing these famous words of the watchmaker, we introduce you to an inside view of the exclusive Dynazoom/Flat Field Optical System by Bausch & Lomb. Conceived by an award-winning team of microscope designers. Executed by master craftsmen in optical/mechanical precision. Nothing else in the world can match this advance in microvision. You glide through continuously variable magnifications to the one just right for what you want to see or photograph. You are always in visual contact with the specimen . . . and you see it flat from edge to edge. Such microscope performance cannot be matched for anywhere near the Dynazoom® price. But —let your own eyes decide. We can arrange for you to try a Dynazoom in your own laboratory. Meanwhile we will send you the deluxe Laboratory Microscope brochure, 31-185, and an indexed reproduction of the 21-jewel rendering. You'll want to display it in your office or use it in your classroom. Just write Bausch & Lomb, 87840 Bausch Street, Rochester, New York 14602.

In Canada, Bausch & Lomb Optical Co., Ltd., 16 Grosvenor St., Toronto.

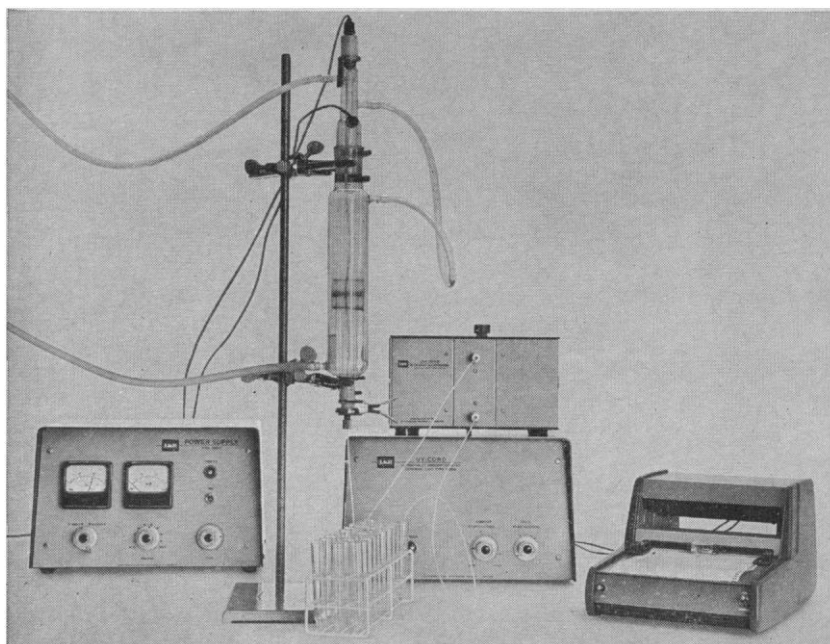
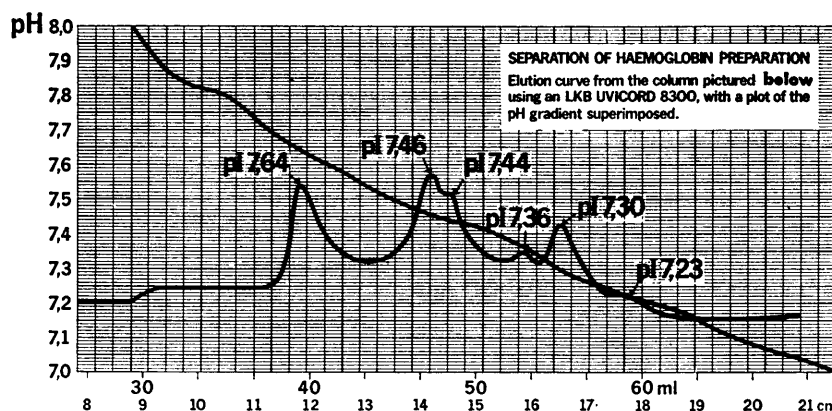
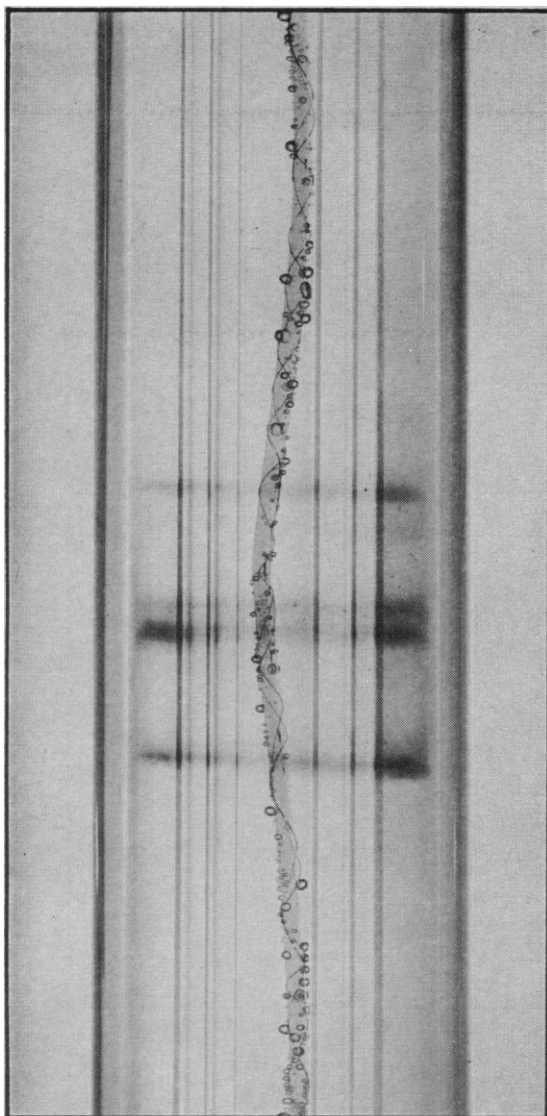
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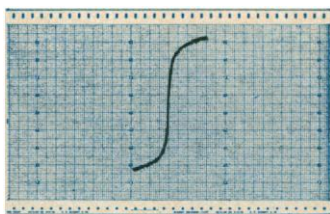
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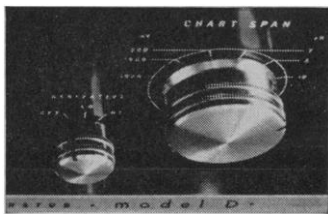
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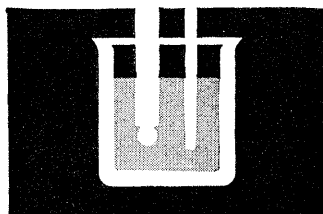
# When your work demands a recording titrator



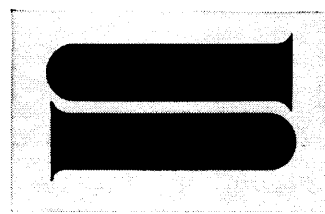
that has to be remarkably accurate (mv or pH accuracy = 0.25%; burette and volume accuracy = 0.1%) and precise (with a 240-mm chart span readable to as little as 0.002 ml and to 0.01 pH units when the 10-ml burette is used),



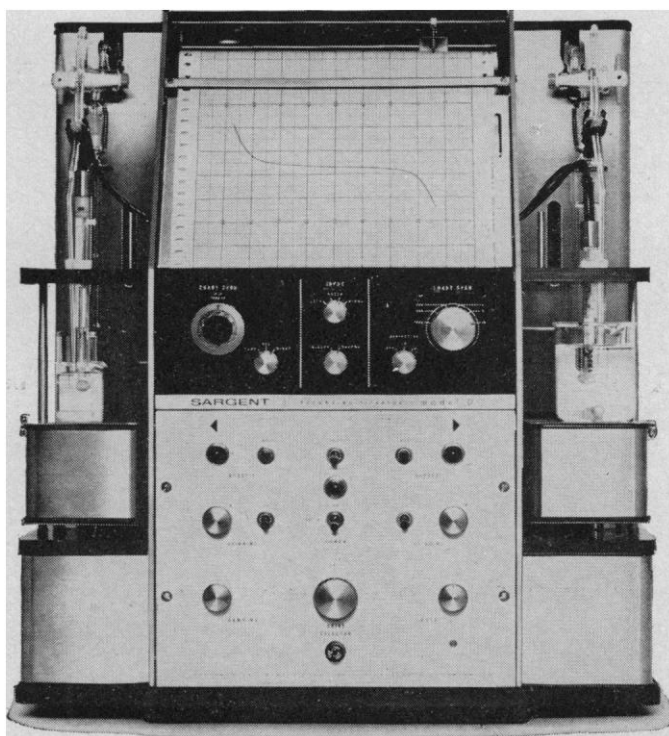
and that is designed for automatic operation (convenient, front-panel settings for chart span, titrant delivery rate, stirring rate, burette rapid flush-and-fill) with built-in titrant deceleration as endpoint is approached,



and that is versatile (accommodating any electrode, for aqueous or nonaqueous media, for semi-micro, micro, or macro work) to perform all potentiometric titrations, including those carried to predetermined endpoints, or indicated by the first derivative of the titration curve,



then the automatic recording titrator for you is the Model D (designed and manufactured by E. H. Sargent & Co.). It has two independent titrating stations and costs \$2850, less electrodes. To see the Model D at work in your lab, call your Sargent man for a demonstration at your convenience. EHS-210

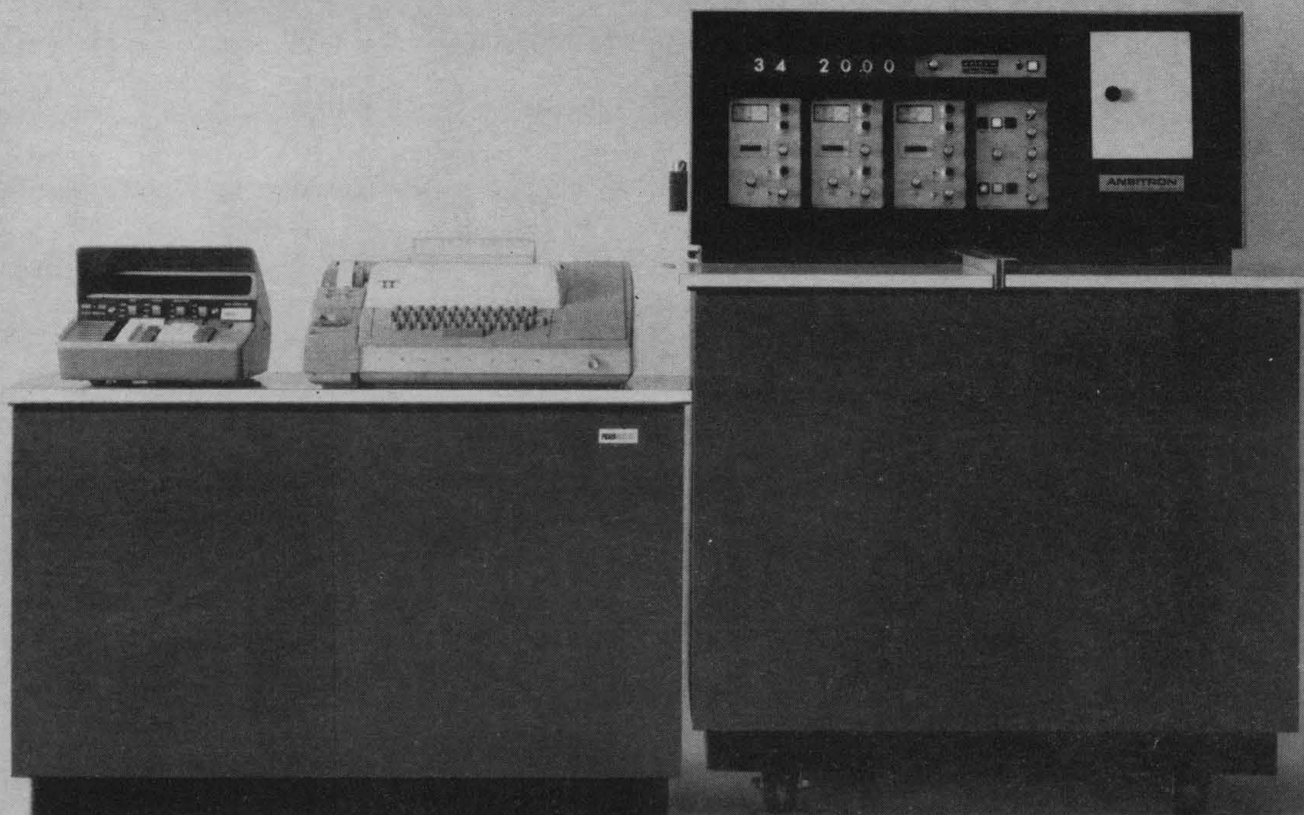


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This new system (called DiRAC™ to suggest that this is a "disintegration rate computer") marries a liquid scintillation counter to an "in-lab computer"™ to give you *both* data and data processing. Answers, not just numbers. And with a computer to cope with the reduction of complex data, one is encouraged to undertake mathematically involved work. Double labeling, for example. Constant instrument calibration becomes practical. Any of the quench correction techniques now available can be utilized; to their fullest. In general, this system will yield more reliable data. Faster. The DiRAC will actually save one minute of data analysis time per sample—while eliminating the need to send data to a processing center. (Ask for proof.)

The liquid scintillation counter of the DiRAC system—the Ansitron™ II—yields data *worthy* of computer analysis. The performance of this instrument will challenge that of any other competitive unit. And this is the easiest liquid scintillation counter to operate. One example: the availability of "β-set" plug-in discriminators which pro-

vide preset control settings for commonly used isotopes and mixtures. (Ask for proof.)

The computer of the DiRAC system is Picker's DAC™ "in-lab computer". And although the marriage of this computer to the liquid scintillation counter gives the practical convenience of an on-line computer, it is done in such a way as to make the "in-lab computer" available for other uses. The DAC and its interface will accept teletype data from any other instrument. Hence you can also marry it to your other devices that now generate data (not answers). Too: the DAC computer is a full-fledged computer and can be used by itself for polynomial computations, statistical analysis, curve-fitting, interpolation, and as an everyday calculator for more mundane computations. (Ask for proof.)

Finally: (1) we offer the needed software for the operation of the DiRAC, and (2) we take complete "systems responsibility" for its proper functioning and for your continued satisfaction with it. (Now get proof, ask for file 128S).



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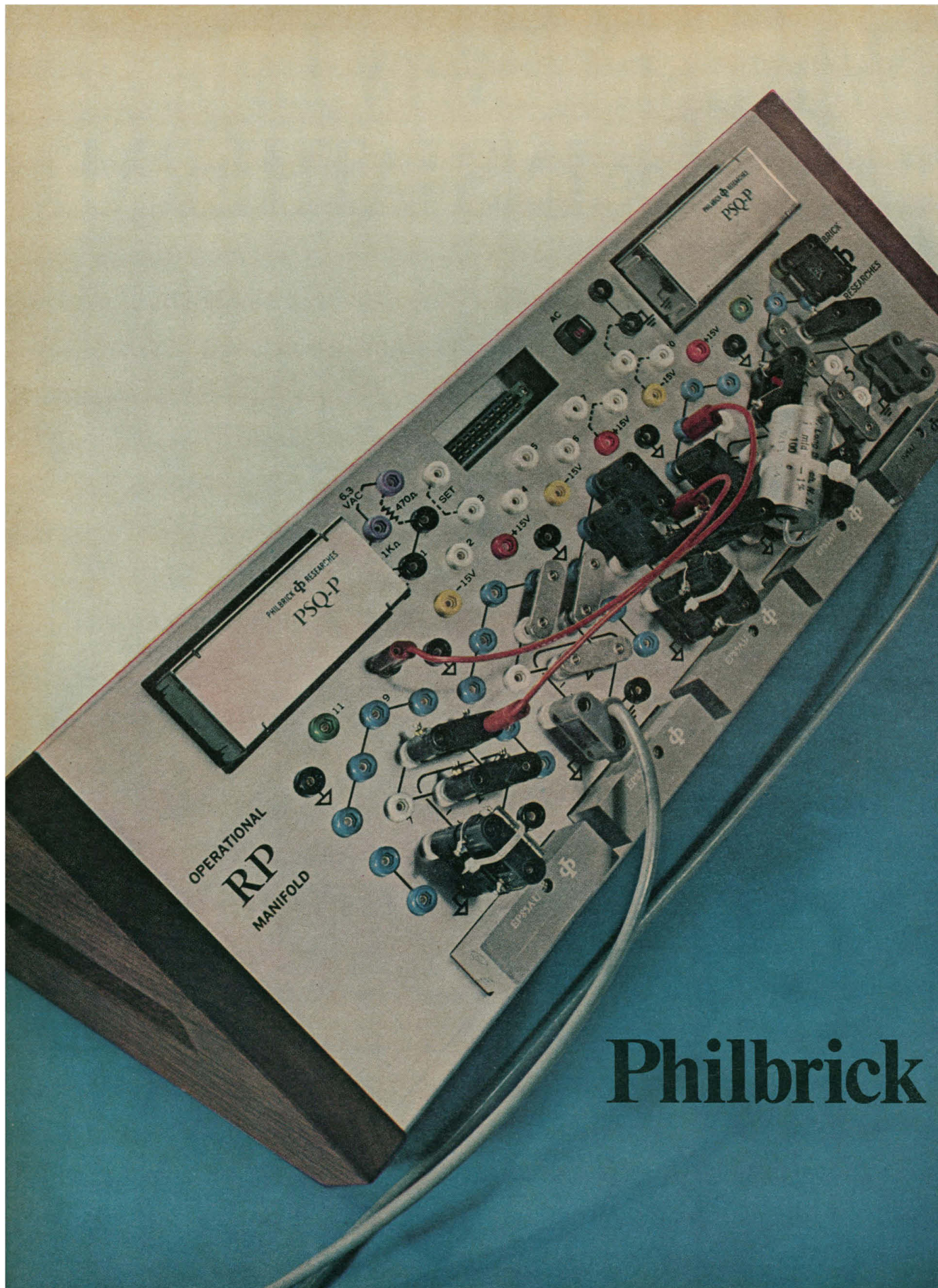
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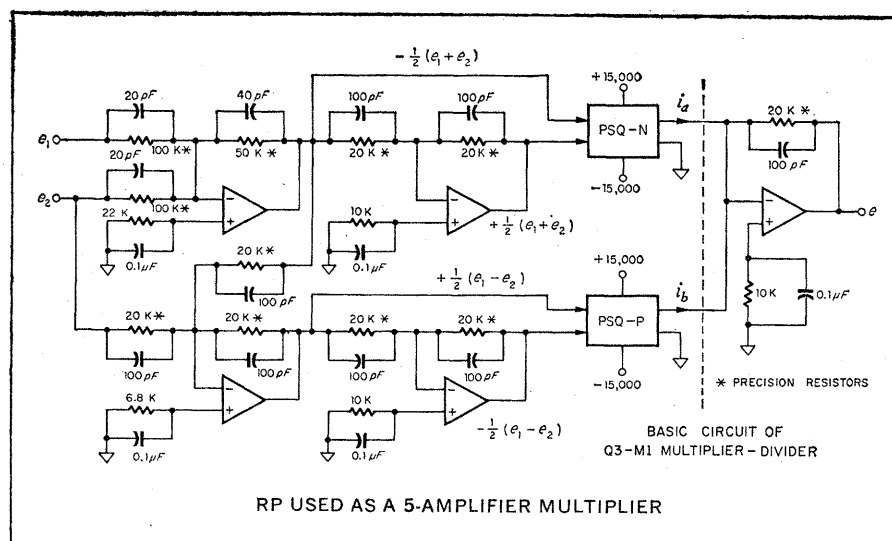
Philbrick



Model RP is an all-in-one analog instrument. With it you can assemble operational amplifier circuits in *minutes* instead of hours or days. It's ideal for experimentation, simulation and instruction in the practical application of solid-state analog circuitry. The RP combines the convenience and freedom of old-fashioned breadboards with a technique that provides logical organization, shielding, grounding, isolation and stabilization to temporary or experimental circuits. Philbrick Operational Manifolds make it easy to build stable operational amplifier circuits that are free of "bugs," "strays" and other parasitic happenings.

The Model RP Operational Manifold has five receptacles for plug-in solid-state operational amplifiers of the Philbrick "EP" type, an integral regulated DC power supply and a jack panel on which circuitry can be assembled conveniently and quickly. In addition, two extra receptacles accommodate a Philbrick Operational Circuit Plug-in — such as a Quadratic, Logarithmic or Sinusoidal Transconductor or a chopper-stabilized high-gain amplifier. An electrically "free-floating" receptacle included on the panel accepts an additional 10-pin plug-in module such as an EP or P-size Operational Amplifier, a Booster Amplifier, an Operational Circuit Plug-in or any arbitrarily selected set of circuit elements preassembled on an OP-O Uncommitted Plug-in unit.

Mounted on the front panel of the RP Operational Manifold are 106 tip jacks, spaced  $\frac{3}{4}$ " apart in a pattern of equilateral triangles. They accommodate standard twin-tip plugs and are used for mounting



passive components, shorting bars and as terminations for shielded input and output cables. Jacks are color-coded. Functional interconnections are printed on the panel.

The 5-amplifier multiplier-amplifier circuit diagram shown above is typical of the many analog circuits that can be constructed on the RP Operational Manifold. Virtually all of the 125 circuits described in Philbrick's Applications Manual for Operational Amplifiers can be assembled quickly and easily on the instrument. The RP is not limited to use as a breadboard for experimental circuits. It may also be used for permanent or semi-permanent circuits that must be built to seemingly impossible schedules.

The RP Manifold is sturdily built, attractively packaged and wired to Philbrick's usual high standard of quality. The simple, clear-anodized sheet-aluminum enclosure provides effective shielding and a firm base for the solid mounting of electrical components. It is available in a style for rack-mounting or with hardwood ends for bench use.

Philbrick Model MP Operational Manifolds may be used when a lesser degree of sophistication is required. They contain four Type P plug-in amplifiers and have an interconnection panel with 66 jack tips. The MP provides wide flexibility and a high degree of reliability at relatively low cost.

A complete line of accessory hardware is available for both the RP and MP Operational Manifolds. Uncommitted plug-in component boards are also available.

A 4-color, 6-page brochure contains more detailed information on the Philbrick RP and MP Operational Manifolds. For your copy, phone your nearest Philbrick engineering representative or get in touch with Philbrick Researches, 25-A Allied Drive at Route 128, Dedham, Massachusetts 02026. Phone (617) 329-1600.



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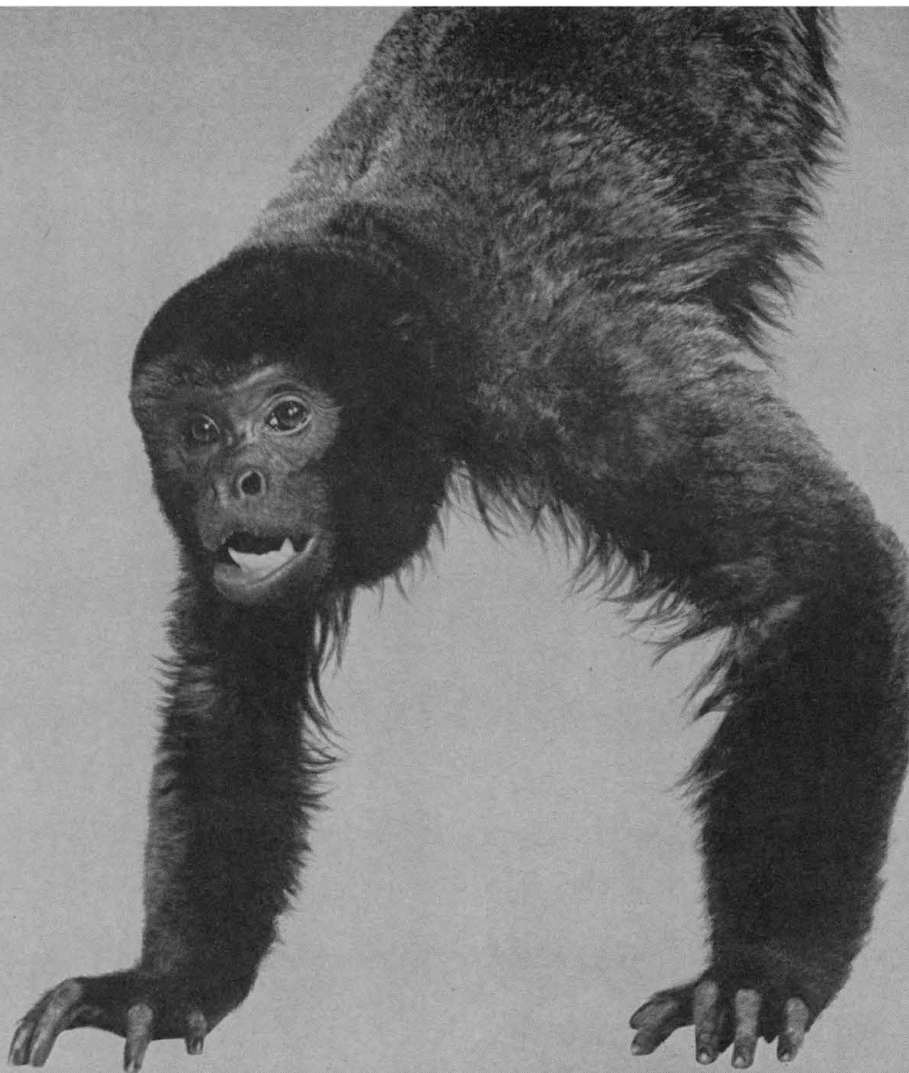
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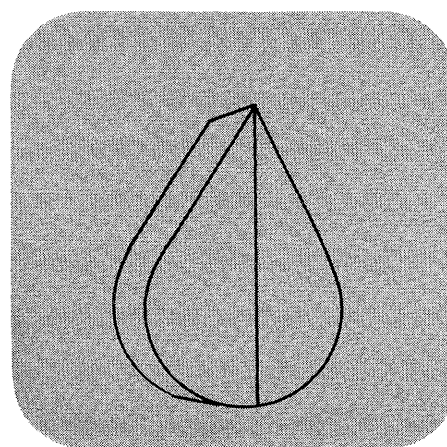
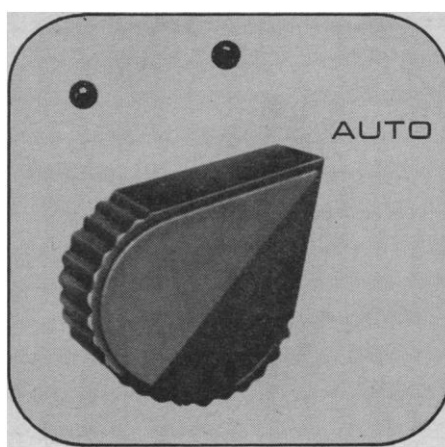
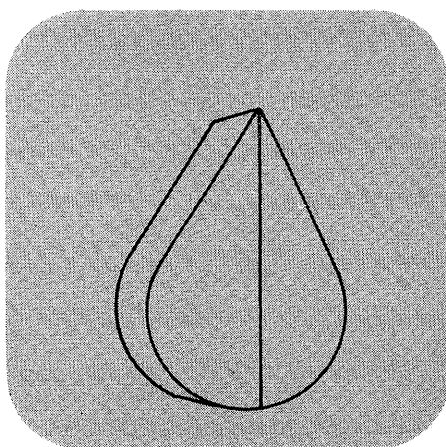
Not just one monkey, but 24 have had their temperatures continuously monitored by our Multipoint. The sensing element was a thermistor surgically implanted in their bodies. ■ No matter what sensing element (thermocouple, resistance bulb, etc.) you use, you'll get unmatched features in the Esterline Angus Multipoint. You'll also get our Multipoint delivered in just 10 days.\* And our Multipoint is priced at \$1,535 with all these standard features: ▷ up to 24 points ▷ solid state amplifier ▷ 50,000 ohm off balance input impedance or better ▷ longitudinal stray rejection at 60 Hz, 1,000 times span or 120 V ▷ accuracy of  $\pm 0.25\%$  span or  $\pm 3\frac{1}{2}$  microvolts or better ▷ manual point advance, which permits dialing in any point without disturbing synchronization ▷ permanently sealed slidewire that requires no cleaning ▷ 5 chart speeds standard ▷ choice of 8 print frequencies from  $1\frac{1}{2}$  to 60 seconds per point ▷ tilt-out writing platen ▷ chart tear-off. ■ Our Multipoint has outstanding options such as: ▷ exclusive electrical programmed printing . . . deleted points can be skipped as fast as  $\frac{1}{4}$  second ▷ 6 alarms ▷ event pens ▷ analog pen to record a single point ▷ thermocouple fail safe. ■ You can get complete information about this exceptional

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## *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;

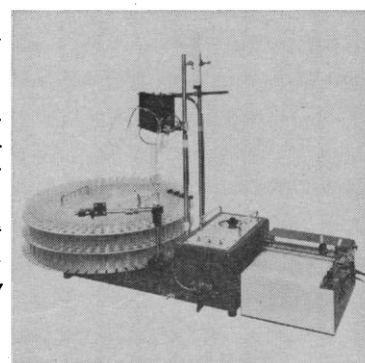
- you have a choice of *five* optical path lengths, up to 20 millimeters (twice the length, four times the sensitivity our competitors offer);

- 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! See them all at Booths 112-115, FASEB, East Room, Conrad Hilton, in Chicago, April 16-20, 1967.*



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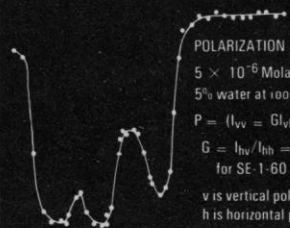


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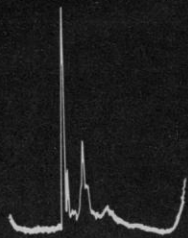
8 4 6  
7 2 2  
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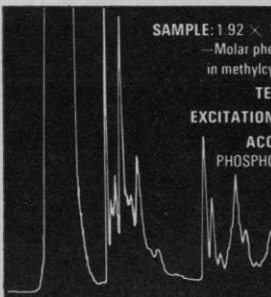
## PERFORMANCE?



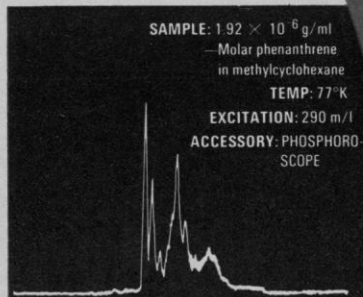
SAMPLE:  $6.64 \times 10^{-10}$  g/ml,  
 3,4-Benzpyrene in heptane  
 TEMP: 77°K  
 EXCITATION: 300 m/μ  
 ACCESSORY: DEWAR  
 POSITIONER



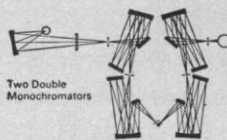
SAMPLE:  $1.92 \times 10^{-6}$  g/ml  
 —Molar phenanthrene  
 in methylcyclohexane  
 TEMP: 77°K  
 EXCITATION: 290 m/μ  
 ACCESSORY:  
 PHOSPHOROSCOPE  
 (In Low-  
 Position)



SAMPLE:  $1.92 \times 10^{-6}$  g/ml  
 —Molar phenanthrene  
 in methylcyclohexane  
 TEMP: 77°K  
 EXCITATION: 290 m/μ  
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# Introducing Nikon auto-photomicrography

## *New Auto-Microflex AFM reduces exposure problems to automatic simplicity*

The new Nikon AFM Auto-Microflex does away with the need for measuring, calculating and timing photomicrographic exposures. It does it all electronically, with automatic certainty and simplicity.

The AFM consists of two units: **The microscope attachment** contains the photo-image optics, a sensitive cadmium-sulfide light sensor, electronically controlled shutter, and finder-observation system. It fits any standard microscope, and may be used with a variety of standard camera bodies and film backs ranging from 35mm to 4 x 5", including Polaroid.

Two interchangeable viewers are supplied: a focusing telescope for high-power microscopy and a ground-glass screen with 7x magni-

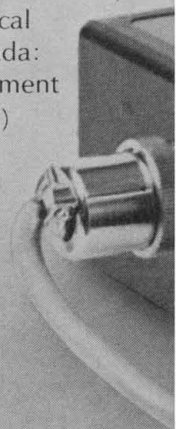
fier for low power work. The latter is useful for group viewing.

**The control unit** is a compact, solid-state computer, electrically connected to the microscope attachment. The light sensor in the attachment measures the integrated brightness of the specimen, and transmits this information to the unit. The unit, having first been preset for the ASA film speed rating, translates this information into exposure duration or shutter timing.

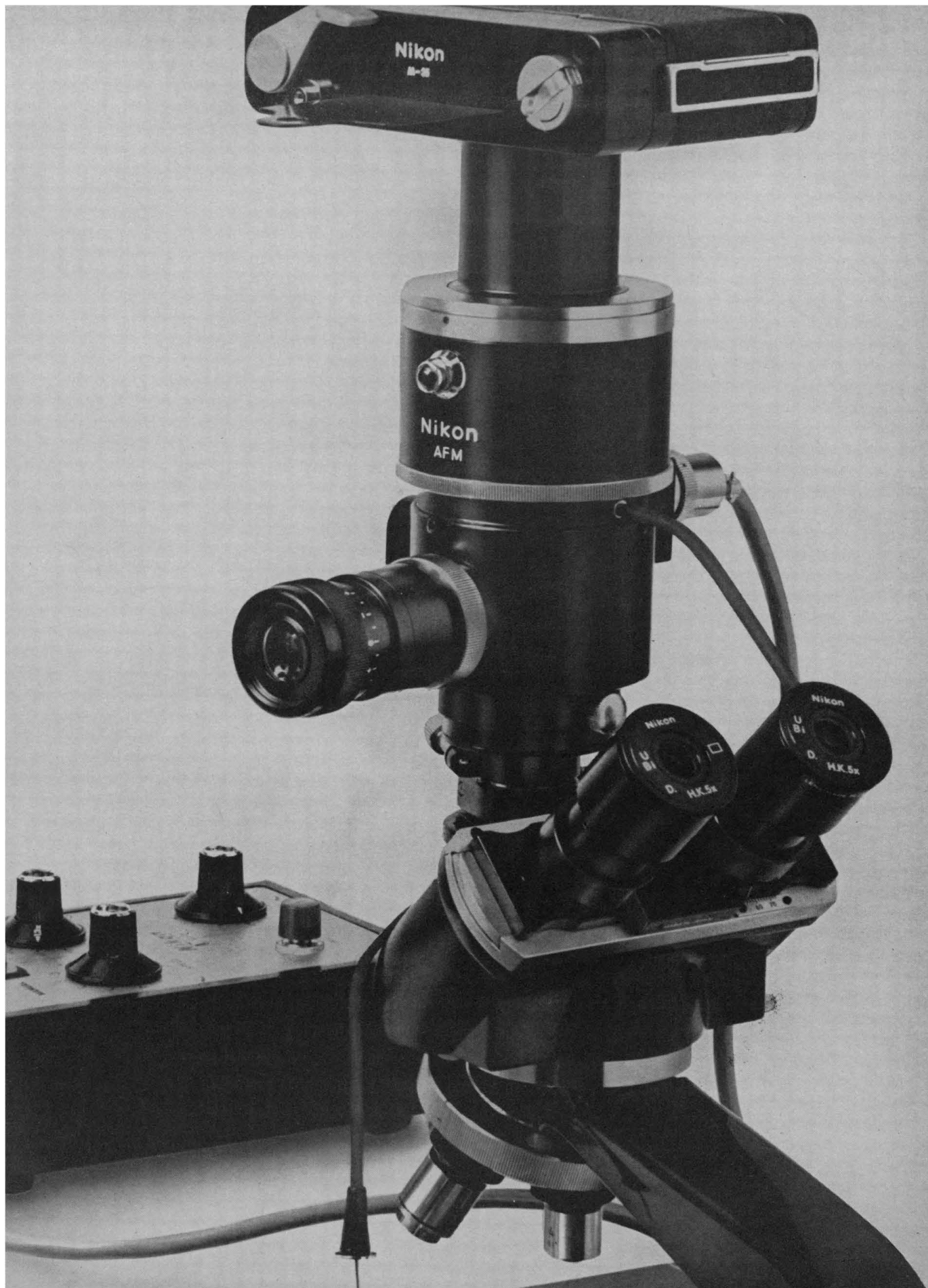
A conventional camera cable release, fitted into the microscope attachment, is used to trigger the exposure. The shutter opens and closes automatically, precisely timed for the interval computed by the control unit. The range is from 1/125th second to 10 minutes.

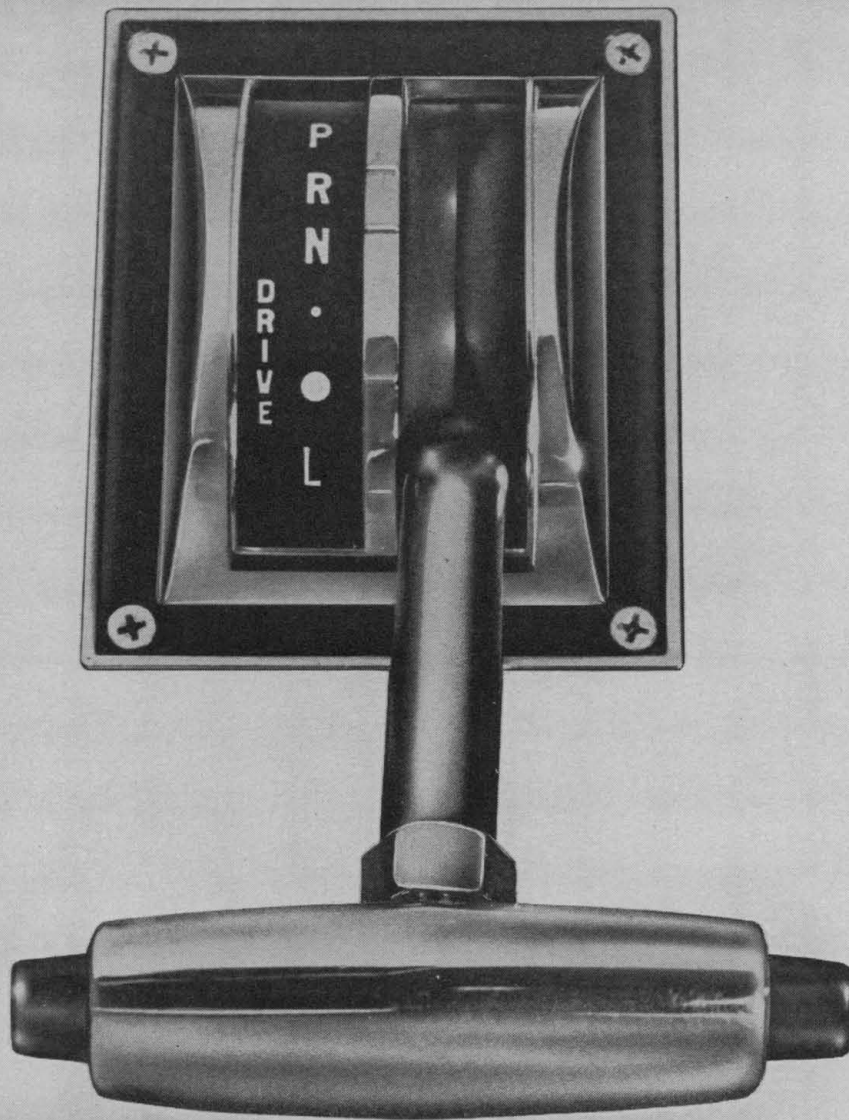
A calibrated, compensation adjustment on the control unit permits increasing or decreasing the programmed exposure in 1/3-stop increments where a somewhat different image density is desired. The control unit also permits manually selected exposures from 8 seconds to 1/125th. And it is provided with a standard PC terminal for photomicrography with synchronized electronic flash.

Price of the Nikon Auto-Microflex AFM, less camera back, is \$795. For more details and specifications, write: Nikon Inc., Instrument Division, Garden City, N.Y. 11533. Subsidiary of Ehrenreich Photo-Optical Industries, Inc. (In Canada: Anglophoto Ltd. Instrument Division, Rexdale, Ont.)







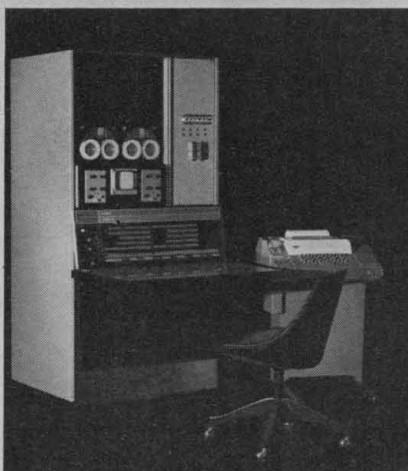


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This new contrast technique reveals specimen details not obtainable by any other contrast method. It shows images in colors or black and white in a pronounced halo free relief. This phenomenon is characteristic for interference contrast produced by birefringent optical elements, in this case, a special turret condenser in combination with Wollaston prisms, rotatable filter polarizer and analyzer.

## CONTRAST FLUORESCENCE MICROSCOPY

This technique enables examination of fluorescent specimens in positive and negative phase contrast (simultaneous contrast fluorescence) by superimposing a bright fluorescence image on the phase contrast image. It is accomplished by simultaneous application of visible (white) and UV illumination and a unique fluorescence-contrast condenser.

## MICROPHOTOMETRIC MEASUREMENTS

For the quantitative determination of reflectivity, absorptivity and extinction or fluorescence intensity and their variation with wave length by means of the new Reichert microphotometer (spectrophotometer) in combination with the "Zetopan". Specimen and measuring diaphragm are viewed simultaneously for infinitely reliable specimen detail location at all objective powers. An integrated photo multiplier assures linearity of indication far exceeding the measuring accuracy of 0.5%. This sensitivity permits measurements of the smallest structural constituents down to 0.5 micron.

## AUTOMATIC PHOTOMICROGRAPHY

The new Reichert "Photo Automatic" is a fully automatic photomicrographic camera. It indicates the exposure time *prior* to actual exposure enabling the operator to decide whether the indicated exposure time is reasonable. A beam splitter directs 80% of the light to the camera and 20% to the focusing telescope. The frame size is 24 x 36 mm with readily interchangeable cassettes. A vibration-free magnetic shutter provides for exposures starting at 1/250 sec. with a range to any exposure time necessitated by film and specimen. The film speed setting can be varied between ASA 6 and 1600. The magnification of the built-in photographic eyepiece is variable from 6.3x to 10x eliminating the need for changing objectives.

These and other advanced techniques in optical microscopy are available to you with the . . .

## REICHERT RESEARCH MICROSCOPE "ZETOPAN"

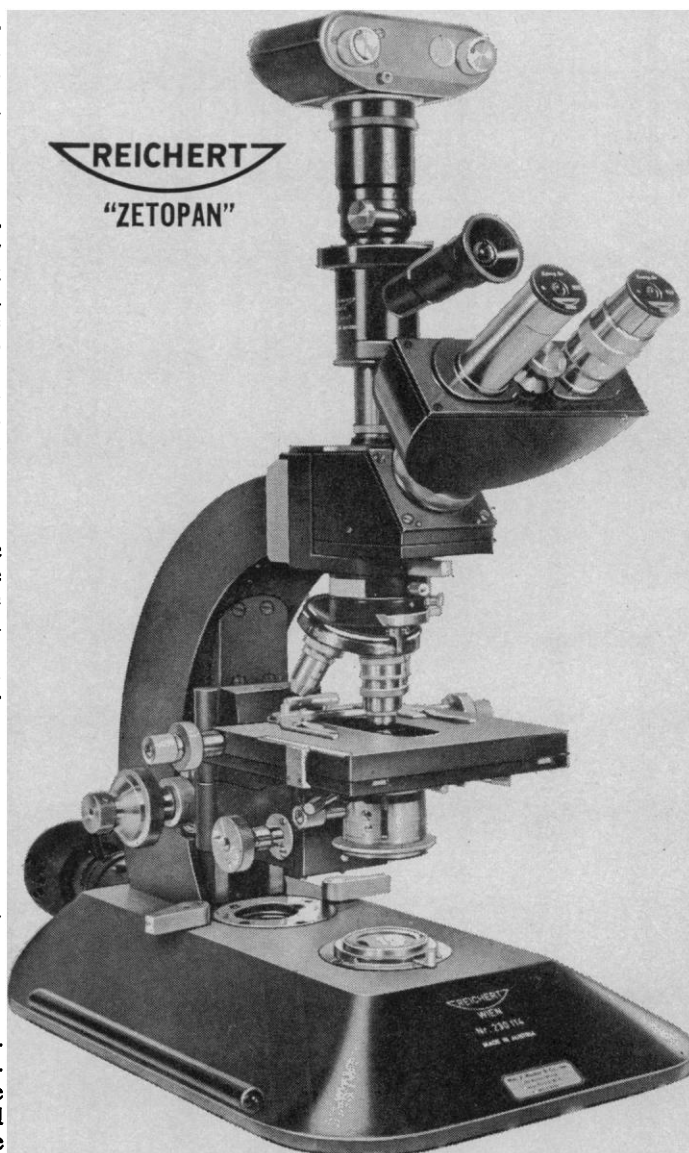
The "ZETOPAN" has built-in illuminating systems for reflected, transmitted and mixed light . . . Brightfield, Dark-field and Oblique Illumination. Separate independent tube for convenient photomicrography, including new Polaroid Land Camera Back for instant color or black and white pictures. Automatic and semi-automatic exposuremeters. Light sources include high intensity, xenon and mercury arc, iodine quartz and monochromatic lamps.

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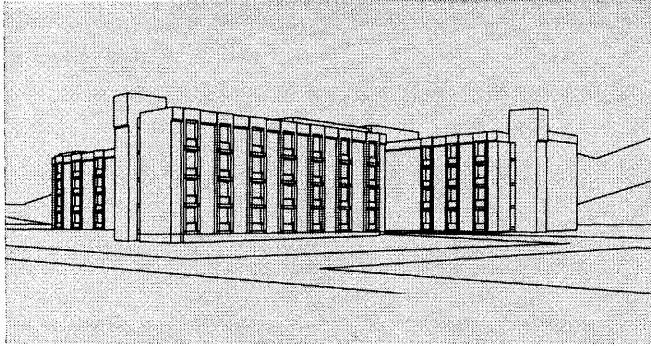
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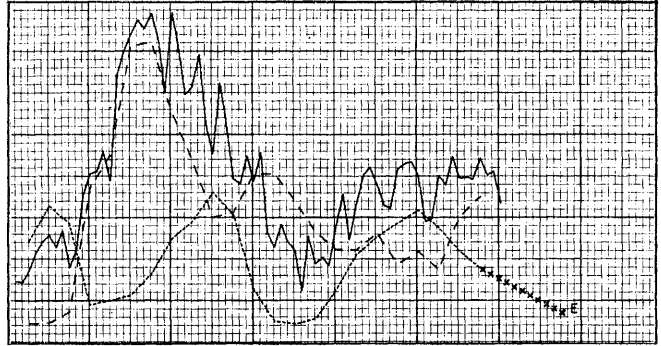


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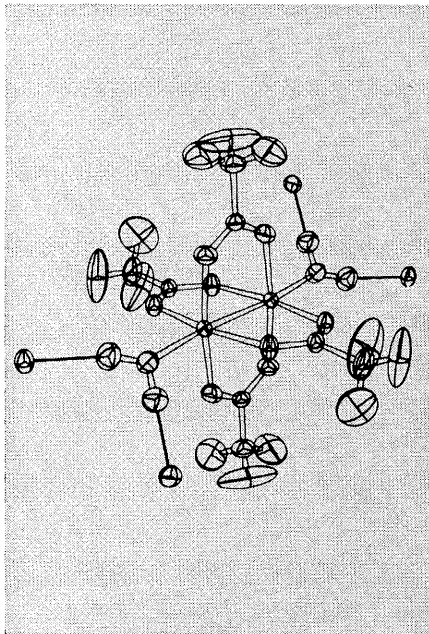
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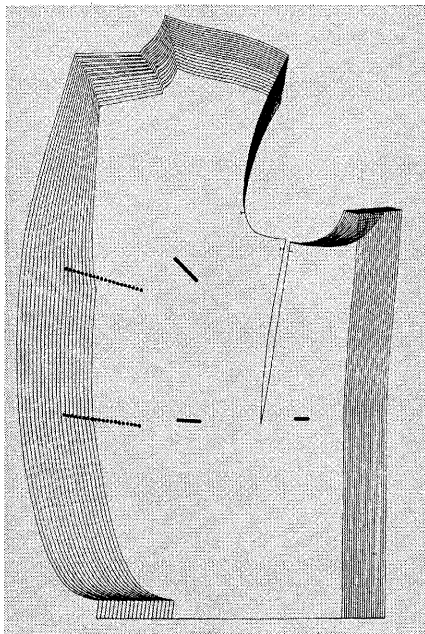
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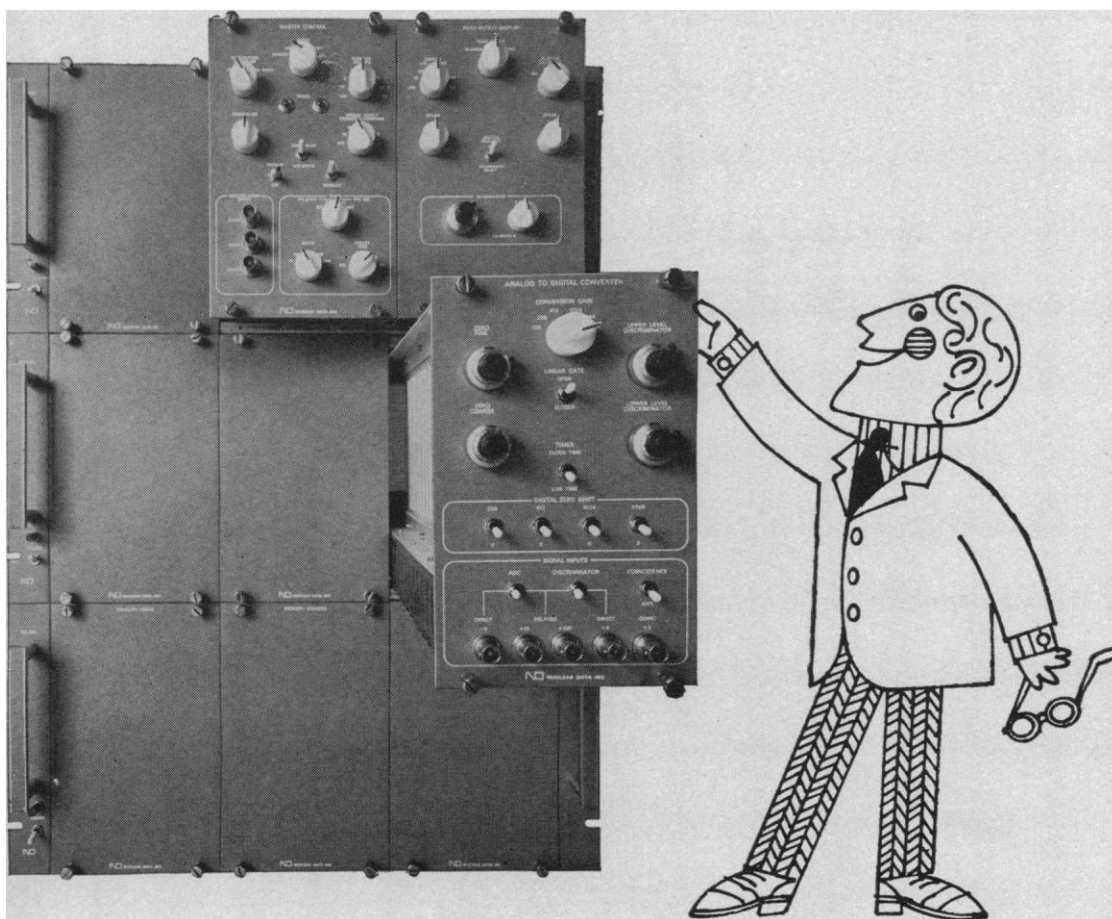
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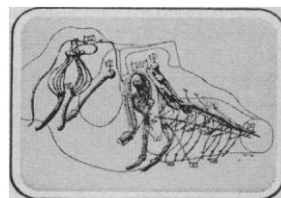
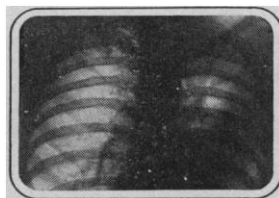
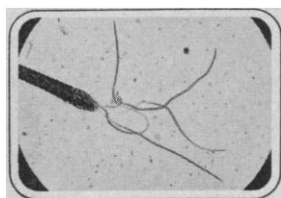
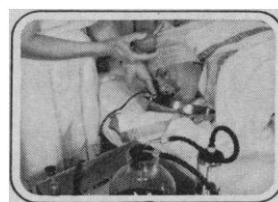
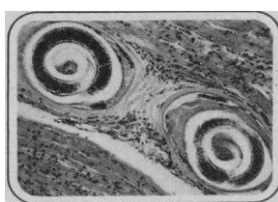
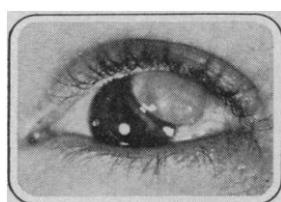
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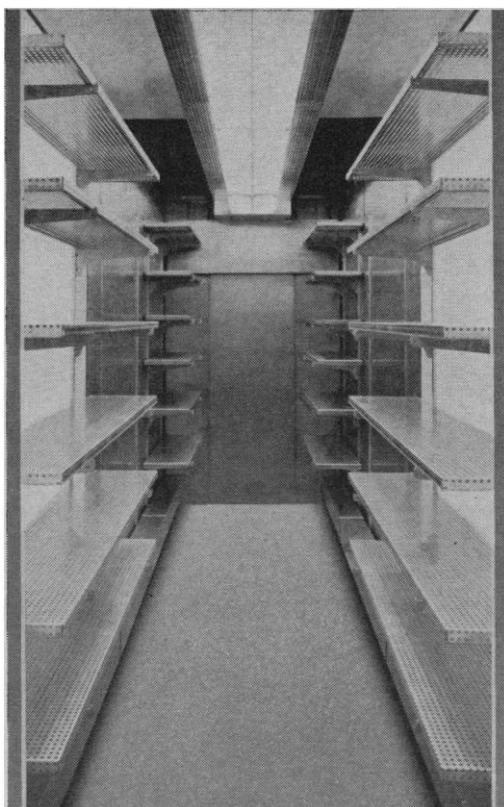
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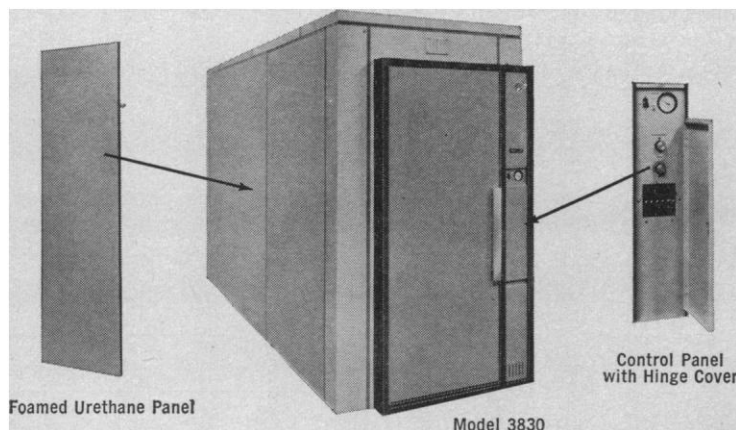
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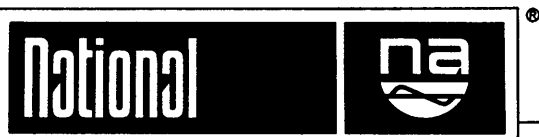
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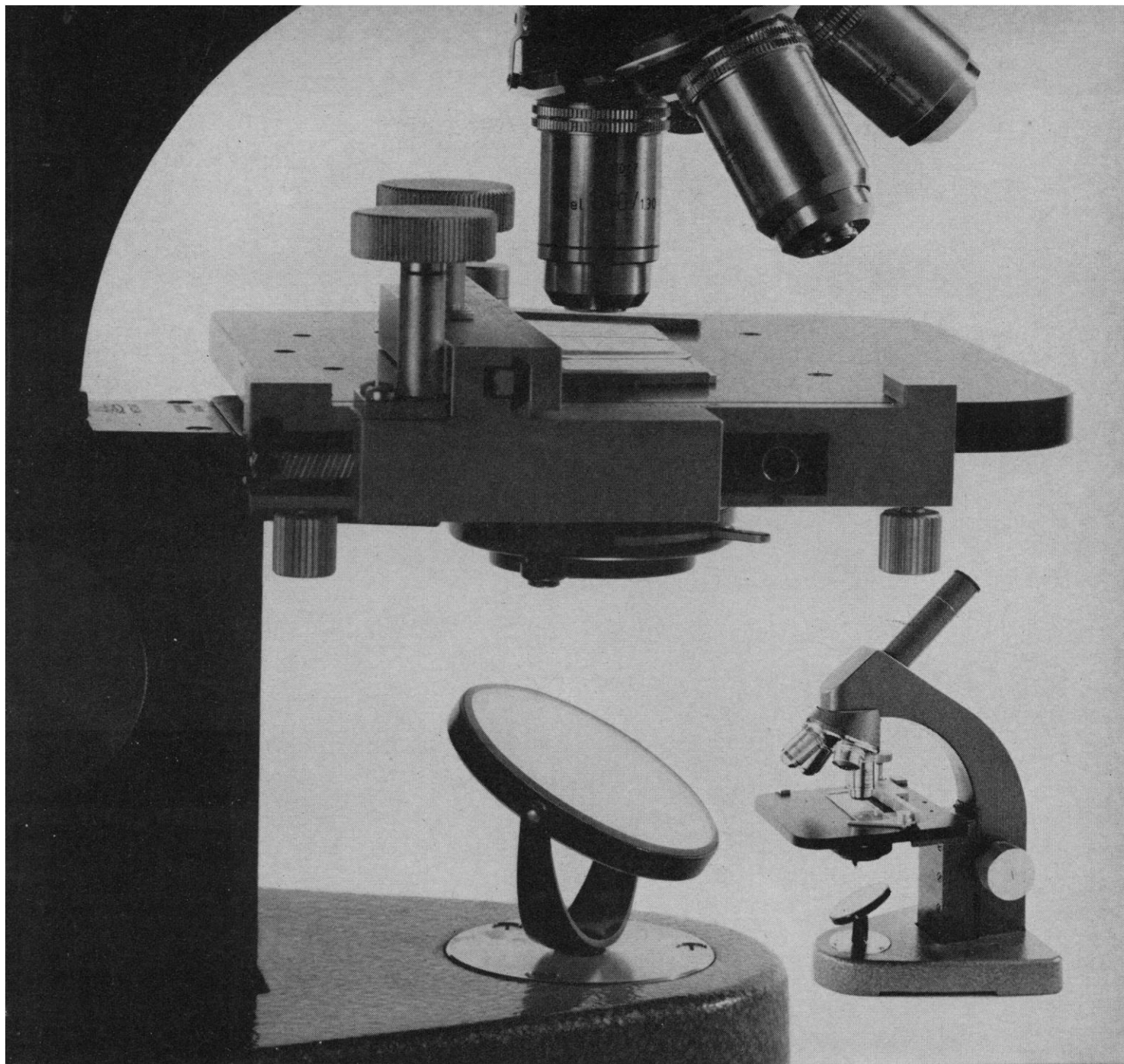
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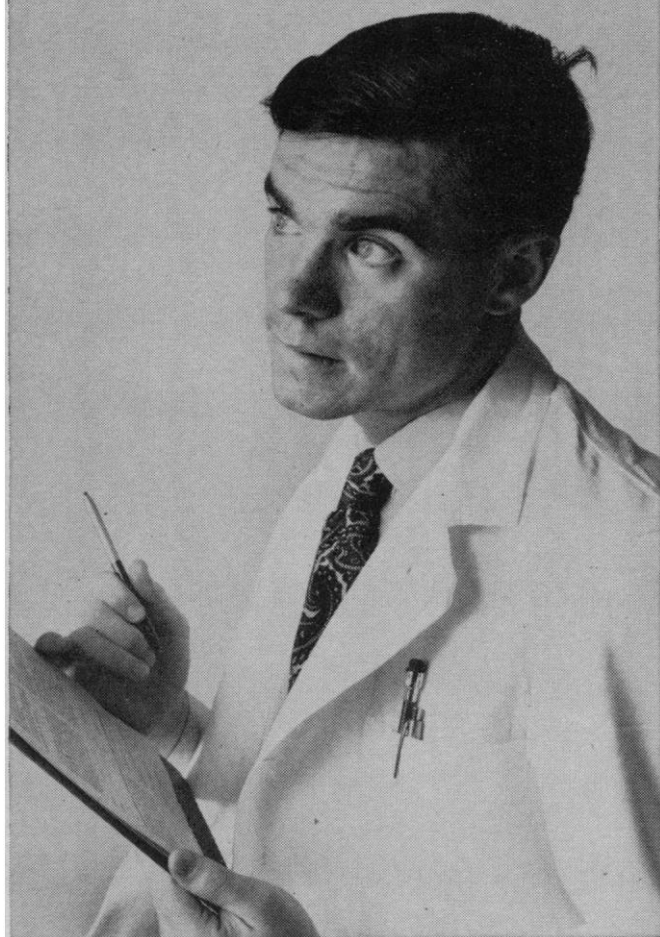
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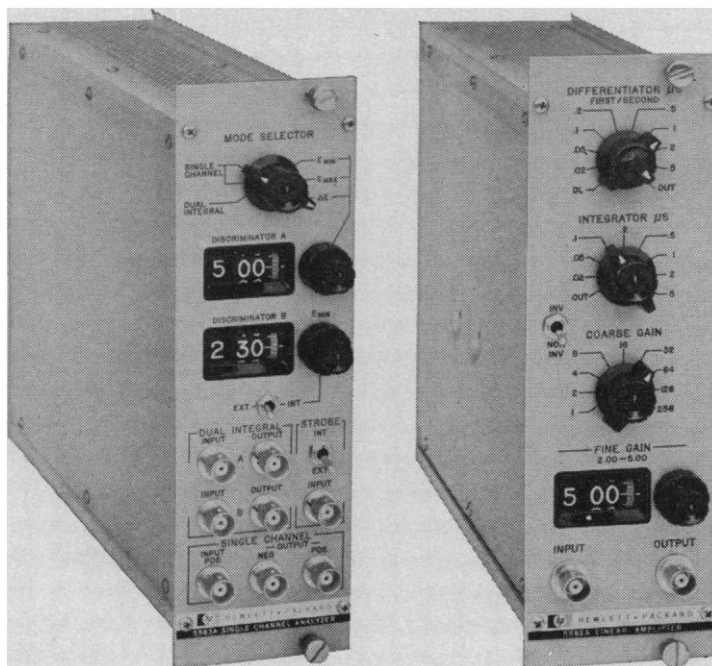


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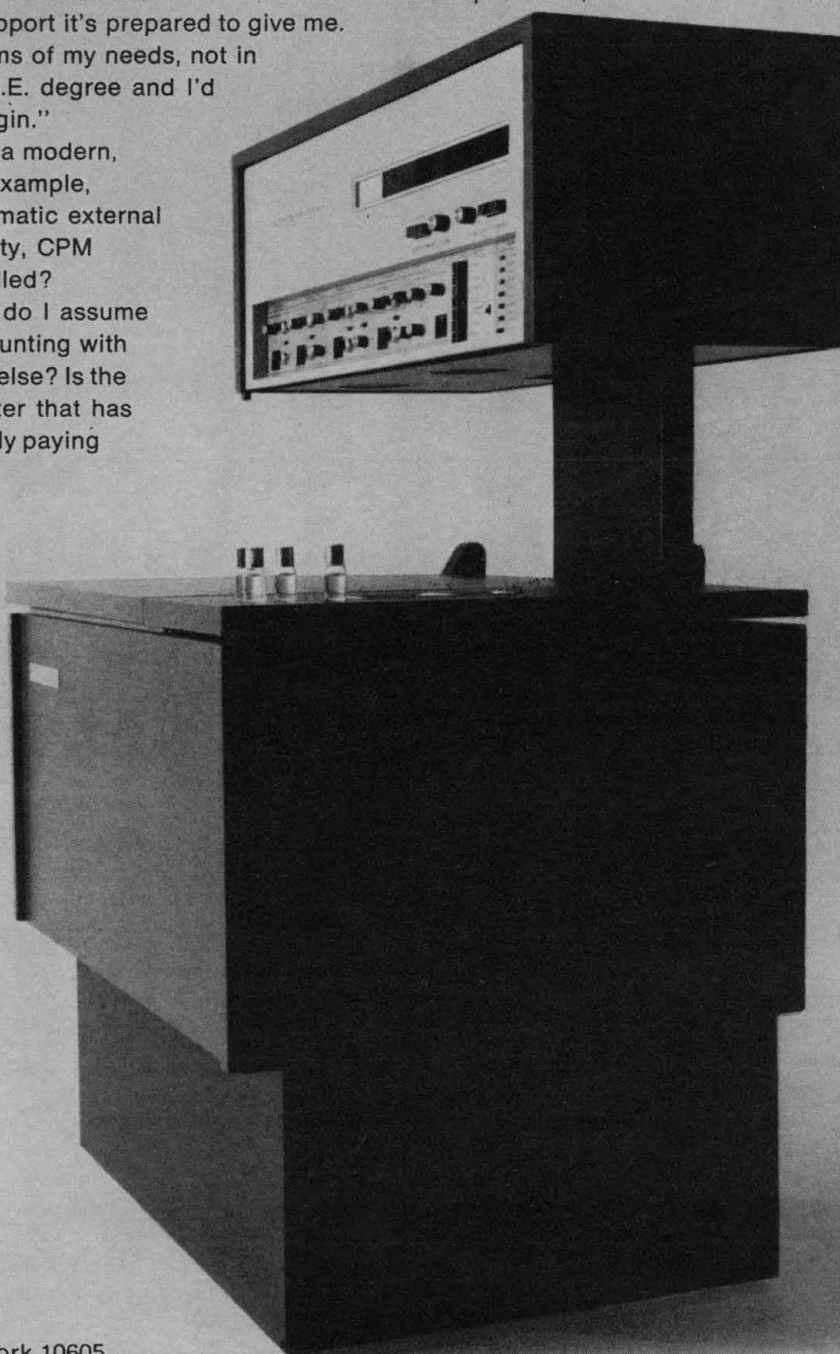
*Question 4:* Other than yourself, what *other* Picker Nuclear sales or service people can I rely on in this area?

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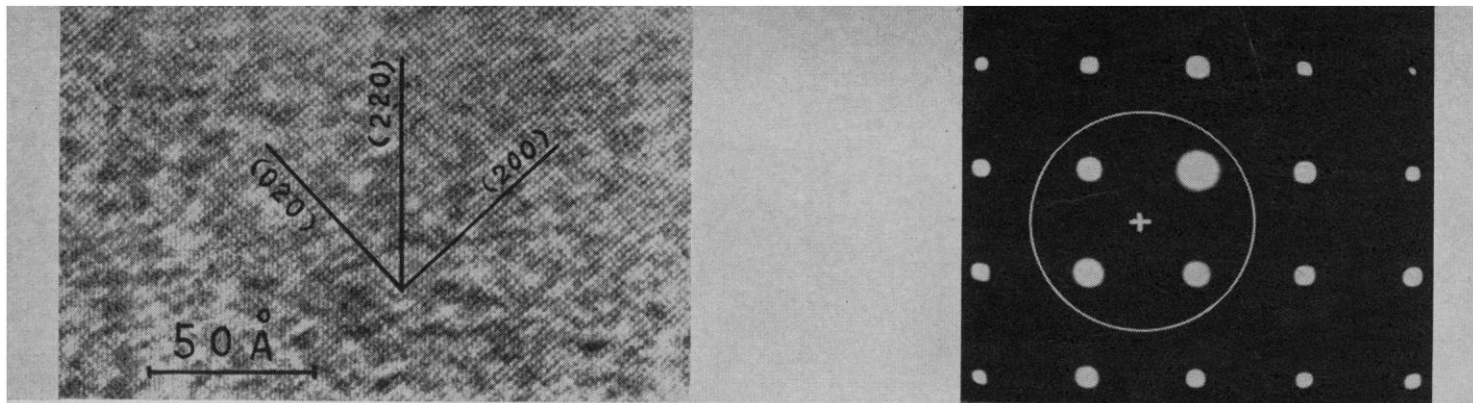
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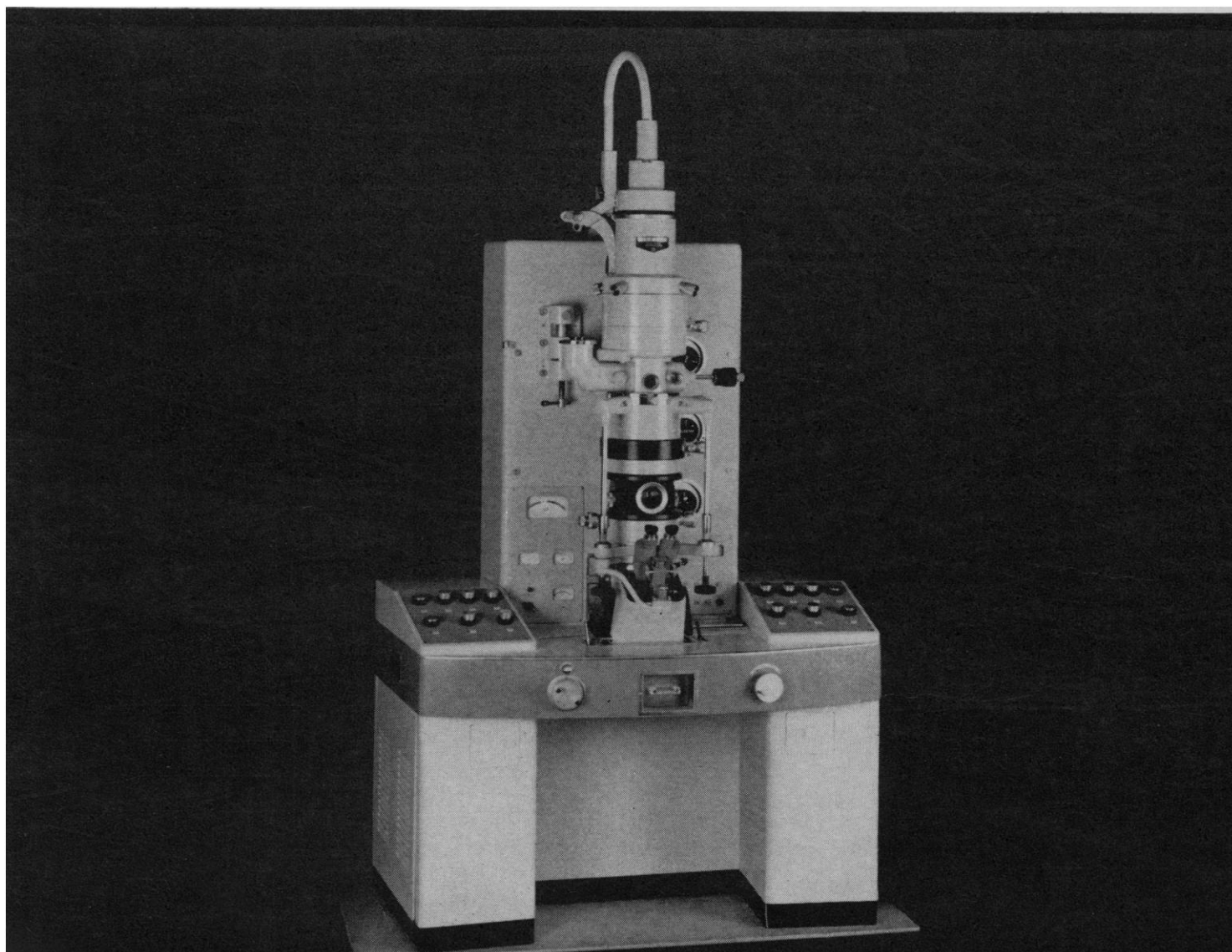
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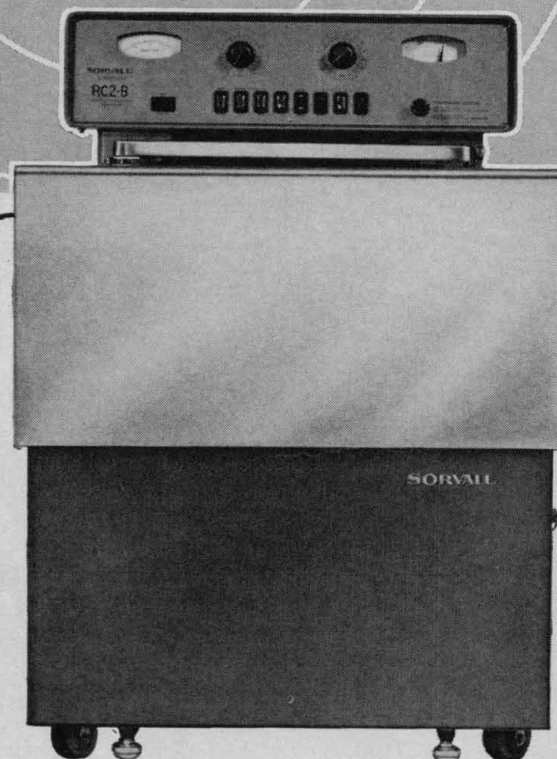
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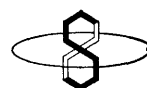
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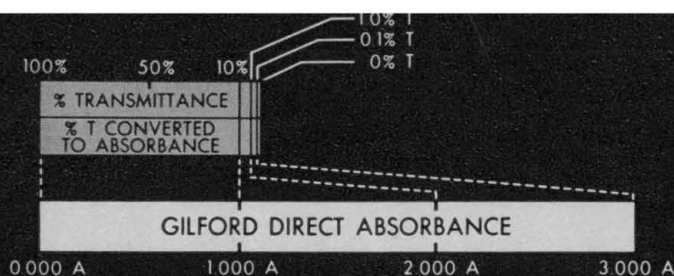
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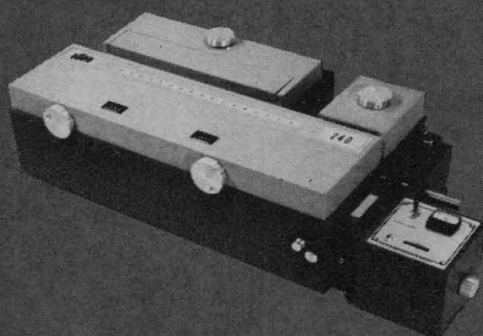


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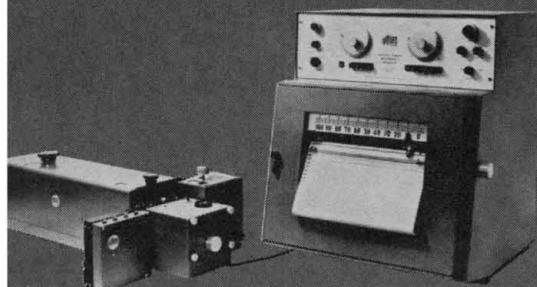


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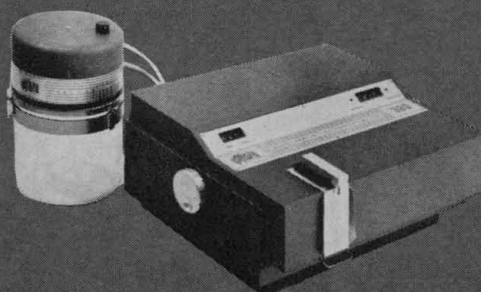
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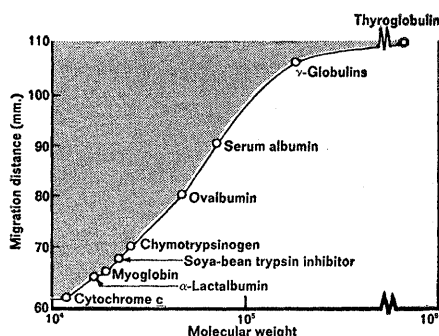
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event, the present government policy of doing everything possible to restrict free discussion of chemical and biological weapons should be modified so as to permit full public examination of the question, limited only by the dictates of necessary military security. Hopefully, the petition might assist in advancing this aim.

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## Incaparina Gains Acceptance

In Carter's article, "World food supply: problems and prospects" (News and Comment, 6 Jan., p. 56), he referred to Incaparina, the low-cost protein-rich food supplement developed by the Institute for Nutrition for Central America and Panama (INCAP) as one example of the use of oil seed protein in a product designed to meet the needs of the developing countries. However, I believe that some clarification with respect to the commercial application of Incaparina is in order. While it is true that Incaparina is in various stages of product development in several Latin American countries, it is currently in full-scale commercial distribution in only Colombia and Guatemala. We do not believe that the current commercial sales of the product in either of these countries should be classified as "not particularly encouraging."

Carter did note, of course, that the Guatemalan experience is a notable exception. The 1966 sales in the two countries exceeded 4.6 million pounds (2.1 million kilograms) for a 40 percent increase over the previous year. This performance has been achieved without either large-scale governmental purchases of the product or any other form of subsidy. In Guatemala Incaparina has been sufficiently well accepted by consumers to have been in a paying position for the producer for over 2½ years. Sales volumes in Colombia are now reaching the "break-even" point and full commercial success is anticipated there. It is too early to forecast the results of consumer acceptability and market tests now underway in El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Brazil, and Venezuela.

RICHARD L. SHAW  
Institute for Nutrition for Central  
America and Panama, Carretera  
Roosevelt Zona 11, Guatemala, C. A.

## Microbial Ecology

I strongly disagree with Pramer's review (3 Feb., p. 551) of Brock's *Principles of Microbial Ecology*. When I read the book in manuscript, I was delighted to note that it was *not* a compendium, but rather "a book of principles," to use the author's own words. The finished volume reaffirms this opinion. Brock has managed to wield the scissors with discrimination, and the result is a very readable, thought-provoking book which does bring forth many of the problems and principles of microbial ecology.

Contrary to Pramer's comments, the author clearly defines his intended audience in the preface, and the very elementary chapter on the microbial environment is a good starting point for many potential readers who may have had their training in the usual soils curriculum. I do not find an inconsistency between the statements that "the interior of an experimental animal is usually sterile" and that "microorganisms are frequently present in huge quantities, especially on the skin and in the intestinal tract," for the interior of an animal is usually considered to exclude the skin and the gastrointestinal tract. In short, I believe that Brock is to be commended for writing an informative, often profound, first volume in a new field in such a manner that the charm of the author's expression has not been deadened by dreary details of superfluous, uncritically chosen examples from the literature.

WARREN S. SILVER  
Department of Bacteriology,  
University of Florida, Gainesville 32601

... I found, in contrast with Pramer, that Brock's book was thoughtfully assembled, provocative, and, in those areas which I was able to judge, reasonably accurate. ... The reviewer writes that "There is little new information that the book can impart to a college student who has completed courses in introductory chemistry and microbiology. ..." Whether or not this is so is moot. But what is important is not just "new information" but the incorporation of that information into the warp and woof of the total fabric of science. Not to realize this is to miss the whole point of the book.

MARTIN DWORKIN  
Department of Microbiology,  
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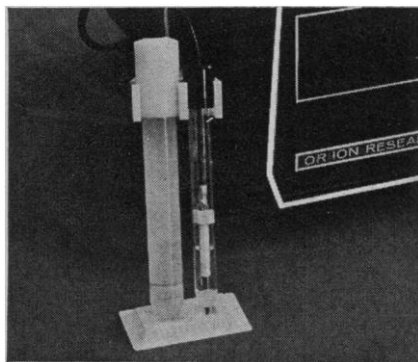
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**Experimental Approach.** Set up experiments which will give meaningful results regardless of whether data are positive or negative; once you set up a procedure, never, never alter it or you will have to explain how and why and what difference it made. Restrict your study to a single variable so that you don't have to concern yourself with complicating factors and there will be no necessity for a comprehensive discussion. Avoid experiments which must be presented in the form of figures or graphs and, by all means, exclude photographs. If all data can be summarized in typewritten tables you will save yourself time, money, and frustration. (It's even better if you don't need tables!)

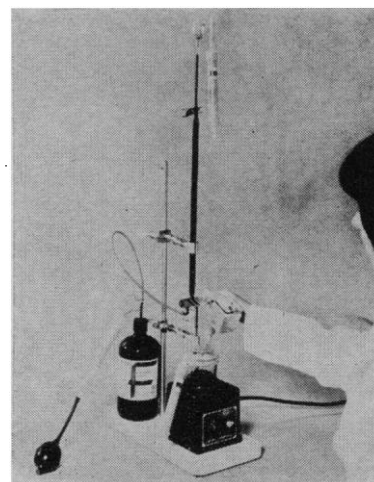
**The Literature Review.** If you've followed the advice above, your review will have been written for you by a former student and all you need to do is paraphrase it slightly and bring it up to date. If you should work on a topic which hasn't been reviewed recently, depend exclusively on *Chemical and Biological Abstracts* for information for your own review. Thus you will avoid the problem of trying to track down journals which were hidden away at the bindery all the time; you'll also save yourself many hours of reading and trying to organize experimental details which only make those lovely, sweeping generalizations more difficult. It goes without saying that you should have made sure there is no significant amount of foreign-language literature on the subject. Remember to document thoroughly every statement you make. It really doesn't matter that the idea is now out of date or that the author



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A. W. JAMES

*Department of Biology,  
Canisius College, Buffalo, New York*

## Performance of Retarded Children

Zigler and his co-workers have amassed considerable and impressive evidence demonstrating that a large portion of what has been described as "rigidity" on the part of the mental retardate may be due to such motivating factors as social deprivation ("Familial mental retardation: a continuing dilemma," 20 Jan., p. 292). However, we feel that he has minimized certain other motivating factors which influence the behavior of the noninstitutionalized retardate. Specifically, we refer to the feelings of inadequacy which are inevitably generated as a result of the noninstitutionalized retardate's daily experiences with the normal child. Indeed, in this sense, the noninstitutionalized retardate probably is under more environmental pressure than his institutionalized counterpart.

In an unpublished study (1) we have compared the performances of normal children and institutionalized and noninstitutionalized retardates under various rewards. The noninstitutionalized retardate was found to perform for a significantly longer period of time and

at a faster rate than either of the other two groups under "social" reinforcement (presence of the examiner and verbal encouragement). Thus, we feel that "success deprivation" may be as important an influence on the behavior of noninstitutionalized retardates as social deprivation is on the behavior of institutionalized retardates.

J. ROBERT NOONAN

JOHN R. BARRY

*Department of Psychology,  
University of Georgia, Athens 30601*

## Reference

1. J. R. Noonan and J. R. Barry, *J. Educ. Res.*, in press.

## Attention Research in 1896

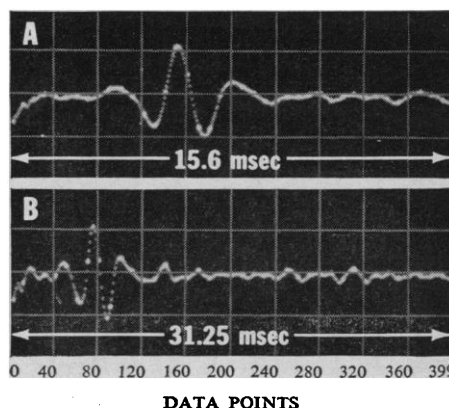
Hess and Polt in two papers published in *Science* [132, 349 (1960); 143, 1190 (1964)] have demonstrated an effect of cognitive variables on the size of the pupillary opening. Great interest has been generated by their findings that interesting visual stimuli and mental arithmetic produce pupillary dilatation. The availability of a subtle indicator of attention holds promise in a number of fields ranging from psychophysics to personality.

Recently, while surveying literature on early work on attention, I came across an anticipation of cognitive pupillometry in a paper by Heinrich, *Zeitschrift für Psychologie und Physiologie der Sinnesorgane* 9, 343 (1896). He measured pupillary diameter with an ophthalmograph while the subject tried to identify a letter on a card which was fixated centrally and at varying angles into the peripheral field. Pupillary diameter tended to increase with peripheral vision; this is attributed to the greater attentive effort required for peripheral vision. Heinrich also anticipated the work of Hess and Polt on the effect of mental arithmetic on pupillary size. He found that difficult mental multiplication was accompanied by a marked increase in pupil diameter, 39 percent in the case of one subject and 100 percent for another subject. Heinrich made use of the data to refute Helmholtz's contention that attention need not be correlated with changes in the sense organ.

PAUL BAKAN

*Department of Psychology,  
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## The Office of Science and Technology

Five years ago the United States and the U.S.S.R. were involved in an intense cold war. There seemed urgent need for efficient use of resources for research and development.

In this atmosphere the Office of Science and Technology was formally established. Among other functions, the director of OST was to advise and assist the President "with respect to major policies . . ." and with "review, integration, and coordination of major federal activities in science and technology. . . ." More than two-thirds of all research and development work in this country is federally financed. Thus the director of OST and his staff of 18, together with the President's Science Advisory Committee and some part-time consultants, were expected to mastermind most R & D in this country.

After 5 years the structure of the science advisory apparatus remains unchanged. However, the circumstances are different. Concern over the Russian peril has faded and has been replaced largely by concern over domestic issues, such as urban problems, and Vietnam. There is another President, and another Science Adviser, and their styles are not those of their predecessors.

Perhaps the greatest change is in the approach of Congress toward problems involving science and technology. This in turn reflects altered public attitudes. When the big problems were top-secret, the public did not expect wide participation by Congress. However, contemporary issues such as air and water pollution are matters on which the people expect participation by and action from their representatives. Another prod has come from the widespread belief that federal R & D funds are a key to economic progress. Whatever the causes, Congress today effectively participates and often leads in science policy making.

The prospects are that Congress will seize an even larger role. Congress controls the purse. It also provides effective means of shaping and weighing public opinion, through congressional hearings. When the issues are simple and dramatic, the President can dominate the scene. When the issues are many and complex, Congress can take the lead, as it did on pollution. An important aspect of hearings is the public record that results. These documents are valuable sources of technical information, and they often influence members of Congress.

During the past 2½ years Congress has availed itself of a new mechanism, the Science Policy Research Division of the Legislative Reference Service of the Library of Congress. In the last fiscal year, 33 committees or subcommittees of Congress sought assistance from the Division, and 168 representatives and 54 senators called on the Division for help. The Division has prepared a series of excellent reports. The latest of these\* is a rich source of information concerning OST. Within the limitations of his opportunities, the director, Donald Hornig, has done a good job. However, in comparison with the scholarly record compiled by Congress and its Library staff, or in comparison with the output of ideas in the publications of the National Academy of Sciences, OST and the White House science apparatus have not been very productive. Such a performance would have been merely regrettable under the circumstances of 5 years ago. Today, this deficiency is costly of prestige and could lead to a back seat in science policy making.

—PHILIP H. ABELSON

\*The report is available from The Military Operations Subcommittee, House of Representatives, B 373 Rayburn Building, Washington, D.C. 20025.



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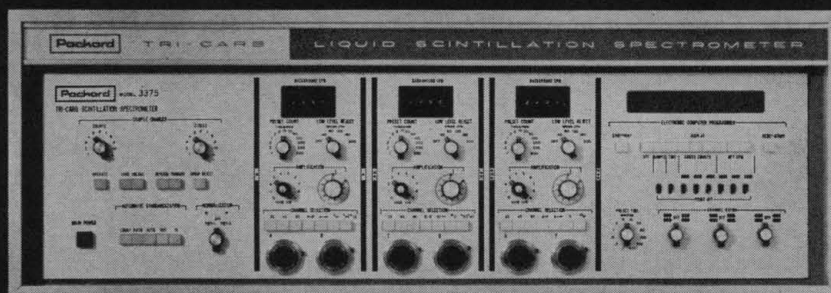
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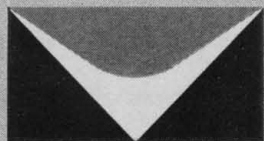
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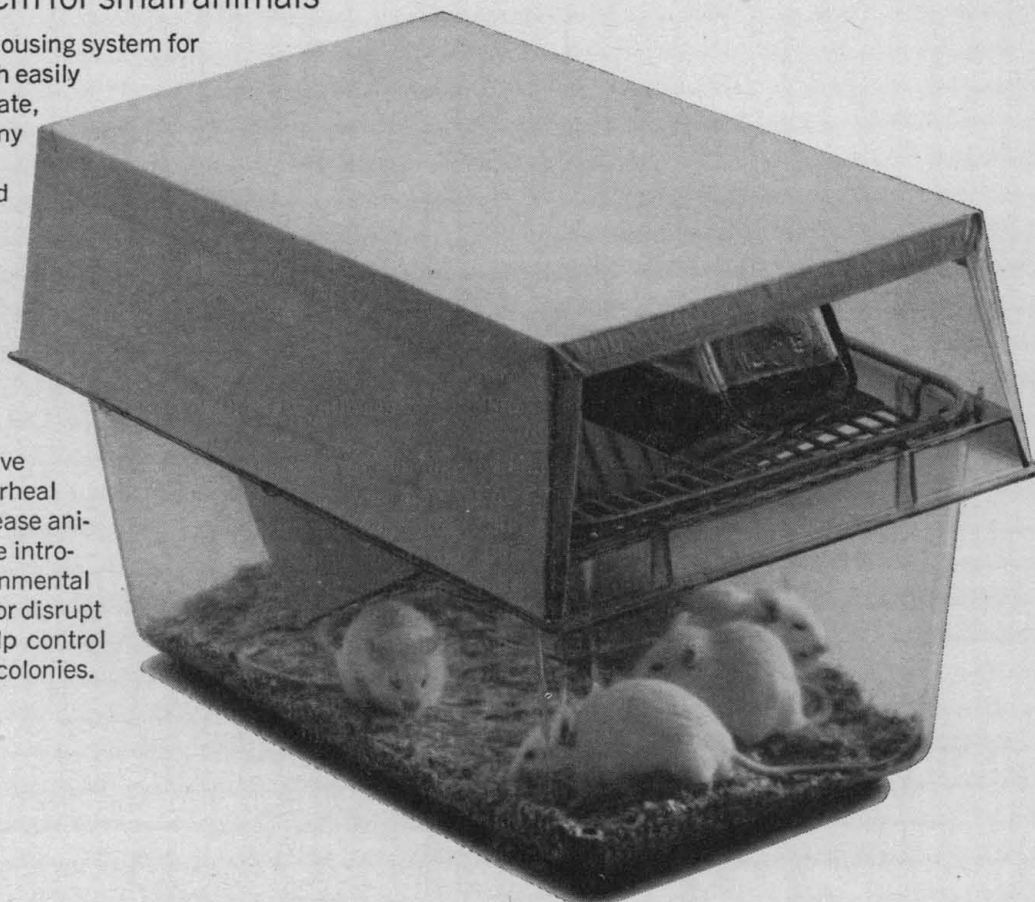
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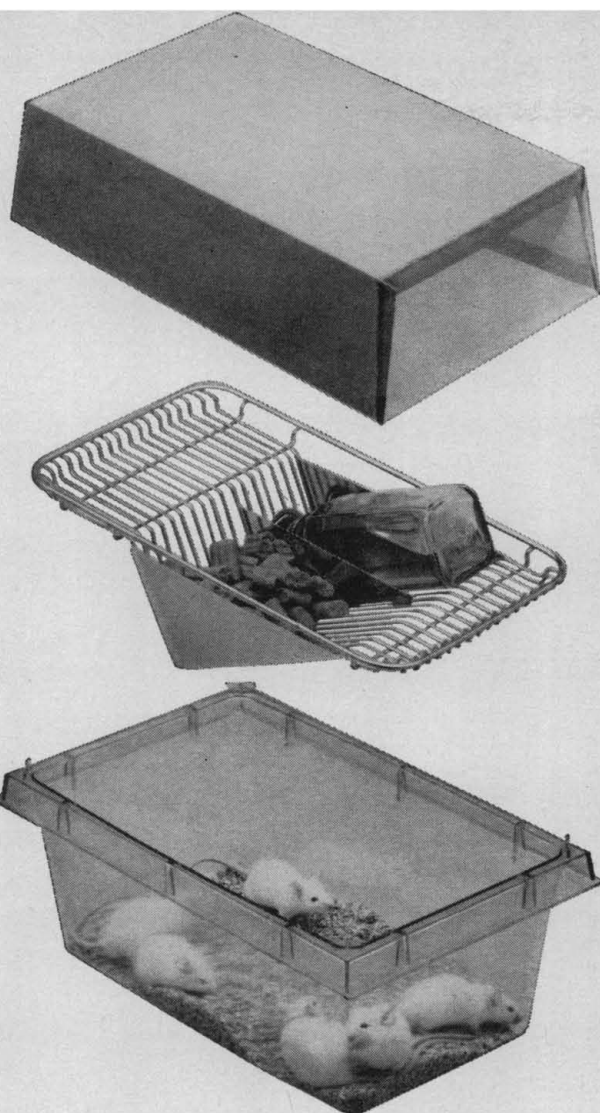
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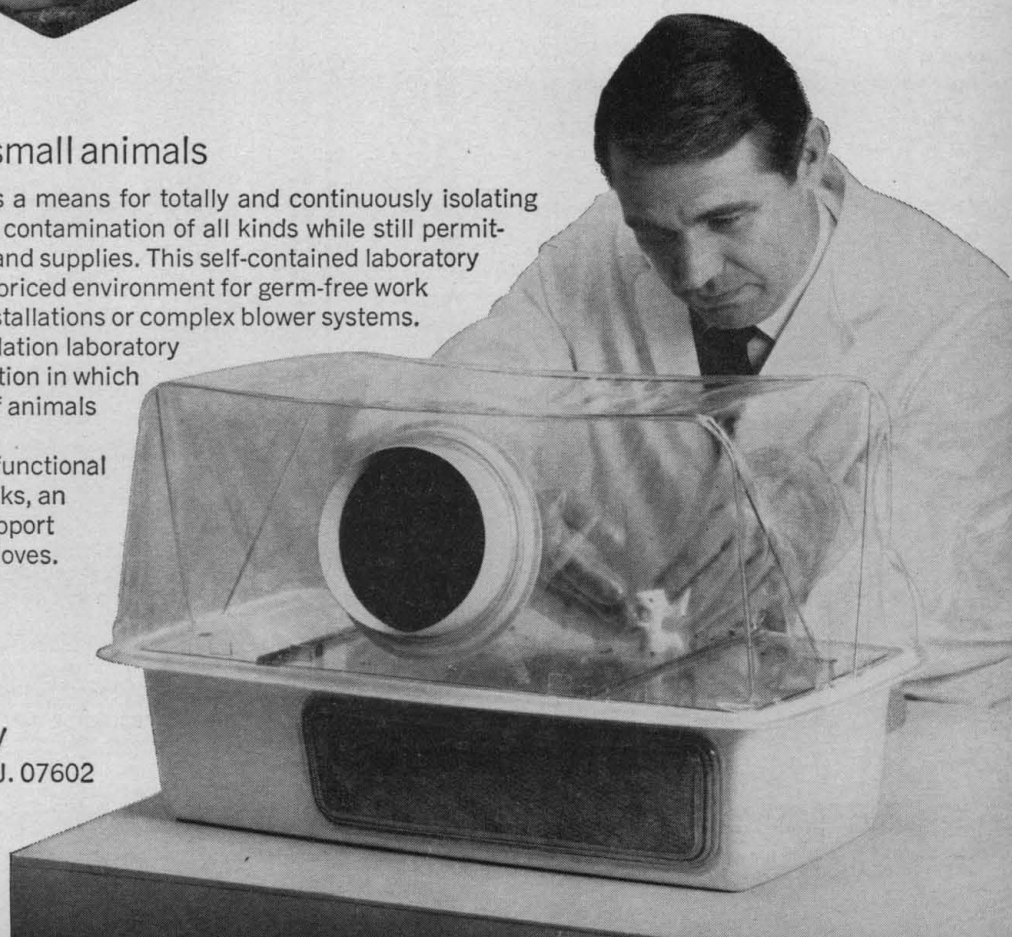
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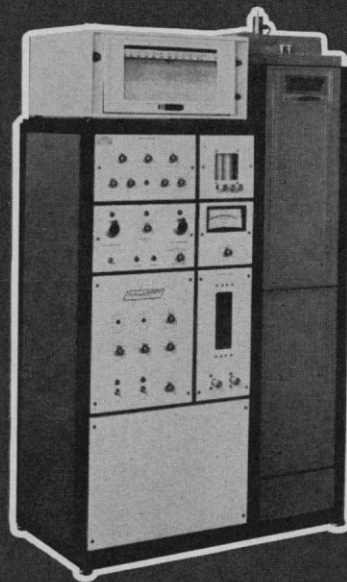
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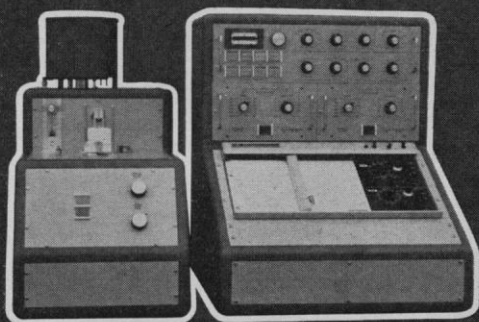
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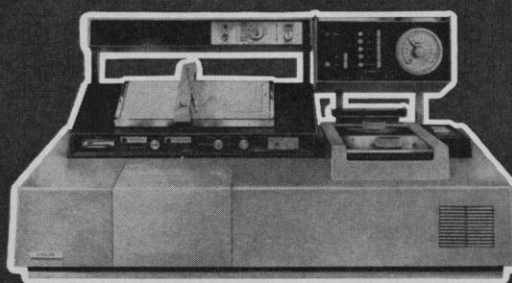
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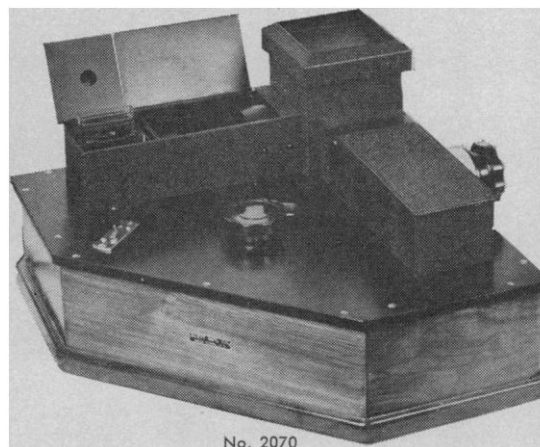
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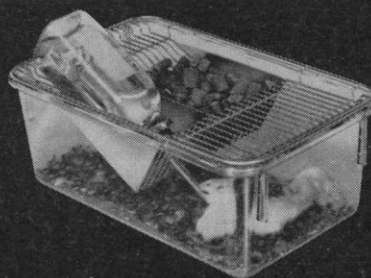
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up studies on such cases of poisoning have been performed. Among other common poisons of significance at all age levels, Done cited carbon monoxide, barbiturates, tranquilizers and sedatives, glutethimide, and psychedelic substances. Thus, in addition to accidental poisonings, we must consider suicidal and environmental poisonings as well as the growing problem of intentional abuse of drugs and solvents.

A number of panelists talked about the role of oxygen poisoning and of cerebral anoxia and asphyxia. Sokoloff (NIMH) postulated a possible correlation between rate of cerebral blood flow and sensitivity to anoxia. He noted that in the middle of the first decade of life the brain may account for as much as 50 percent of the total basal oxygen consumption of the body. Lowden (Hospital for Sick Children, Toronto) reported the experimental finding that asphyxia in cats produced a fall in the sialic acid content of cerebral gangliosides; he related the observation that the concentration of this acid in the gangliosides of patients dying from cyanosis was also sharply reduced. Behrman (University of Oregon Medical School) discussed basic concepts of placental transport as they relate to the administering of a particular drug to pregnant women, and the pathophysiology of the development of fetal anoxia. Rubinstein (Stanford University School of Medicine) essayed an analysis of the pathogenesis and mechanism of neonatal anoxia, drawing attention to the age-dependent differences in histologic responses to anoxia of the human brain.

In an examination of model systems of chemically induced mental retardation, the role of vitamin D was discussed by Wiltse (University of California School of Medicine, Los Angeles). Lowe (University of Florida, College of Medicine), who is chairman of the Committee on Nutrition of the American Academy of Pediatrics, reviewed this Committee's investigations into the vitamin D problem. The Committee found that the daily requirement of this vitamin can be fully met by a ration of 400 units per day. Lowe touched upon the complex problems inherent in any attempt by government agencies, such as the Food and Drug Administration, to impose limits on the permissible use of food additives or drugs without arousing unwarranted public apprehension about the dangers involved.

Other model systems of brain dam-



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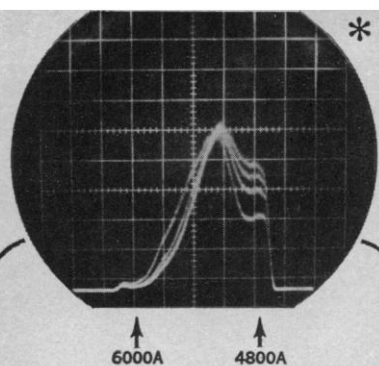
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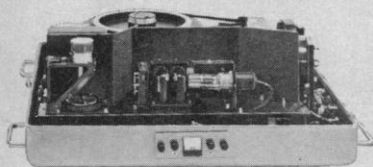
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age caused by exogenous agents were the heavy metals, notably lead, mercury, and thallium. Harrison (Baltimore City Hospital) appraised the problem of lead poisoning and its possible mechanisms; he described measures being taken in Baltimore and other cities to control this environmental problem. He stressed that lead poisoning is most commonly seen in children from slum areas, who have easy access to lead contained in paint on walls and other surfaces. As many as 5 percent of children from such slum areas were found to have significant blood levels of lead. Harrison raised the question of possible chronic brain damage from continuous, low-level exposure to lead, thus resulting in subclinical blood lead levels. Preventive steps must include changes in the physical environment; cases of frank poisoning can be effectively treated with chelating agents. Kurland (Mayo Clinic) described an example of industrial water pollution which led to an outbreak of a disease resembling cerebral palsy among children in Minamata, Japan. The disease was caused by organic mercury compounds that were discharged into the bay as waste from a vinyl chloride-producing plant. The compound was subsequently ingested with the water by fish fed to the victims. (Brief mention was also made of thallotoxicosis.)

Comments by Eeckels (University of Lovanium, Republic of Congo) illuminated the perspective from which mental retardation is viewed in some of the underdeveloped countries. In such countries the phenomenon is commonly due to states of deficiency rather than to intake of exogenous agents. Mentally retarded children do not pose a serious problem simply because the environment is too harsh to allow them to live very long.

A highlight of the conference was an address by James L. Goddard (commissioner of the Food and Drug Administration). He canvassed the broad responsibilities of his agency in the realm of consumer protection, reviewed experience to date in the fields of drug, food additive, and pesticide regulation, and sketched future plans and projects.

In remarks concluding the conference, Goldstein (Stanford University School of Medicine) reformulated the major problems raised; cited the difficulty of screening drugs with potential neurotoxicity in animals; and underscored the need for vastly intensified

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efforts aimed at full clarification and prevention of cases of brain damage due to exogenous chemical agents. Protection of the public is the primary goal.

In their final recommendations the participants made the following points:

1) There is a strong need for continued and greatly expanded basic research relating to the developing nervous system.

2) Another paramount need is for the development of more effective monitoring systems for the collection and dissemination of data on drugs and toxic agents. The group welcomed the initiative of the FDA in embarking on a comprehensive review of drug efficacy, which should be immensely helpful in facilitating the evaluation of drug effects.

3) Long-term, follow-up studies should be undertaken of patients known to have been intoxicated, and surveillance of intoxicated patients should be maintained so that possible latent effects leading to manifestations of brain damage may be detected.

4) Massive efforts should be instituted to gather data to determine whether a relationship exists between the incidence of damage to the central nervous system and changes in environment and continued exposure to drugs and other agents. There was strong emphasis on the need for planning and study to devise appropriate, effective, methodological approaches in order to attain these objectives.

The meeting was held under the sponsorship of the National Institute of Neurological Diseases and Blindness. Detailed proceedings of the conference will be published by the Institute.

GUY M. MCKHANN

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## Forthcoming Events

### April

20-22. **Biological Energy Conversion**, conf., NASA Ames Research Center, Moffett Field, Calif. (Letters and Science Extension, Univ. of California, 2223 Fulton St., Berkeley)

20-22. **Ohio Acad. of Science**, 76th annual mtg., Dayton, Ohio. (J. H. Melvin, Executive Officer, The Academy, 505 King Ave., Columbus, Ohio 43221)

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23-27. American Soc. of **Mechanical Engineers**, Chicago, Ill. (Meetings Manager, The Society, 345 E. 47 St., New York 10017)

27-28. **Care of Animals for Medical Research**, symp., Kingston, Ont., Canada. (D. B. Jennings, Dept. of Physiology, Queen's University, Kingston)

27-29. **Southwestern Psychological Assoc.**, 14th annual, Houston, Tex. (Mrs. C. Cleland, Southwestern Psychological Assoc., 2104 Meadowbrook Dr., Austin, Tex. 78703)

27-29. **Wildflower Pilgrimage**, 17th annual, Great Smoky Mountains Natl. Park. (Dept. of Botany, Univ. of Tennessee, Knoxville 37916)

28-29. **Biology Colloquium**, 28th annual mtg., Corvallis, Ore. (W. P. Lowry, 1967 Biology Colloquium, Dept. of Statistics, Oregon State Univ., Corvallis)

28-29. Physics of **Superconducting Devices**, symp., Univ. of Virginia, Charlottesville. (B. S. Deaver, Jr., Organizing Committee, Dept. of Physics, Univ. of Virginia, Charlottesville 22903)

28-30. **Wisconsin Acad. of Sciences**, Arts and Letters, annual mtg., Wisconsin State Univ., Oshkosh. (J. Thompson, Birge Hall, Univ. of Wisconsin, Madison 53706)

29. American Soc. for **Clinical Nutrition**, annual mtg., Atlantic City, N.J. (A. B. Eisenstein, 818 S. Meramec Ave., St. Louis, Mo. 63105)

29-4. American **Ceramic Soc.**, 69th annual mtg., New York, N.Y. (Technical, Secretary, The Society, 4055 N. High St., Columbus 14, Ohio)

30-3. **Underwater Technology Conf.**, American Soc. of Mechanical Engineers, Hampton, Va. (Meetings Manager, The Society, 345 E. 47 St., New York 10017)

30-5. **International College of Surgeons**, congr., Bal Harbor, Fla. (S. E. Henwood, 1516 Lake Shore Dr., Chicago, Ill. 60610)

## May

1-2. **Adhesion (Cold Welding) of Materials in Space Environments**, natl. symp., American Soc. for Testing and Materials, Toronto, Ont., Canada. (The Society, 1916 Race St., Philadelphia, Pa. 19103)


1-2. Association for **Research in Ophthalmology**, Clearwater Beach, Fla. (H. E. Kaufman, Dept. of Ophthalmology, Univ. of Florida College of Medicine, Gainesville 32601)

1-2. Colloquium on the **Pupil**, Univ. of Pennsylvania, Philadelphia. (A. Laties, Room 188, Old Medical School Bldg., Univ. of Pennsylvania School of Medicine, Philadelphia 19104)

1-2. Rocky Mountain **Bioengineering Symp.**, Univ. of Colorado Medical Center, Denver. (RMBS, P.O. Box 59, USAF Academy, Colo. 80840)

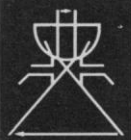
1-2. 1967 **Rural Electrification Conf.**, Cedar Rapids, Iowa. Office of Technical Activities Board, (Inst. of Electrical and Electronics Engineers, 345 E. 47 St., New York 10017)

1-3. American **Astronautical Soc.**, 13th annual mtg., Dallas, Tex. (R. Gilmer, Varo, Inc., 800 Garland Ave., Garland, Tex.)



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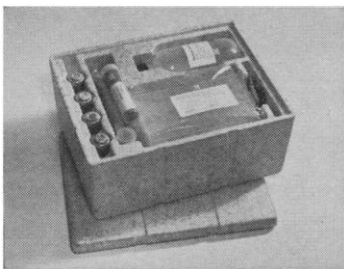
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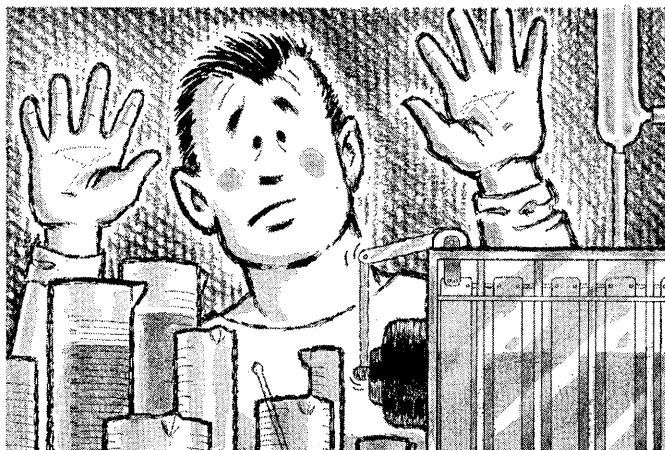
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1-3. **Geology and Technology of Gulf Coast Salt**, symp., Louisiana State Univ., Baton Rouge. (D. H. Kupfer, Dept. of Geology, Louisiana State Univ., Baton Rouge 70803)

1-3. **Markov Processes and Potential Theory**, spring symp., Madison, Wis. (J. Chover, Mathematics Research Center, Univ. of Wisconsin, Madison 53706)

1-4. American Soc. of **Lubrication Engineers**, 22nd annual, Toronto, Ont., Canada. (The Society, 838 Busse Hwy., Park Ridge, Ill. 60068)

1-4. **Pulp Bleaching Conf.**, 4th intern., Toronto, Ont., Canada. (Canadian Pulp & Paper Assoc., Technical Section, 2280 Sun Life Bldg., Montreal 2, P.Q.)

1-5. American **Industrial Hygiene Assoc.**, conf., Chicago, Ill. (The Association, 14125 Prevost, Detroit, Mich. 48227)

2-4. **Purdue Industrial Waste Conf.**, Lafayette, Ind. (D. E. Bloodgood, Purdue Univ. of School of Civil Engineering, Lafayette 47907)

2-5. Biological Effects of **Pesticides**, conf. New York Acad. of Sciences, New York, N.Y. (Executive Director, The Academy, 2 E. 63 St., New York 10021)

2-5. **Pulp and Paper Industry Tech. Conf.**, Houston, Tex. (W. S. Hines, Westinghouse Electric Corp., Box 4808, Atlanta, Ga. 30302)

2-5. Use of **Subhuman Primates in Drug Evaluation**, symp., Southwest Foundation for Research and Education, San Antonio, Tex. (L. R. Smith, Jr., The Foundation, P.O. Box 2296, San Antonio 78206)

3-5. **Human Factors in Electronics**, 8th annual symp., Institute of Electrical and Electronic Engineers, Palo Alto, Calif. (R. J. Randle, Biotechnology Div., Ames Research Center, Moffett Field, Calif.)

3-6. **Rare Earth Research Conf.**, 6th, Gatlinburg, Tenn. (W. C. Koehler, Solid State Div., Oak Ridge Natl. Lab., Oak Ridge, Tenn. 37831)

3-7. Fifteenth Colloquium, **Protides of Biological Fluids**, Brugge, Belgium. (The Colloquium, P.O. Box 71, Brugge 1)

4-5. **Fiber Soc.**, Asheville, N.C. (The Society, Textile Research Inst., P.O. Box 625, Princeton, N.J.)

4-5. **Salt-Water Encroachment of Aquifers**, symp., Louisiana State Univ., Baton Rouge. (E. J. Dantin, Louisiana Water Resources Research Inst., Louisiana State Univ., Baton Rouge 70803)

4-6. Society for **American Archaeology**, Ann Arbor, Mich. (E. M. Davis, Dept. of Anthropology, Univ. of Texas, Austin 78712)

4-7. Association of **Clinical Scientists**, Orlando, Fla. (R. P. MacFate, 300 N. State St., Apartment 5322, Chicago, Ill. 60610)

5-7. American Acad. of **Psychoanalysis**, Detroit, Mich. (M. Carroll, The Academy, 125 E. 65 St., New York 10021)

5-7. Society of **Biological Psychiatry**, scientific conv., Detroit, Mich. (The Society, 2010 Wilshire Blvd., Los Angeles, Calif. 90057)

6. Central States **Entomological Soc.**, 42nd annual, Univ. of Missouri, Columbia. (R. B. Mills, Dept. of Entomology, Kansas State Univ., Manhattan 66504)

6-8. World **Dredging Conf.**, New York,

N.Y. (M. Richardson, P.O. Box 88, Palos Verdes Estates, Calif. 90274)

7-11. Third Pan American **Cancer Cytology Congr.**, New York, N.Y. (J. E. Ayre, The Congress, 115 E. 69 St., New York 10021)

7-12. **Electrochemical Soc. Sets**, spring mtg., Dallas, Tex. (The Society, 30 E. 42 St., New York 10017)

7-12. **Petroleum Symp.**, Banff, Alta., Canada. (Director, Dept. of Extension, Univ. of Alberta, Edmonton, Alta.)

8-10. American **Oil Chemists' Soc.**, 58th annual, New Orleans, La. (The Society, 35 E. Wacker Dr., Chicago, Ill. 60600)

8-10. **Static Electrification**, 2nd conf., Inst. of Physics and Physical Soc., London, England. (Meetings Officer, The Society, 47 Belgrave Sq., London, S.W.1)

8-10. International Conf. of **Mechanics of Composite Materials**, Philadelphia, Pa. (T. Ryan, Space Sciences Lab., General Electric Co., P.O. Box 8555, Philadelphia 19101)

8-10. Symposium on **Origin and Distribution of the Elements**, Paris, France. (E. Ingerson, Dept. of Geology, Univ. of Texas, Austin 78712)

8-11. G-MTT 1967 Intern. **Microwave Symp.**, Boston, Mass. (Inst. of Electrical and Electronics Engineers, 345 E. 47 St., New York 10017)

8-11. **Molecular Association in Biology**, intern. symp., Paris, France. (B. Pullman, Director, Institut de Biologie Physico-Chimique, 12, rue Pierre Curie, Paris 5<sup>e</sup>)

8-12. American Soc. of **Civil Engineers**, Seattle, Wash. (W. H. Wisely, The Society, 345 E. 47 St., New York 10017)

8-12. **Color Measurement Seminar**, Clemson Univ., Clemson, S.C. (H. J. Keegan, School of Industrial Management and Textile Science, Clemson Univ., Clemson 29631)

8-13. **Nuclear Activation Techniques in Life Sciences**, symp., Intern. Atomic Energy Agency, Amsterdam, Netherlands. (J. H. Kane, Conferences Branch, Div. of Technical Information, Atomic Energy Commission, Washington, D.C. 20545)

9-11. **Electron, Ion and Laser Beam Technology**, 9th annual symp., Institute of Electrical and Electronics Engineers, Berkeley, Calif. (C. Susskind, Electrical Engineering, Univ. of California, Berkeley 94720)

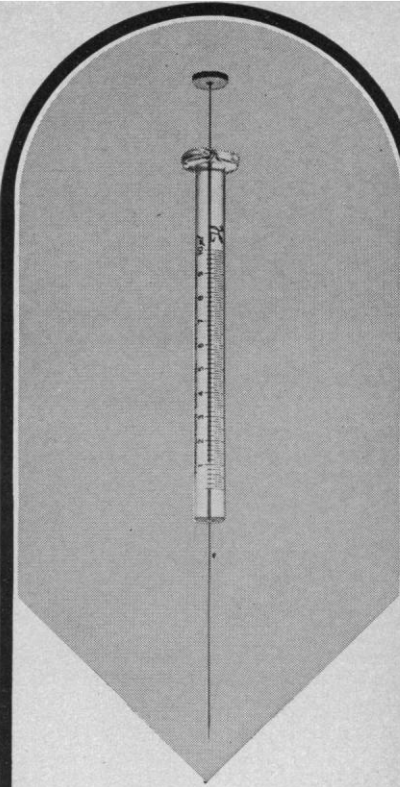
9-11. **Packaging Industry Technical Conf.**, New York, N.Y. (Office of Technical Activities Board, Inst. of Electrical and Electronics Engineers, 345 E. 47 St., New York 10017)

11-12. Canadian **Operational Research Soc.**, 9th annual conf., Ottawa, Ont., Canada. (Chairman, The Society, Box 120, R.R. No. 1 Ottawa, Ont.)

12-13. Association of University **Radiologists**, annual mtg., Philadelphia, Pa. (S. Rogoff, Dept. of Radiology, Univ. of Rochester Medical School, Rochester, N.Y. 14620)

12-13. **North Carolina Acad. of Science**, Duke Univ., Durham. (J. A. Yarbrough, Meredith College, Raleigh, N.C. 27602)

12-13. Northern and Southern societies for **Electron Microscopy**, joint mtg., Anaheim, Calif. (R. F. Bills, Hancock Foun-



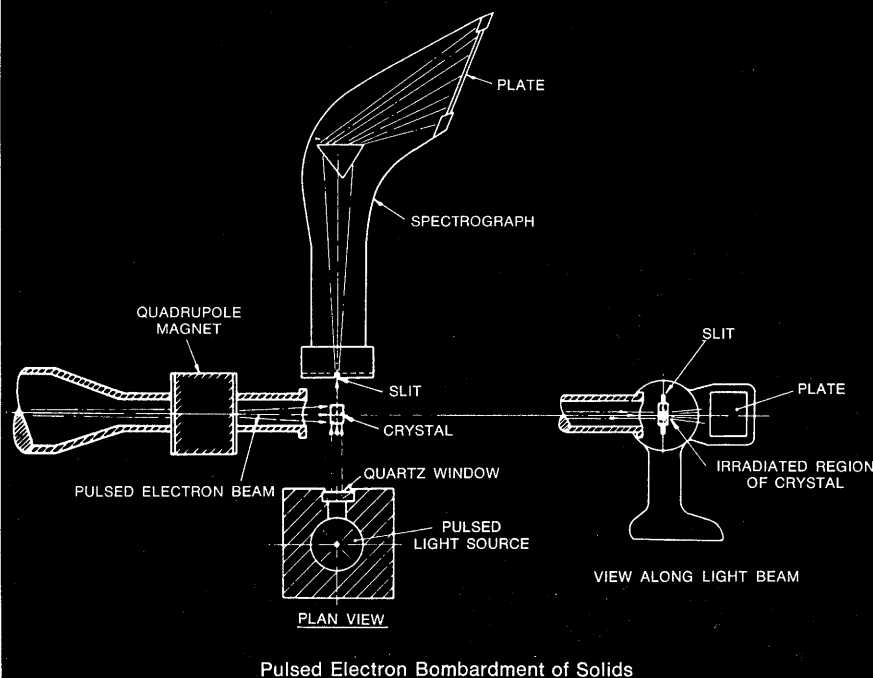
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dation, Univ. of Southern California, Los Angeles 90007)

14-19. Institute of **Food Technologists**, 27th annual, Minneapolis, Minn. (The Institute, 221 N. LaSalle St., Chicago, Ill. 60601)

14-19. Society of **Photographic Scientists and Engineers**, annual conf., Chicago, Ill. (W. S. Dempsey, Itek Corp., 1735 Eye St., NW, Washington, D.C. 20006)

15. **Biomacromolecules**, symp., New York Soc. of Electron Microscopists and New York Univ. School of Medicine, New York, N.Y. (S. S. Breese, Jr., Plum Island Animal Disease Lab., Box 848, Greenport, Long Island, N.Y. 11944)

15-17. **Aerospace Electronics Conf.**, 19th annual conf., Dayton, Ohio. (Inst. of Electrical and Electronics Engineers, Dayton Office, 1414 E. 3 St., Dayton 3)

15-17. **Diagnosis and Treatment of Deposited Radionuclides**, intern. symp., Richland, Wash. (T. Bauman, The Symposium, P.O. Box 999, Richland 99352)

15-17. **Chemical and Petroleum Instrumentation Symp.**, 8th natl., Instrument Soc. of America, St. Louis, Mo. (S. A. Young, Honeywell, Inc., 2146 Hampton St., St. Louis 63139)

15-17. **Biomedical Sciences Instrumentation Symp.**, 5th natl., Instrument Soc. of America, Albuquerque, N.M. (The Society, 530 William Penn Pl., Pittsburgh, Pa. 15219)

15-17. **Radioecology**, 2nd natl. symp., Univ. of Michigan, Ann Arbor. (F. C. Evans, Dept. of Zoology, Univ. of Michigan, Ann Arbor)

15-17. **Technical Literature Abstracting and Indexing**, 3rd annual institute, Washington, D.C. (Director, Center for Technology and Administration, American Univ., 2000 G St., NW, Washington, D.C. 20006)

15-18. Mid-America Symp. on **Spectroscopy**, 18th annual, Chicago, Ill. (W. K. Baer, Nalco Chemical Co., 6216 W. 66 Place, Chicago 60038)

15-18. Society of **Plastics Engineers**, 25th annual technical conf., Detroit, Mich. (R. D. Forger, The Society, 65 Prospect St., Stamford, Conn. 06902)

15-19. Society of **Photographic Scientists and Engineers**, annual conf., Chicago, Ill. (R. J. Mazor, Nugent-Williams Studies, Inc., 120 N. Pulaski Rd., Chicago)

15-20. **Space Technology and Science**, 7th intern. symp., Tokyo, Japan. (S. Nozawa, ISTS-Tokyo, 1967, Japanese Rocket Soc., Yomiuri Newspaper Bldg., 1, 3-chome, Ginza-Nishi, Chuo-ku, Tokyo)

15-26. Workshop in **Heat Transfer Computer Programs**, Univ. of California, Los Angeles. (Engineering Extension, Room 6266, Boelter Hall, Univ. of California, Los Angeles 90024)

16-18. National **Telemetry Conf.**, San Francisco, Calif. (L. Winner, 152 W. 42 St., New York 10036)

16-19. Society for **Experimental Stress Analysis**, Ottawa, Ont., Canada. (B. E. Rossi, The Society, 21 Bridge Sq., Westport, Conn. 06882)

16-20. **Solid Inorganic Phosphates**, intern. colloquium, Toulouse, France. (Secretariat du Colloque International sur les Phosphates Mineraux Solids, Dept. de Chimie Inorganique, Faculté des Sciences,



38, rue des Trente-Six Ponts, 31-Toulouse)

17-22. **Fresh Water from the Sea**, 2nd European symp., Athens, Greece. (A. A. Delyannis, P.O. Box 1199, Athens-Omonia)

18. **Washington Acad. of Sciences**, mtg., Washington, D.C. (R. P. Farrow, Natl. Canners Assoc., 1133 20th St., NW, Washington, D.C. 20036)

18-19. **Midwest Symp. on Circuit Theory**, Purdue Univ., West Lafayette, Ind. (B. J. Leon, School of Electrical Engineering, Purdue Univ., West Lafayette 47907)

18-19. **Southern Textile Research Conf.**, Hilton Head Island, S.C. (A. L. Smith, Chatham Manufacturing Co., Elkin, N.C. 28621)

20-24. **Recent and Ancient Deltaic Deposits**, seminar, Louisiana State Univ., Baton Rouge. (J. M. Coleman, Coastal Studies Inst., Dept. of Geology, Louisiana State Univ., Baton Rouge 70803)

21-24. **American Inst. of Chemical Engineers**, mtg., Salt Lake City, Utah. (F. J. Van Antwerpen, The Institute, 345 E. 47 St., New York 10017)

21-26. **Nondestructive Testing**, 5th intern. conf., Montreal, P.Q., Canada. (Conf. on Nondestructive Testing, P.O. Box 95, Verdun 19, P.Q.)

22-24. **Conference on Frequency Generation and Control for Radio Systems**, London, England. (J. L. Regan, Inst. of Electrical Engineers, Savoy Pl., London, W.C.2)

22-25. **Institute of Electrical and Electronics Engineers**, joint technical conf., Cleveland, Ohio. (Office of Technical Activities Board, The Institute, 345 E. 47 St., New York 10017)

22-25. **New Aids for Management Decision Making**, Washington, D.C. (Director, Center for Technology and Administration, American Univ., 2000 G St., NW, Washington, D.C.)

22-25. **URSI-IEEE**, spring mtg., Ottawa, Ont., Canada. (R. S. Rettle, Natl. Research Council, Ottawa 2)

22-26. **Drug Metabolism**, 2nd workshop, George Washington Univ., Washington, D.C. (Dept. of Pharmacology, School of Medicine, George Washington Univ., 1337 H St., NW, Washington, D.C. 20005)

22-26. **Radiosterilization of Medical Products**, symp., Intern. Atomic Energy Agency, Budapest, Hungary. (J. H. Kane, Conferences Branch, Div. of Technical Information, Atomic Energy Commission, Washington, D.C. 20545)

23-25. **National Tuberculosis Assoc. and American Thoracic Soc.**, annual mtg., Pittsburgh, Pa. (NTA, 1740 Broadway, New York 10019)

23-31. **Water for Peace**, intern. conf., Washington, D.C. (R. C. Hagan, Dept. of State, Room 1318, 2201 C St., NW, Washington, D.C.)

24-26. **Fourteenth Canadian High Polymer Forum**, Laval Univ., Quebec City. (J. F. Henderson, Research and Development Div. Polymer Corp. Ltd., Sarnia, Ont., Canada)

24-27. **Teratology Soc.**, 7th annual mtg., Estes Park, Colo. (M. D. Runner, Inst. for Developmental Biology, Univ. of Colorado, Boulder 80302)

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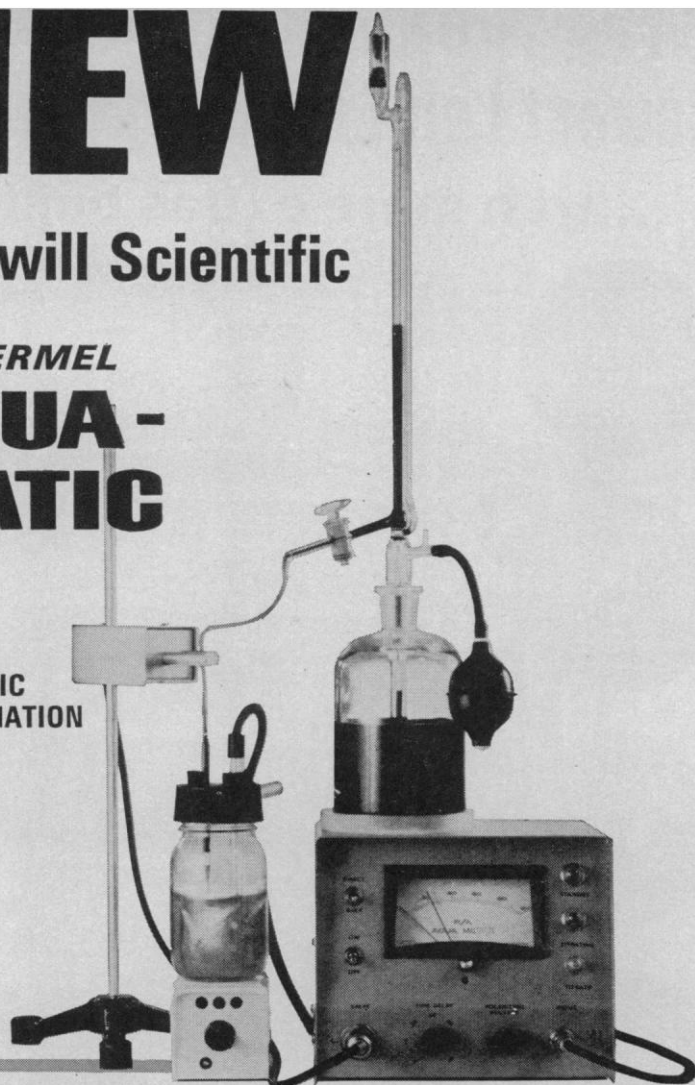
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### NEW BOOKS

(Continued from page 232)

Academic Press, New York, 1966. 398 pp. Illus. \$16. Five papers.

**Amines and Schizophrenia.** Harold E. Himwich, Seymour S. Kety, and John R. Smythies, Eds. Pergamon, New York, 1967. 300 pp. Illus. \$11.50. Eighteen papers.

**Analyses of Concept Learning.** Herbert J. Klausmeier and Chester W. Harris, Eds. Academic Press, New York, 1966. 286 pp. Illus. \$8.50. Sixteen papers presented at a conference (Madison, Wis.), October 1965.

**Animal Tissue Techniques.** Gretchen L. Humason. Freeman, San Francisco, ed. 2, 1967. 585 pp. Illus. \$9.

**Antibiotics: Advances in Research, Production and Clinical Use.** Proceedings of the Congress on Antibiotics (Prague), June 1964. Miloš Herold and Zdeněk Gabriel, Eds. Czechoslovak Medical Press, Prague; Butterworth, Washington, D.C., 1966. 778 pp. Illus. \$21. There are 163 papers.

**Applications of Undergraduate Mathematics in Engineering.** Ben Noble. Macmillan, New York, 1967. 384 pp. Illus. \$9.

**Arid Lands: A Geographical Appraisal.** E. S. Hills, Ed. Methuen, London; Barnes and Noble, New York, 1967. 479 pp. Illus. \$13.50. Twenty papers.

**An Atomistic Approach to the Nature and Properties of Materials.** Joseph A. Pask, Ed. Wiley, New York, 1967. 491 pp. Illus. \$19.95. University of California Engineering and Physical Sciences Extension Series.

**The Bacterial Lipids.** Jean Asselineau. Based on a translation of the French edition (Paris, 1962). Hermann, Paris; Holden-Day, San Francisco, Calif., 1967. 372 pp. Illus. \$11.50.

**A Biological and Psychological Background to Education.** C. G. Ivan Husell and Alice F. Laing. Pergamon, New York, 1967. 237 pp. Illus. Paper, \$5.25. Commonwealth and International Library.

**Biological Foundations of Language.** Eric H. Lenneberg. Wiley, New York, 1967. 507 pp. Illus. \$14.95.

**Biological Science.** William T. Keeton. Norton, New York, 1967. 971 pp. Illus. \$9.50.

**La Biologie des Chiroptères.** André Brosset. Masson, Paris, 1966. 248 pp. Illus. F. 50.

**Biology of the Invertebrates.** Cleveland P. Hickman. Mosby, St. Louis, 1967. 685 pp. Illus. \$10.

**Botanical Latin: History, Grammar, Syntax, Terminology and Vocabulary.** William T. Stearn. Hafner, New York, 1966. 580 pp. Illus. \$16.75.

**Breakthroughs in Chemistry.** Peter Wolff. New American Library, New York, 1967. 336 pp. Illus. Paper, 75¢.

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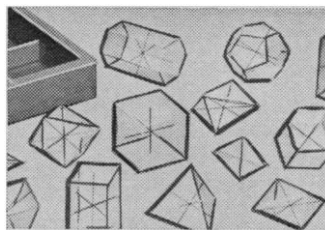
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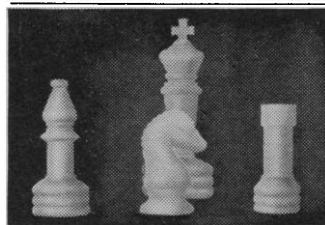
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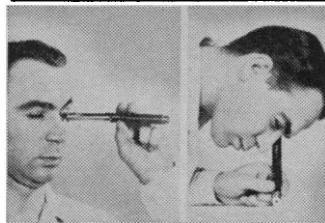
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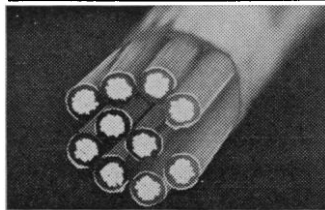
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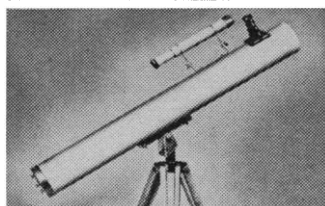
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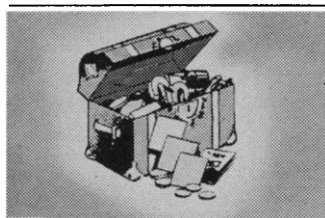
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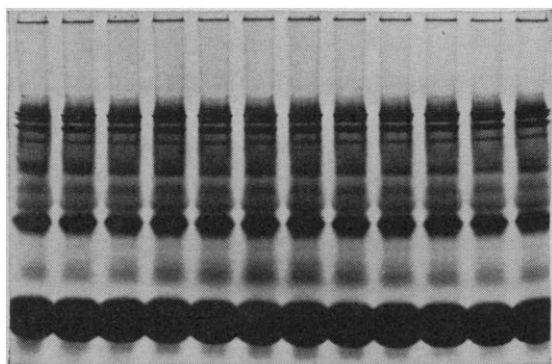


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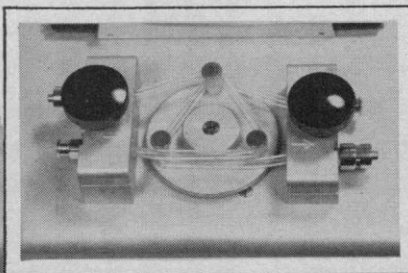
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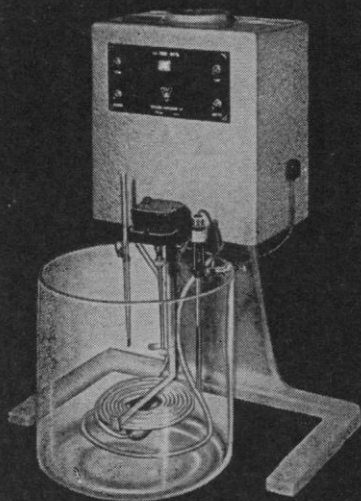
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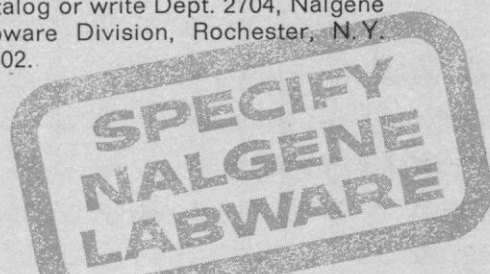
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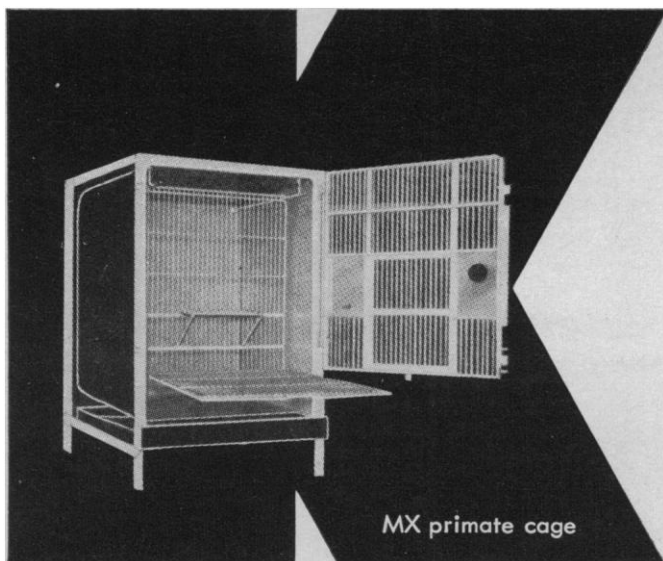
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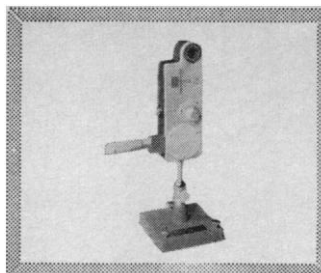
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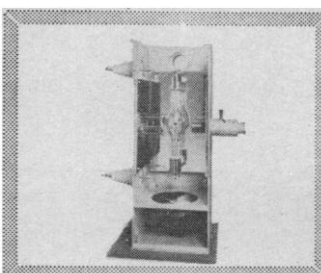
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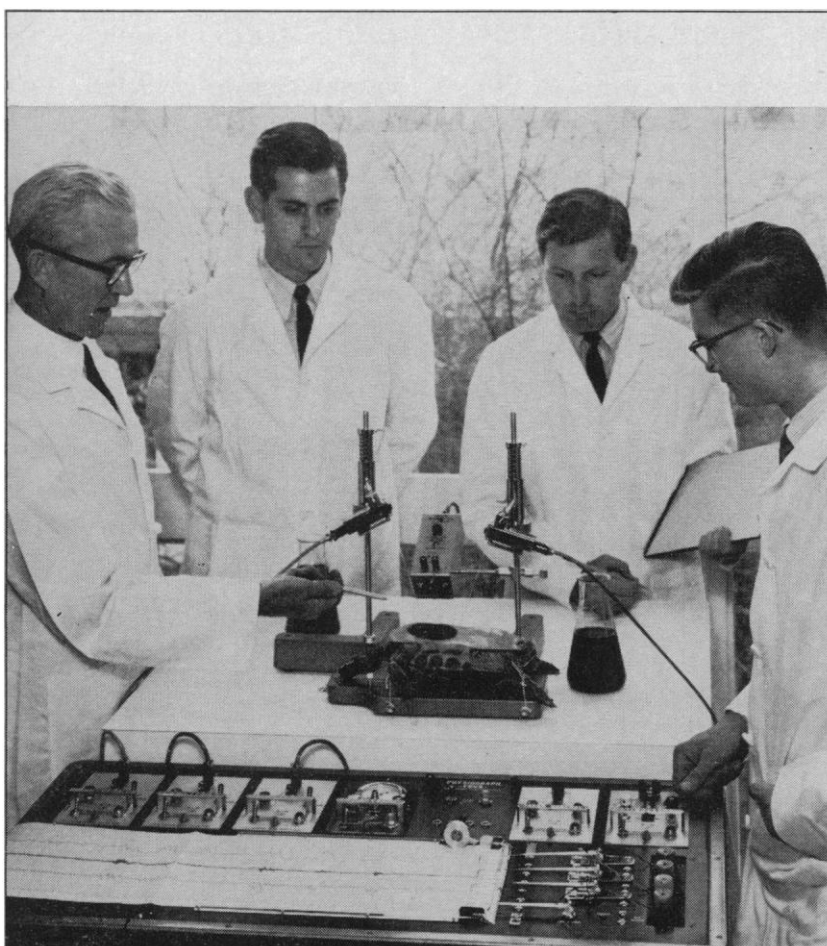
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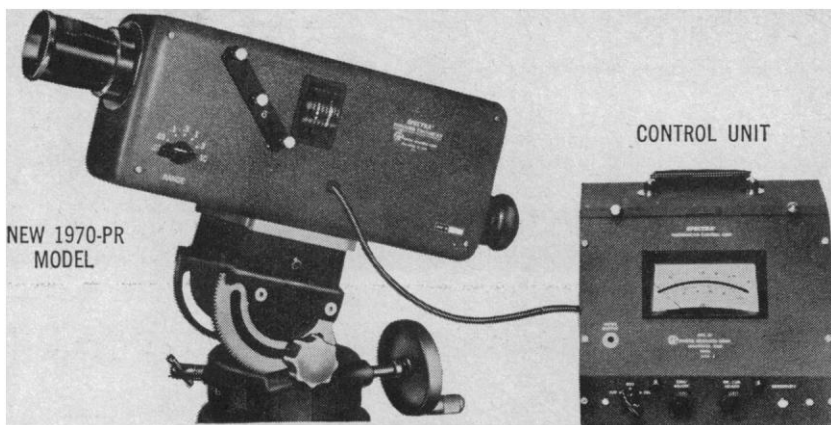
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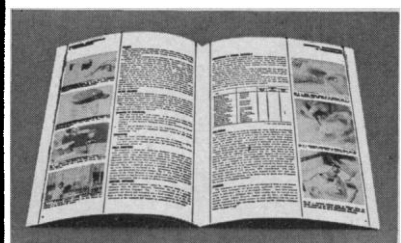
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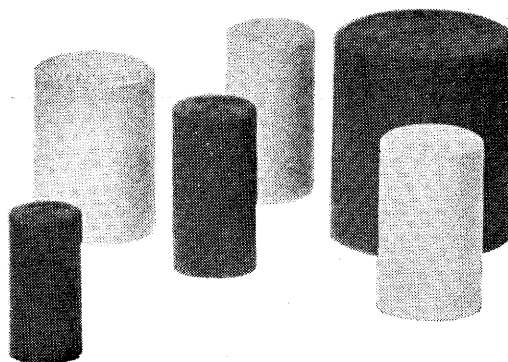
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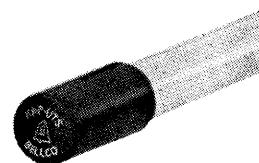


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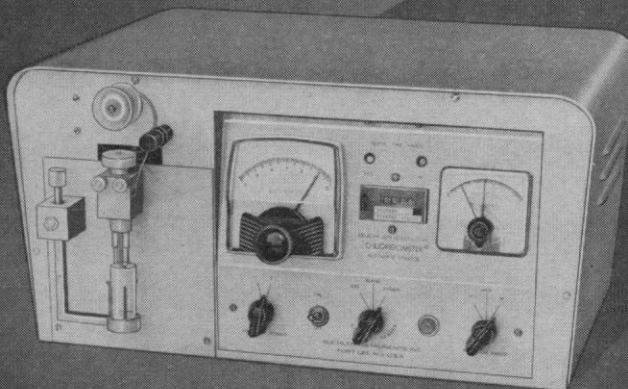


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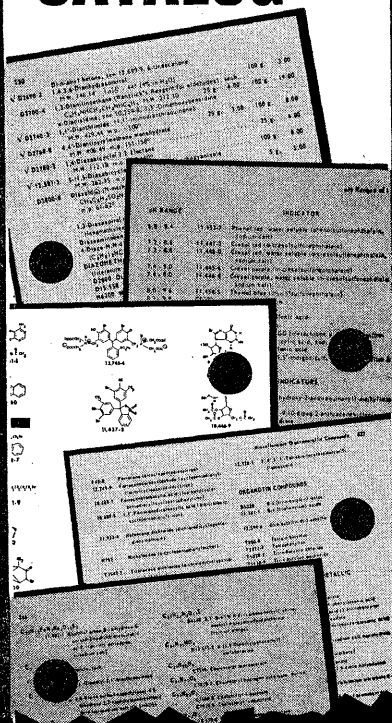
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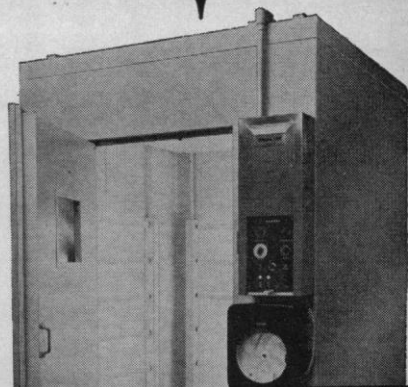
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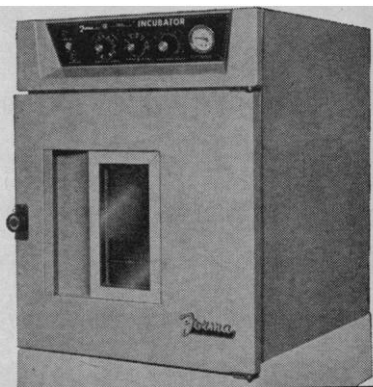
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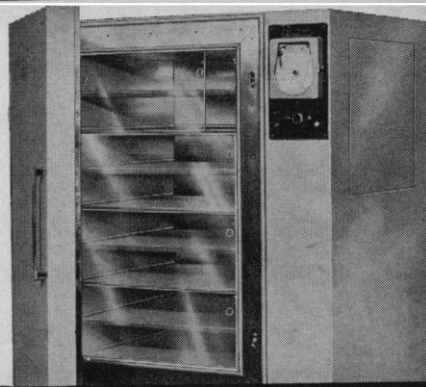
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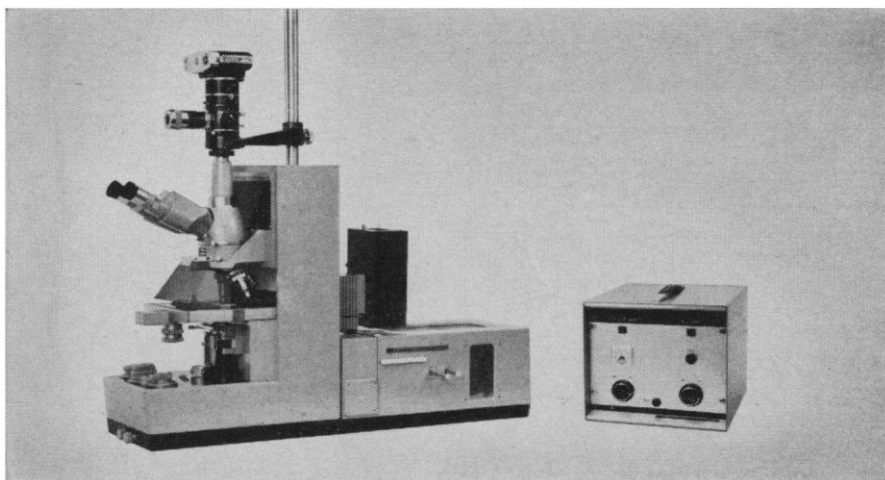
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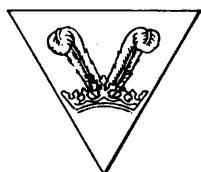
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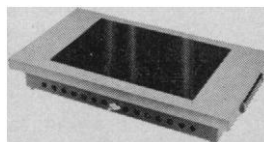
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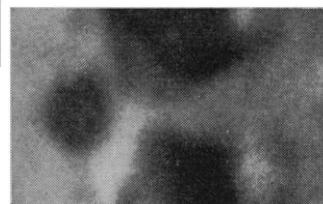
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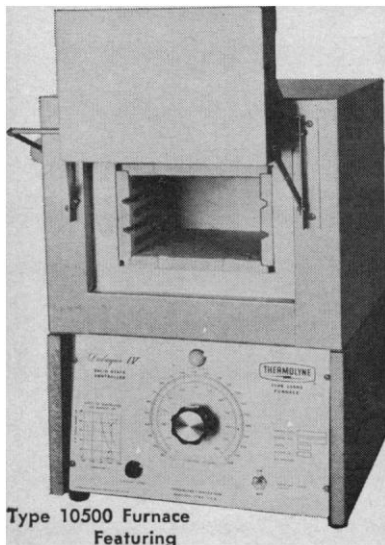
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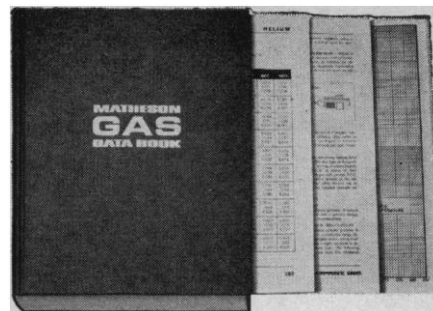
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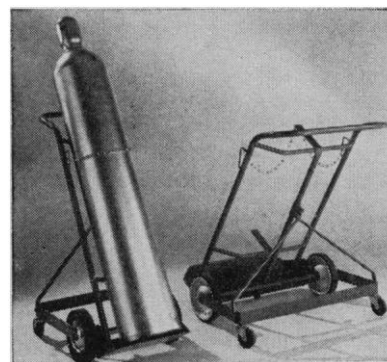
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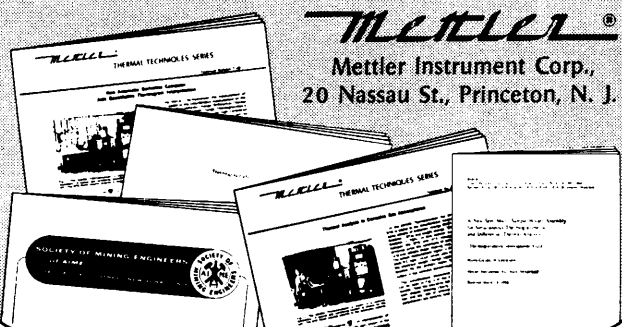
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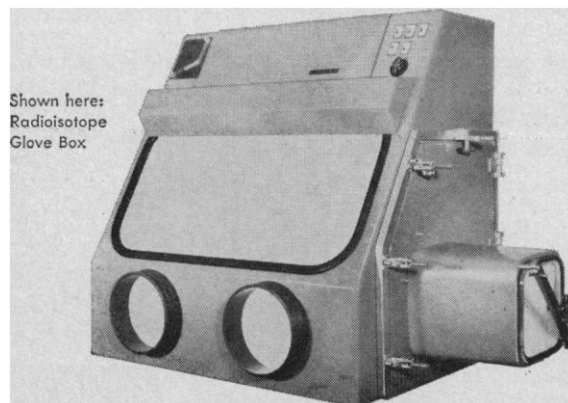


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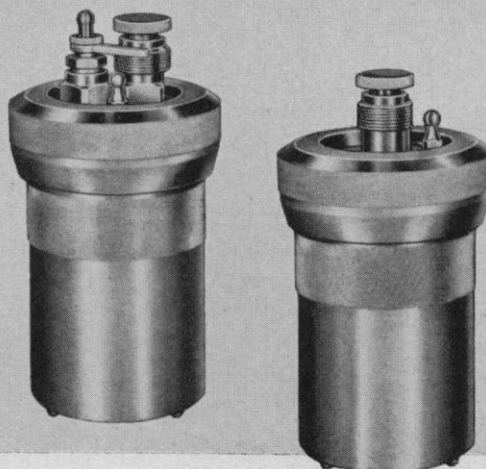
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