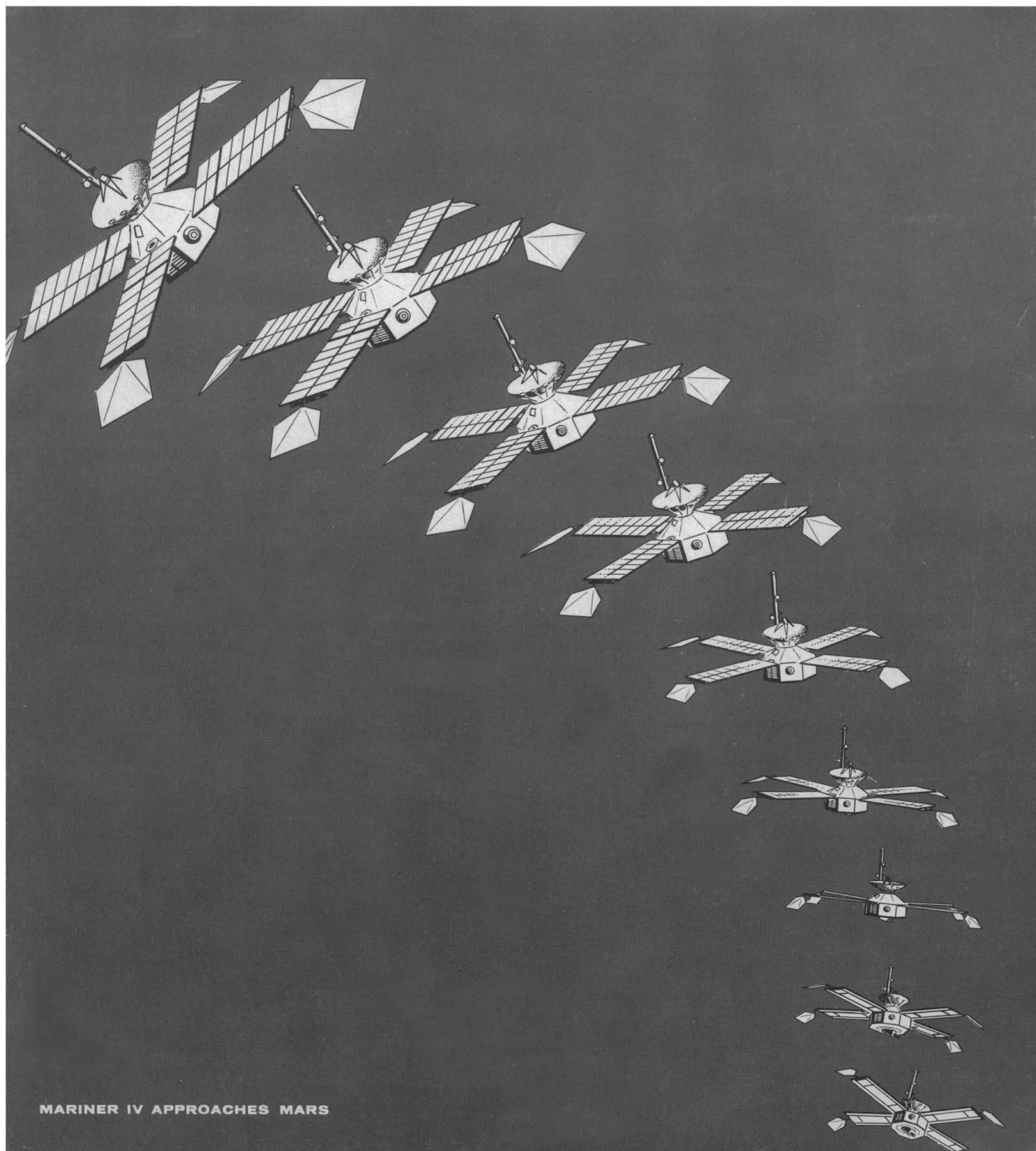


# SCIENCE

10 September 1965

Vol. 149, No. 3689

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



MARINER IV APPROACHES MARS

# Ever wish you could choose a Microtome-Cryostat ideally suited to your needs?

## Now you can.

International, makers of the first open-top cryostat, now offers the first family of Microtome-Cryostats . . . one for every application, workload, budget.

Model CTD is the world's standard for routine frozen sectioning. Modestly priced, this unit features anti-fog control,  $\pm 1^{\circ}\text{C}$  temperature control, internal quick-freezing.

Model CTI is a new, advanced unit, ideal for both routine and research work. Compact, economical, it offers many features of its research counterpart, the Model CTR.

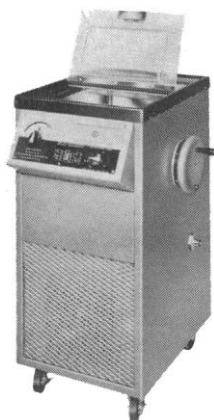
Model CTR is the complete frozen sectioning workshop. Preparation, cutting, staining and microscopic examination all can be performed from a comfortable seated position. Features include  $\pm 1^{\circ}\text{C}$  control, condensate-free cover, internal quick-freeze system, illuminated cold chamber, vacuum port for freeze drying, work and storage space, quick defrost system.

All are equipped with IEC's famous Minot Custom Microtome . . . the precision instrument for both paraffin and frozen sectioning. Cuts sections

from 2 to 16 microns, with 18 to 40 micron sectioning optional. 100% rustproof. Autoclavable. Many other high precision features.

CTD, CTI and CTR include special micrometer adjusted anti-roll plate. A new wire loop type anti-roll and frozen sectioning knife are also available. Other accessories such as razor blade holder and rapid freeze device available.

Send for Bulletin CT for complete description of all three models.



MODEL CTD



MODEL CTI



MODEL CTR

INTERNATIONAL  EQUIPMENT CO.

300 SECOND AVENUE, NEEDHAM HEIGHTS, MASS. 02194

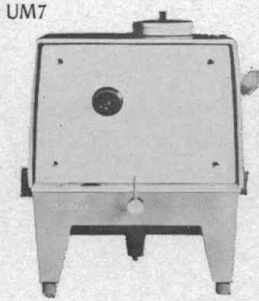
# There's a Mettler to meet any weighing need!

M5



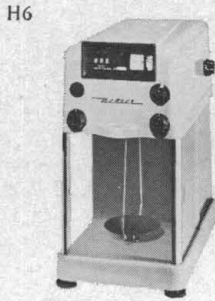
Cap: 20 g Prec:  $\pm 0.001$  mg

UM7



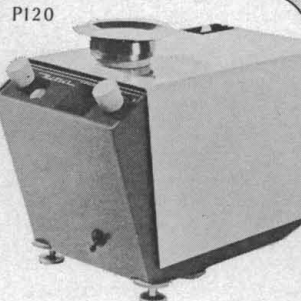
Cap: 2 mg Prec:  $\pm 0.1$  mcg

H6



Cap: 160 g Prec:  $\pm 0.05$  mg

PI20



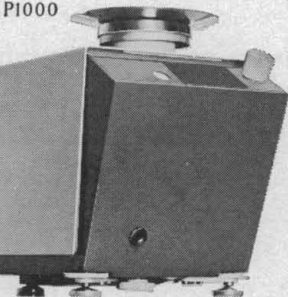
Cap: 130 g Prec:  $< \pm 0.5$  mg

H15



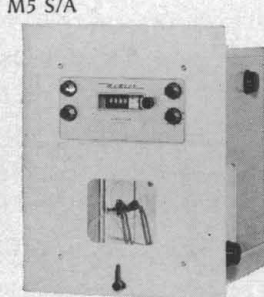
Cap: 160 g Prec:  $\pm 0.03$  mg

PI000



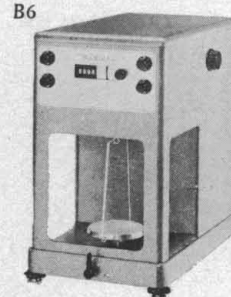
Cap: 1300 g Prec:  $< \pm 0.05$  g

M5 S/A



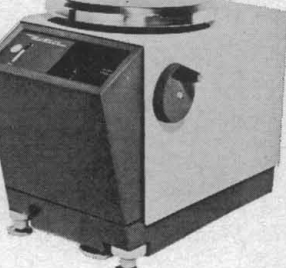
Cap: 20 g Prec:  $\pm 0.001$  mg

B6



Cap: 100 g Prec:  $\pm 0.01$  mg

P10



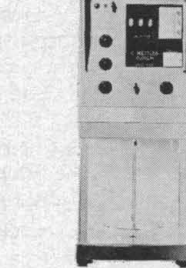
Cap: 13 kg Prec:  $< \pm 0.5$  g

H16



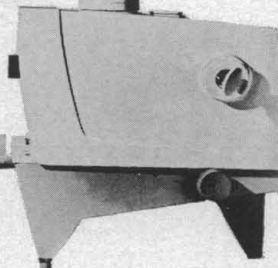
Cap: 80 g Prec:  $\pm 0.01$  mg

W5



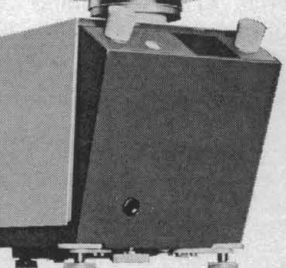
Cap: 5000 g Prec:  $\pm 1$  mg

UM6



Cap: 10 mg Prec:  $\pm 0.5$  mcg

PI200



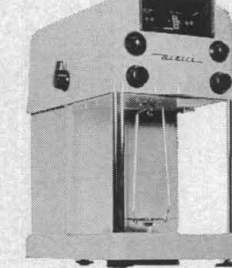
Cap: 1300 g Prec:  $< \pm 0.005$  g

S5



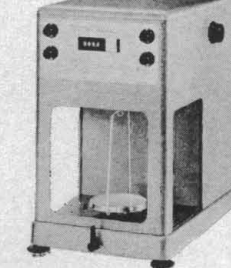
Cap: 160 g Prec:  $\pm 0.05$  mg

H6 Digital



Cap: 160 g Prec:  $\pm 0.05$  mg

B5



Cap: 200 g Prec:  $\pm 0.03$  mg

There are more than 100 Mettler models to choose from. They range from .1 mcg. precision to 13 kg. capacity, all with single-pan convenience and speed. Whatever your weighing need, it can be met by a Mettler. If you'd like to know more about Mettler Balances, write: Mettler Instrument Corp., 20 Nassau St., Princeton, N. J.

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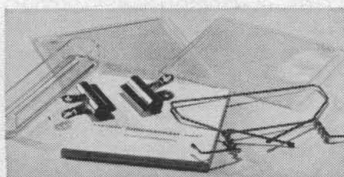
## COVER

Mariner IV left Earth 28 November 1964 on a cruise to the neighborhood of Mars. Data transmitted by instruments aboard the spacecraft during encounter, 14 to 15 July 1965, are presented and interpreted in the reports on the nature of the magnetic fields and particle fluxes near Mars (pages 1226-1248). [Drawing by Federal Graphics]

American Association for the Advancement of Science was founded in 1848 and incorporated in 1911. Its objects are to further the work of scientists, to facilitate cooperation among them, to promote the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

The EASTMAN CHROMAGRAM System for thin-layer chromatography consists of EASTMAN CHROMAGRAM Sheet and EASTMAN CHROMAGRAM

Developing Apparatus.



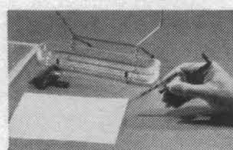
It makes TLC — once messy

and cumbersome — fast, neat, and uncomplicated. Gone are the bulk

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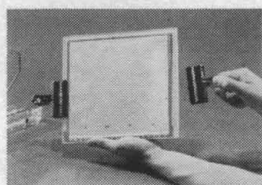
siliceous dust. You take EASTMAN CHROMAGRAM Sheet out of a box,

spot it,

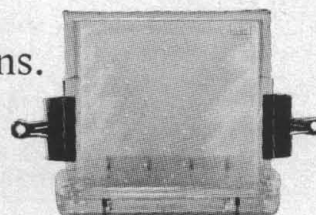


place it in the EASTMAN CHROMAGRAM Developing

Apparatus,



and separation begins.



EASTMAN CHROMAGRAM Sheet comes in two types: Type K301R with fluorescent indicator and Type K301R2 without fluorescent indicator. Both types are inert poly(ethylene terephthalate) with an adsorbent layer of polyvinyl-alcohol-bound silica gel 100 microns thick; over-all thickness is 0.3mm. The 20cm x 20cm sheets are packed 20 to the box. They are easily cut to desired sizes and shapes—you need stock only the one size.

EASTMAN CHROMAGRAM Developing Apparatus comprises two identical 23cm-square plates made with bosses,

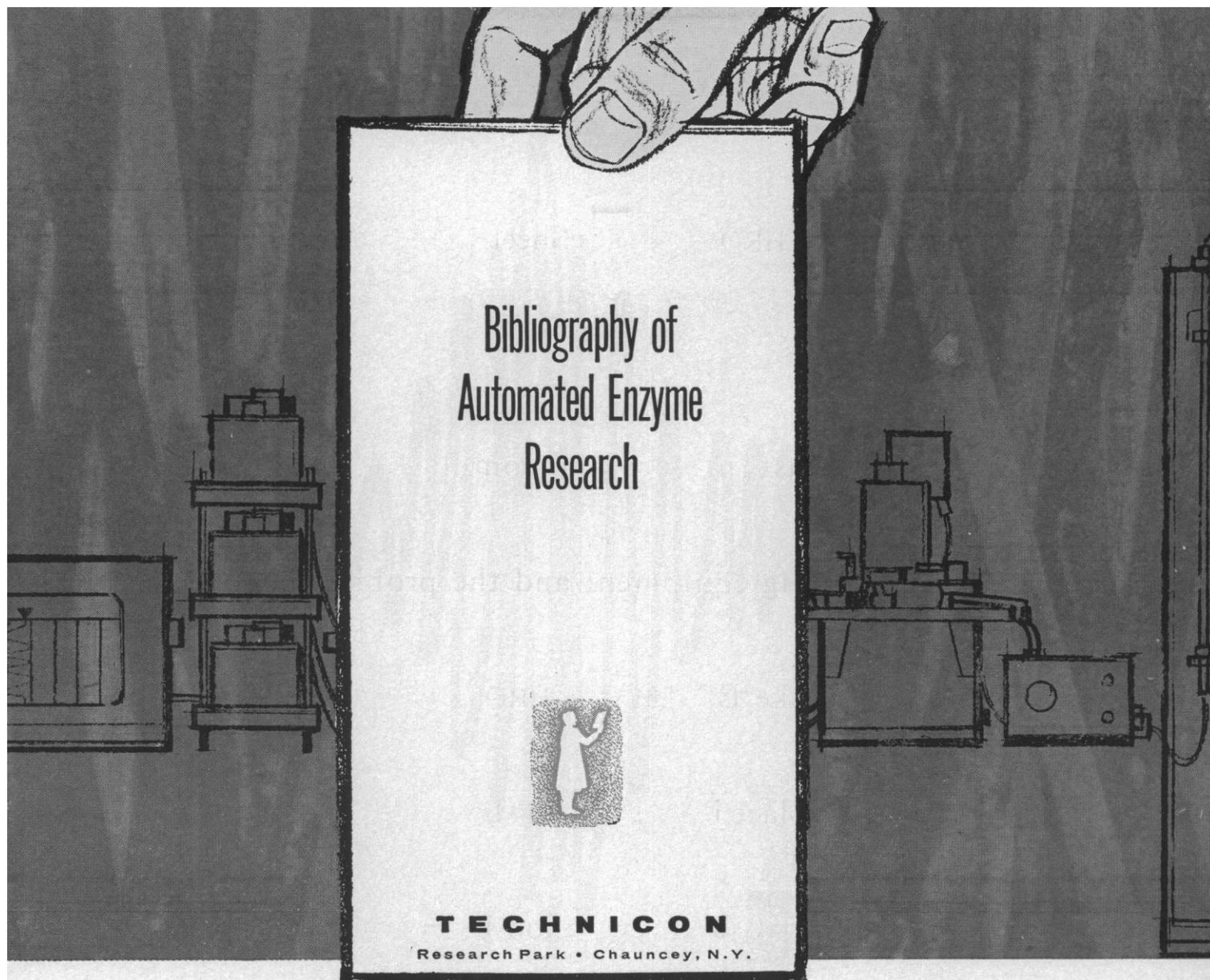
ridges, and flats that work together; a solvent trough, an easel, and a pair of spring clips. The apparatus involves no presaturation or lining with solvent-soaked filter paper. It takes little bench space, and that only when in actual use.

You can obtain EASTMAN CHROMAGRAM Sheet and Apparatus from your regular supplier of EASTMAN Organic Chemicals. Also available directly from *Distillation Products Industries*, Rochester, N.Y. 14603, at \$35.50 for the apparatus and \$23.20 per box of sheet (prices are subject to change without notice and do not include transportation).

"CHROMAGRAM" is a trademark.  
Patents applied for.

Distillation Products Industries is a division of Eastman Kodak Company



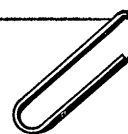


A reference you'll be glad to discover is this 73-paper bibliography of investigations involving automatic enzyme determinations. It can be your guide to a widely useful array of experience ranging from the automatic assay of almost any number of enzymes through chemical determinations using enzymatic reagent systems to studies of the complete course of an enzyme reaction to establish its kinetics.

May we mail a copy to you?  
It's bibliografree . . . from Technicon.

For the  
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*An Automatic Suggestion*



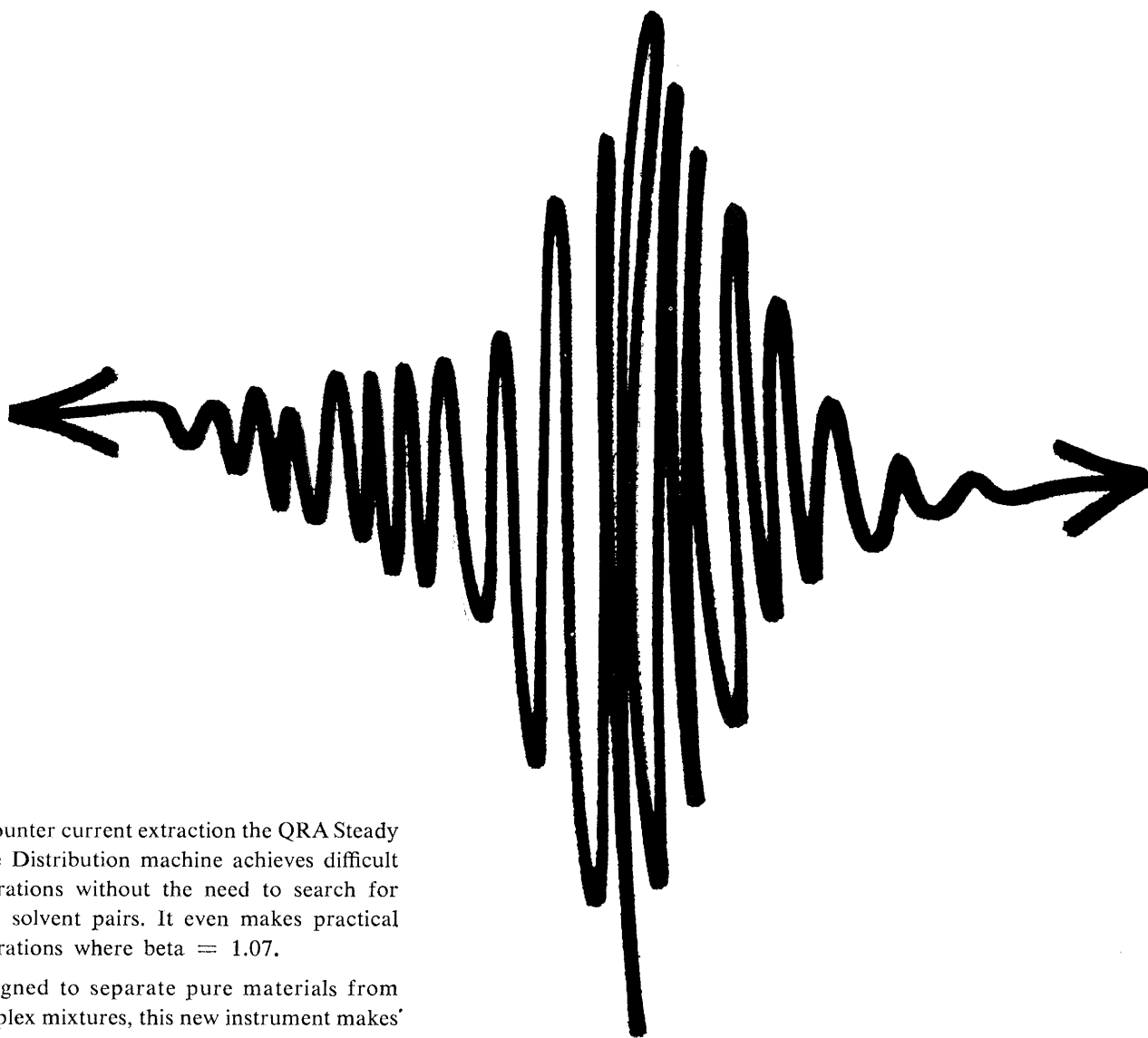
*If you are assaying large numbers of enzyme samples involving repetitive testing, consider the automated AutoAnalyzer® way. It's rapid (up to 60 samples/hr.), reliable, highly specific and accurate. May be just what you need.*



**TECHNICON**

INSTRUMENTS CORPORATION  
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Where  $\beta = 1.2 \dots$



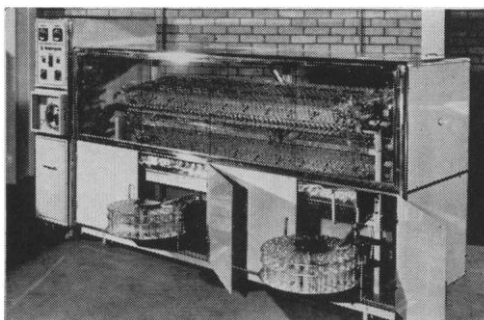
In counter current extraction the QRA Steady State Distribution machine achieves difficult separations without the need to search for ideal solvent pairs. It even makes practical separations where  $\beta = 1.07$ .

Designed to separate pure materials from complex mixtures, this new instrument makes possible a system of analysis or preparation predicted in theory several decades ago.

Unlike single phase systems, the QRA SSDM moves both solvents in opposite directions, enabling you to separate complex mixtures using relatively few tubes. The key to the flexibility, speed and simplicity of operation of the machine is its program controller. This carries out any sequence of upper to lower transfers. The easy alteration of the ratio of upper to lower phase transfers minimizes the preliminary conditions required to achieve separation. Large numbers of different consecutive separations can be made without changing the solvent system phase volume.

## QUICKFIT REEVE ANGEL STEADY STATE DISTRIBUTION MACHINE

for analysis/concentration and isolation of a minor constituent/continuous preparation



### Features:

- Every instrument wet tested with over 1000 transfers.
- Handblown precision glassware.
- Automatic filling and emptying.
- Leak free.
- Precision ball and socket joint.
- No gear train or clutch.
- Available with fraction collectors.

*For further information about the Steady State Distribution system and the SSD machine, call or write for our free SSDM booklet.*

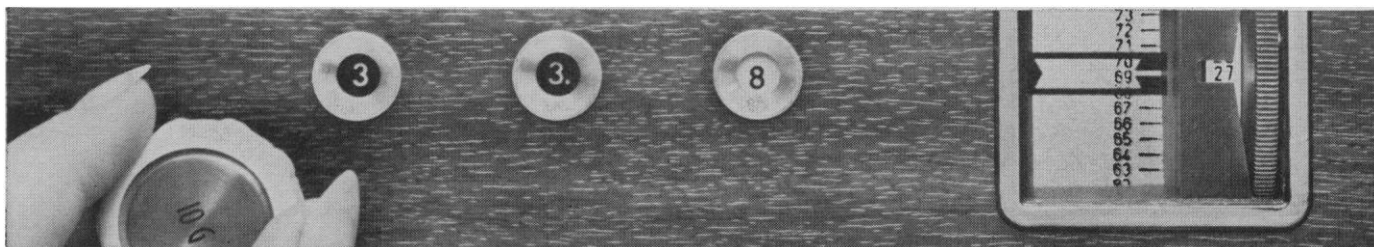


### QUICKFIT REEVE ANGEL

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## NEW LINE OF AINSWORTH BALANCES



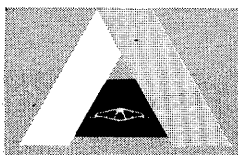
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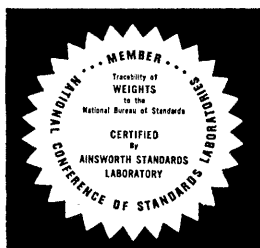
Weights are quickly dialed as directed by easy-to-follow “add weight” and “remove weight” signals. Little experience is required to obtain fast, accurate results. Mail coupon today for free, full-color folder giving complete information.

### NEW, COMPLETE LINE—a type and price for every need!

Type	SCN	24N	10N	21N	23N
Total Capacity	200 g	120 g	220 g	160 g	160 g
Sensitivity	0.1 mg	0.01 mg	0.1 mg	0.1 mg	1.0 mg
1 digit in last place					
color	Brown Hammer-tone	Brown Wood Grain	Blue	Green	Red
Price	\$895	\$875	\$670	\$550	\$530



A BALANCE FOR EVERY NEED



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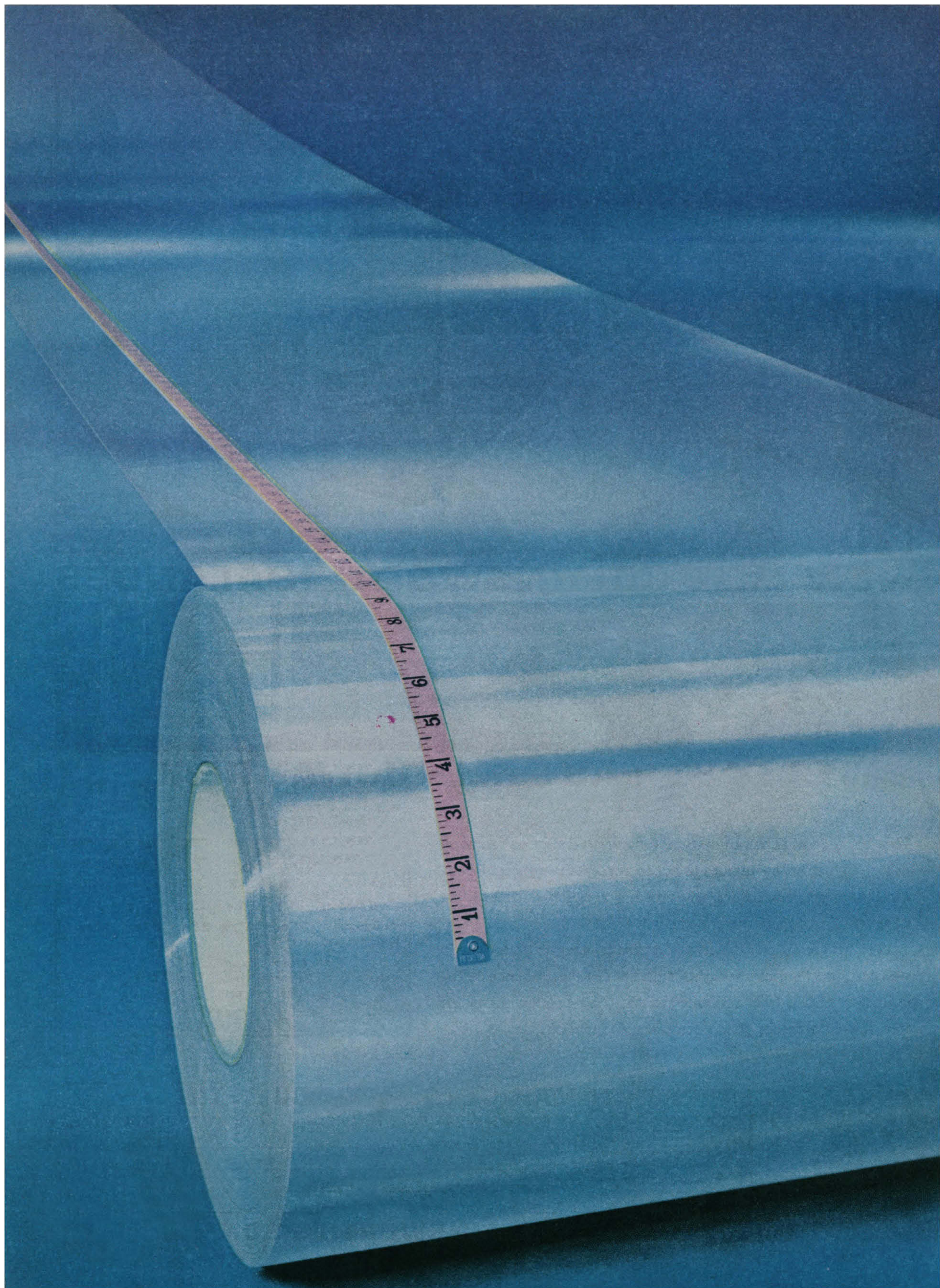
My name \_\_\_\_\_

Firm name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**WM. AINSWORTH & SONS, INC.**



# We'll go to any length to make Celanar Polyester Film your best buy!

We mean that literally! Case in point: Customers pointed out that a splice-free roll, tailored to *their* specifications (rather than to the suppliers), would give them a considerable processing advantage. So, unlike the other supplier, we tailor Celanar roll lengths to our customer's specifications. *Your* specifications.

This is just one of the meaningful service advantages causing so many manufacturers to switch to new Celanar polyester film. For magnetic tape. Packaging. Engineering reproduction. Metalizing. Stationery and office supplies. And electrical applications.

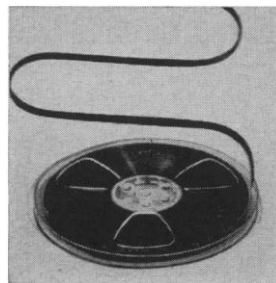
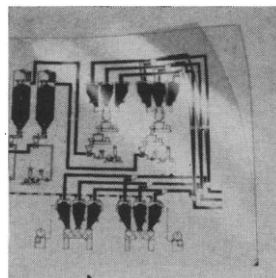
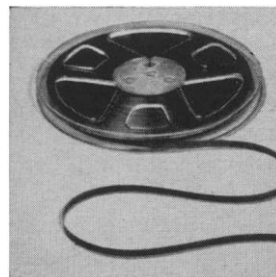
Other good reasons include *cleanliness*. New Celanar film is produced in a sealed-off "White Room" clean enough for surgery—the most modern in the industry. For the cleaner the polyester film, the better it processes.

Then there's the fact that Celanar film is *protected against dust contamination* by use of non-fibrous cores. That it may be *shipped with Impact Recorders* to protect you against accepting film jolted and damaged during shipment. And with *temperature recording flags* to alert you to the possibility of undetected harmful environmental changes suffered in transit.

This is the kind of meaningful service you would expect from Celanese Plastics—whose operating philosophy is that the customer, not the supplier, is always right. Celanese Plastics Company, 744 Broad Street, Newark 2, N. J.

Celanese® Celanar®

## Celanar® Polyester Film



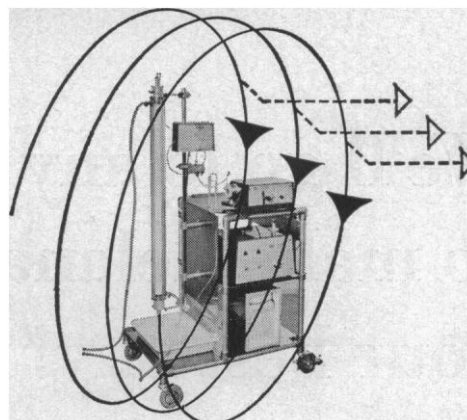
Roll lengths tailored to your specifications, is just one of *six* meaningful service advantages you get when you switch to new Celanar polyester film.

*Celanese*

*Introducing the LKB ReCyChrom for*

# RECYCLING CHROMATOGRAPHY

## NEW INSTRUMENTATION FOR A NEW TECHNIQUE\* IN CHROMATOGRAPHIC SEPARATION



The ReCyChrom is equally applicable for preparative and analytical separation of mixtures of large-sized or of small-sized molecules. These molecules do not have to be electrolytes and restrictions on the type of buffer used are less than with other types of chromatography. Components within a narrow range of molecular sizes, usually not resolved on simple gel filtration columns, are separated in the ReCyChrom by allowing the sample to pass repeatedly through the bed, thereby multiplying its effective height many times. Separated fractions and uninteresting or disturbing parts of the effluent may be bled out of the stream after any cycle without interrupting the separation of the remaining components.

The apparatus is especially suitable for grading homologous series of polymers, e.g., dextrans; for routine control of the purity of biochemical preparations such as serum proteins, enzymes and hormones; and for separation of heat labile substances.

One unique advantage of recycling chromatography is the need for columns of only moderate length. Columns in two standard lengths, 60 cm and 100 cm, both with 32 mm bore are available at present. The range of sample volumes accommodated by these columns depends greatly on the nature of the sample. For simple desalting opera-

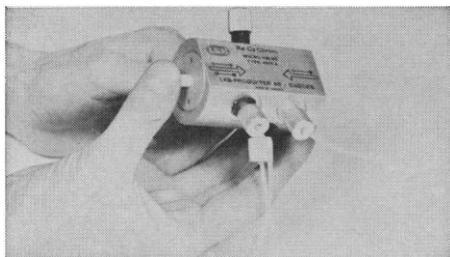
tions or for separation of peptides and amino acids from proteins, a sample of up to 150 ml is not unusual, whereas for purity controls of radioactively tagged concentrated preparations, quantities down to 1/100 of this volume are feasible. Sample application by pipette is eliminated. The pump sucks sample through a selector valve with a holdup of 150  $\mu$ l—a reproducible and non-critical method.

The four main components of the ReCyChrom, namely, a separation column, a peristaltic pump, a selector valve and a flow analyzer are available separately for incorporation into other instrument setups. The specially constructed columns with adjustable plungers at both ends can be sealed completely to eliminate the pressure of water head and permit liquid flow in either direction. Closed system operation and ascending flow maintains even packing and prevents the flow rate from falling off with use, even when beds of material with low mechanical strength (gels) are used.

LKB's specially designed peristaltic pump has a very high flow constancy—0.5% over a period of a week—and a continuously variable pumping rate from 0-390 ml/hr.

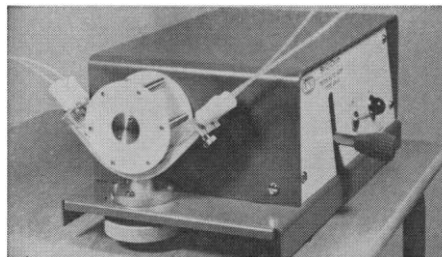
A choice of three flow analyzers, cooling jackets, terminal box, connections and a cart comprise the remainder of the assembly.

\*According to J. Porath and H. Bennich



*The simple push of a button on the Selector Valve alters the flow circuit from injection or bleeding to recycling.*

Request literature file 49005-9 for details

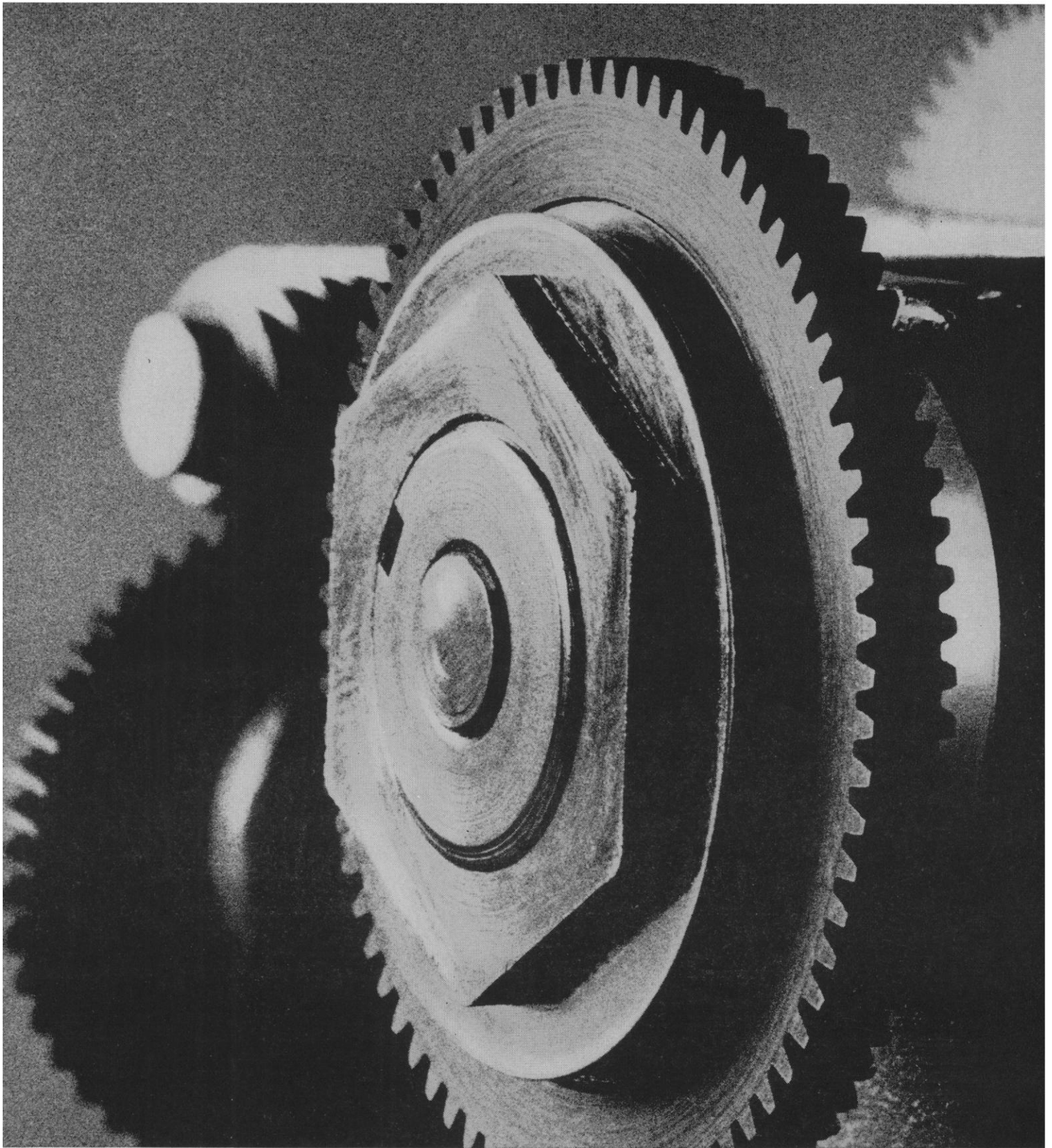


*The Peristaltic Pump has many other uses when not in service for the ReCyChrom.*



LKB INSTRUMENTS, INC., 4840 Rugby Ave., Washington, D.C. 20014

LKB PRODUKTER AB, P.O. Box 12220, Stockholm 12, Sweden



**We take extra care with our recorder's teeth. Cheap ones are false economy.**

Just another cog in the machine.

But stamp it cheaply out of sheet metal. It'll be a little less durable, a little less accurate—a little more prone to play and backlash. You risk trouble.

So our gear-teeth are machine-cut.

Like many other details of construction it makes our recorders a little more expensive. Makes us lose a little business on price-buying. But our customers don't lose. They

don't lose control of costly processes, either. No false economies.

They're satisfied. So are we.

You see, we cut our teeth on process control. In steel, steam generation, ceramics and cement—to name a few.

Learned it the hard way. From the back of the plant all the way up to computer control. Learned to be fussy about transducers, recorders, controls. Computers, too.

No cog in the machine fouls up a system of ours. And no system gets fouled up by a cog that came from L&N.

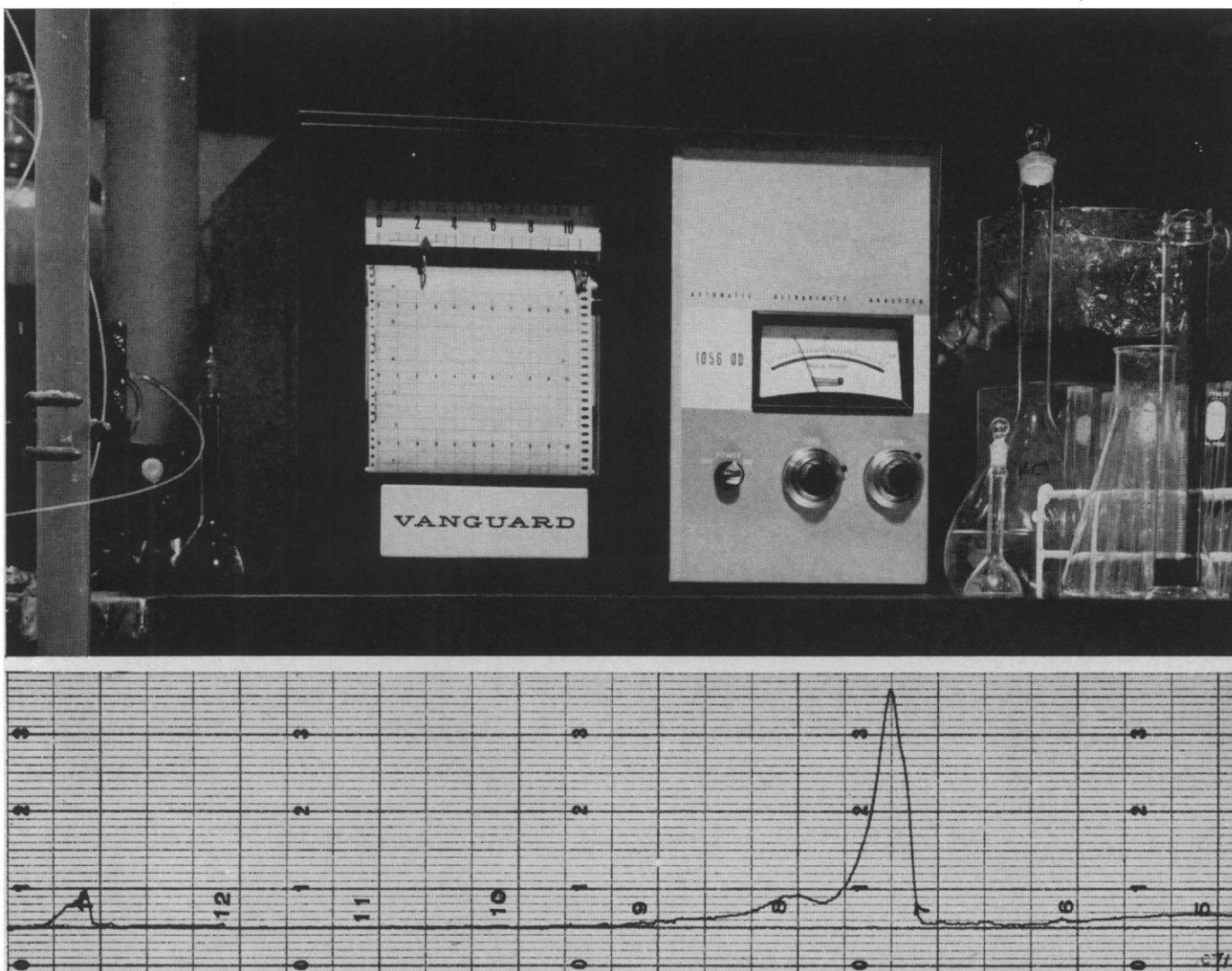
If precise control is important to you—remember our slogan. *Pioneers in Precision.* We're advancing a few frontiers right now.

Ask us about them.



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Typical chromatogram of a mixture of unknown proteins from a DEAE cellulose column. O.D. vs. Volume. Full scale is 2 O.D. units.

## Reliable way to run UV analysis automatically at any absorption band you select

The TMC-Vanguard Model 1056-OD is an automatic ultra-violet analyzer, designed for extreme versatility and reliability. It has two independent logarithmic converters which provide a chart recording of the optical density of effluent from a chromatographic column, the ordinate of which is linear with optical density. A plane diffraction grating monochromator makes a continuous energy range available from 200 millimicrons well into the visible spectrum. Wave length settings can be made to an accuracy of 1 mμ by

means of a simple dial control. This makes it possible to run each experiment at a wave length setting providing best chart resolution for the sample of interest.

Split-beam operation of the 1056-OD, utilizing sample and reference cuvettes, provides continuous base line compensation for gradient elutions or other applications where the optical density of the eluent may change.

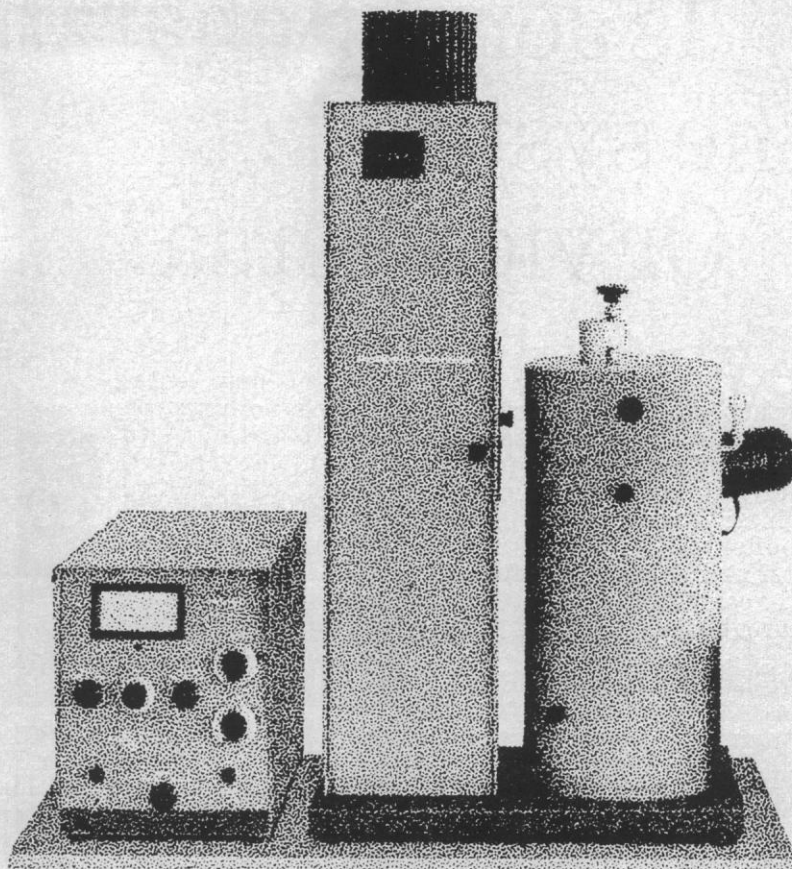
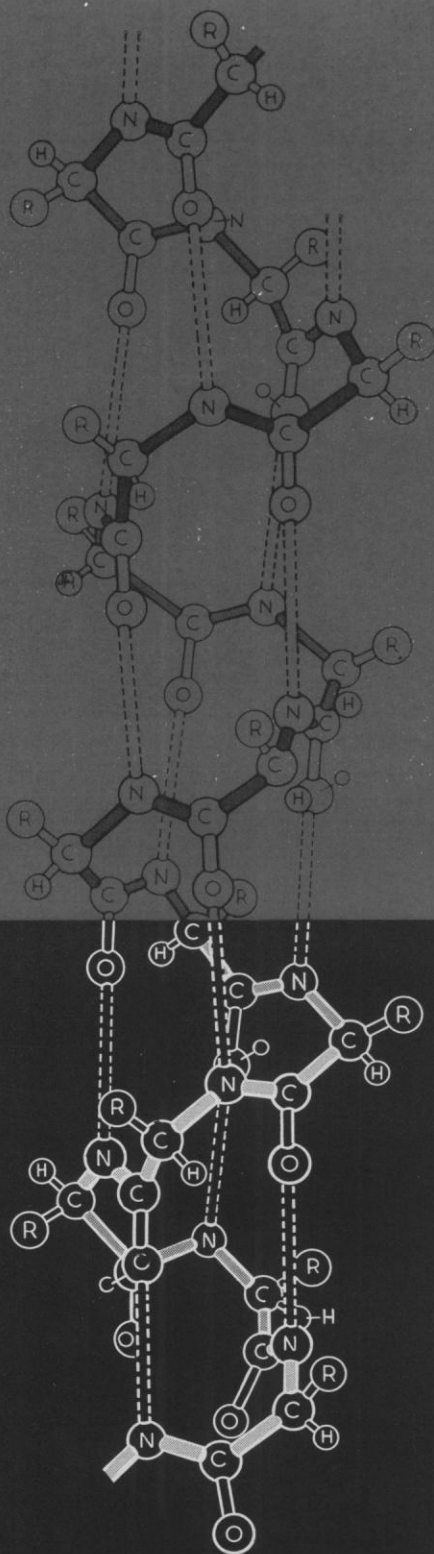
The location and identification of test

tubes containing ultra-violet absorbing fractions is speeded by an automatic chart-marking system. Of course, the detection system is completely self-contained and light-shielded. Solid-state electronics are used throughout. Application assistance and field service are assured by TMC's world-wide facilities.

For complete specifications on the Model 1056-OD, contact nearest office or write: Vanguard Instrument Corporation, 441 Washington Ave., North Haven, Conn.



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## BY REQUEST: A LOW-TEMPERATURE OSMOMETER FOR BIOCHEMISTS

A number of researchers have asked for a low temperature version of the Mechrolab High Speed Membrane Osmometer. And here it is. Equipped with thermoelectric cooling, the Model 503 allows operation down to 5°C. Overall temperature range is 5° to 65°C, making it a very versatile instrument indeed.

Best news of all, aside from the fact that you're assured of the stability of your materials, is that the 503 requires *less than 1 ml.* of sample solution.

### RAPID AND PRECISE

The 503 delivers the same rapid and precise performance as other Mechrolab 500 Series instruments, now widely used in chemical and biochemical laboratories. Osmotic and oncotic pressures are automatically read in 3-10 minutes, thereby allowing complete determinations of number-average molecular weights in one hour or less (20,000 to 1,000,000). Price \$5,550.

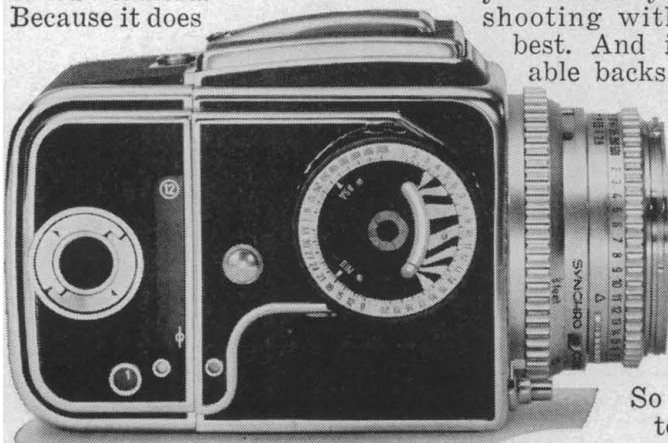
Your technically-qualified Mechrolab field man has more details; or write us at 1062 Linda Vista Ave., Mountain View 16, Calif.

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PACKARD**  **MECHROLAB  
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*"Advanced Instrumentation for Increasing Laboratory Productivity"*

# Is Jerry Schatzberg part of "the system"? Or vice versa?

**W**e don't really know. But let us explain. "The system" we refer to is the Hasselblad system. And it offers the photographer a unique and complete combination of interchangeable components that allows for greater versatility than anything called "camera." Because it does



more, photographers depend on it more. To the exclusion of "cameras." And after a while we wonder whether they become part of it, or if of them? We asked Jerry Schatzberg.

"**Y**es, I've gotten to depend upon 'the system,'" he said. "It's versatile enough to minimize my need for anything else. When you're on the job you just can't lug around anything extra. 'The system's' got it all. Like six interchangeable lenses. When you've got 50, 80, 120, 150, 250,

and 500mm lenses, there's nothing you can't take. And when they're all Zeiss, with manual and automatic diaphragm, and coupled EVS system, you know you're shooting with the best. And interchangeable backs. If I didn't

have 'the system,' I'd have, say, three or four cameras loaded with different film. Not for me. 'The system' has 4 interchangeable magazines, 3 for roll film, one for cut film.

So I can go from color to black and white, indoor to outdoor film, mid-roll.

"**V**iewfinders, too. 'The system' lets me see the shot the way I want to see it. (Not any one set way like with 'cameras.')

It gives me a choice of eye-level prisms, magnifying hoods, reflex prisms. The works.

"**W**hen you've got all that going for you, you just don't need much else. So after a while I don't think about the mechanics of how I'm shooting. I only

*Jerry Schatzberg, most contemporary of contemporary New York photographers, moves around fast. Look in his luggage and you're bound to find "the system."*

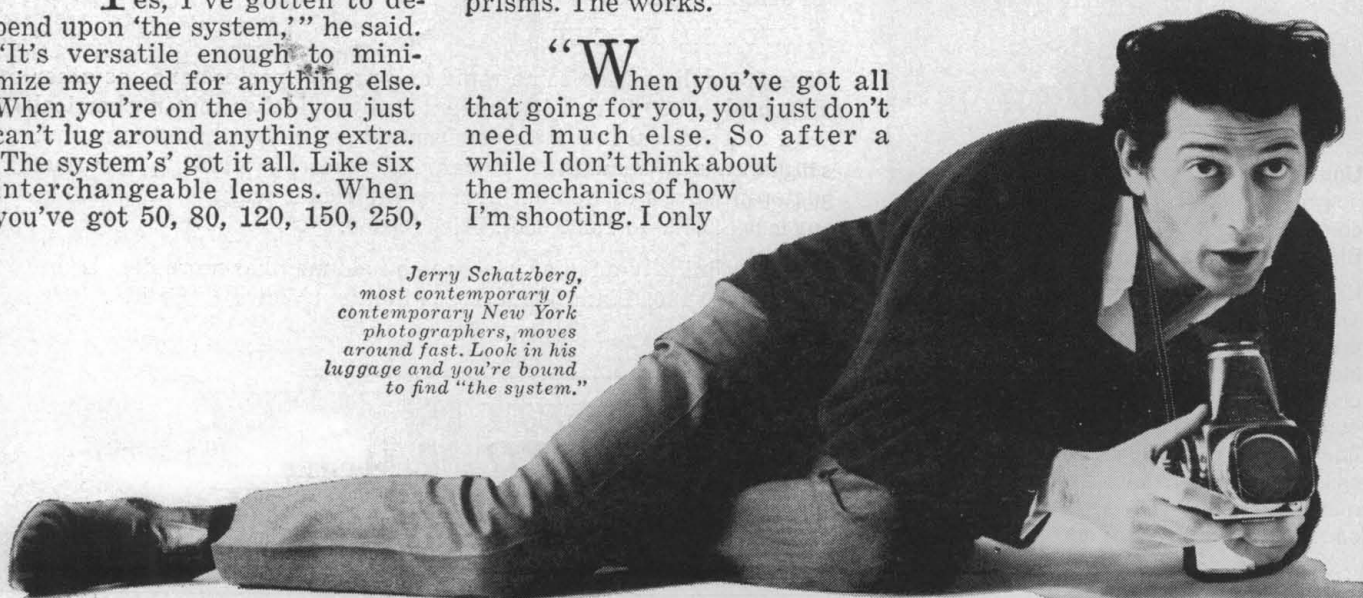


*Clockwise: Hasselblad 500C with 80mm lens and light meter knob, 150mm lens, sunshade, filter, eye-level prism finder, 250mm lens, magnifying hood and film magazine.*

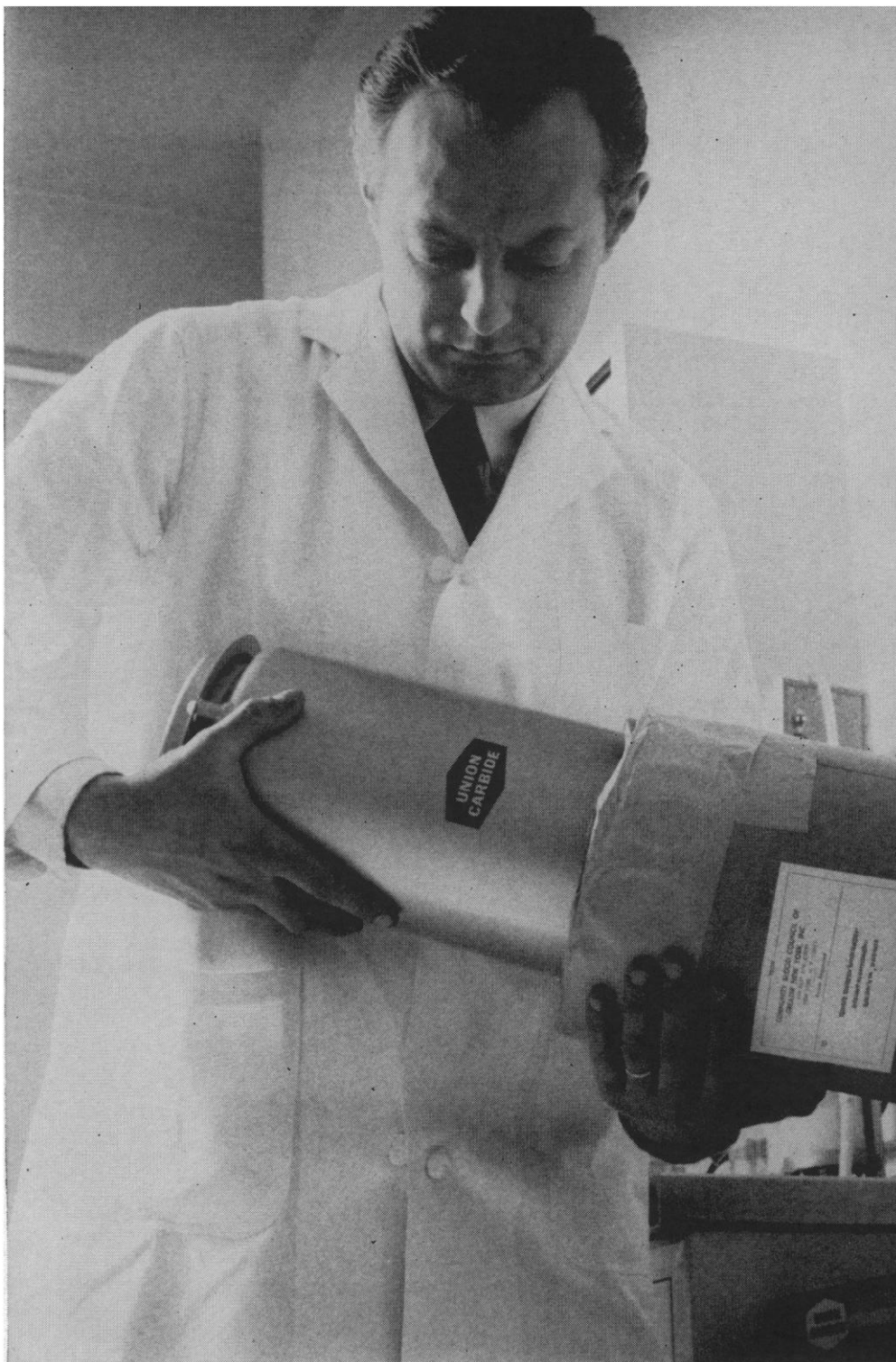
think about shooting. You might say 'the system' becomes an extension of myself."

**T**here's our answer: "The system" *does* become part of Jerry Schatzberg. It never gets in the way of the picture. It leaves the photographer free to see, to feel, to shoot. Take 5 cameras out with you. See how much or how little they get in your way. You'll let "the system" become part of you. For literature write: Paillard Incorporated, 1900 Lower Road, Linden, New Jersey.

## HASSELBLAD



**Inside:  
biological  
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—completely  
frozen  
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assures high thermal efficiency.

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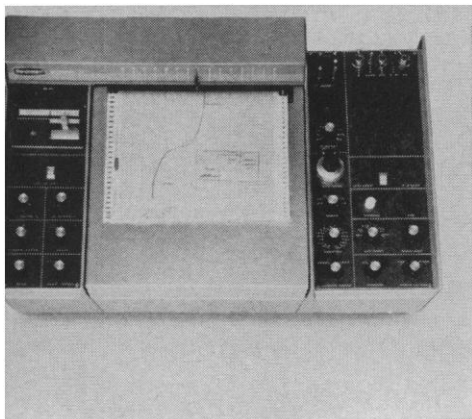
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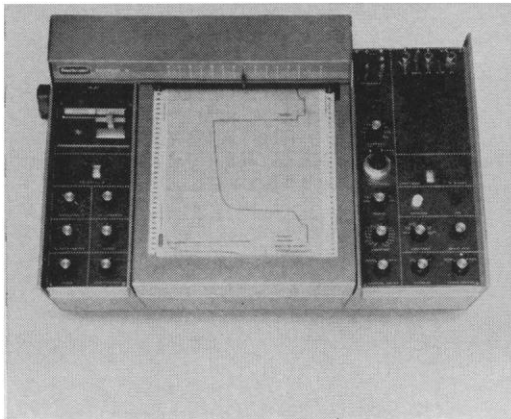


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PRODUCTS**

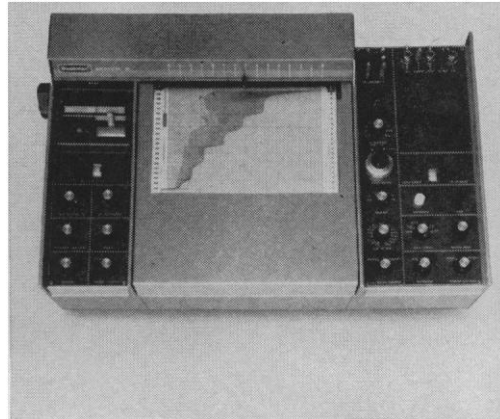
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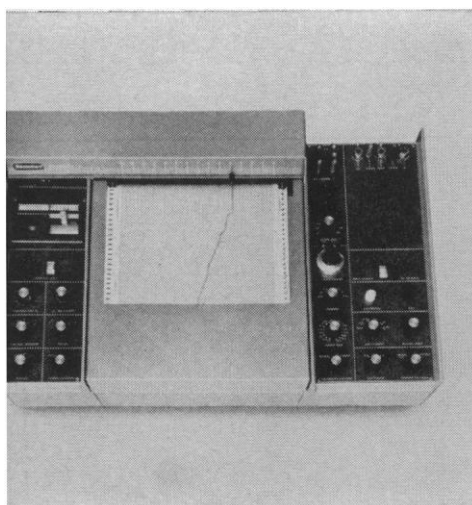
**Coulometer,**



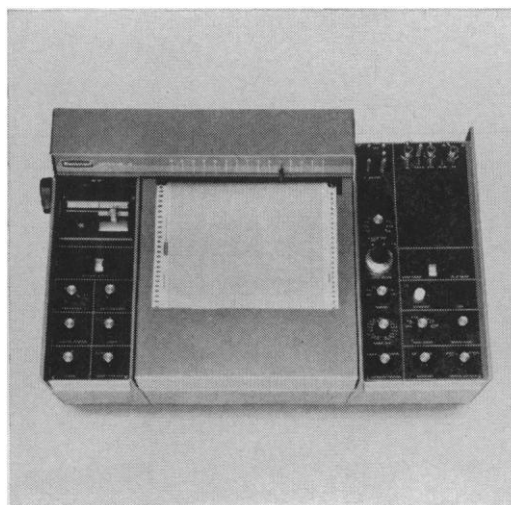
**Chronopotentiometer,**



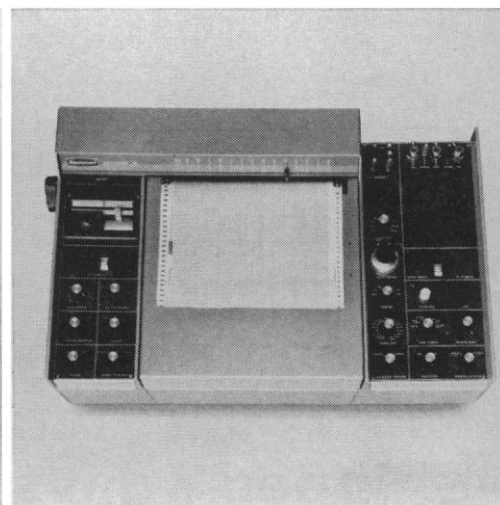
**Polarographic Analyzer,**



**pH Recorder,**



**etc.,**



**etc.,**

**etc....**

## the new Electroscan\* 30

The etceteras are up to you. We found a dozen names for the new Electroscan 30, but we're sure there are more. In fact, we think the Electroscan 30 is a complete electrochemical laboratory.

It's been evaluated for coulometric titrations, chronopotentiometry, three-electrode polarography, cyclic voltammetry, rapid scan voltammetry, electrodeposition, chronoamperometry, stripping analysis, pH and ORP measurements. What else it will do is up to you, your problems, and your imagination.

The standard Electroscan 30 features a controlled DC current power supply, a high-speed, high-impedance, 10-inch recorder, and a wide variety of electrodes and sensors. It is also available with a built-in potentiostat accessory which converts the controlled current supply into a controlled

voltage supply. And it's backed by Beckman's 30 years experience as the leader in electrochemical measurement.

If you've had to build your own electrochemical instruments, or if you've never taken advantage of the techniques of electroanalysis, find out what the Electroscan 30 can do for you. For details and specifications, and a copy of the informative new electrochemical primer, contact your Beckman Sales Engineer or write for Data File LES-165.

Then tell us about your etceteras.

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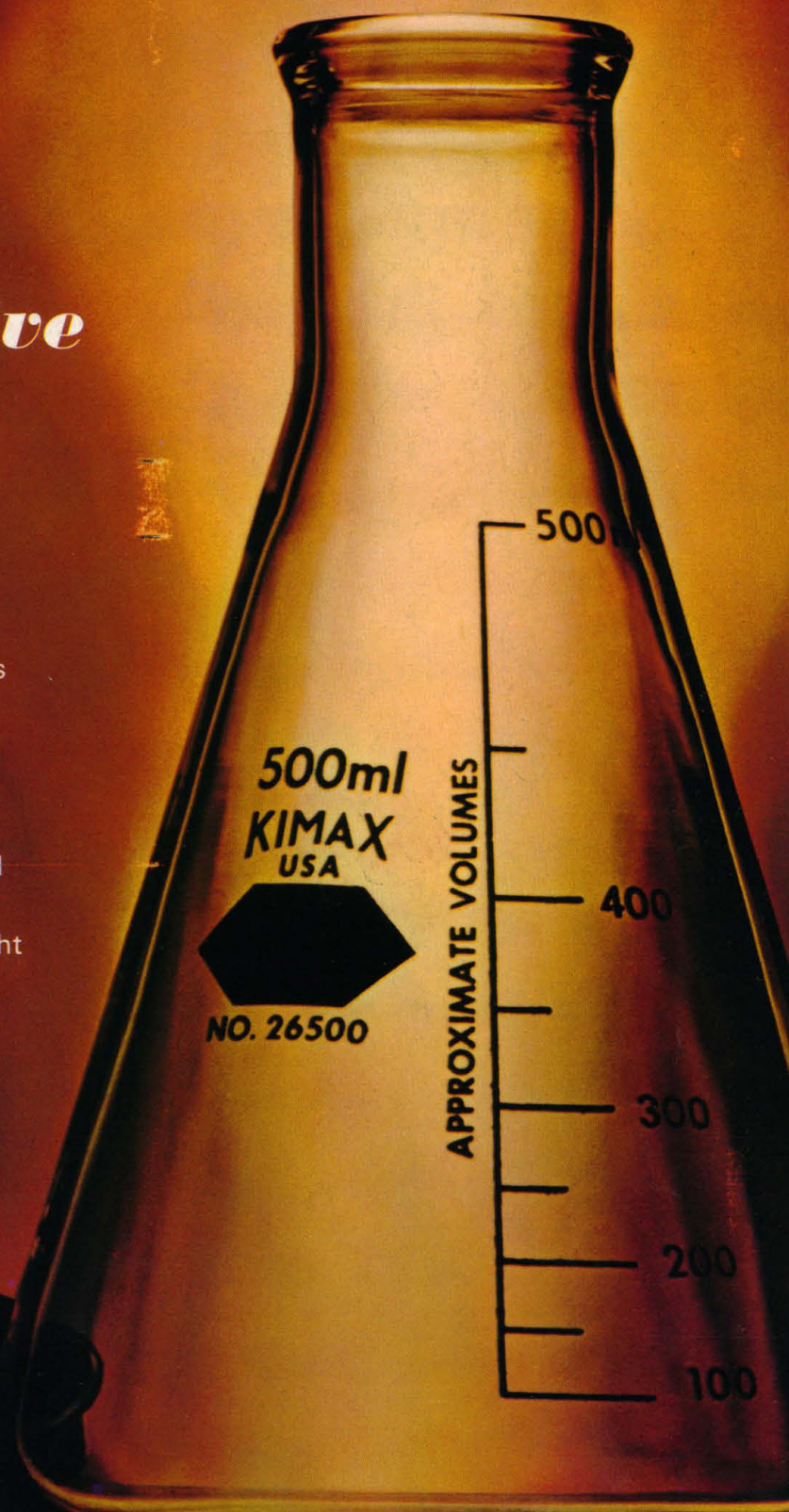
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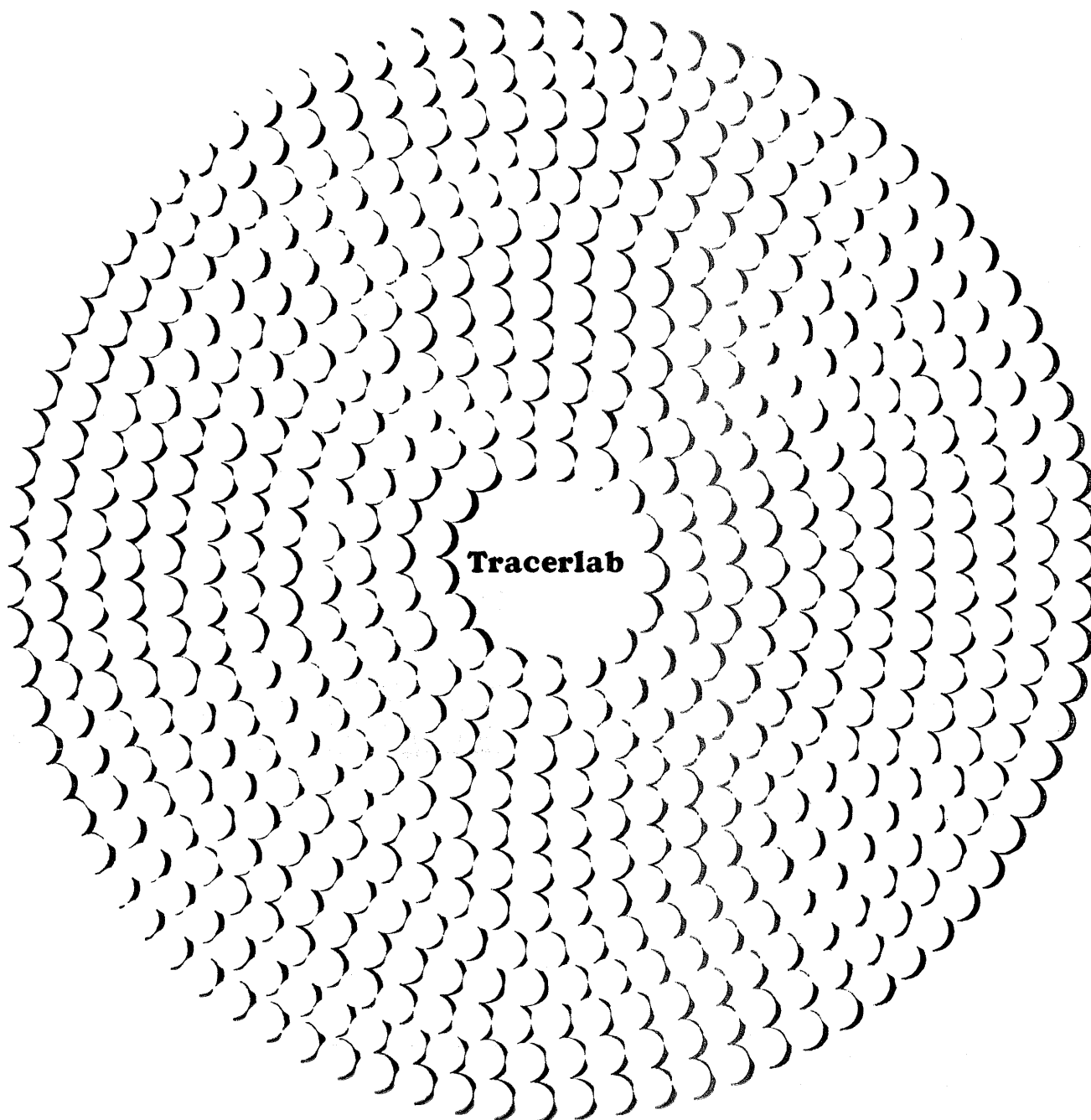
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Resulting from an extensive study of the scientific computational needs of over 1,000 EAI customers, the EAI 680 sets a new standard for economical analog/hybrid simulation. The compact solid-state EAI 680 combines for the first time outstanding dynamic performance with the high accuracy formerly available only in slower, more expensive large-scale computers.

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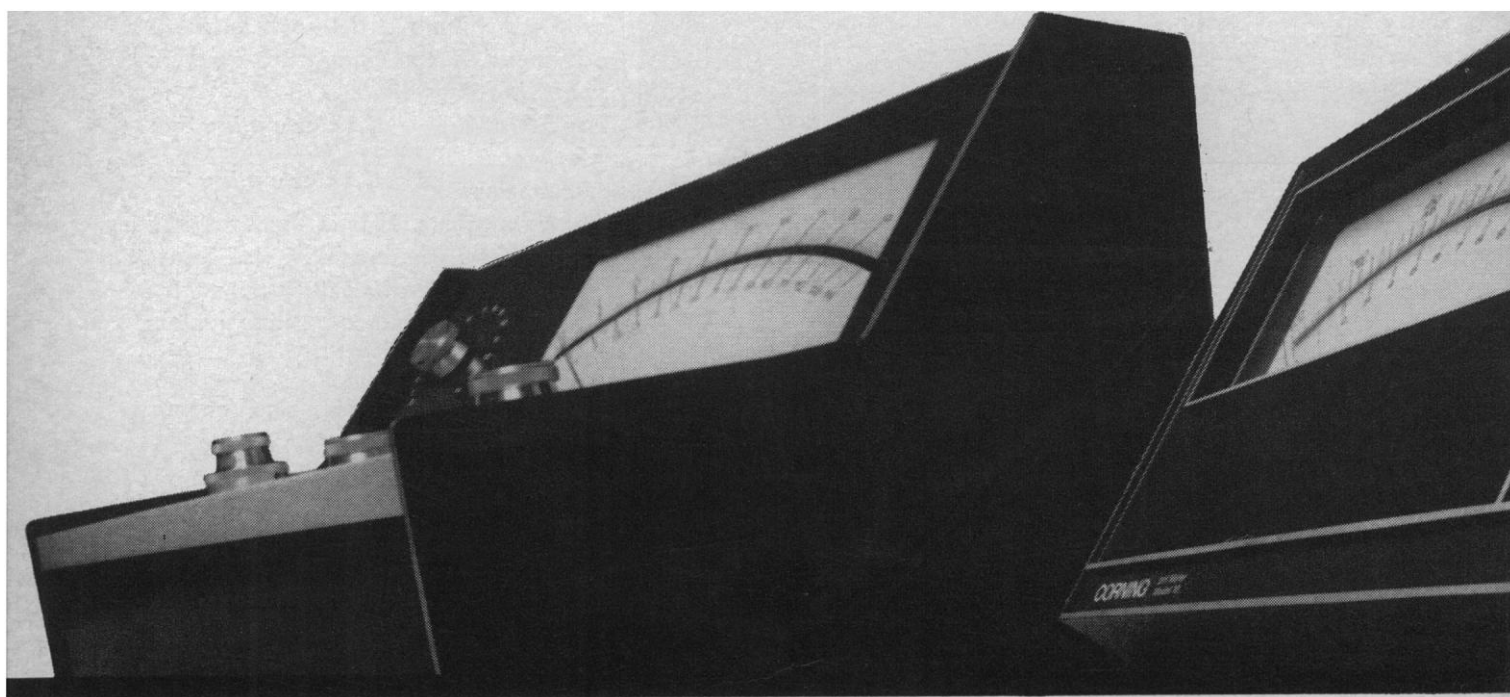
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**CORNING Model 12 Research pH Meter, left**—This precision instrument allows you to standardize on any 1-pH-unit expanded range, then switch to and read on others without restandardizing. Reproducibility on expanded scale is better than  $\pm 0.002$  pH. Price is \$595 complete with accessory kit.

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For evaluation loan or literature, send this coupon to: Dept. SC-9, Corning Glass Works, 11 Blackstone St., Cambridge, Mass. 02139.

☐ CORNING Model 12 Research pH Meter ☐ CORNING Model 10 Expanded-Scale pH Meter ☐ CORNING Model 7 General-Purpose pH Meter

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Title \_\_\_\_\_

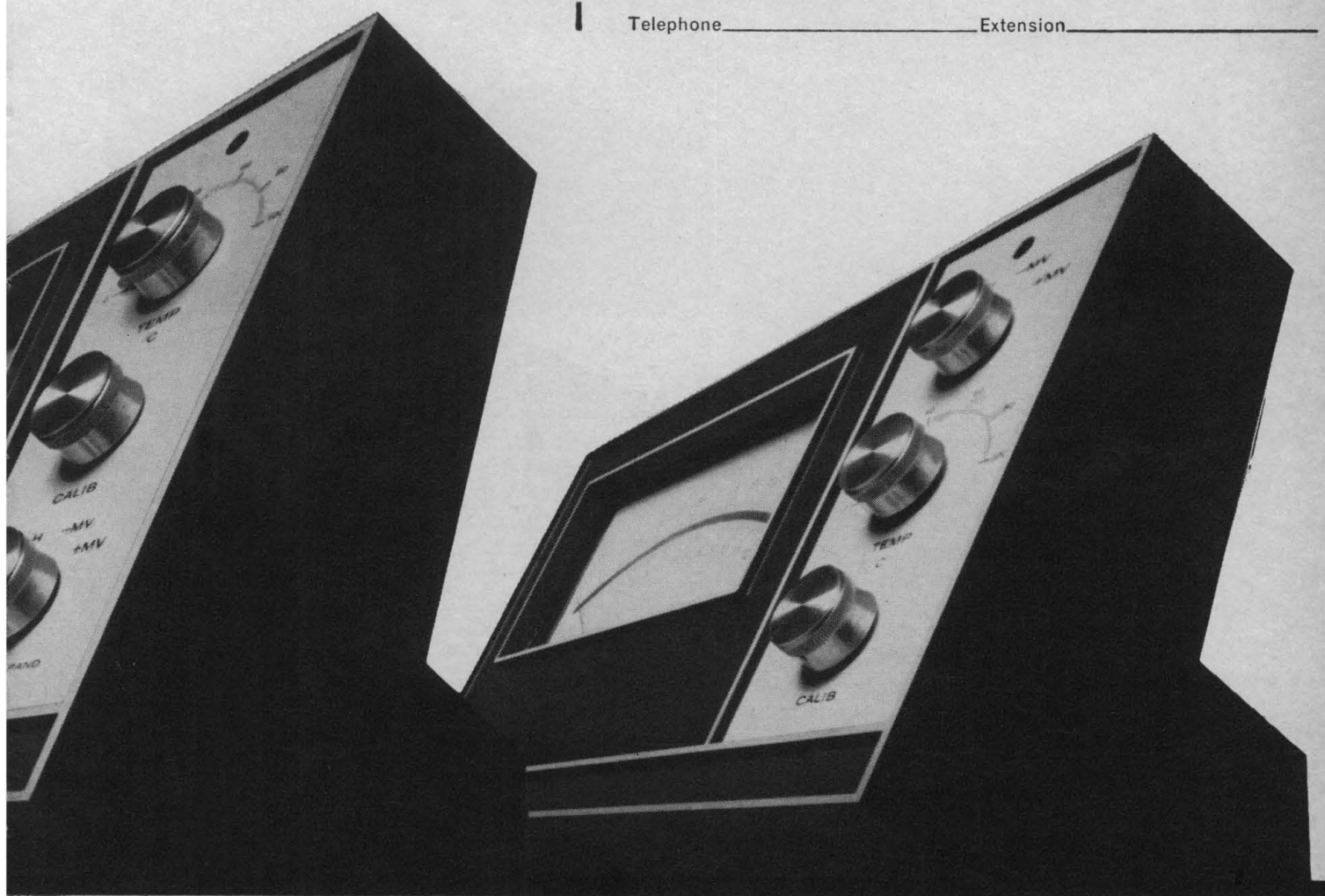
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**CORNING Model 10 Expanded-Scale pH Meter, center**—The longest—10 inches—meter scale on any lab pH instrument lets us put more scale divisions on it, lets you read easily to 0.01 pH on full-scale expansion of any 3 pH units, and to 0.05 pH on the 0-14 range. Reproducibility is better than  $\pm 0.005$  pH. \$485 with accessory kit.

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The basic system features include an automatic cuvette positioner, adaptable to laboratory quality monochromators such as the Beckman DU or the Zeiss MQ4III; a detector-indicator unit with direct digital absorbance readout; and a main console housing the lamp source stabilizer, photometer circuit, chart recorder and automation circuitry.

Absorbance Range . . . . .	0.000 to 3.000 A.
Wavelength Range . . . . .	200 — 700 mμ
Background Neutralization . . . . .	to 2.9 A.
Linearity . . . . .	± 0.25% or within 0.005 A.
Stability . . . . .	less than 0.01 A drift per hour
Maximum Noise . . . . .	less than 0.003 A at 1.5 A.

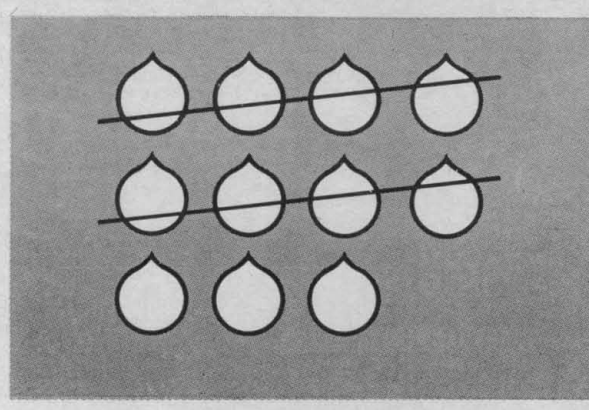
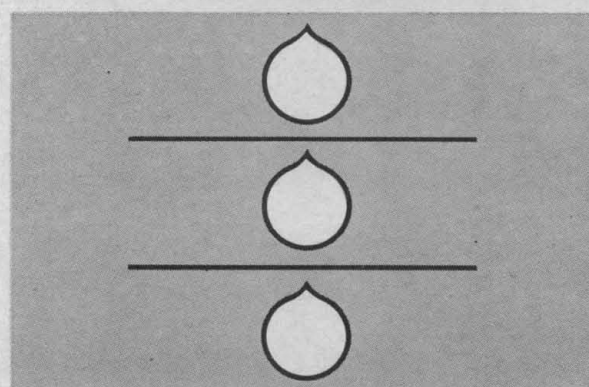
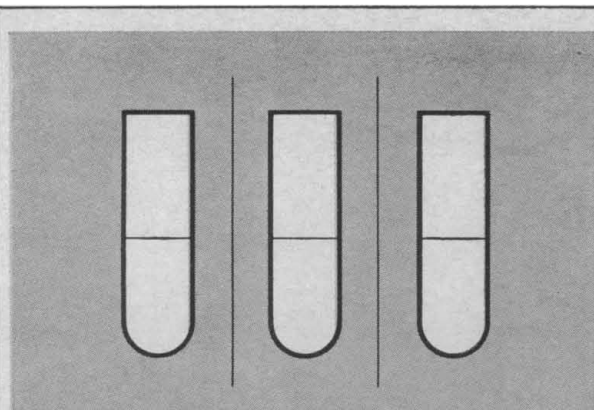
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separated by  
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**DROP  
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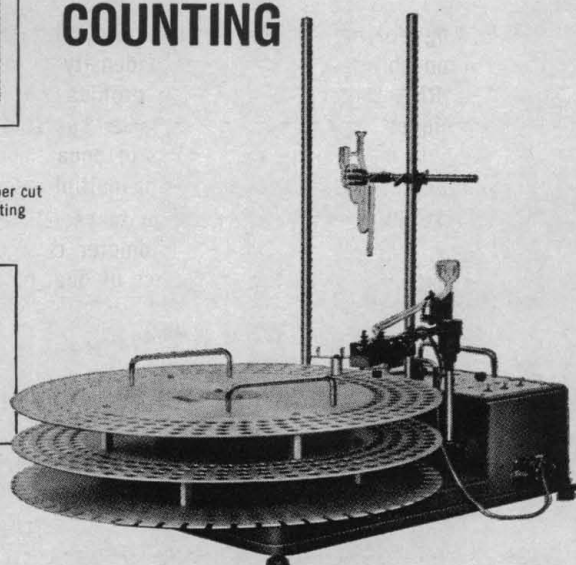
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3 ml. to 20 ml. siphons for volumetric cuts	18 second to 2 hour intervals for time-based cuts	1 to 400 drops per cut for drop counting
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operates on 115 volts 60 cycle or 230 volts 50 cycle

WCLID Model #	Diameter	Turntables		Vol. Range (ml.)	Pattern	
		Tube Size (mm.)			Holes	Rows
1205-E2 (Item #12062)	15"	13 x 100		1 to 5	150	3
1205-D3 (Item #12063)	24"	18 x 150		3 to 20	240	4

- dependability—in laboratory or cold room
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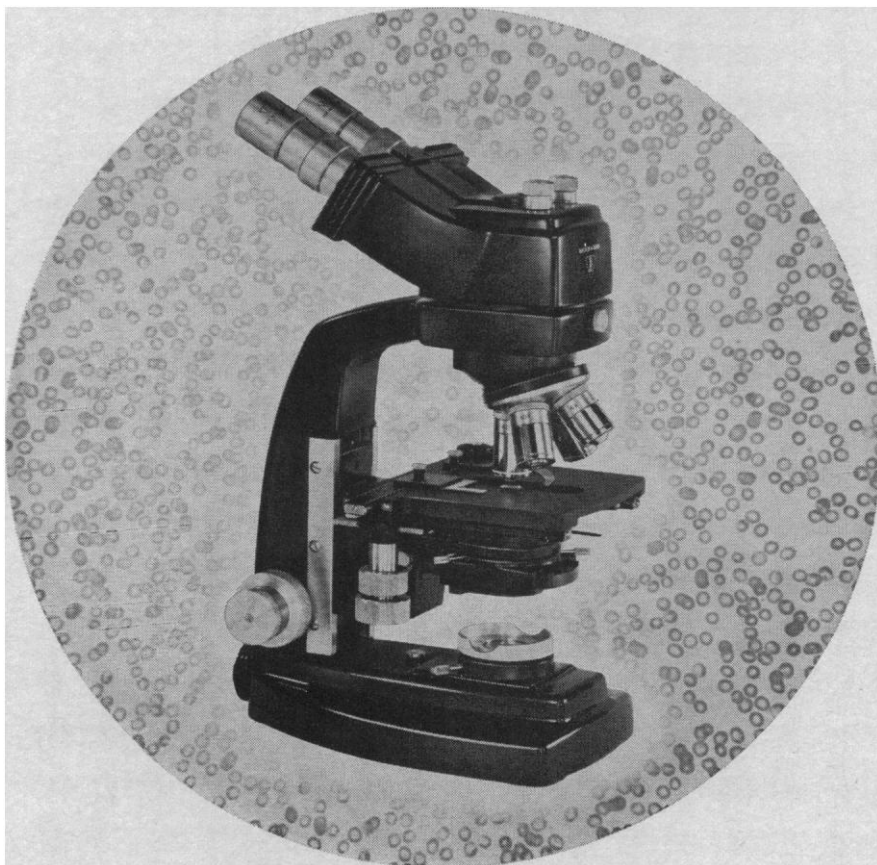


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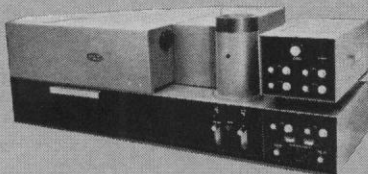
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# Three Different Atomic Absorption Instruments

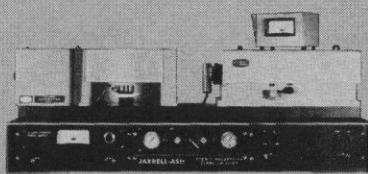


## FOR MULTI-ELEMENT ANALYSIS

The first direct reading polychromator in the atomic absorption field. A precision analytical instrument for high speed quantitative analysis of very low concentrations of metallic elements in agricultural, biomedical or industrial samples.

- performs up to 600 analyses per hour
- combines both atomic absorption and flame emission spectrometry
- sound-muffled HETCO\* Burner
- choice of readout systems
- all solid state electronics
- determines up to 12 elements simultaneously

Model 82-600

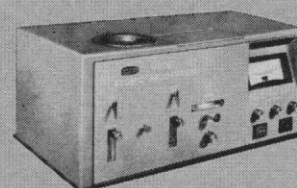


## FOR MAXIMUM VERSATILITY

Designed to handle difficult trace metal analysis problems, this Jarrell-Ash unit is the most versatile atomic absorption spectrometer available today. Based on the famous Model 82-000 Ebert Spectrometer, the system contains a unique multi-pass optical system and provides facilities for altering system components and adding new developments. Easy spectrum scanning with electrical wavelength drive!

- performs up to 120 analyses per hour
- combines both atomic absorption and flame emission spectrometry
- sound-muffled HETCO\* Burner (pre-mix burner also available)
- standard meter readout or optional direct plug-in recorder readout
- lowest possible detection limits
- choice of interchangeable burners, gratings, photomultiplier and hollow cathode tubes
- six-lamp Hollow Cathode Turret

82-500 Series



## FOR ROUTINE ANALYSIS

This Atomic Absorption/Flame Spectrometer has been designed specifically for routine analysis where dependability, simplicity of operation, compactness and price are of prime importance. Many desirable features of the more costly instrument have been incorporated into this budget price atomic absorption spectrometer.

- performs up to 120 analyses per hour
- combines both atomic absorption and flame emission spectrometry
- sound-muffled HETCO\* Burner
- standard meter readout or optional plug-in recorder readout
- pre-aligned optics
- reliable all solid state electronics
- requires less than 3 sq. feet of bench space
- simple to operate — minimum number of controls

Model 82-700

Need more convincing? Write for complete technical information about the instrument that interests you. Copies of new 16mm color sound movie "Atomic Absorption Spectrometry" now available. Write: Jarrell-Ash, Film Library.

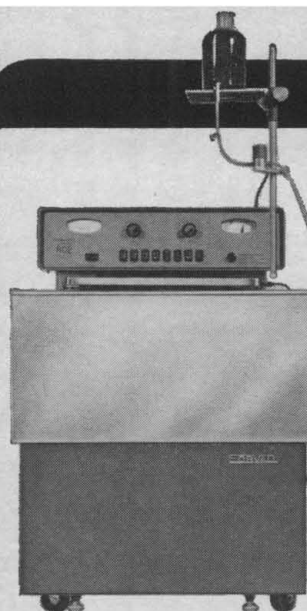
\*HETCO is the name of a new High Efficiency Total Consumption Burner by Jarrell-Ash



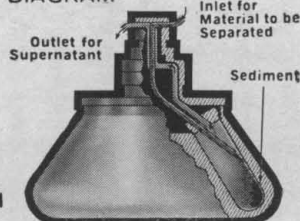
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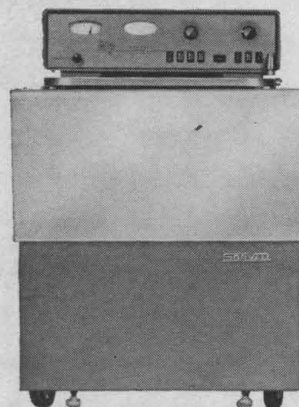
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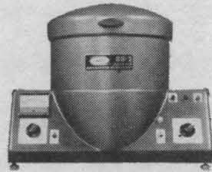
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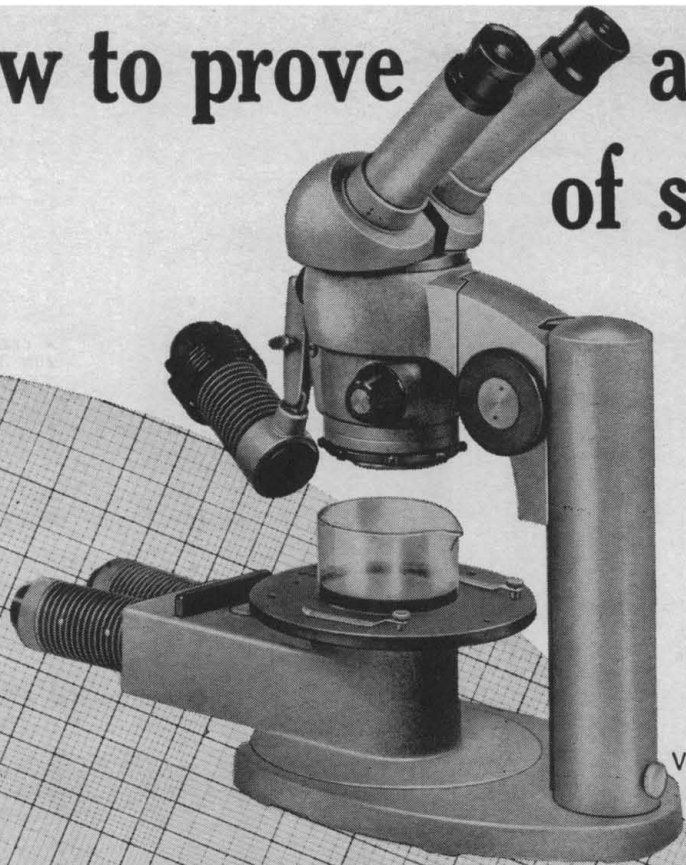
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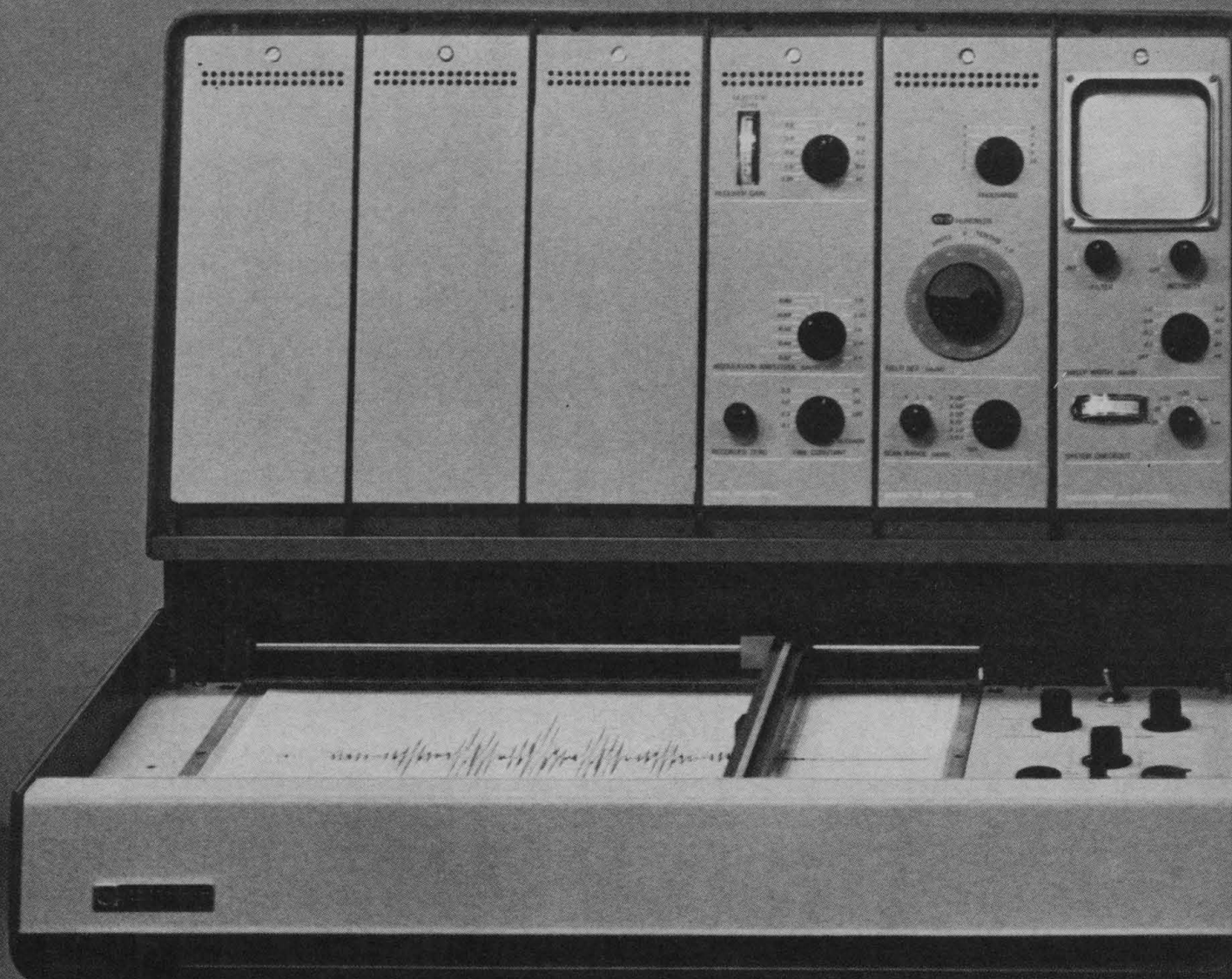
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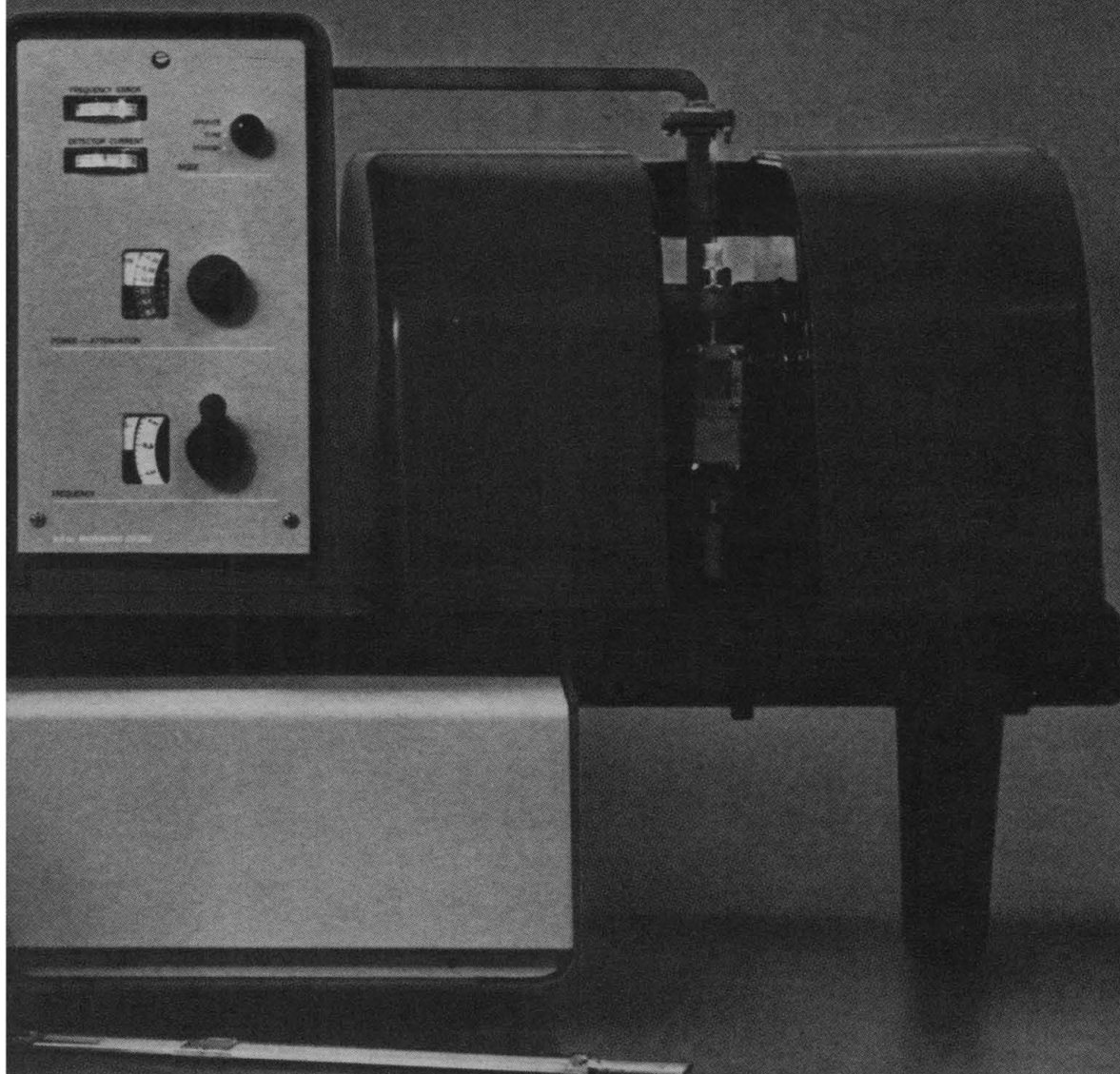
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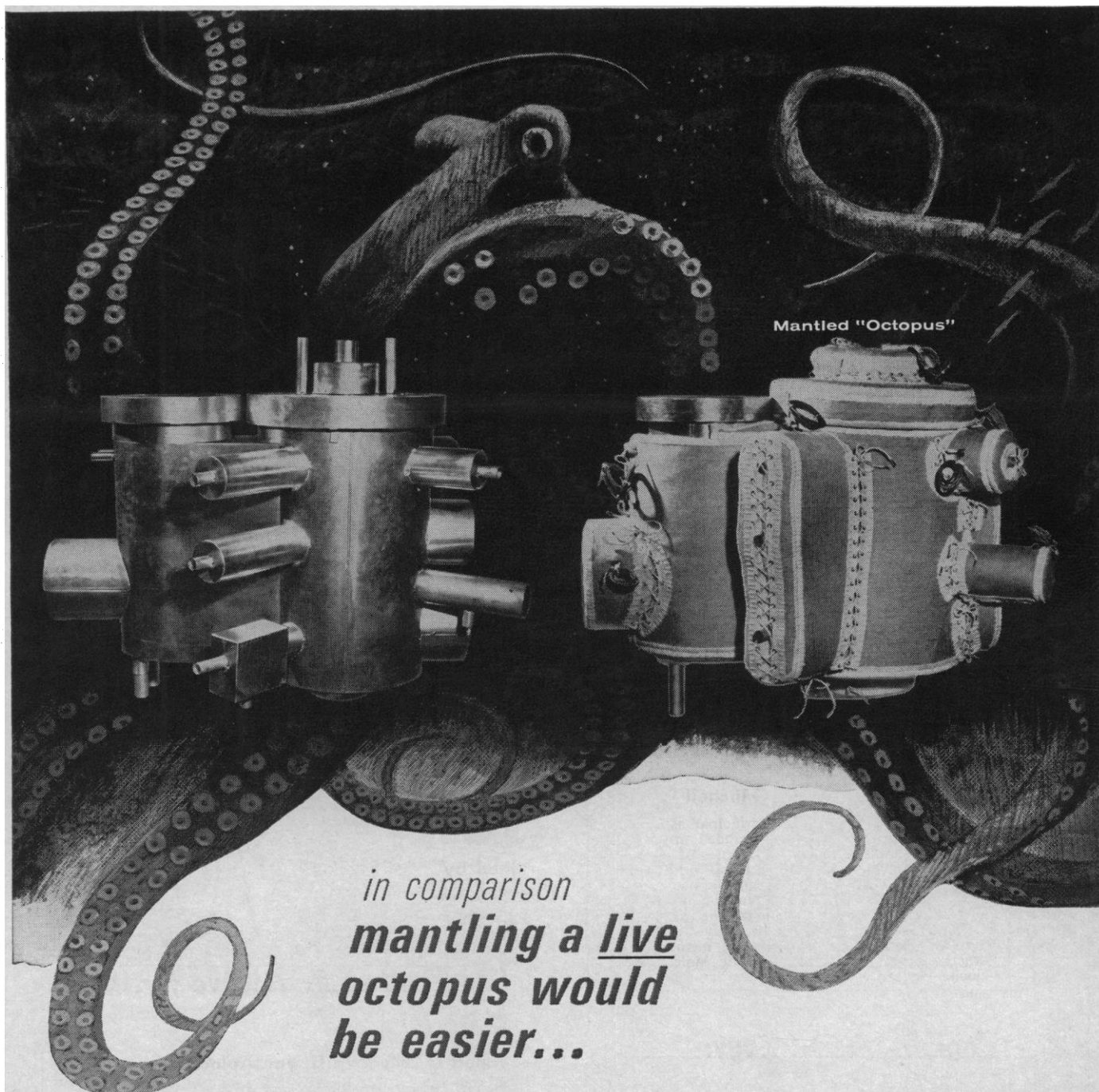
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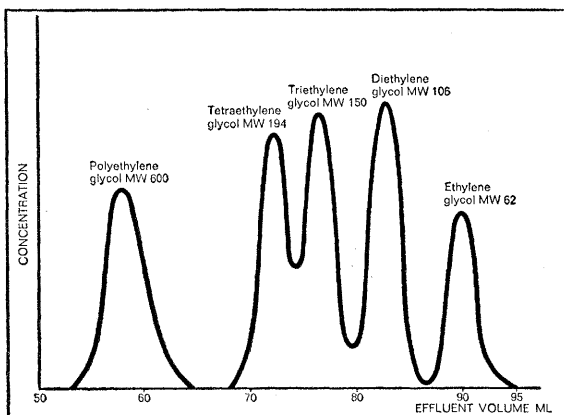


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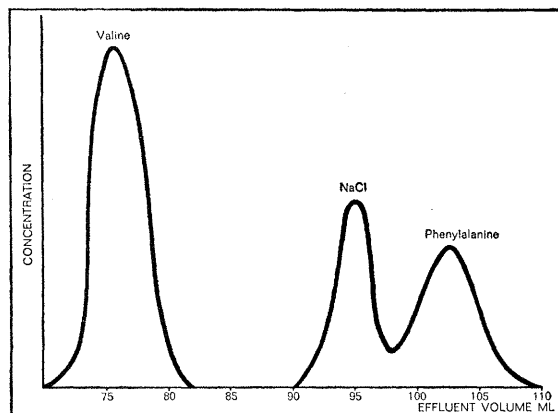
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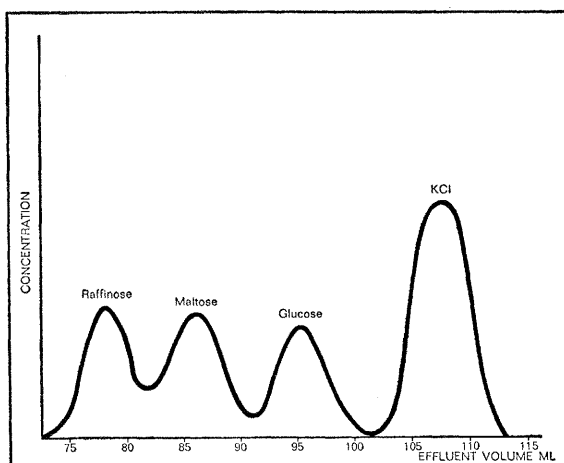
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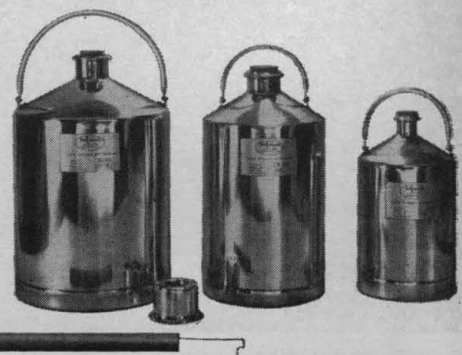
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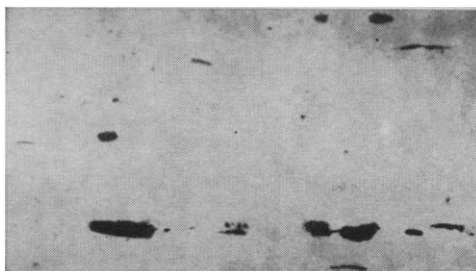
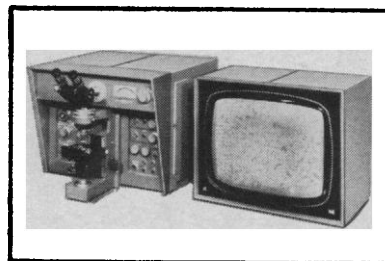
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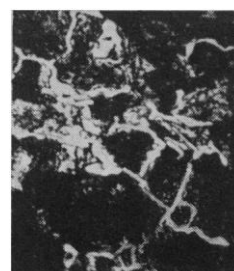
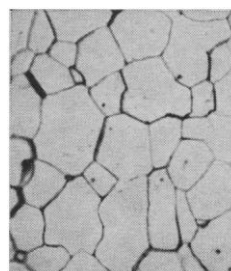
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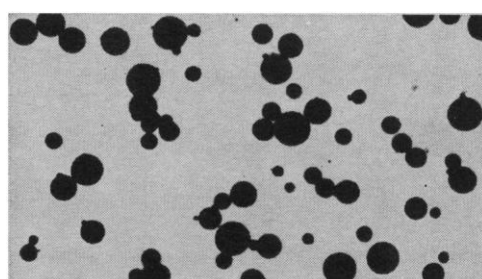
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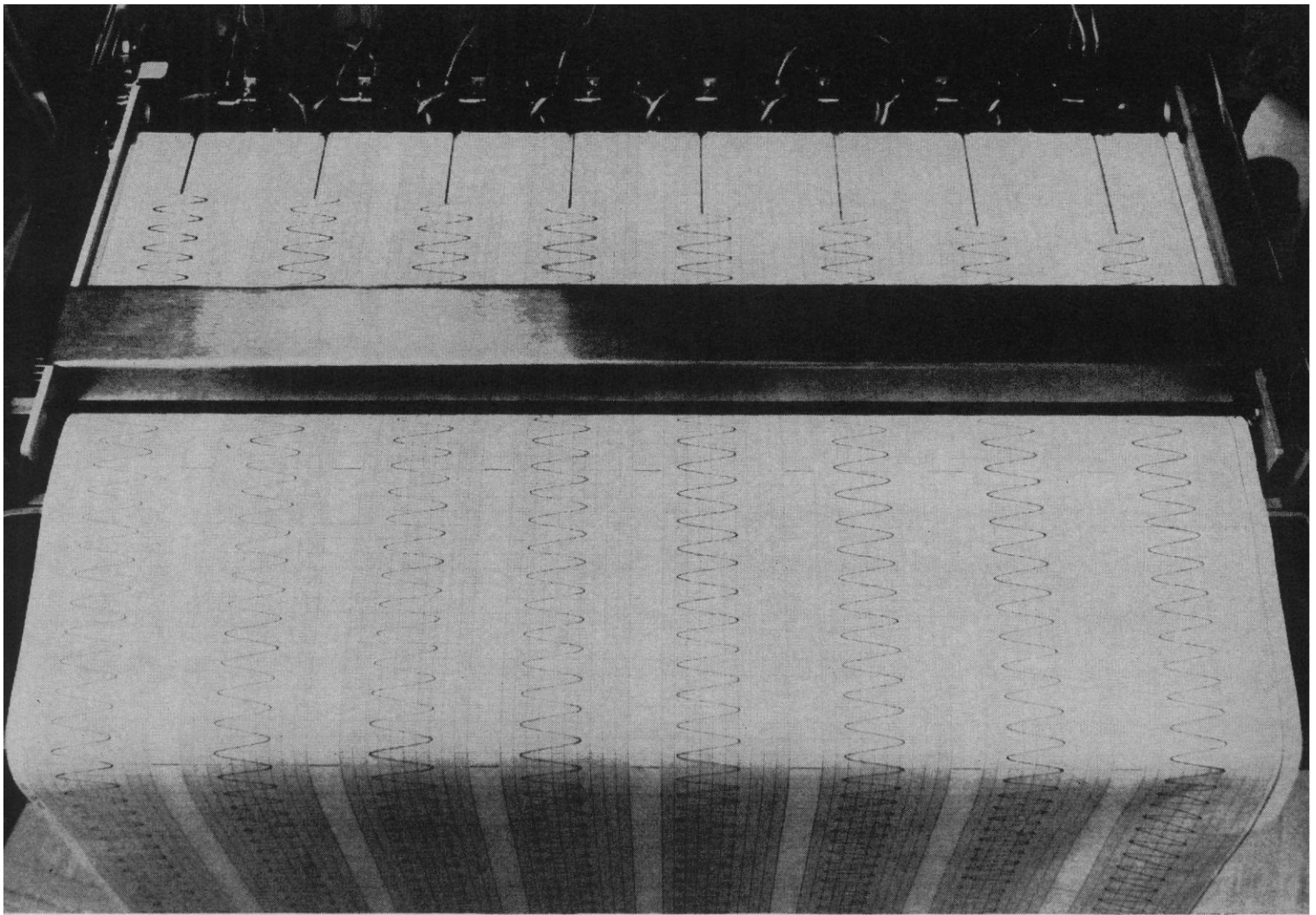
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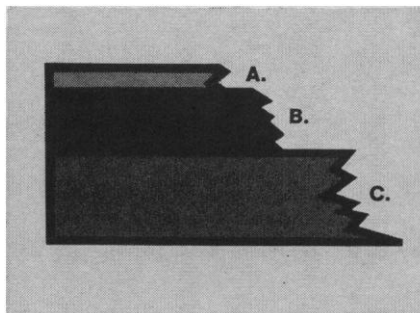


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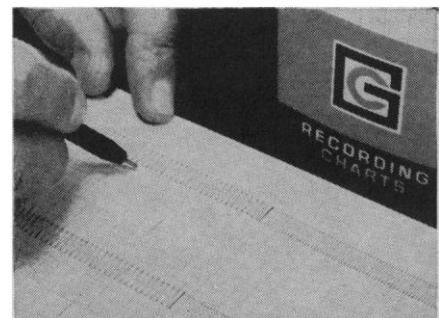
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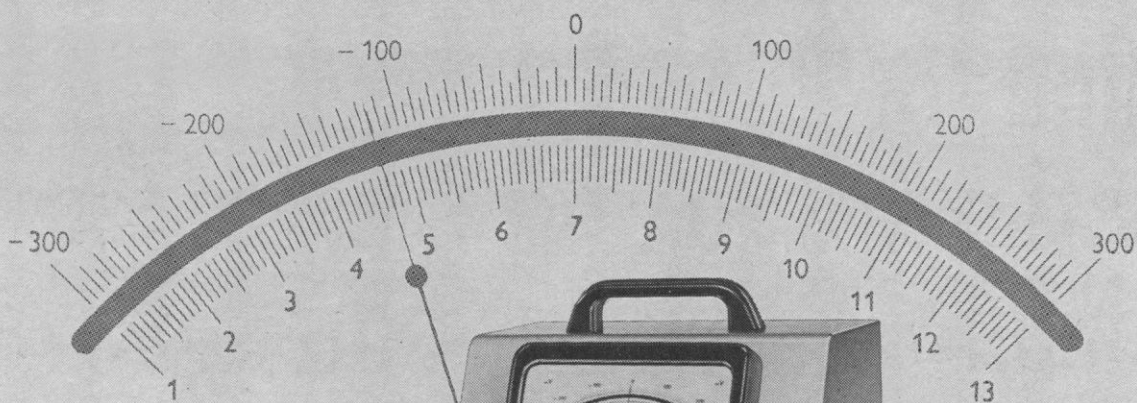
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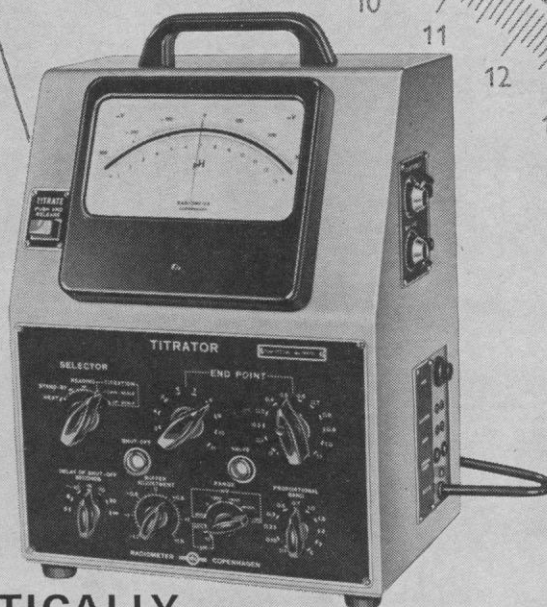
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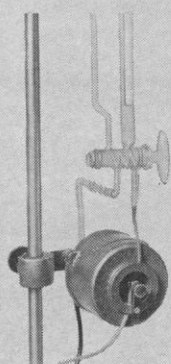
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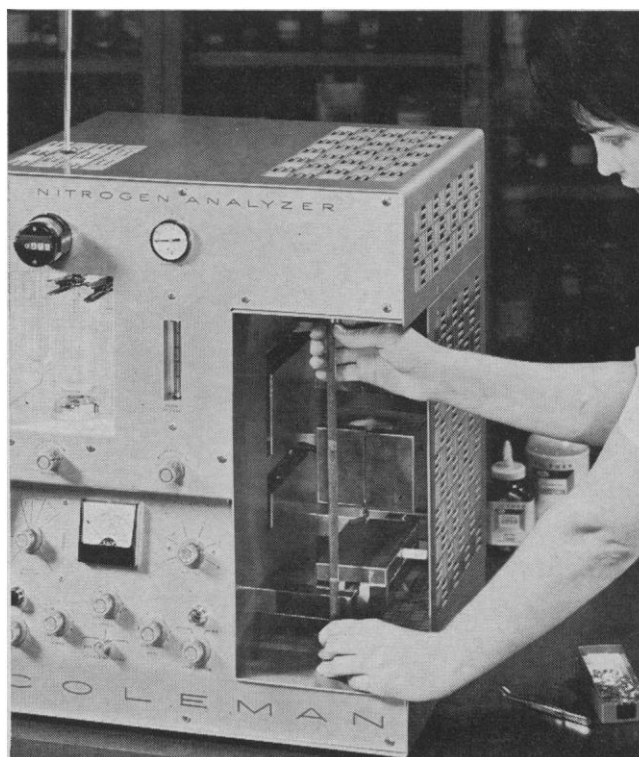
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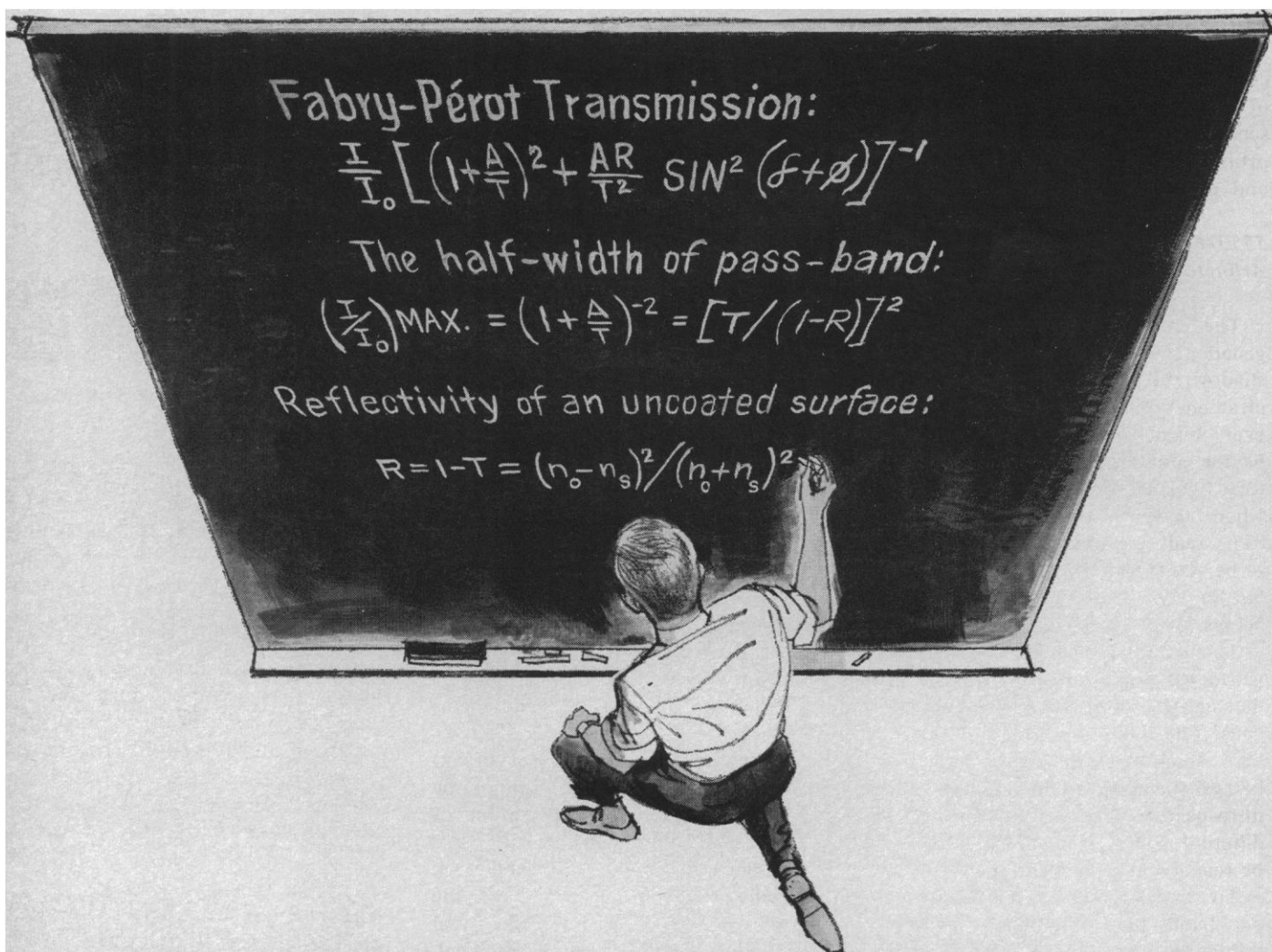
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with which this knowledge, if attained, can be entrusted to human nature in its present state of moral development. Otherwise we put ourselves in the position of the small boy who blows himself up by playing with explosives. . . . If scientists as human beings are concerned with the dangerous possibilities of "scientific progress," they can best serve mankind by doing their part in promoting the restoration of a healthy and proper sense of moral values.

BENJAMIN GINZBURG  
5550 Columbia Pike,  
Arlington, Virginia 22204

The control of human evolution by genetic treatment will probably overshadow the impact of the use of nuclear energy upon man's destiny. However, this achievement does not seem to be the great revolution in human history which Aldous Huxley foresaw when he wrote, as quoted by Abelson, "The really revolutionary revolution is to be achieved not in the external world but in the souls and flesh of human beings."

The external world is the objective world we are aware of by computing the signals collected by the sense organs. The internal world, the world of "the souls and the flesh of human beings" investigated by Huxley, is the introspective one revealed through the different states of awareness that can be reached in deep meditation.

To the internal world belong, on one hand, the "phantoms" built by a religiously indoctrinated imagination and the fantastic impressions generated by psychedelic drugs and, on the other hand, the inspired flashes of the scientists and the poets and the incommunicable states of awareness reached by the true mystics.

The discovery of the internal world is a strange experience. This discovery may drastically change the way of living of an individual by giving him the knowledge of the existence of a reality which transcends the reality of the physical world. If this knowledge were largely shared, the human race would probably enter a new phase of its evolution. Unfortunately, this knowledge is solely the result of a personal experience and apparently cannot be taught.

Contemporary scientists, objectively trained, are not inclined to accept the possibility of a *spiritual* mutation of the human race. But for those who accept the possibility of such a mutation, as suggested with persuasive arguments by Teilhard de Chardin in *The Phe-*

*nomenon of Man* (Harper, New York, 1961), this mutation, and not the control of human evolution by genetic treatment, will be the revolutionary revolution prophesied by Aldous Huxley.

ANDRE L. JULIARD  
Green Acres, Bryn Mawr, Pennsylvania

### "Disjointed Incrementalism"

In his article "National planning for medical research" (25 June, p. 1688), Handler discusses the dynamics of planning in the face of unknowns and uncertainties which are characteristic of biomedical research. He states that research gains are achieved through a process of "disjointed incrementalism" rather than through balanced, overall planning. To make progress, a critical mass effort must be applied against a target. A resulting payout may cause an imbalance in knowledge to occur, says Handler, but the imbalances are self-correcting through a variety of mechanisms. He adds that such an irregular pattern of advance is more in conformity with reality than planners would have the rest of us—and themselves—believe. His arguments are directed toward the planning of breakthroughs, which he says cannot be planned although the exploitation of actual breakthroughs can be.

Handler's arguments are persuasive, especially within the context of the pursuit of knowledge. In the real worlds of social, economic, political, and military action, disjointed incrementalism has often furthered the public good but it has also been followed by disaster and grief which could or should not have been left to self-correction.

The emerging dangers in the real world of biomedical affairs lie in the ensuing phases of exploitation after breakthrough. There we have not really had the planning which Handler says is feasible. Rather, political considerations associated with the funding of medical affairs have led people into premature exploitation of laboratory findings and statistical inferences. Some of the perturbations in the area of chemotherapy are due to premature application of such findings in spite of ignorance of drug effects; that is, the side-effects problem. Assumptions in mental-health planning must now be revised because psychopharmacology has not paid off as first hoped and promoted. Public-relations gains were

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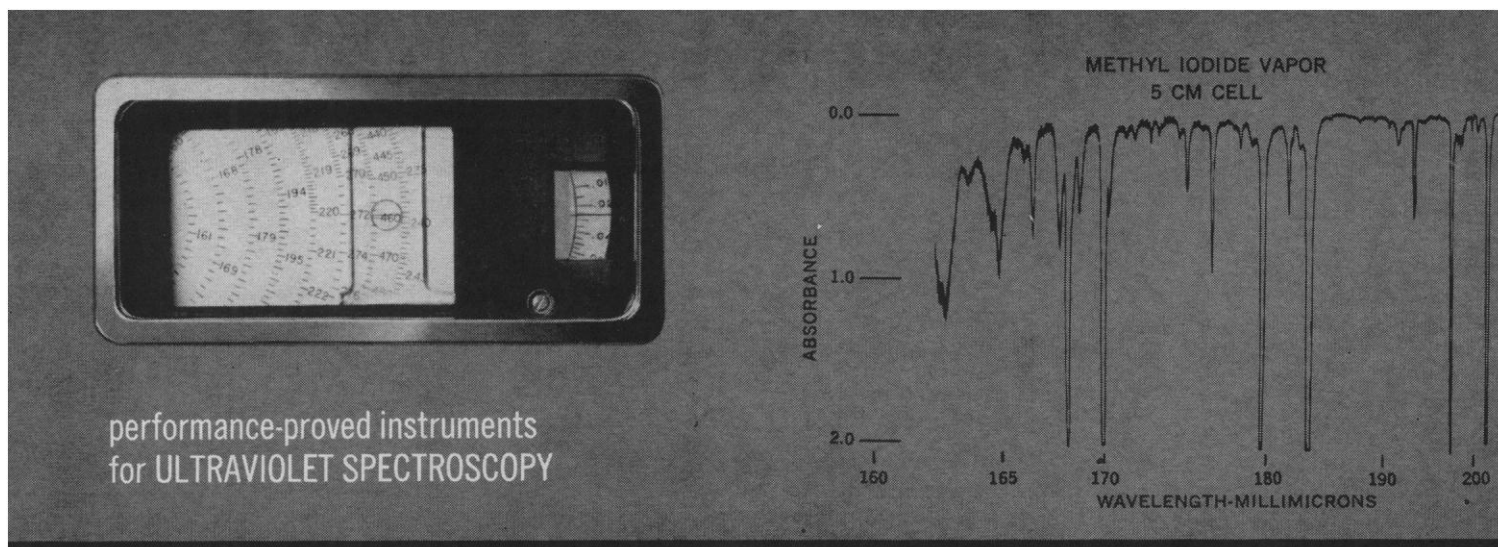
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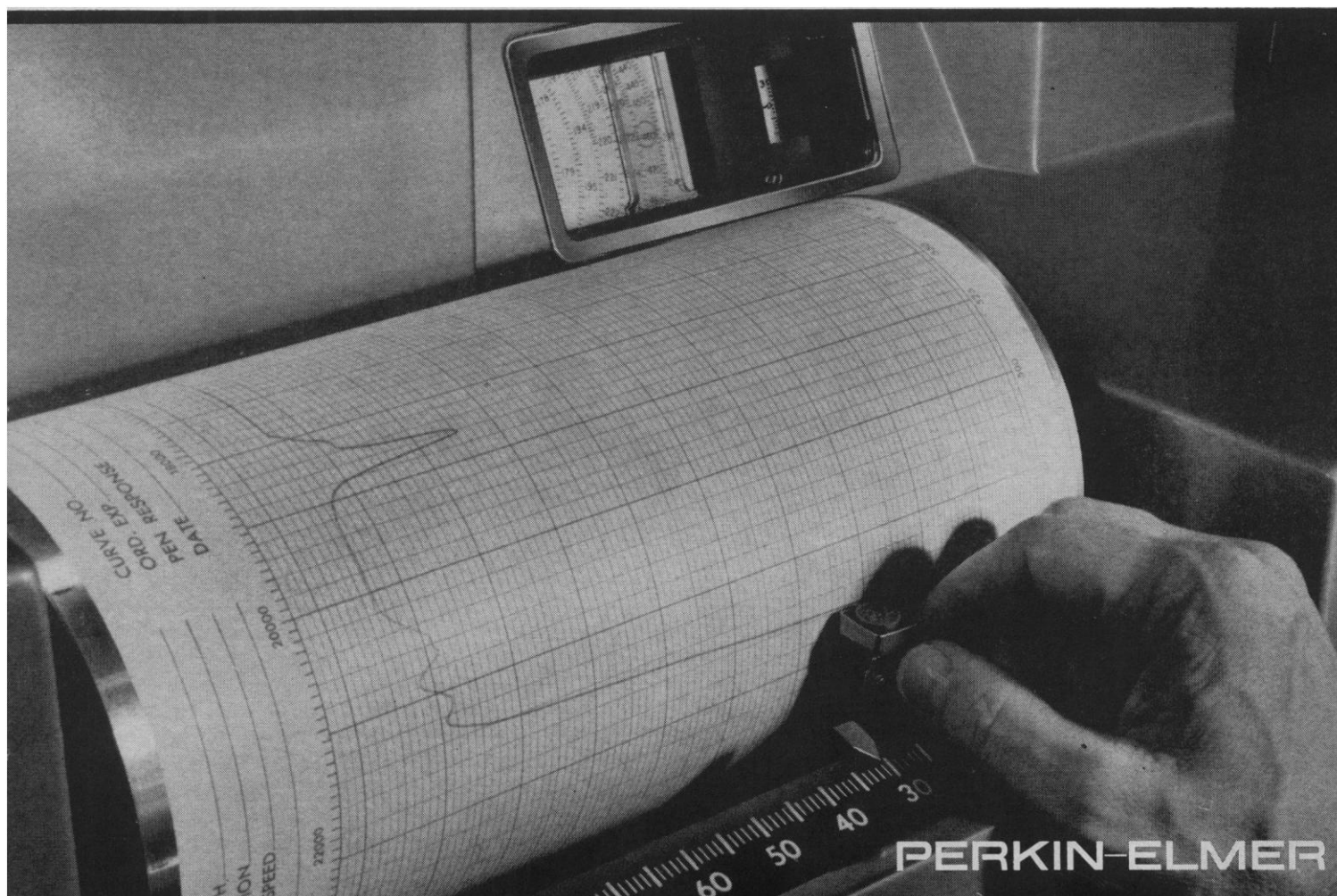
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words the scientific community has adopted a benignant posture toward the escalation of neologisms with concomitant minimization of sophistication in their utilization.

ARTHUR L. COHEN  
*Electron Microscope Laboratory  
and Department of Botany,  
Washington State University, Pullman*

### Working Hypotheses in Psychotherapy

I agree with N. H. Eisen in his letter concerning Chamberlin's method of "multiple working hypotheses" as applied to psychotherapy (16 July, p. 246) that many psychotherapists are coming to frown on rigid adherence to any single "school of thought," that is, working hypothesis. However, what psychotherapists do in practicing the eclectic methods is not identical with applying on a tentative basis, with the same patient, now this and then another hypothetical viewpoint. Rather, they use a single hypothesis based on a combination and fusion into one unified working hypothesis of whatever they find correct in the approaches of the various schools. Such a hypothesis bears the marks of the personality of the therapist and makes it possible to emphasize once this, and another time another, element of this unified eclectic hypothesis according to the individual case. In this again I agree with Eisen.

However, one of the main elements of successful treatment is to give the patient a unified working hypothesis for dealing with external and internal reality. It is the patient who presents us, unfortunately, with multiple working hypotheses which interfere with his efficiency and happiness. The patient uses simultaneously the magic and the rational hypotheses, the system of projection and the system of reality testing, the infantile and the grown-up code of morals, and so on. It is the task of the therapist to use all methods at his disposal to replace this confusion by a unified working hypothesis. One of the necessary methods involves giving the patient a living example of an unconfused mind. This is not all theory; I have actually seen bad results from introducing, for example, the physiological hypotheses in the case of a psychologically oriented patient, and sometimes also from combining behavior therapy with psychoanalytically oriented therapy.

Eisen suggests the application of the method of multiple working hypotheses to psychodiagnosis. In contrast to therapy, I see no objection to this and have seen advantages from the application of neurologic viewpoints simultaneously with psychological.

JOSEPH WILDER  
*1199 Park Avenue, New York 10028*

### Occurrence of Cilia

Kilburn and Salzano (18 June, p. 1618), in reporting a conference on cilia, began with the words: "Cilia are found in all animal groups except Nematoda. . . ." If this is correct, I have been teaching an error in introductory zoology courses for many years. I recognize the Onychophora as a distinct phylum rather than as a class of Arthropoda and teach that cilia do not occur in the Arthropoda, which, in terms of number of species, constitute some four-fifths of the animal kingdom. If I am wrong, I would appreciate references to the occurrence of cilia in insects, crustaceans, arachnids, chilopods, or diplopods.

LAMONT C. COLE  
*Department of Zoology,  
Cornell University, Ithaca, New York*

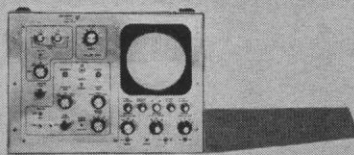
The statement "Cilia are found in all animal groups except Nematoda . . ." was a summary of Table 1 in M. A. Sleigh, *The Biology of Cilia and Flagella* (Macmillan, New York, 1962). The references for this table were L. H. Hyman, *The Invertebrates* (McGraw-Hill, New York, 1959), and P. P. Grasse, *Traité de Zoologie* (Masson, Paris, 1948–1961). Specifically, to answer Cole's questions: in Onychophora, nephridia and reproductive systems have cilia, while in Insecta, cilia are found in sensory organs and gametes.

A substantial correction to the same statement was suggested to us by Donald E. Giles. He calls attention to a study by H. G. Browne and A. B. Chowdbury [*J. Parasitol.* **45**, 241 (1959)] which showed cilia in the intestine of the nematode dog roundworm, *Ancylostoma caninum*.

Thus, the opening statement should be amended to "Cilia are found in all animal phyla." We stand corrected and informed.

KAYE H. KILBURN  
*Department of Medicine,  
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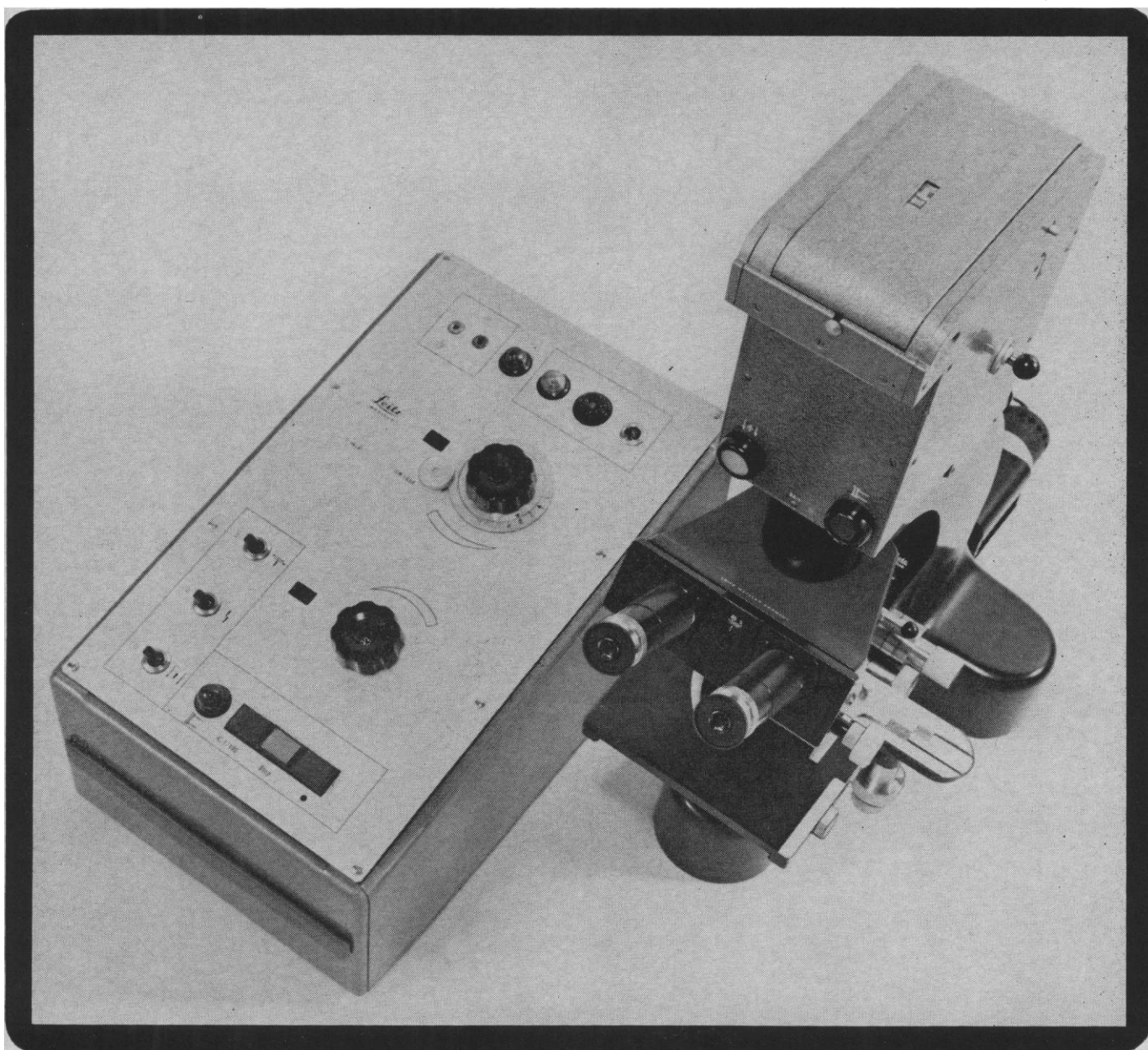
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## Mariner IV Mission

Scientifically, the results of the Mariner IV mission constitute the most important advance in space research since the discovery of the Van Allen radiation belts. Contributing to the value of the mission is the fact that the results of the various experiments are complementary; they also build on and extend previous findings of ground-based astronomy.

Useful data on particles, fields, and micrometeorites were collected during the voyage to Mars. Additional information was gathered after the fly-by, and more may be forthcoming when the spacecraft is once again fairly close to Earth. The major contributions, however, are the observations in the vicinity of Mars. Among the most important are the photographs (*Science*, 6 August). These show that, unlike Earth, Mars resembles the moon in topography. There are many craters, but there is no evidence of mountain chains.

Experiments on particles and fields reported in this issue show other major differences between the two planets. The magnetic field of Mars is not more than 1/1000 that of Earth, and the Red Planet has no radiation belt. An occultation experiment gives independent evidence that the atmosphere of Mars is tenuous and unlike that of Earth. A micrometeorite study shows that interplanetary dust is more abundant in the vicinity of Mars than near Earth.

The evidence from the photographs, the absence of a sizable magnetic field, and the character of the atmosphere all support the view that the history of Mars has been unlike that of Earth.

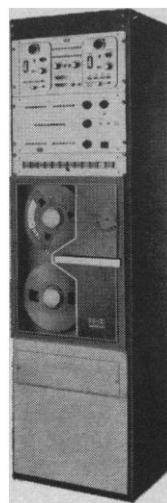
An example of a close relation between Earth-based findings and findings from Mariner is the estimate of the composition and density of the Martian atmosphere. Astronomers have known for some time that the atmosphere of Mars is thin and that it contains CO<sub>2</sub>. Recently the estimates have been sharpened. Measures of infrared radiation indicate that the total pressure at the Martian surface is 11 millibars, of which about half is CO<sub>2</sub> (0.28 mole per square centimeter). The Mariner IV occultation experiment determined changes in radio signals from the spacecraft caused by passage through the atmosphere and the ionosphere of Mars. Preliminary interpretation of the data provides an estimate of the scale height of the atmosphere (~9 km) and its density. The pressure at the surface of Mars as estimated from the data (about 5 or 6 mb) is lower than estimates obtained in ground-based studies. This disagreement is not serious, and the discrepancy will probably diminish on further analysis. The important fact is that two very different kinds of measurements give essentially the same result. Half or more of the atmosphere of Mars is CO<sub>2</sub>, and the total number of molecules per unit area is about 1/100 the number in the Earth's atmosphere.

The contrast between Earth and Mars can be stated in another way by listing the amounts per unit area of three volatile substances that have appeared at the surface of the planets in the past or are now present. For Earth the values are: H<sub>2</sub>O,  $3.2 \times 10^5$  g; CO<sub>2</sub>,  $1.8 \times 10^4$  g; N<sub>2</sub>,  $8 \times 10^2$  g. The corresponding values for Mars are: H<sub>2</sub>O, ~0.01 g; CO<sub>2</sub>, ~12 g; N<sub>2</sub>, <10 g. The numbers are not strictly comparable, for most of the CO<sub>2</sub> that has reached the surface of the Earth is now incorporated in sedimentary rocks. Probably most of the H<sub>2</sub>O that has appeared on Mars has been lost, the hydrogen having escaped and the oxygen having been consumed or lost. Nitrogen has not been detected on the planet, and the value given is probably an upper limit, derived from the pressure effect it exerts on CO<sub>2</sub>.

The success of Mariner IV represents a superb engineering achievement by the Jet Propulsion Laboratory. The accomplishment required the proper functioning of 134,000 parts after 7 months in space. The magnitude of the success is highlighted by the failure of others to attain the goal. The Russians, who have some first-class engineering talent, have not succeeded in their dozen or so attempts at attaining close-in data from Mars or Venus.—PHILIP H. ABELSON

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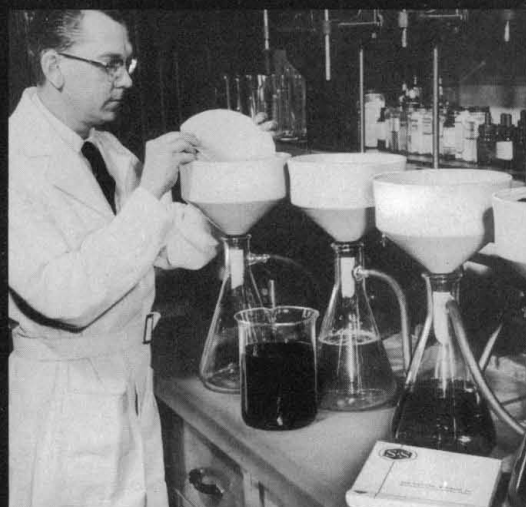
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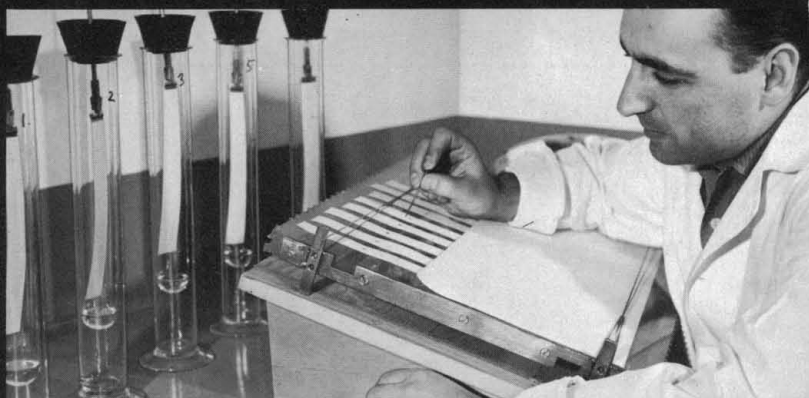
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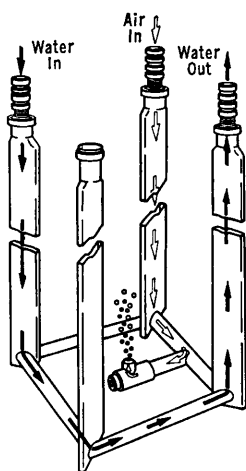


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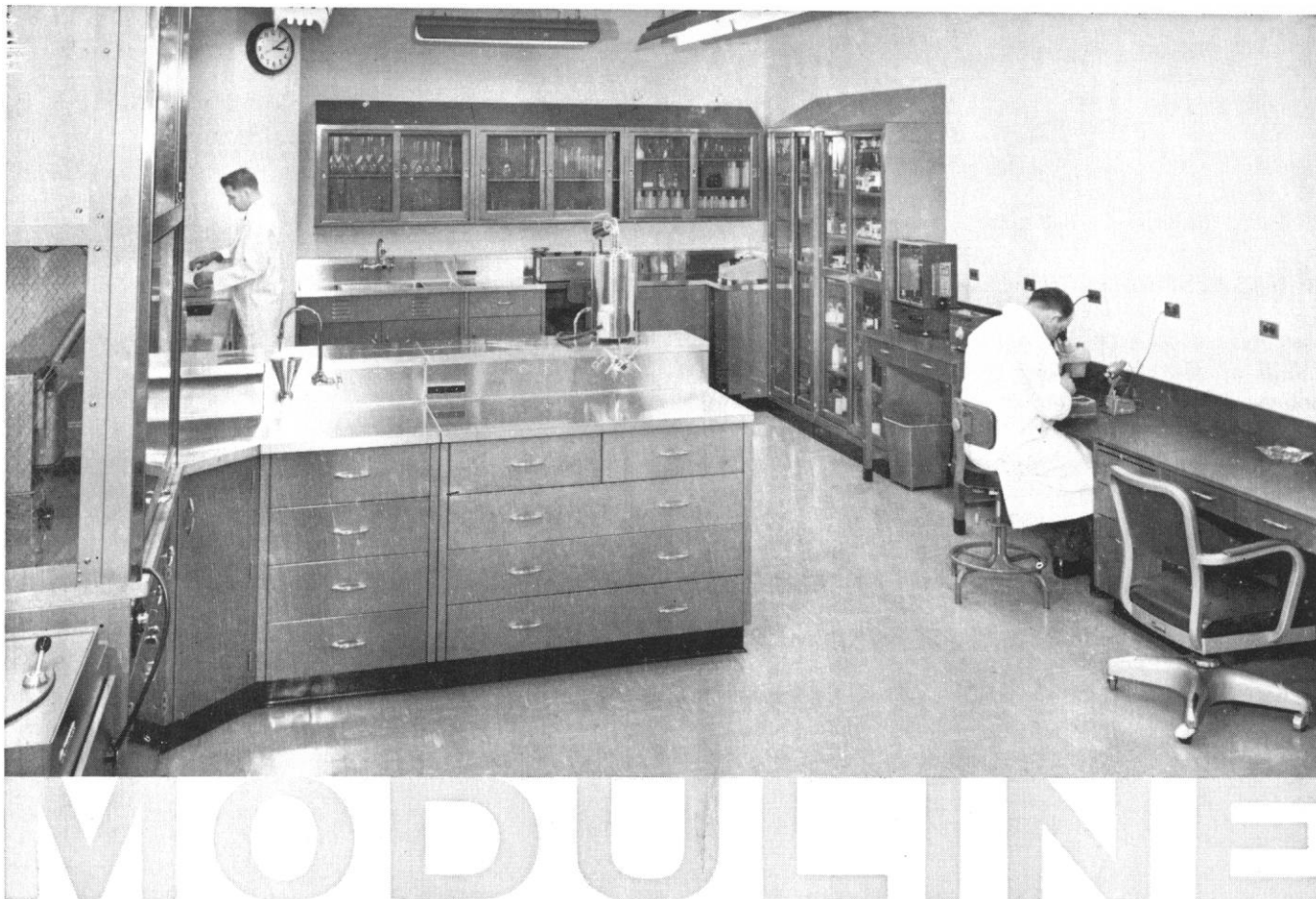
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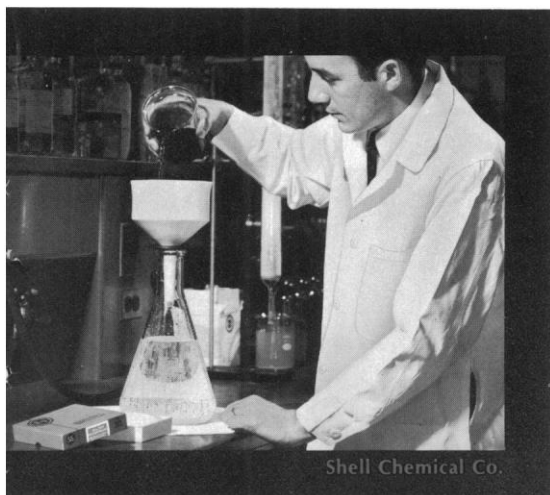
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Photographs courtesy of the companies named below each picture

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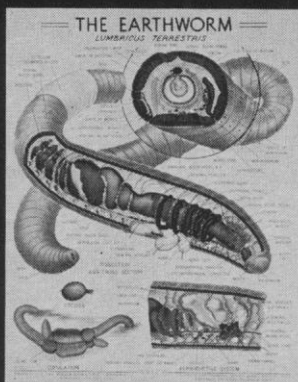
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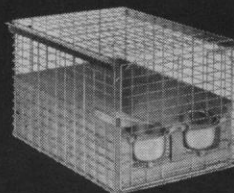
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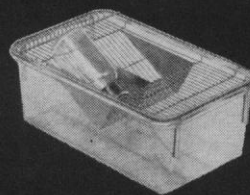
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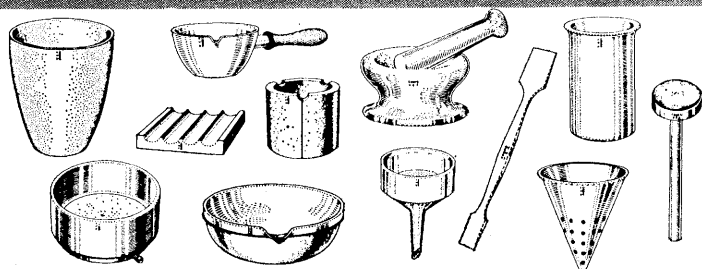
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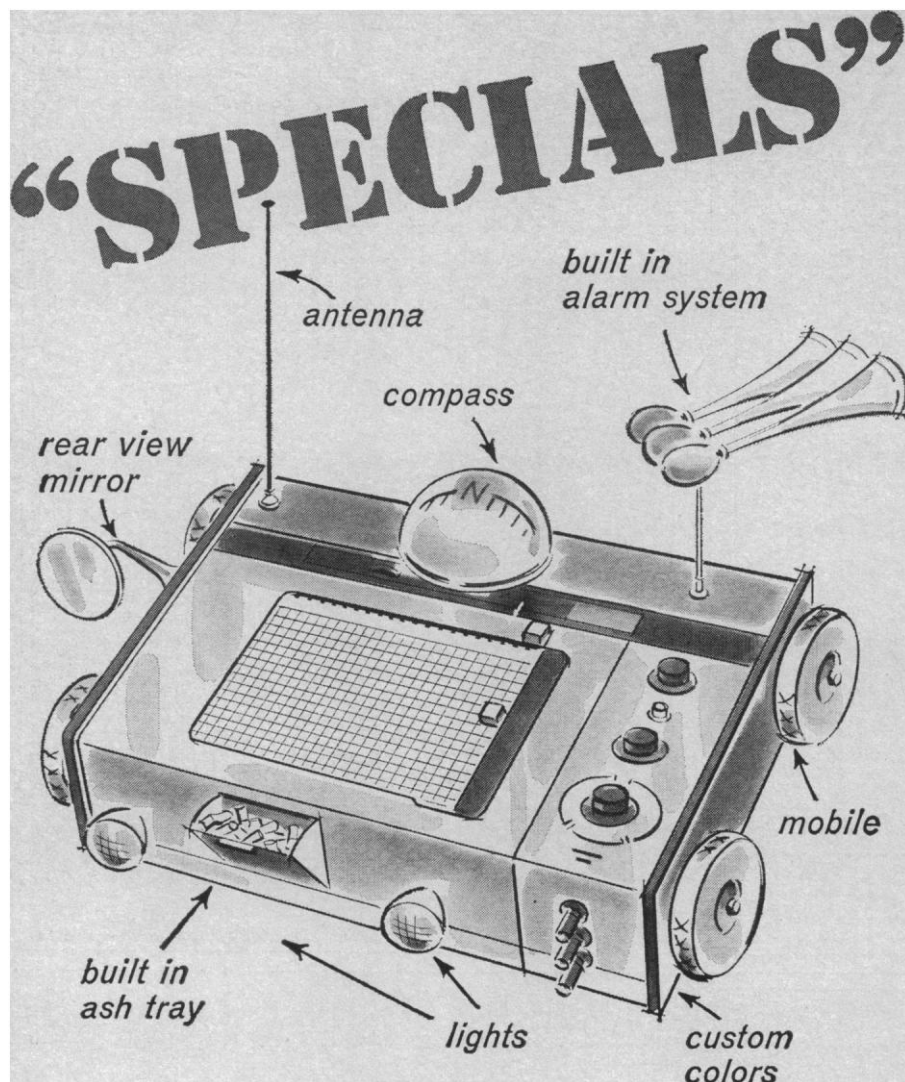
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are therefore vital to obtaining significant calculations. It was evident at the meeting that a considerable amount of effort has gone into the collection and organization of good nuclear data. More than a dozen systems have been developed to process evaluated nuclear data. Perhaps the most advanced nuclear data system, the Evaluated Nuclear Data File, is being worked on at the Sigma Center at Brookhaven National Laboratory. Most nuclear data will be primarily available through inquiry to some computer system.

The time behavior of reactors is receiving increased emphasis. W. K. Ergen (ORNL) pointed out a number of mathematical problems in nuclear safety analysis which would require additional computations. However, because large reactors can lead to spatial instability in the flux, it is becoming necessary to consider spatial kinetics problems. Judging by papers presented from the United Kingdom and France it appears that this is an area of reactor computation in which the United States does not lead.

Depletion codes continue to be based on a series of steady-state diffusion codes. The new interest appears to be centered about allowing the user to specify the depletion chains of interest to him. Depletion or burn-up codes are tending to become systems or linked calculations and, for example, the KARE and NOVA systems, allow depletion calculations to be selected.

The usual competition was present between advocates of probabilistic methods (Monte Carlo) and deterministic methods. On the deterministic side, some results were shown for supposedly complex problems for the transport equation which gave good comparative results with Monte Carlo codes. The deterministic methods used only a fraction of the machine time required by the Monte Carlo codes. Two papers dealing with Monte Carlo codes, however, indicated that, by astute techniques, it was possible to reduce the computer time and still get satisfactory results. L. H. Underhill (United Kingdom) commented that a Monte Carlo program had the advantage of eliminating unnecessary human thinking and allowed the computer to do the real brute-force work. After comparing some deterministic and probabilistic results, the comment was attributed to Bengt Carlson that his faith was restored in the Monte Carlo method because it agreed so well with the deterministic methods.

This conference was very valuable to those present and will also be valuable to those who will receive the conference proceedings. Two of the "facetious" remarks made by J. J. Syrett (United Kingdom) point out the concern of man and computers. He commented, in reference to the new faster and bigger computers that are appearing, that "a sort of Parkinson's Law applies to computing in that the computing requirements always expand to fill the machine available." His second comment was that "the really important question was not the cost per operation on the computer but the cost per useful piece of output that one gets off the computer."

The meeting was jointly sponsored by Argonne National Laboratory, European Nuclear Energy Agency, and the Mathematics and Computations Division of the American Nuclear Society.

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#### Forthcoming Events

##### September

19-22. **Power**, natl. conf., Albany, N.Y. (Inst. of Electrical and Electronics Engineers, Box A, Lenox Hill Station, New York 10021)

19-25. **World Medical Assoc.**, 19th general assembly, London, England. (H. S. Gear, 10 Columbus Circle, New York 10019)

20. **Organic Solid State**, 3rd annual symp., Franklin Inst., Philadelphia, Pa. (M. M. Labes, Franklin Inst. Research Laboratories, Philadelphia 19103)

20. **Photo-Electronic Image Devices** as Aids to Scientific Observation, symp., London, England. (G. V. McGee, Dept. of Physics, Imperial College of Science and Technology, South Kensington, London S.W.7)

20-22. **Glacier Mapping**, symp., Ottawa, Ont., Canada. (Intern. Assoc. of Scientific Hydrology, 61 rue des Ronces, Gentbrugge, Belgium)

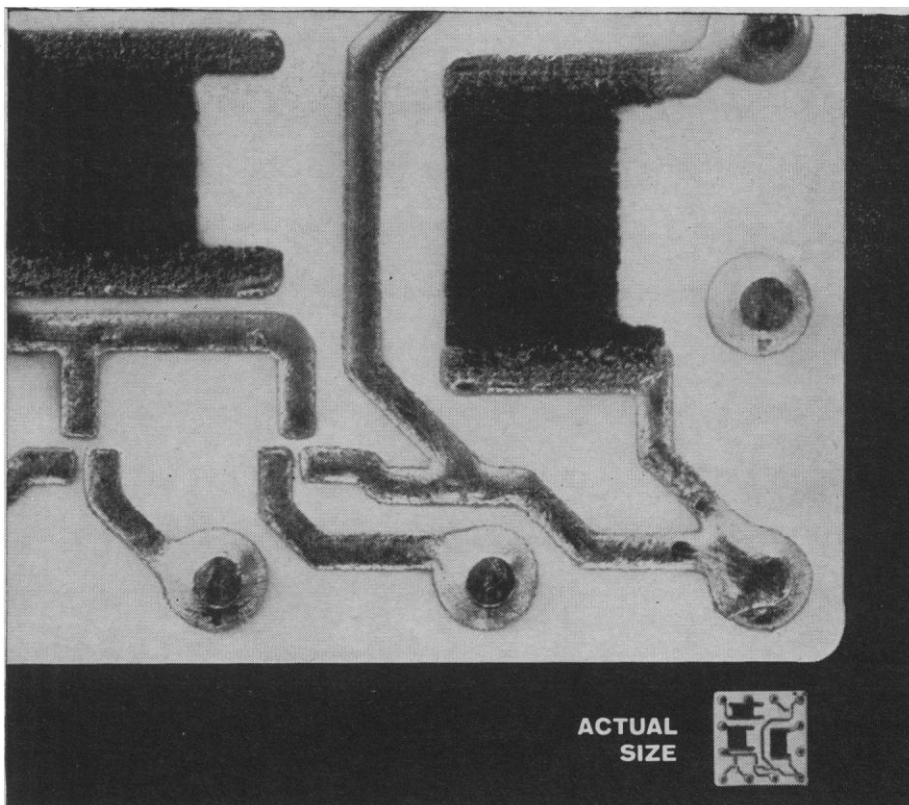
20-24. **Biochemistry**, 8th Latin meeting, Lisbon, Portugal. (S. F. Gomes da Costa, Laboratorio de Quimica Fisiologica, Faculdade de Medicina, Hospital de Santa Maria, Lisbon)

20-24. **Burn Research**, intern. congr., Edinburgh, Scotland. (A. Sutherland, Royal Hospital for Sick Children, Sciennes Rd., Edinburgh 9)

20-24. **Fundamental Research**, 3rd intern. symp., Cambridge, England. (H. W. Emerton, Reed Paper Group Ltd., Research and Development Centre, Aylesford, Maidstone, Kent, England)

20-24. **International Council of Societies of Industrial Design**, 4th general assembly and congr., Vienna, Austria. (Mrs. D. des

10 SEPTEMBER 1965



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20-24. **Thermionic Electrical Power Generation**, intern. conf., London, England. (Inst. of Electrical Engineers, Savoy Pl., London W.C.2)

20-27. **Comparative and Cellular Pathology of Epilepsy**, symp., Liblice, Czechoslovakia. (F. Hrabal, Foreign Relations Dept., Czechoslovak Academy of Sciences, Narodni tr. 3, Prague 1)

21-23. **Chemurgic** conf., Columbus, Ohio. (J. Ticknor, Chemurgic Council, 350 Fifth Ave., New York, N.Y.)

21-23. **Fiber Soc.**, 25th mtg., Boston, Mass. (Box 625, Princeton, N.J.)

21-23. **Magnetism**, European conf., Vienna, Austria. (Verein Deutscher Eisenhüttenleute, Breit Str. 27, Düsseldorf, Germany)

21-23. **Plasma Electromagnetics of Hypersonic Flight**, 3rd symp., Boston and Bedford, Mass. (A. Cahill, Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Bedford, Mass. 01731)

21-23. **Touch, Heat, and Pain**, CIBA symp., London, England. (CIBA, 41 Portland Pl., London W.1)

21-25. **Propagation Factors in Space Communications**, symp., Rome, Italy. (Lt. Col. E. F. Dukes, Advisory Group for Aeronautical Research and Development, 64 rue de Varenne, Paris 7, France)

22-24. **Practice of Gas Chromatography**, 4th annual mtg., St. Louis, Mo. (N. Brenner, Perkin-Elmer Corp., Main Ave., Norwalk, Conn.)

22-24. **Canadian High Polymer Forum**, 13th, Ottawa, Ont. (D. M. Wiles, Div. of Applied Chemistry, National Research Council, Ottawa)

22-24. **Military Electronics**, conf. (MIL-E-CON 9), Washington, D.C. (L. H. King, Atlantic Research Corp., Shirley Hwy. at Edsall Rd., Alexandria, Va.)

22-24. **American Soc. of Photogrammetry**, 30th semiannual conv., Wright-Patterson AFB, Ohio. (A. J. Cannon, Research and Technology Div., Wright-Patterson AFB)

22-25. **Committee of European Agronomists**, symp., Milan, Italy. (G. Mathys, Stations Federales d'Essais Agricoles, Lausanne, Switzerland)

22-25. **Amblyopia Exanopsia**, intern. symp., Liège, Belgium. (R. Weekers, Clinique Ophtalmologique, Université de Liège, 66 blvd. de la Constitution, Liège)

22-25. **British Assoc. for Cancer Research**, annual, Dublin, Ireland. (J. G. Bennerre, Courtauld Inst., Middlesex Hospital, London W.1, England)

22-26. **Paläontologische Gesellschaft**, mtg., Zurich, Switzerland. (E. Kuhn-Schwyder, Paläontologisches Institut d. Univ. Zurich, Künstlergasse 16, 8006, Zurich)

22-28. **Radiology**, 11th intern. congr., Rome, Italy. (Secretariat, Via Reno 21, Rome)

23-25. **French Medical Congr.**, Paris, France. (M. Bricaire, 40 rue Scheffer, Paris 16)

23-25. **Society of the Plastics Industry**,

New England sect., 21st annual, Groton, Conn. (The Society, 250 Park Ave., New York 10017)

23-26. **Mycology**, tripartite conf., Germany, Austria, Switzerland; Klagenfurt, Austria. (Austrian Mycology Soc., Postfach 200, Vienna 1)

23-28. **Electronics and Vacuum Physics**, 3rd Czechoslovak conf., Prague, Czechoslovakia. (Organizing Committee, Ke Karlovu 5, Dept. of Electronics and Vacuum Physics, Prague 2)

24-25. **Communications**, 13th conf., Cedar Rapids, Iowa. (Inst. of Electrical and Electronics Engineers, Box A, Lenox Hill Station, New York 21)

25-30. **International Soc. of Nephrology**, 3rd intern. congr., Washington, D.C. (Secretariat, 9650 Wisconsin Ave., Washington, D.C. 20014)

26-29. **American Inst. of Chemical Engineers**, 57th natl., Minneapolis, Minn. (AICHE, 345 E. 47 St., New York 10017)

27. **Society for Pediatric Radiology**, Washington, D.C. (J. L. Gwinn, Children's Hospital, 4614 Sunset Blvd., Los Angeles, Calif.)

27-29. **Chemistry of the Solvent Extraction of Metals**, intern. conf., Atomic Energy Research Establishment, Harwell, England. (F. K. Pyne, B. 329, Harwell)

27-1. **Community Oral Health**, hemispheric conf., San Juan, P.R. (N. O. Harris, School of Dentistry, Univ. of Puerto Rico, San Juan 00905)

27-1. **Urology**, French congr., Paris, France. (J. Michon, French Assoc. of

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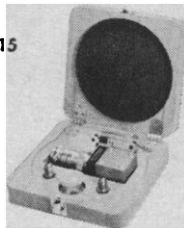
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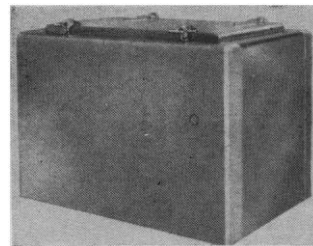
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N-DNP-Glycine  
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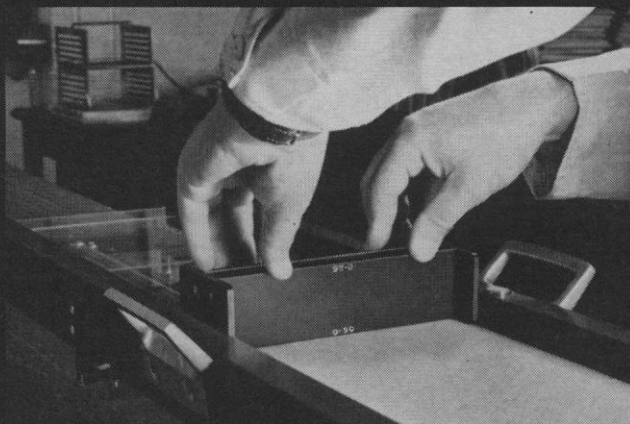
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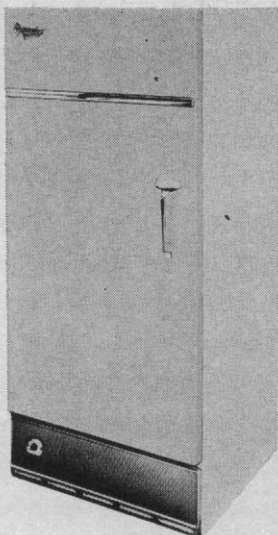
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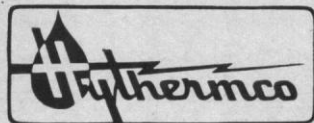
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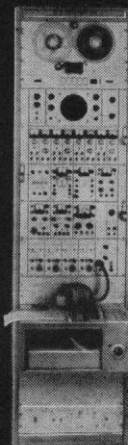
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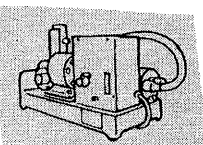
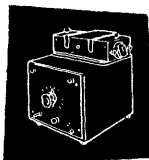
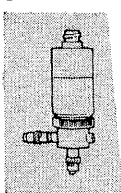
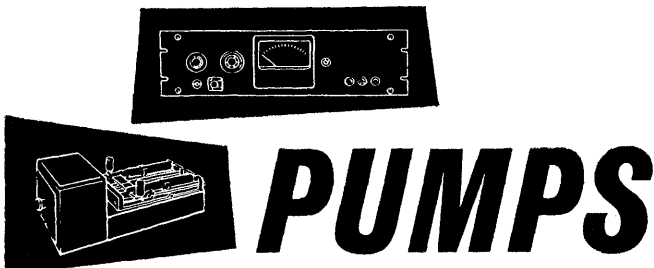
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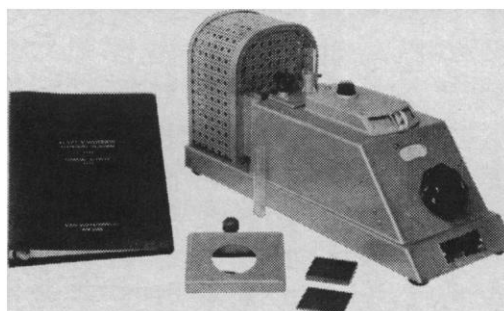
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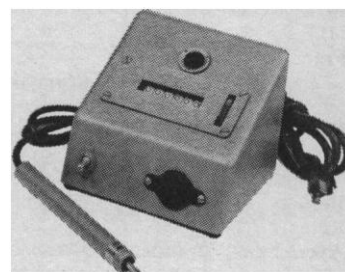


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28. Society of Austrian **Chemists**, general assembly, Graz, Austria. (The Society, Eschenbachgasse 9, Vienna 1)

28-29. **Electric Heating**, 7th biennial conf., Cleveland, Ohio. (A. F. Leatherman, Battelle Memorial Inst., 505 King Ave., Columbus, Ohio 43201)

28-30. German Soc. for **Documentation**, 17th annual, Constance, Germany. (The Society, Schubertstr. 1, Frankfurt am Main, Germany)

28-30. Physics and **Nondestructive Testing**, symp., Dayton, Ohio. (D. W. J. McGonagle, IIT Research Inst., 10 W. 35 St., Chicago, Ill. 60616)

28-30. Industrial and Commercial **Power Systems**, conf., Buffalo, N.Y. (J. A. Hart, Allison Div., General Motors Corp., Box 894, Indianapolis 6, Ind.)

28-1. **Experimental Mechanics**, 2nd intern. congr., Washington, D.C. (J. L. Jones, Soc. for Experimental Stress Analysis, 21 Bridge Sq., Westport, Conn. 06880)

28-1. Society for **Experimental Stress Analysis**, Washington, D.C. (B. E. Rossi, 21 Bridge Sq., Westport, Conn.)

28-1. **Inhaled Particles and Vapors**, Cambridge, England. (J. S. McLintock, Medical Service, Natl. Coal Board, Hobart House, Grosvenor Pl., London S.W.1)

28-1. **Medical Electronics**, European symp., Brighton, England. (J. Pearce, 4 Mill St., London W.1)

28-2. **Hyperpure Materials** in Science and Technology, Inst. for Applied Physics of Hyperpure Materials, Dresden, Germany. (The Institute, Dresden A 20, Winterbergstr. 28, East Germany)

29-1. German Soc. for **Aviation and Space Medicine**, intern. congr., Munich, Germany. (H. von Diringshofen, German Soc. for Aviation and Space Medicine, Silcherstr. 6, Munich 13)

29-1. **Analytical Chemistry**, symp., Graz, Austria. (Prof. Gutmann, Austrian Assoc. for Microchemistry and Analytical Chemistry, Eschenbachgasse 9, Vienna 1)

29-1. European **Atomic Forum**, 2nd congr., Frankfurt am Main, Germany. (European Atomic Energy Forum, 26, rue de Clichy, Paris 9)

29-1. American **Vacuum Soc.**, 12th annual symp., New York, N.Y. (R. L. Jepsen, Varian Associates, 611 Hansen Way, Palo Alto, Calif.)

## October

1-3. French-Language Assoc. of **Scientific Psychology**, 10th study sessions, Marseilles, France. (P. Fraisse, The Association, Inst. de Psychologie, 28, rue Serpente, Paris 6°)

1-11. International **Scientific Film Assoc.**, 19th annual congr., Bucharest, Rumania. (ISFA, 38, avenue des Termes, Paris 17°, France)

2. Association of **Clinical Biochemists**, annual, London, England. (D. W. Moss, Postgraduate Medical School, Ducane Rd., London, W.12)

3-5. **Refractory Metals**, 4th symp., French Lick, Ind. (J. Maltz, Materials Research Div., NASA, 600 Independence Ave., SW, Washington, D.C. 20546)

3-7. American **Phytopathological Soc.**, Miami Beach, Fla. (J. R. Shay, Dept. of Botany and Plant Pathology, Purdue Univ., Lafayette, Ind.)

3-8. **Clinical Pathology**, 6th intern. congr., Rome, Italy. (B. L. Della Vida, Via de'Penitenzieri 13, Rome)

3-9. **Water Desalination**, 1st intern. symp., Washington, D.C. (Atomic Industrial Forum, 850 Third Ave., New York 10022)

4-5. **Enzyme Regulation**, 4th intern. symp., Indiana Univ., Indianapolis. (G. Weber, Indiana Univ. School of Medicine, Indianapolis 46207)

4-5. **Physical Metallurgy of Refractory Metals**, conf., American Inst. of Mining, Metallurgical, and Petroleum Engineers, French Lick, Ind. (AIME, 345 E. 47 St., New York 10017)

4-6. **Electronics**, Canadian conf., Toronto, Ont. (W. M. Lower, 1819 Yonge St., Toronto)

4-6. **Industrial Organic Analysis**, Analytical Chemistry Div., Chemical Inst. of Canada, Sarnia, Ont. (R. M. Small, Research Dept., Polymer Corp, Sarnia)

4-6. International **Scientific Radio Union/Inst. of Electrical and Electronics Engineers**, fall meeting, Dartmouth College, Hanover, N.H. (IEEE, Box A, Lenox Hill Station, New York, N.Y.)

4-7. **Instrument-Automation Conf.**, Los Angeles, Calif. (E. M. Grabbe, Instrument Soc. of America, 530 William Penn Pl., Pittsburgh, Pa. 15219)

4-7. **Otorhinolaryngology**, 62nd French congr., Paris, France. (H. Guillon, 6, avenue Mac-Mahon, Paris 16°)

4-7. **Research Equipment**, exhibit and instrument symp., 15th annual, Bethesda, Md. (J. B. Davis, Natl. Institutes of Health, Bethesda, Md. 20014)

4-7. International Committee for **Social Sciences Documentation**, annual plenary assembly, Budapest, Hungary. (J. Meyriat, 27, rue St. Guillaume, Paris 7)

4-8. **Aeronautic and Space Engineering**, Soc. of Automotive Engineers, Los Angeles, Calif. (C. C. King, SAE Western Branch, 999 North Sepulveda Blvd., El Segundo, Calif. 90245)

4-8. Ciba Foundation **Clinical Research** Guest Conf., London, England. (Ciba, 41 Portland Pl., London W.1)

4-10. **Physicists**, conf., Frankfurt am Main, Germany. (G. Schubert, Inst. für Theoretische Physik, Universität, Mainz, Germany)

4-13. International Council for the **Exploration of the Sea**, 53rd annual meeting, Rome, Italy. (The Council, Charlottenlund Slot, Charlottenlund, Denmark)

4-13. **Commonwealth Medical Conf.**, Edinburgh, Scotland. (Mrs. J. Hotchkiss, Ministry of Overseas Development, Stag Place, London, S.W.1, England)

5-7. Industrial and Commercial **Power Systems**, conf., Buffalo, N.Y. (T. O. Zittel, Bethlehem Steel Co., 3555 Lake Shore Rd., Buffalo 14219)

5-8. International Committee of **Weights and Measures**, session, Sèvres, France. (Intern. Bureau of Weights and Measures, Pavillon de Breteuil, Sèvres, Sein-et-Oise, France)

5-9. **Infectious Pathology**, 4th intern. congr., Freiburg im Breisgau, Germany. (G. Mossner, Hugertstr. 55, Freiburg im Breisgau)

5-9. **Tuberculosis**, 18th intern. conf., Munich, Germany. (Intern. Union Against Tuberculosis, 15, rue Pomereu, Paris 16°, France)

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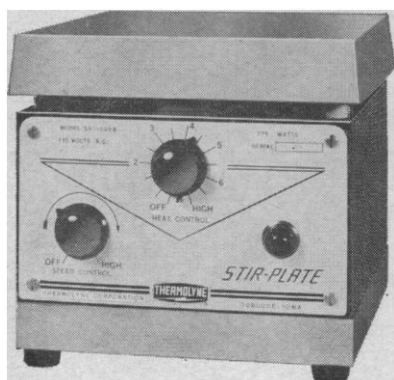
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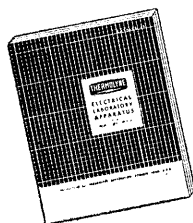
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6-8. **Dynamics of Fluids and Plasmas**, symp., Univ. of Maryland, College Park. (S. I. Pai, Inst. for Fluid Dynamics and Applied Mathematics, Univ. of Maryland, College Park 20742)

6-8. **Optical Soc. of America**, annual meeting, Philadelphia, Pa. (M. E. Warga, OSA, 1155 16th St., NW, Washington, D.C. 20036)

6-8. **Royal Inst. of Public Health and Hygiene**, annual conf., Weymouth, England. (Secretary, RIPHH, 28 Portland Place, London, W.1, England)

6-10. **Wood and Organisms**, intern. symp., Berlin, Germany. (German Soc. for Wood Research, Danneckerstr. 37, Stuttgart S, Germany)

7-9. **Seismological Soc. of America**, eastern sec. 37th annual, Lamont Geological Observatory, Palisades, N.Y. (J. Dorman, Lamont Geological Observatory, Palisades 10964)

8-9. **Atlantic Coastal Plain Geological Assoc.**, field trip, South Carolina. (D. J. Colquhoun, Dept. of Geology, Univ. of South Carolina, Columbia)

8-9. **Association of Midwestern College Biology Teachers**, 9th annual conf., Northern Illinois Univ., DeKalb

8-9. **Indiana Acad. of Science**, fall meeting, Notre Dame. (C. F. Dineen, St. Mary's College, Notre Dame)

9. **Paleontological Research Inst.**, Ithaca, N.Y. (K. V. W. Palmer, Paleontological Research Inst., 109 Dearborn Pl., Ithaca)

9-10. **Gastroenterology**, French conf., Paris, France. (R. Biguie, 79, Boulevard Malesherbes, Paris 8<sup>e</sup>)

9-13. **American Soc. of Clinical Hypnosis**, Chicago, Ill. (F. D. Nowlin, ASCH, 800 Washington Ave., SE, Minneapolis, Minn. 55414)

9-17. **Electrical, Electronics, and Mechanical Engineering**, first Pan American congr., Mexico, D.F. (Inst. of Electrical and Electronics Engineers, Box A, Lenox Hill Station, New York 10021)

10-14. **Water Pollution Control Fed.**, 38th annual, Atlantic City, N.J. (R. E. Fuhrman, 4435 Wisconsin Ave., NW, Washington, D.C. 20016)

10-15. **International Federation for Documentation**, congr., Washington, D.C. (Secretariat, FID, 9650 Wisconsin Ave., Washington 20014)

10-15. **Electrochemical Soc.**, meeting, Buffalo, N.Y. (Executive Secretary, ES, 30 E. 42 St., New York 10017)

10-15. **Endocrinology**, 6th Pan American conf., Mexico, D.F. (G. Gual, Inst. Nacional de la Nutrición, Dr. Jimenez No. 261, Mexico 7)

10-16. **American Documentation Inst.**, Washington, D.C. (J. E. Bryan, 2000 P St., NW, Washington, D.C. 20036)

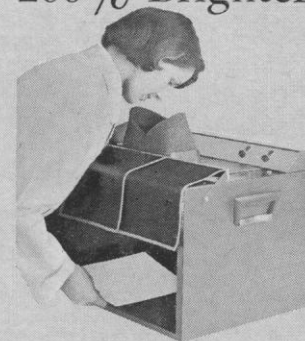
10-17. **Bronchoesophagology**, 1st Latin American congr., Rio de Janeiro, Brazil. (F. Aprigliano, Rua Alcindo Guanabara, 24, Sob-Loja 206, Rio de Janeiro)

10-17. **Otorhinolaryngology**, 14th Brazilian congr., Rio de Janeiro, Brazil. (W. Benevides, Rua Alcindo Guanabara, 24, Sob-Loja 206, Rio de Janeiro)

10-17. **Plastic Surgery**, 10th Latin American congr., Buenos Aires, Argentina. (J. Norberto Spera, Riglos 624, Buenos Aires)

11-13. **Color Centers in Alkali Halides**,

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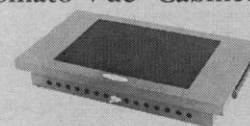
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symp., Univ. of Illinois, Urbana. (D. W. Compton, Dept. of Physics, Univ. of Illinois, Urbana)

11-13. **Communications**, 11th natl. symp., Utica, N.Y. (G. E. Brunette, Communications Div. (EMCT) Rome Air Development Center, Griffiss AFB, New York 13442)

11-13. **Metabolic Roles of Lipids**, symp., Cincinnati, Ohio. (C. H. Hauber, American Oil Chemists' Soc., 35 East Wacker Dr., Chicago 1, Ill.)

11-13. **Manned Spaceflight**, 4th meeting, St. Louis, Mo. (J. F. Yardley, McDonnell Aircraft Corp., P.O. Box 516, St. Louis)

11-13. **National Acad. of Sciences**, fall meeting, Univ. of Washington, Seattle. (H. Neurath, Dept. of Biochemistry, Univ. of Washington, Seattle 98105)

11-13. **American Record Management Assoc.**, 10th annual conf., Minneapolis, Minn. (L. Loveless, Office Services, Honeywell, Inc., 2701 Fourth Ave., S, Minneapolis 55408)

11-14. **Association of Official Agricultural Chemists**, 79th annual, Washington, D.C. (L. G. Enslinger, AOAC, Box 540, Benjamin Franklin Station, Washington 20044)

11-14. **American Oil Chemists' Soc.**, fall meeting, Cincinnati, Ohio. (AOCS, 35 E. Wacker Dr., Chicago, Ill. 60600)

11-15. **Fall Metallurgy Days**, Paris, France. (Soc. Française de Metallurgie, 25 rue de Clichy, Paris 9<sup>e</sup>)

11-16. **Stomatology**, 19th French congr., Paris. (R. Cayron, 99, rue de Courcelles, Paris 17<sup>e</sup>)

11-23. **International Organization for Standardization**, Milan, Italy. (Soc. of Motion Picture and Television Engineers, 9 E. 41 St., New York 10017)

12-13. **Cardio-Renal Consequences of Sustained Hypertension**, seminar, Philadelphia, Pa. (Miss S. Rosen, Symposium Office, Hahnemann Medical College and Hospital, 230 N. Broad St., Philadelphia 19102)

12-14. **Analytical Chemistry in Nuclear Technology**, 9th conf., Gatlinburg, Tenn. (C. D. Susano, Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn. 37831)

12-16. **Communications**, 13th intern. congr., Genoa, Italy. (Inst. for Intern. Communications, Viale Brigate Partigiane, 18, Genoa)

13. **Medical Physics**, seminar, New York, N.Y. (American Inst. of Physics, 335 E. 45 St., New York 10017)

13. **Animal Nutrition Research Council**, 26th annual, Washington, D.C. (J. C. Fritz, 12314 Madeley Lane, Bowie, Md. 20715)

13-15. **Detonation**, 4th symp., White Oak, Silver Spring, Md. (S. J. Jacobs, U.S. Naval Ordnance Laboratory, White Oak, Silver Spring 20910)

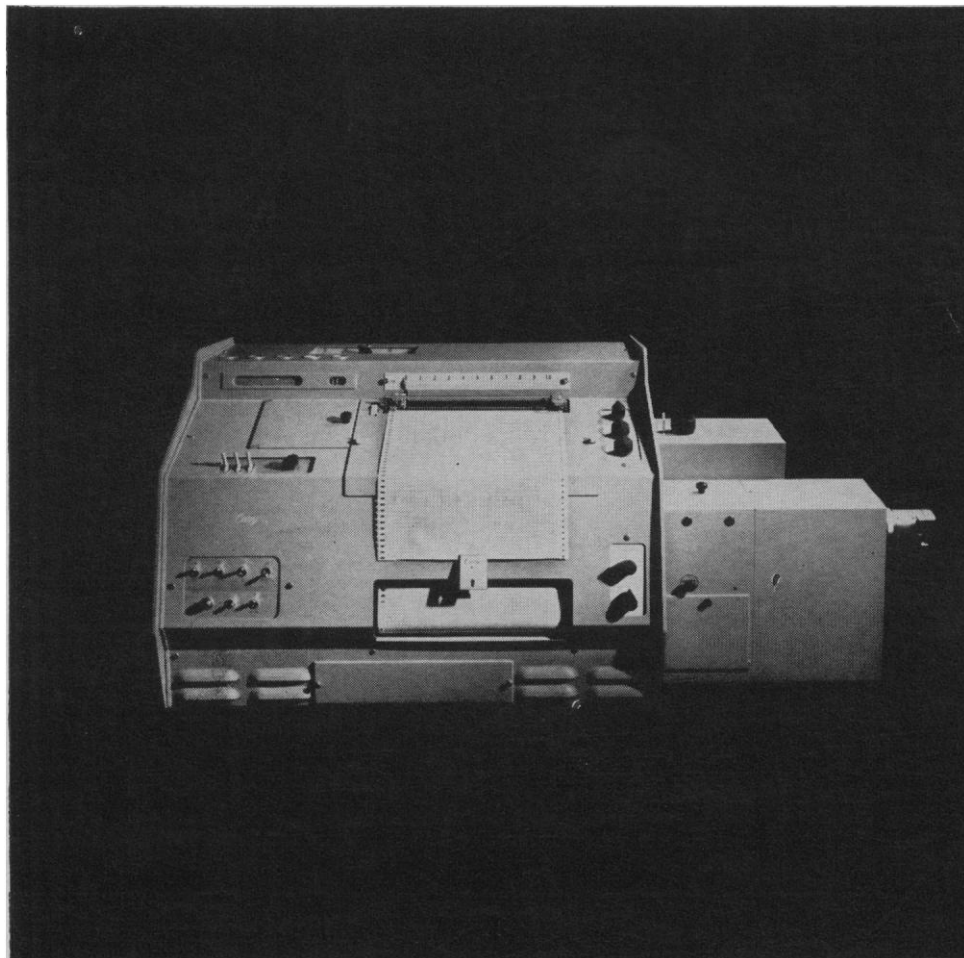
13-15. **American Assoc. of Petroleum Geologists**, mid-continent regional meeting, Tulsa, Okla. (E. W. Ellsworth, AAPG, Box 979, Tulsa 74101)

13-16. **Tau Beta Pi Assoc., Inc.**, Univ. of Maryland, College Park. (R. H. Nagel, 508 Dougherty Engineering Bldg., Univ. of Tennessee, Knoxville)

13-17. **Soil Biology**, first Latin American colloquium, Bahia Blanca, Argentina.

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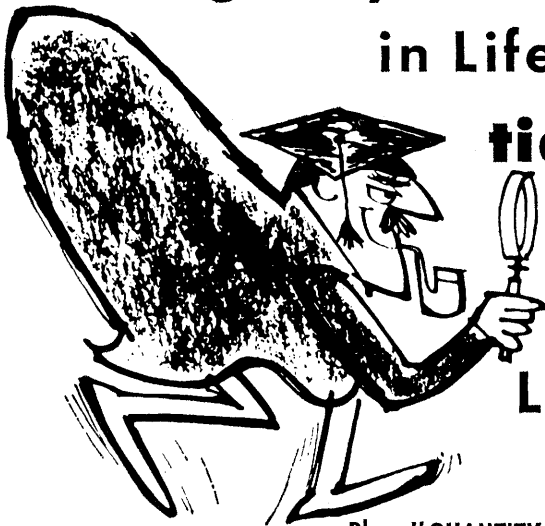
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13-19. **Instrumentation and Automation**, 3rd intern. congr., Düsseldorf, Germany. (Nordwestdeutsche Ausstellungs- und-Messe-Gesellschaft, Ehrenhof 4, 4000 Düsseldorf 10)

14. Association of **Vitamin Chemists**, Chicago, Ill. (D. Olson, Dawe's Laboratories, 4800 S. Richmond St., Chicago)

14-15. International Federation of **Surgical Colleges**, 8th annual, Philadelphia, Pa.; 17, Atlantic City, N.J. (K. Cassels, Royal College of Surgeons, Lincoln's Inn Fields, London W.C.2, England)

14-16. British **Orthopaedic Assoc.**, fall meeting, London, England. (Joint Secretariat, 47 Lincoln's Inn Fields, London, W.C.2)

15. **Southern California Acad. of Science**, Los Angeles. (C. Rozaire, Los Angeles County Museum, 900 Exposition Blvd., Los Angeles 90007)

15-16. Contributions of Cytogenetics to the **Determination of Phylogenies**, 12th symp., Missouri Botanical Garden, St. Louis. (H. C. Cutler, Missouri Botanical Garden, St. Louis 63110)

15-16. National Soc. of **Professional Engineers**, 3rd annual conf., Oklahoma City, Okla. (NSPE, 2029 K St., NW, Washington 20006)

15-17. American **Heart Assoc.**, Scientific sessions, Bal Harbour, Fla. (AHA, 44 E. 23 St., New York 10010)

16-17. **Infectious Diseases Soc. of America**, Washington, D.C. (E. H. Kass, IDS, Boston City Hospital, Boston, Mass. 02118)

17-21. **Antimicrobial Agents and Chemotherapy**, 5th interscience conf./4th intern. congr. of chemotherapy, Washington, D.C. (R. W. Sarber, American Soc. for Microbiology, 115 Huron View Blvd., Ann Arbor, Mich.)

17-21. **Metallurgical Soc. of American Inst. of Mining, Metallurgical, and Petroleum Engineers**, Detroit, Mich. (AIME, 345 E. 47 St., New York 10017)

18. **Industrial Pharmacy** sect., American Pharmaceutical Assoc., 4th annual mid-west regional meeting, Chicago, Ill. (C. Schroeter, Abbott Laboratories, North Chicago, Ill.)

18-19. American Inst. of **Aeronautics and Astronautics/Canadian Aeronautics and Space Inst.**, Toronto, Ont., Canada. (D. L. Raymond, 1290 Sixth Ave., New York 10019)

18-19. **Systems Science**, conf., Case Inst. of Technology, Cleveland, Ohio. (Inst. of Electrical and Electronics Engineers, Box A, Lenox Hill Station, New York 10021)

18-20. **Dynamic Stability of Structures**, intern. conf., Evanston, Ill. (G. Herrmann, Technological Inst., Northwestern Univ., Evanston 60201)

18-20. **Electromagnetic Radiation in Agriculture**, intern. conf., Roanoke, Va. (D. P. Brown, Niagara Mohawk Power Corp., 300 Erie Blvd. W., Syracuse, N.Y. 13202)

18-20. American Soc. of **Lubrication Engineers**, San Francisco, Calif. (D. B. Sanberg, 5 North Wabash Ave., Chicago, Ill.)

18-20. Canadian Inst. of **Mining and**

**Metallurgy**, annual western meeting, Winnipeg, Canada. (CIMM, 906 Drummond Bldg., 1117 St. Catherine St. W., Montreal 2, P.Q., Canada)

18-20. **Nuclear Science**, 12th symp., San Francisco, Calif. (Inst. of Electrical and Electronics Engineers, Box A, Lenox Hill Station, New York 10021)

18-20. **Applied Spectroscopy**, 12th symp., Ottawa, Ont., Canada. (R. V. Baker, Aluminum Co. of Canada, Arvida, P.Q., Canada)

18-21. **Advances in Gas Chromatography**, 3rd intern. symp., Houston, Tex. (A. Zlatkis, Dept. of Chemistry, Univ. of Houston, Houston)

18-21. **Management Information and Data Transfer Systems**, American Univ., Washington, D.C. (R. I. Cole, Center for Technology and Administration, American Univ., 2000 G St., NW, Washington, D.C. 20006)

18-22. **American Soc. of Civil Engineers**, Kansas City, Mo. (W. H. Wisely, ASCE, 345 E. 47 St., New York 10017)

18-22. **Society for Nondestructive Testing**, 25th natl. conv., Detroit, Mich. (N. H. Cale, Anaconda American Brass Co., Research and Technical Center, P.O. Box 747, Waterbury, Conn.)

18-22. **American Public Health Assoc.**, 93rd annual, Chicago, Ill. (APHA, 1790 Broadway, New York, N.Y.)

18-22. **Radioisotope Instruments in Industry and Geophysics**, Warsaw, Poland. (J. H. Kane, Div. of Special Projects, U.S. Atomic Energy Commission, Washington, D.C.)

18-22. **American Soc. for Metals**, natl. congr., Detroit, Mich. (A. R. Putnam, ASM, Metals Park, Ohio)

18-22. **Application of Radioisotopes in Gastroenterology**, symp., Lausanne, Switzerland. (A. Vannotti, Clinique Médicale Universitaire, Hôpital Cantonal, Lausanne)

18-22. **American College of Surgeons**, annual clinical congr., Atlantic City, N.J. (American College of Surgeons, 55 East Erie St., Chicago, Ill. 60611)

19-20. **International Rhinologic Soc.**, 1st congr., Kyoto, Japan. (H. A. E. van Dishoeck, Academisch Ziekenhuis, Leiden, Netherlands)

19-21. **Association of Analytical Chemists**, 13th conf., Detroit, Mich. (G. Schenk, Dept. of Chemistry, Wayne State Univ., Detroit 48202)

19-21. **Cloud Physics and Severe Storms**, conf., American Meteorological Soc., Reno, Nev. (K. C. Spengler, 45 Beacon St., Boston 8, Mass.)

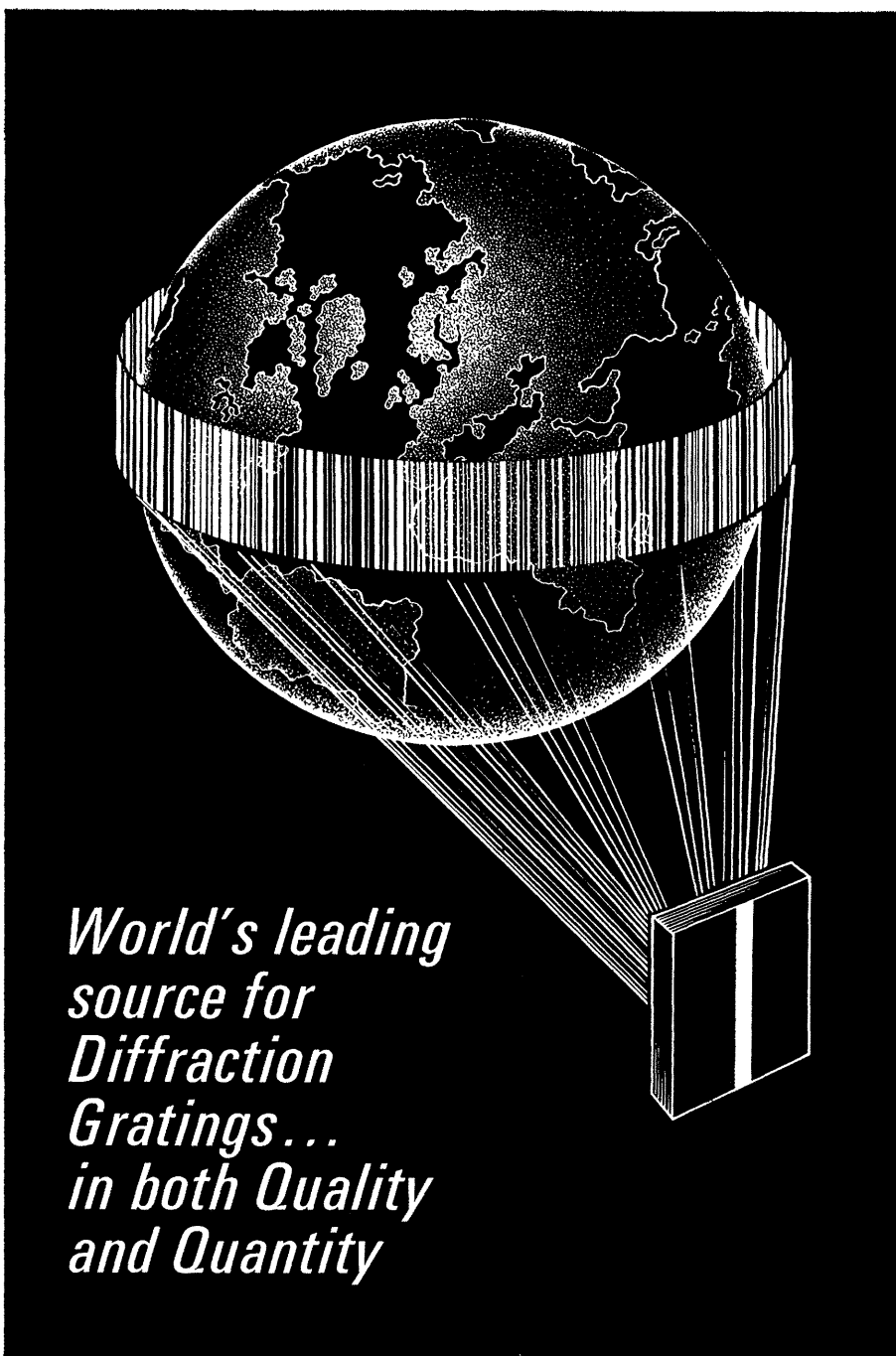
19-21. **Radio Astronomical and Satellite Studies of the Atmosphere**, 2nd symp., Boston, Mass. (G. A. Cushman, Wentworth Inst., 550 Huntington Ave., Boston)

19-22. **Economics of Automatic Data Processing**, symp., Rome, Italy. (Intern. Computation Center, Viale della Civiltà del Lavoro, 23, P.O.B. 10053, Rome)

20-21. **Airborne Infection**, 2nd intern. symp., Johns Hopkins School of Medicine, Baltimore, Md. (E. K. Wolfe, Fort Detrick, Frederick, Md. 21701)

20-21. **International Soc. of Audiology**, 2nd congr., Kyoto, Japan. (M. Goto, Dept. of Otolaryngology, Kyoto Univ., Shogoin, Sakyo-ku, Kyoto)

20-22. **Circuit and System Theory**, Alerton Conf., Univ. of Illinois, Monticello. (M. E. Van Valkenburg, Dept. of Elec-



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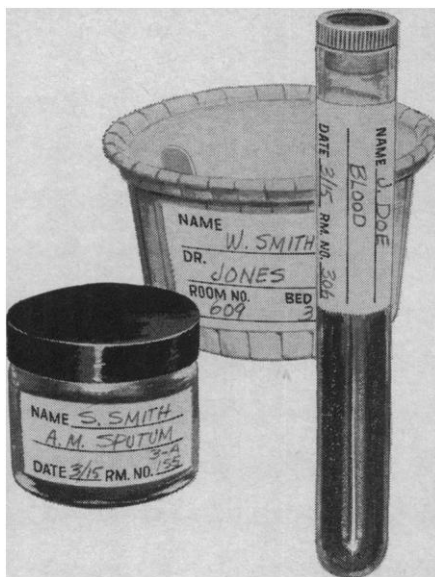
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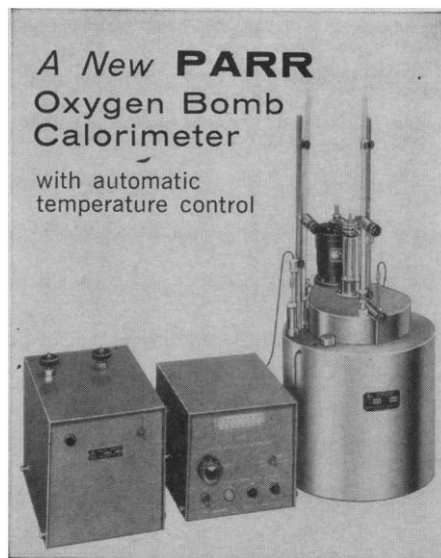
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20-22. **Parenteral Drug Assoc.**, annual conv., New York, N.Y. (PDA, Western Saving Fund Bldg., Broad and Chestnut St., Philadelphia, Pa. 19107)

21. **New Mexico Acad. of Science**, Albuquerque. (K. S. Bergstresser, 739 42nd St., Los Alamos, N.M.)

21-22. **Copolymer conf.**, Ludwigshafen, Germany. (Deutsche Bunsen-Gesellschaft für Physikalische Chemie, Varrentrappstr. 40-42, 6 Frankfurt am Main, Germany)

21-22. **Electrochemical Current Sources**, symp., Frankfurt am Main, Germany. (Gesellschaft Deutscher Chemiker, Postfach 9075, 6 Frankfurt am Main)

21-23. **Microminiaturization in Automatic Control**, symp., Munich, Germany. (G. Müller, Siemens & Halske AG, Wernerwerk für Messtechnik, Postfach 834, Karlsruhe, Germany)

21-23. **Society of Photographic Scientists and Engineers**, symp., Washington, D.C. (W. S. Dempsey, Houston Fearless Corp., 1413 K St., NW, Washington 20005)

22-23. **Data Processing in Public Libraries**, conf., Drexel Inst. of Technology, Philadelphia, Pa. (M. D. Warrington, Graduate School of Library Science, Drexel Inst. of Technology, Philadelphia 19104)

23-28. **American Acad. of Pediatrics**, annual, Chicago, Ill. (R. G. Frazier, AAP, 1801 Hinman Ave., Evanston, Ill. 60204)

24-27. **Society of American Foresters**, annual, Detroit, Mich. (Society of American Foresters, 1010 16th St., NW, Washington 20036)

24-29. **Stable Isotopes**, 4th symp., Leipzig, East Germany. (Inst. für Stabile Isotope, Deutsche Akademie der Wissenschaften, Permoserstr. 15, 705 Leipzig)

24-30. **American College of Gastroenterology**, Bal Harbour, Fla. (D. Weiss, 33 W. 60 St., New York 10023)

25-27. **Chemical Engineering**, 15th conf., Quebec, Que., Canada. (Chemical Inst. of Canada, 48 Rideau St., Ottawa 2, Ont.)

25-27. **Functional Organization of the Compound Eye**, symp., Karolinska Inst., Stockholm, Sweden. (W. E. Savely, Air Force Office of Scientific Research, Washington, D.C. 20333)

25-27. **Electrical Insulation**, Natl. Acad. of Sciences-Nat. Research Council conf., Buck Hill Falls, Pa. (D. W. Thornhill, NAS, 2101 Constitution Ave., NW, Washington, D.C.)

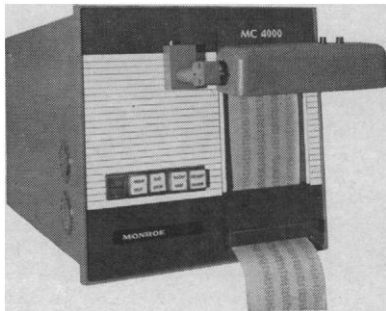
25-27. **Electronics**, natl. conf., Chicago, Ill. (R. G. Brown, Dept. of Electrical Engineering, Iowa State Univ., Ames 50010)

25-27. **Nuclear and Engineering Ceramics**, conf., Harwell, England. (G. H. Stewart, British Ceramic Soc., Shelton House, Shelton, Stoke-on-Trent, England)

25-27. **Society of Rheology**, Case Inst. of Technology, Cleveland, Ohio. (J. C. Miller, Union Carbide Plastics Co., Bound Brook, N.J.)

25-29. **Hypotensive Polypeptides**, intern. symp., Florence, Italy. (E. G. Erdős, Dept. of Pharmacology, Univ. of Oklahoma

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26. American Soc. of **Safety Engineers**, annual, Chicago, Ill. (A. C. Blackman, ASSE, 5 N. Wabash, Chicago, Ill.)

26-28. **Fluid Amplification**, symp., Washington, D.C. (J. M. Kirschner, Fluid Systems Branch, Harry Diamond Laboratories, Washington 20438)

26-28. **Shock and Vibration**, 25th symp., New Orleans, La. (Shock and Vibration Information Center, Code 4021, U.S. Naval Research Laboratory, Washington, D.C. 20390)

26-28. **Spacecraft Sterilization Technology**, natl. conf., NASA, California Inst. of Technology, Pasadena. (L. B. Hall, Code SB, NASA, Washington, D.C. 20546)

26-29. National Soc. for **Clean Air**, 32nd annual conf., Eastbourne, England. (R. Sharp, The Society, Field House, Brems Bldg., London, E.C.4)

26-30. **Immunohistochemistry**, symp., Nijmegen, Netherlands. (H. von Mayersbach, Faculteit der Geneeskunde, Laboratorium voor Cytologie en Histologie, Universiteit Van Nijmegen, Nijmegen)

27-29. **Aerospace and Navigational Electronics**, 12th East Coast conf., Baltimore, Md. (B. W. Moss, Mail #383, Martin Co., Box 988, Baltimore 21203)

27-29. American **Ceramic Soc.**, Electronics Div., fall meeting, Los Angeles, Calif. (R. S. Shelden, 4055 N. High St., Columbus 4, Ohio)

27-29. **Electronic Data Processing Systems** for State and Local Governments, 2nd natl. conf., New York Univ., New York, N.Y. (H. G. Berkman, Graduate School of Public Administration, 4 Washington Sq. N, New York 10003)

27-30. **Neurological Surgeons**, 15th annual congr., Chicago, Ill. (J. R. Russell, 1815 N. Capitol Ave., Indianapolis, Ind. 46202)

28-29. **Educational Records Bureau**, 13th annual conf., New York. (A. E. Traxler, Educational Records Bureau, 21 Audubon Ave., New York 10032)

28-29. **Microwave Acoustics**, symp., Hanscom Field, Bedford, Mass. (T. G. Burnhagen, Air Force Cambridge Research Laboratories, Cambridge, Mass.)

28-30. American Soc. for **Aesthetics**, Washington, D.C. (J. R. Johnson, Cleveland Museum of Art, Cleveland, Ohio 44106)

28-4. **Psychology** as a Theoretical and Applied Discipline, seminar, Gujarat Univ., Ahmedabad, India. (P. H. Prabhu, School of Psychology, Education, and Philosophy, Gujarat Univ., Ahmedabad 9)

29-30. Society for the **Scientific Study of Religion**, annual, New York, N.Y. (SSSR, 1200 17th St., NW, Washington, D.C. 20036)

30-31. **Bronchoesophagology**, 11th intern. congr., Hakone, Japan. (C. M. Norris, 3401 N. Broad St., Philadelphia, Pa. 19140)

30-2. American **Speech and Hearing Assoc.**, Chicago, Ill. (K. O. Johnson, 1001 Connecticut Ave., NW, Washington, D.C.)

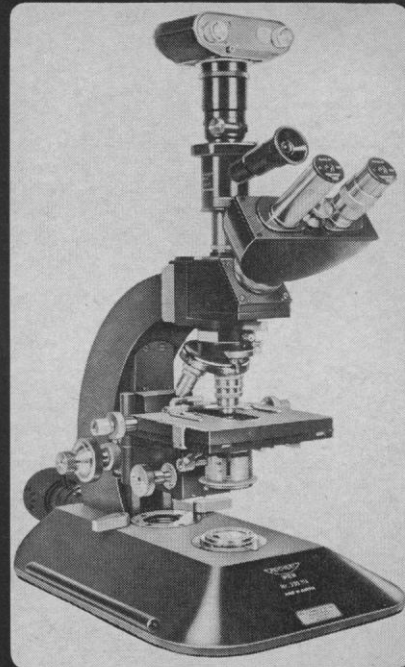
31-4. American Soc. of **Agronomy**, 57th annual, Columbus, Ohio. (ASA, 677 South Segoe Rd., Madison, Wis. 53711)

31-5. Society of **Motion Picture and Television Engineers**, 98th technical conf., Montreal, P.Q., Canada. (SMPTE, 9 E. 41 St., New York 10017)

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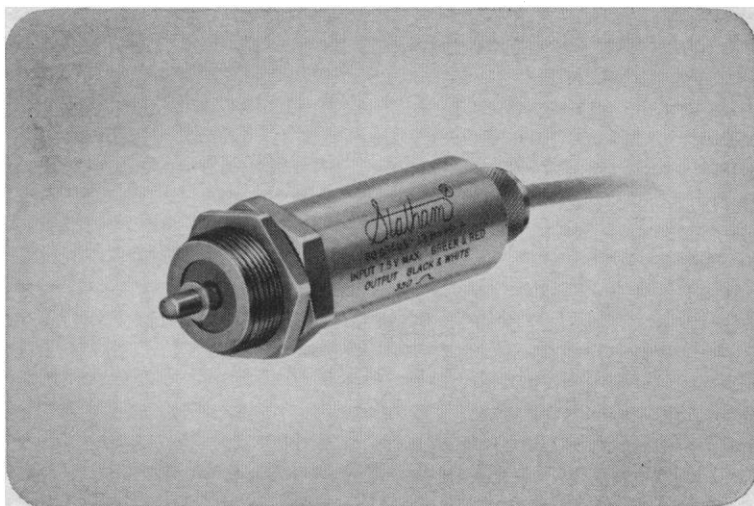
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**Boron-Nitrogen Compounds.** Kurt Nienzen and John W. Dawson. Springer, Berlin; Academic Press, New York, 1965. 184 pp. Illus. \$6.75. *Anorganische und Allgemeine Chemie in Einzeldarstellungen*, vol. 6, edited by Margot Becke-Goechring.

**Chemical Energy.** Laurence E. Strong and Wilmer J. Stratton. Reinhold, New York; Chapman and Hall, London, 1965. 125 pp. Illus. Paper, \$1.95. A volume in the *Selected Topics in Modern Chemistry Series*, edited by Harry H. Sisler and Calvin A. VanderWerf.

**The Collected Papers of Emil Artin.** Serge Lang and John T. Tate, Eds. Addison-Wesley, Reading, Mass., 1965. 566 pp. Illus. \$13.50.

**Cooling Electronic Equipment.** Allan D. Kraus. Prentice-Hall, Englewood Cliffs, N.J., 1965. 406 pp. Illus. \$16.

**Cosmic Rays.** Proceedings of the P. N. Lebedev Physics Institute. vol. 26. D. V. Skobel'tsyn, Ed. Translated from the Russian (Moscow, 1964). Consultants Bureau, New York, 1965. 260 pp. Illus. Paper, \$27.50.

**Development of Concepts of Physics: From the Rationalization of Mechanics to the First Theory of Atomic Structure.** A. B. Arons. Addison-Wesley, Reading, Mass., 1965. 992 pp. Illus. \$14.75.

**Developments in Applied Spectroscopy.** vol. 4. Proceedings, 15th Annual Mid-America Spectroscopy Symposium (Chicago, Ill.), June 1964. Elwin N. Davis, Ed. Plenum Press, New York, 1965. 558 pp. Illus. \$18.50. Forty-five papers on the following topics: X-ray spectroscopy (9 papers); Infrared and raman spectroscopy (8 papers); Ultraviolet and visible spectroscopy (4 papers); Gas chromatography (11 papers); NMR spectroscopy (1 paper); and Emission, flame, and atomic absorption spectroscopy (12 papers).

**Diffusion in Body-Centered Cubic Metals.** Proceedings of a conference (Gatlinburg, Tenn.), September 1964. J. A. Wheeler, Jr., and F. R. Winslow, Eds. American Soc. for Metals, Metals Park, Ohio, 1965. 440 pp. Illus. \$18. Twenty-seven papers.

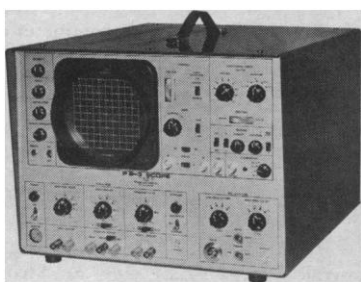
**The Dynamics of Conduction Electrons.** A. B. Pippard. Gordon and Breach, New York, 1965. 156 pp. Illus. Paper, \$1.95; cloth, \$4.95. *Documents on Modern Physics Series*, edited by Elliott W. Montroll and George H. Vineyard.

**Electronic Computers.** S. H. Hollingdale and G. C. Tootill. Penguin Books, Baltimore, 1965. 336 pp. Illus. Paper, \$1.65.

**Elementary Structural Analysis and Design: Steel, Timber, and Reinforced Concrete.** Linton E. Grinter. Macmillan, New York, ed. 2, 1965. 485 pp. Illus. \$9.75.

**Elements of Modern Algebra.** Sze-Tsen Hu. Holden-Day, San Francisco, 1965. 21 pp. Illus. \$9.85. *Holden-Day Series in Mathematics*, edited by Earl A. Coddington and Andrew M. Gleason.

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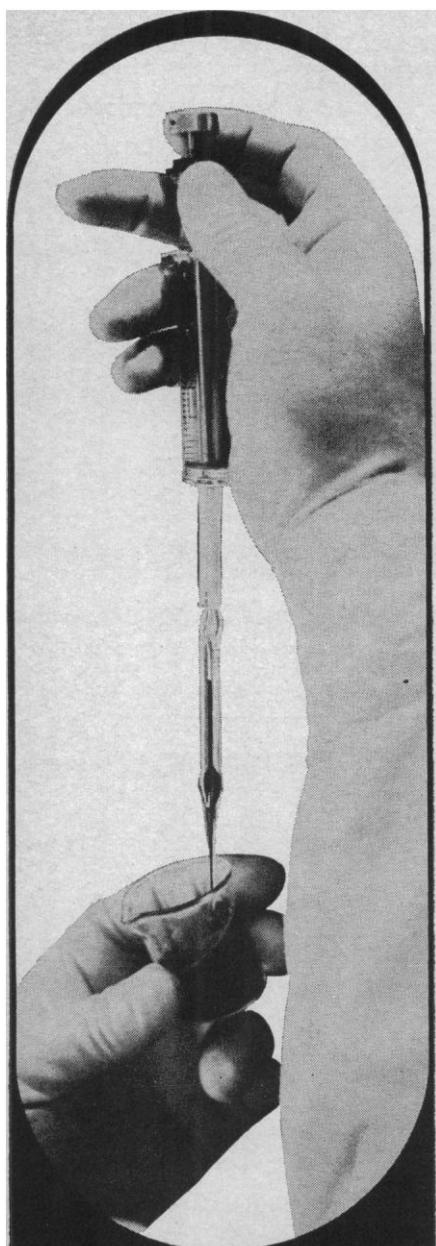
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**Engineering Magnetohydrodynamics.** George W. Sutton and Arthur Sherman. McGraw-Hill, New York, 1965. 568 pp. Illus. \$19.75. A volume in the McGraw-Hill Series in Mechanical Engineering.

**Finite Graphs and Networks: An Introduction with Applications.** Robert G. Busacker and Thomas L. Saaty. McGraw-Hill, New York, 1965. 308 pp. Illus. \$11.50. A volume in the International Series in Pure and Applied Mathematics.

**Fundamentals of Carbanion Chemistry.** Donald J. Cram. Academic Press, New York, 1965. 297 pp. Illus. \$9.50. Organic Chemistry, vol. 4, a series of monographs edited by Alfred T. Blomquist.

**Die Genese der metamorphen Gesteine.** Helmut G. F. Winkler. Springer, Berlin, 1965. 226 pp. Illus. Paper, DM. 19.80.

**Geological Problems in Lunar Research** (*Ann. N.Y. Acad. Sci.* 123). Harold E. Whipple, Ed. New York Acad. of Sciences, New York, 1965. 891 pp. Illus. Paper. Fifty-four papers presented at a conference held in May 1964. The topics considered were: Volcanic and impact mechanisms and origins (14 papers); Lunar tectonics (3 papers); Surface properties and radiation effects (5 papers); Lunar surface features and changes (6 papers); Lunar and terrestrial analogs (10 papers); Shatter coning (3 papers); Tekite origin (3 papers); Possible lunar technologies (5 papers); and Geophysical programs (5 papers).

**High-Strength Materials.** Proceedings, 2nd Berkeley International Materials Conference, June 1964. Victor F. Zackay, Ed. Wiley, New York, 1965. 895 pp. Illus. \$22. Twenty-two papers.

**Industrial Isotope Techniques.** Lars G. Erwall, Hans G. Forsberg, and Knut Ljunggren. Wiley, New York, 1965. 342 pp. Illus. \$19.50.

**Interpretation Theory in Applied Geophysics.** F. S. Grant and G. F. West. McGraw-Hill, New York, 1965. 603 pp. Illus. \$17.50. A volume in the International Series in the Earth Sciences.

**An Introduction to Abstract Mathematical Systems.** David M. Burton. Addison-Wesley, Reading, Mass., 1965. 128 pp. Illus. \$3.95. Addison-Wesley Series in Introductory Mathematics.

**Introduction to Linear Algebra.** Marvin Marcus and Henryk Minc. Macmillan, New York, 1965. 271 pp. Illus. \$7.95. A series of Advanced Mathematics Texts, edited by Carl B. Allendoerfer.

**Introduction to Mass Spectroscopy and Its Applications.** Robert W. Kiser. Prentice-Hall, Englewood Cliffs, N.J., 1965. 368 pp. Illus. \$14. Prentice-Hall International Series in Chemistry.

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**Lattice Defects in Quenched Metals.** International Conference (Argonne, Ill.), June 1964. R. M. J. Cotterill, M. Doyama, J. J. Jackson, and M. Meshii, Eds. Academic Press, New York, 1965. 829 pp. Illus. \$22. Twenty-eight papers.

**Lectures in Theoretical Physics.** vol. 7A, *Lorentz Group*. Lectures delivered at the Summer Institute for Theoretical Physics (Boulder, Colo.), 1964. Wesley E. Brittin and Asim O. Barut. Univ. of Colorado Press, Boulder, 1965. 394 pp. Illus. Paper, \$6.50. Eighteen papers.

**Lectures on Particles and Field Theory.** vol. 2. Brandeis Summer Institute in Theoretical Physics, 1964. Stanley Deser and Kenneth W. Ford, Eds. Prentice-Hall, Englewood Cliffs, N.J., 1965. 493 pp. Illus. Paper, \$5. Five papers: "Quantum electrodynamics" by K. Johnson; "Spectroscopy of the strongly interacting particles" by D. Lichtenberg; "Field theory of particles" by J. Schwinger; "Quasiparticles and perturbation theory" by S. Weinberg; and "The quantum theory of massless particles" by S. Weinberg.

**Linear Elastic Theory of Thin Shells.** J. E. Gibson. Pergamon, New York, 1965. 192 pp. Illus. Paper, 21s. The Commonwealth and International Library.

**Machine-Tool Vibration.** S. A. Tobias. Translated from the German edition (1961) by A. H. Burton. Wiley, New York, 1965. 367 pp. Illus. \$10.50.

**Materials Science Research.** vol. 2. Proceedings of a conference (Orlando, Fla.), April 1964. Henry M. Otte and Saul R. Locke, Eds. Plenum Press, New York, 1965. 333 pp. Illus. \$6.65. Seventeen papers given at the Southern Metals and Materials Conference on Advances in Aerospace Materials, sponsored by American Society of Metals.

**Mathematical Theory of Connecting Networks and Telephone Traffic.** V. E. Beneš. Academic Press, New York, 1965. 333 pp. Illus. \$12. Mathematics in Science and Engineering Series, edited by Richard Bellman.

**Mathematics for Introductory Science Courses: Calculus and Vectors.** With a review of algebra, analytic geometry, and trigonometry. Daniel A. Greenberg. Benjamin, New York, 1965. 230 pp. Illus. Paper, \$2.45; cloth, \$5.

**Mechanics of Machines.** vol. 1. H. E. Barnacle and G. E. Walker. Pergamon, New York, 1965. 312 pp. Illus. Paper, 25s. A volume in the Commonwealth and International Library Series, Mechanical Engineering Division, edited by N. Hiller and G. E. Walker.

**Methods of Matrix Algebra.** Marshall C. Pease, III. Academic Press, New York, 1965. 424 pp. Illus. \$13.75. Mathematics in Science and Engineering Series, edited by Richard Bellman.

**Microwave Tubes.** Proceedings, 5th International Congress (Paris), September 1964. Academic Press, New York, 1965. 535 pp. Illus. \$55. One hundred and forty-two papers.

**Modern Algebra.** vol. 1. Seth Warner. Prentice-Hall, Englewood Cliffs, N.J.,



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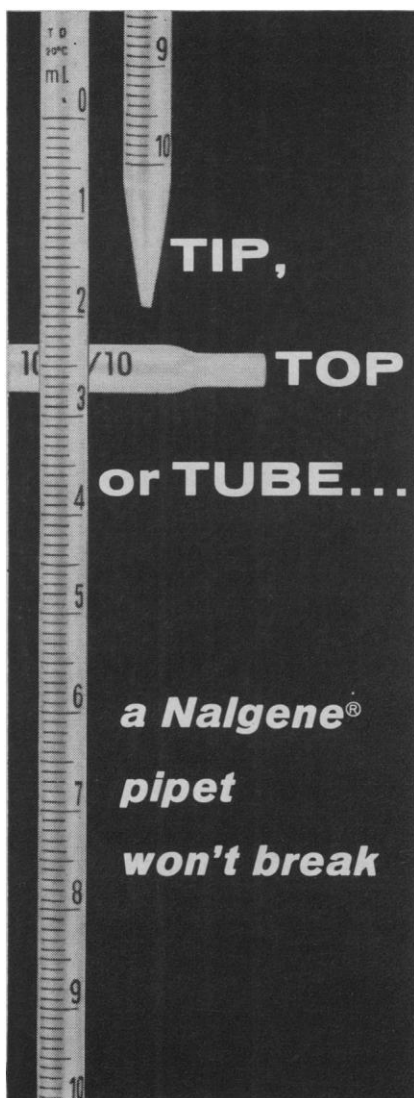
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**Nuclear Interactions of the Hyperons.** R. H. Dalitz. Published for the Tata Institute of Fundamental Research, Bombay, by the Oxford Univ. Press, New York, 1965. 112 pp. Illus. Paper, \$5.05.

**Nuclear Magnetic Resonance in a Flowing Liquid.** Aleksandr Ivanovich Zhernovoi and Georgii Dmitrievich Latyshev. Translated from the Russian edition (Moscow, 1965) by C. Nigel Turton and Tatiana I. Turton. Consultants Bureau, New York, 1965. 174 pp. Illus. \$22.50.

**Numerical Analysis.** I. M. Khabaza. Pergamon, New York, 1965. 254 pp. Illus. Paper, \$5. A volume in the Commonwealth and International Library of Science.

**100 Great Problems of Elementary Mathematics: Their History and Solution.** Heinrich Dörrie. Translated from the German edition (Würzburg, ed. 5, 1958) by David Antin. Dover, New York, 1965. 399 pp. Illus. Paper, \$2.

**Optical Methods of Investigating Solid Bodies.** vol. 25. Proceedings, P. N. Lebedev Physics Institute. D. V. Skobel'tsyn, Ed. Translated from the Russian. Consultants Bureau, New York, 1965. 194 pp. Illus. Paper, \$22.50. Three papers: "Polarized luminescence of molecular crystals" by N. D. Zhevandrov; "Vibrational spectra and structure of certain oxides in the crystalline and glassy states" by V. P. Cheremisinov; and "Calculation of cross sections for excitation of atoms and ions by electron impact" by L. A. Vainshtein.

**Optical Physics.** Max Garbuny. Academic Press, New York, 1965. 480 pp. Illus. \$14.50.

**Organic Chemistry.** B. Pavlov and A. Terentyev. Translated from the Russian edition by Boris Belitzky. Gordon and Breach, New York; Noordhoff, Groningen, Netherlands, 1965. 568 pp. Illus. \$16. Russian Monographs and Texts on Advanced Mathematics and Physics, vol. 18.

**Oxidation and Combustion Reviews.** vol. 1. C. F. H. Tipper, Ed. Elsevier, New York, 1965. 350 pp. Illus. \$14.50. Six papers: "Application of the theory of branched chain reactions in low-temperature combustion" by R. Ben-Aïm and M. Lucquin; "Oxidation reactions induced by ionising radiation" by G. Hughes; "Gas phase photo-oxidation" by G. R. McMillan and J. G. Calvert; "Oxidation reactions involving nitrogen dioxide" by J. H. Thomas; "Oxidative degradation of high polymers" by W. L. Hawkins; and "The heterogeneous selective oxidation of hydrocarbons" by R. J. Sampson and D. Shooter.

**Oxidation-Reduction Polymers (Redox Polymers).** Harold G. Cassidy and Kenneth A. Kun. Interscience (Wiley), New York, 1965. 323 pp. Illus. \$12.50.

**Periodic Correlations.** Ronald Rich. Benjamin, New York, 1965. 175 pp. Illus. Paper, \$3.95; cloth, \$8. A volume in the Physical Inorganic Chemistry Series, edited by Robert A. Plane and Michell J. Sienko.

**Physical Networks.** Richard S. Sanford. Prentice-Hall, Englewood Cliffs, N.J.,



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**Physico-Chemical Constants of Pure Organic Compounds.** vol. 2. J. Timmermans. Elsevier, New York, 1965. 490 pp. \$28.50.

**Physics of High Pressures and the Condensed Phase.** A. Van Itterbeek, Ed. North-Holland, Amsterdam; Interscience (Wiley), New York, 1965. 614 pp. Illus. \$22.50. Fourteen papers.

**Physics of Non-Crystalline Solids.** Proceedings, International Conference (Delft, Netherlands), July 1964. J. A. Prins, Ed. North-Holland, Amsterdam; Interscience (Wiley), New York, 1965. 683 pp. Illus. \$27.50. Fifty-three papers on the following topics: Structure and devitrification (10 papers); Neutron diffraction, heat conduction, ESR, NMR, magnetism, and ultrasonics (9 papers); Relaxation, mainly in organic materials (12 papers); Relaxation, fracture, and coordination, mainly in inorganic materials (12 papers); and Optical and electric properties (10 papers).

**Physics of the Earth's Upper Atmosphere.** C. O. Hines, I. Paghis, T. R. Hartz, and J. A. Fejer, Eds. Prentice-Hall, Englewood Cliffs, N.J., 1965. 448 pp. Illus. \$17.35. Eighteen papers.

**Preparative Inorganic Reactions.** vol. 2. William L. Jolly, Ed. Interscience (Wiley), New York, 1965. 387 pp. Illus. \$14.50. Nine papers: "Phosphazene compounds" by R. A. Shaw, R. Keat, and C. Hewlett; "Silicon-nitrogen compounds" by B. J. Aylett; "Orthophosphoric acids and orthophosphates" by C. Y. Shen and C. F. Callis; "Metal alkoxides" by D. C. Bradley; "Cyclopentadienyl and arene metal carbonyls" by R. L. Pruett; "Sulfur and phosphorus—Bridged complexes of transition metals" by R. G. Hayter; "Binary fluorides" by E. L. Muetterties and C. W. Tullock; "Fluorine compounds of the platinum metals" by N. Bartlett; and "Compounds of xenon" by E. H. Appelman and J. G. Malm.

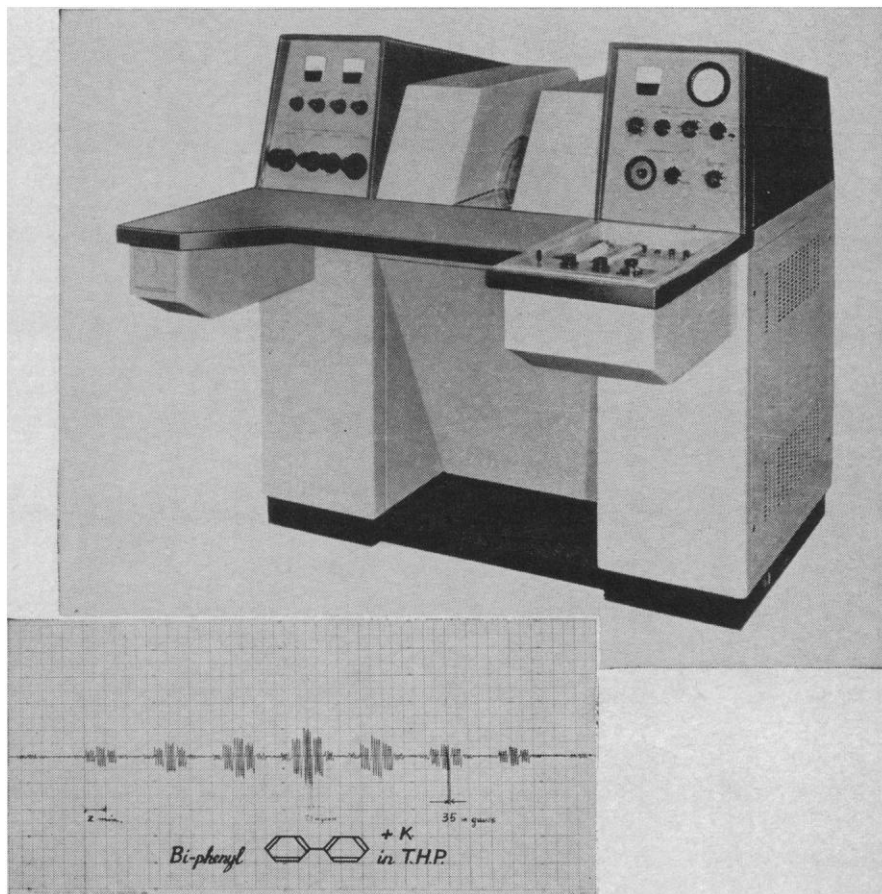
**Probability Tables for Locating Elliptical Underground Masses with a Rectangular Grid.** Igor' Dmitrievich Savinskii. Translated from the Russian edition (Moscow, 1964). Consultants Bureau, New York, 1965. 116 pp. Illus. \$15.

**Programmed Units in Chemistry.** *Balancing Chemical Equations* (69 pp., 60¢); *Chemical Formulas and Names* (62 pp., 56¢); *Chemical Symbols* (31 pp., 36¢); *Molecular Weight Calculations* (48 pp., 52¢); and *Weight and Volume Relationships* (38 pp., 48¢). Virginia P. Powell. Prentice-Hall, Englewood Cliffs, N.J., 1965. Paper.

**Progress in Dielectrics.** vol. 6. J. B. Birks and J. Hart, Eds. Academic Press, New York, 1965. 342 pp. Illus. \$14.50. Four papers: "Electrical force effects in dielectric liquids" by W. F. Pickard; "Polymeric semiconductors" by A. Rembaum, J. Moacanin, and H. A. Pohl; "Space charges in dielectrics" by Z. Croitoru; "Energy transfer in polyacene solid solutions, pt. 4: A bibliography for 1963" by F. R. Lipsett; and "The theory of ionic and electronic mobility in liquids" by S. A. Rice and J. Jortner.

**Projective Geometry.** vols. 1 and 2. Oswald Veblen and John Wesley Young.

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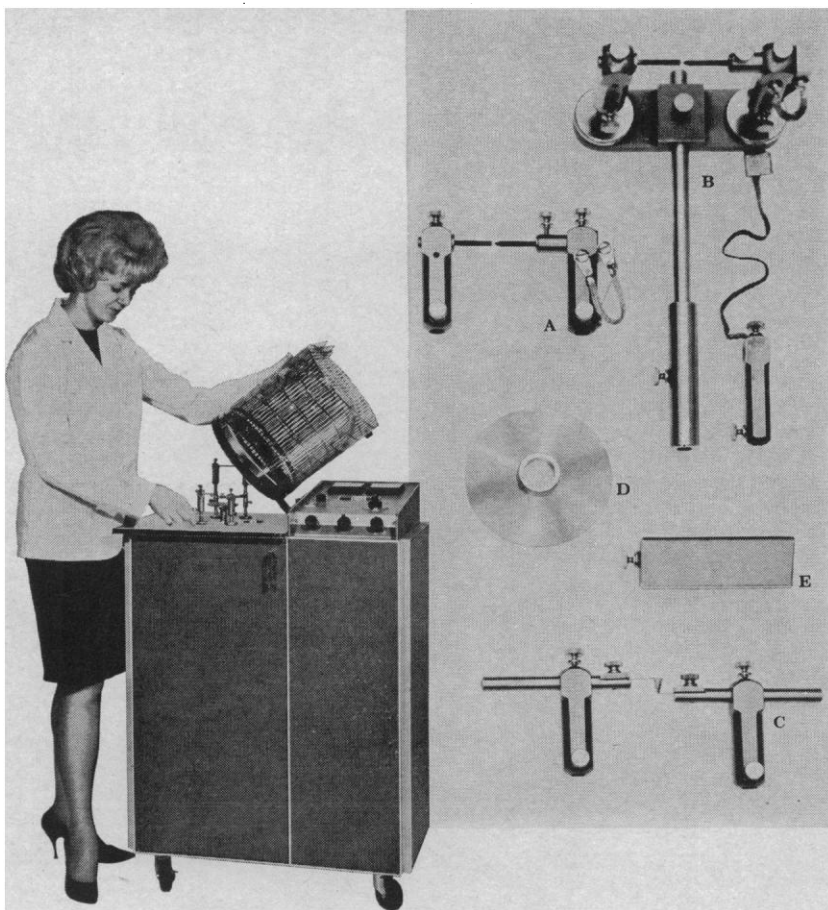
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Blaisdell (Ginn), New York, 1965, vol. 1, 355 pp., \$2.25; vol. 2, 525 pp., \$3. Illus. Paper.

**Quantum Electronics and Coherent Light.** Course 31, International School of Physics "Enrico Fermi." C. H. Townes and P. A. Miles, Eds. Academic Press, New York, 1965. 383 pp. Illus. \$16. Twenty-two papers.

**Radiation Dosimetry.** Course 30, International School of Physics "Enrico Fermi." G. W. Reed and F. W. Spiers, Eds. Academic Press, New York, 1965. 320 pp. Illus. \$14. Twenty-five papers.

**Radiochemical Survey of the Elements.** Principal characteristics and applications of the elements and their isotopes. M. Haissinsky and J. P. Adloff. Translated from the French by Express Translation Service. Elsevier, New York, 1965. 187 pp. Illus. \$12.

**Radiochemistry of Rhodium** [NAS-NS-3008 (rev)]. James C. Armstrong, Jr., and Gregory R. Choppin. Natl. Acad. of Sciences—Natl. Res. Council, Washington, D.C., 1965 (available from Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Va.). 81 pp. Illus. Paper, \$1.

**Random Processes in Nonlinear Control Systems.** A. A. Pervozvanskii. Translated from the Russian (Moscow, 1962) by Scripta Technica. Ivo Herzer, Translation Editor. Academic Press, New York, 1965. 357 pp. Illus. \$14. Mathematics in Science and Engineering Series, vol. 15, edited by R. Bellman.

**Recent Researches in the Fields of Hydrosphere, Atmosphere and Nuclear Geochemistry.** Yasuo Miyake and Tada-shiro Koyama, Eds. Maruzen, Tokyo, 1965. Twenty-five papers; the volume is dedicated to Ken Sugawara.

**Research in Molecular Spectroscopy.** Proceedings, P. N. Lebedev Physics Institute, vol. 27. D. V. Skobel'tsyn, Ed. Translated from the Russian edition (Moscow, 1964). Consultants Bureau, New York, 1965. 211 pp. Illus. Paper, \$22.50.

**Reviews of Plasma Physics.** vol. 1. M. A. Leontovich, Ed. Translated from the Russian edition (Moscow, 1963) by Herbert Lashinsky. Consultants Bureau, New York, 1965. 338 pp. Illus. \$12.50. Four papers: "Motion of charged particles in electromagnetic fields in the drift approximation" by D. V. Sivukhin; "Particle interactions in a fully ionized plasma" by B. A. Trubnikov; "Transport processes in a plasma" by S. I. Braginskii; and "Thermodynamics of a plasma" by A. A. Vedenov.

**Rock Magnetism.** Takesi Nagata. Maruzen, Tokyo; Plenum Press, New York, ed. 2, 1965. 350 pp. Illus. \$9.50.

**Second Symposium on Oil Shale.** A symposium (Denver, Colo.), April 1965. Colorado School of Mines, Golden, 1965. 206 pp. Illus. Paper, \$4. Eleven papers.

**Simplified Design of Structural Steel.** Harry Parker. Wiley, New York, ed. 3, 1965. 325 pp. Illus. \$7.75.

**SOCMA Handbook.** Commercial organic chemical names. Chemical Abstracts Service, American Chemical Soc., Washington, D.C., 1965. 757 pp. Illus. \$25.

**The Solid-State Chemistry of Binary Metal Hydrides.** George G. Libowitz. Benjamin, New York, 1965. 151 pp. Illus.

\$7.50. A volume in the Physical Inorganic Chemistry Series, edited by Robert A. Plane and Michell J. Sienko.

**Soviet Research in New Semiconductor Materials.** D. N. Nasledov and N. A. Goryunova, Eds. Translated from the Russian edition (Kishinev, 1964) by A. Tybulewicz. Consultants Bureau, New York, 1965. 127 pp. Illus. Paper, \$17.50. Seventeen papers.

**Spectroscopic Techniques in Organic Chemistry.** A. J. Baker and T. Cairns. Heyden, London, 1965. 91 pp. Illus. Paper, \$3.50. Spectroscopy in Education Series, vol. 2.

**Stellar and Solar Magnetic Fields.** A symposium, International Astronomical Union (Rottach-Egern near Munich, Germany), September 1963. R. Lüst, Ed. North-Holland, Amsterdam; Interscience (Wiley), New York, 1965. 466 pp. Illus. \$17.50. Fifty-nine papers.

**Studies in Mathematics.** vol. 3, *Studies in Real and Complex Analysis.* I. I. Hirschman, Jr., Ed. Published by the Mathematical Association of America; available from Prentice-Hall, Englewood Cliffs, N.J., 1965. 221 pp. Illus. \$4.

**Sulfonation and Related Reactions.** Everett E. Gilbert. Interscience (Wiley), New York, 1965. 541 pp. Illus. \$16.50. Interscience Monographs on Chemistry, Organic Chemistry Section, edited by George A. Olah.

**A Survey of Modern Algebra.** Garrett Birkhoff and Saunders MacLane. Macmillan, New York, ed. 3, 1965. 447 pp. Illus. \$8.50.

**Symmetries in Elementary Particle Physics.** A. Zichichi, Ed. Academic Press, New York, 1965. 441 pp. Illus. Paper, \$7.95; cloth, \$12. Nine lectures, five seminars, and six discussions presented at the 1964 International School of Physics "Ettore Majorana" (1964) Advanced Study Institute, by J. Ashkin, S. M. Berman, G. Bernardini, L. C. Biedenharn, M. M. Block, N. Cabibbo, R. P. Feynman, R. Gatto, P. Kabir, P. Tarjanne, and G. Zweig.

**Symmetry Principles at High Energy.** Coral Gables Conferences, Second Conference, January 1965. Behram Kurşunoğlu, Arnold Perlmutter, and Ismail Şakmar, Eds. Freeman, San Francisco, 1965. 446 pp. Illus. Paper, \$8.

**Tenth Symposium (International) on Combustion** (Cambridge, England), August 1964. Organized by the Combustion Institute. Combustion Inst., Pittsburgh, Pa., 1965. 1516 pp. Illus. \$35. One hundred thirty-one papers.

**The Theory of Electron-Atom Collisions.** G. F. Drukarev. Translated from the Russian edition (1962) by S. Chomet. J. B. Hasted, Translation Ed. Academic Press, New York, 1965. 173 pp. Illus. \$6.50.

**Theory of Random Functions.** vol. 1. A. Blanc-Lapierre and R. Fortet. Translated from the original French edition (1953) by J. Gani. Gordon and Breach, New York, 1965. 454 pp. Illus. \$14.50.

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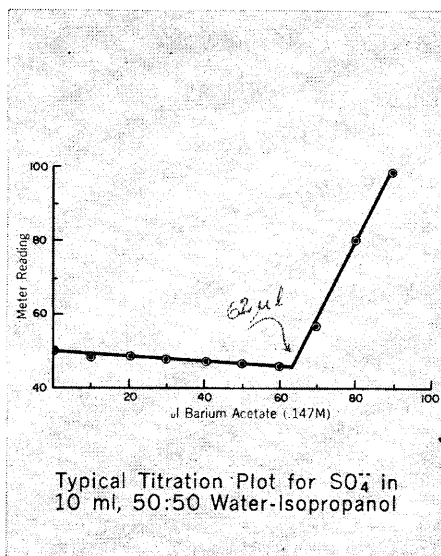
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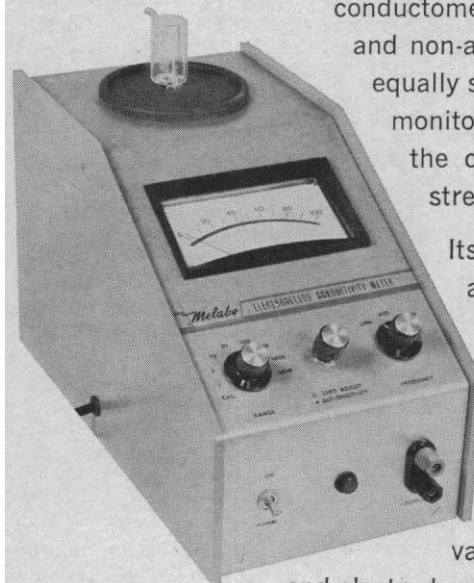
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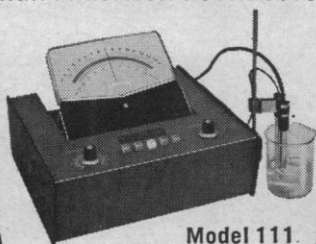
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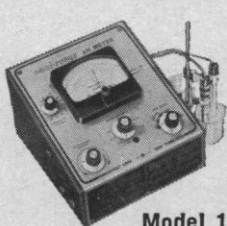
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Pergamon, London; Addison-Wesley, Reading, Mass., 1965. 851 pp. Illus. \$21.

**Thermodynamic and Transport Properties of Uranium Dioxide and Related Phases.** Report of the panel (Vienna), March 1964. Charles Holley, Ed. International Atomic Energy Agency, Vienna, 1965 (order from Natl. Agency for International Publications, New York). 115 pp. Illus. Paper, \$2.50.

**Thermodynamics of Multicomponent Systems.** Bruce H. Sage. Reinhold, New York, 1965. 378 pp. Illus. \$18.50.

**Time-Domain Analysis and Design of Control Systems.** Richard C. Dorf. Addison-Wesley, Reading, Mass., 1965. 206 pp. Illus. \$8.95.

**Transactions of the Moscow Mathematical Society for the Year 1963.** Prepared jointly by the American Mathematical Society and the London Mathematical Society. American Mathematical Soc., Providence, R.I., 1965. 528 pp. Illus. \$5.50. English translation of *Trudy Moskovskogo Matematicheskogo Obshchestva*; 12 papers.

**La Transmission de la Chaleur au Cours de la Solidification, du Rechauffage et de la Trempe de l'Acier.** Yves Dardel. Editions de la Revue de Métallurgie, Paris, 1964. 266 pp. Illus. F. 70.

**Treatise on Analytical Chemistry.** vol. 6, pt. 1, *Theory and Practice*. Section D-3 (continued), *Optical Methods of Analysis*. I. M. Kolthoff and Philip J. Elving, Eds. Interscience (Wiley), New York, 1965. 923 pp. Illus. \$23. The contributors are N. Bauer, George G. Cocks, G. W. Leddicotte, S. Z. Lewin, Lucy B. McCrone, Walter C. McCrone, Marvin Margoshes, Edward C. Olson, John H. Reisner, E. J. Rosenbaum, Bourdon F. Scribner, A. Lee Smith, William A. Struck, Ralph E. Thiers, and Bert L. Vallee.

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**Ultrasound in the Production and Inspection of Concrete.** pt. 1, *Production Applications* (47 pp.) by Yu. E. Kornilovich and V. I. Belokhvostikova; pt. 2, *Inspection in Hydraulic Construction* (64 pp.) by A. K. Tret'yakov and A. M. Filonidov. Translated from the Russian (1964) by James S. Wood. Consultants Bureau, New York, 1965. Illus. Paper, \$7.50 each.

**Ultraviolet Radiation.** Lewis. R. Koller. Wiley, New York, ed. 2, 1965. 320 pp. Illus. \$12. Wiley Series in Pure and Applied Optics; Stanley S. Ballard, Advisory Editor.

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**University Physics: Experiment and Theory.** George D. Freier. Appleton, Century, Crofts (Meredith), New York, 1965. 613 pp. Illus. \$10.

**Vectors.** James A. Hummel. Addison-Wesley, Reading, Mass., 1965. 124 pp. Illus. Paper, \$1.95. Addison-Wesley Series in Introductory Mathematics.

**World Maps of Climatology: Weltkarten zur Klimakunde.** H. E. Landsberg, H. Lippmann, K. H. Paffen, and C. Troll. Springer-Verlag, New York, ed. 2, 1965. 36 pp. Illus. Maps. \$7.50.



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**Advances in Enzymology, and Related Subjects of Biochemistry.** vol. 27. F. F. Nord, Ed. Interscience (Wiley), New York, 1965. 640 pp. Illus. \$17.50. Ten papers: "Mechanism of enzyme action—An approach through the study of slow reactions" by Kunio Yagi; "Extrinsic cotton effects and the mechanism of enzyme action" by David D. Ulmer and Bert L. Vallee; "Contributions of EPR spectroscopy to our knowledge of oxidative enzymes" by Helmut Beinert and Graham Palmer; "Chemie und biochemie des disulfidaustausches" by Von L. Lumper and H. Zahn; "Enzymology of the nucleus" by Günther Siebert and G. Bennett Humphrey; "The chemical basis of mutation" by L. E. Orgel; "The origin of life and the origin of enzymes" by A. I. Oparin; "Experimental approaches to the origin of life problem" by Howard H. Pattee; "Inhibition of folate biosynthesis and function as a basis for chemotherapy" by George H. Hitchings and James J. Burchall; and "The mechanisms of microbial oxidations of petroleum hydrocarbons" by A. C. van der Linden and G. J. E. Thijssen.

**The Amino Sugars: The Chemistry and Biology of Compounds Containing Amino Sugars.** vol. 2A, *Distribution and Biological Role*. Endre A. Balazs and Roger W. Jeanloz, Eds. Academic Press, New York, 1965. 620 pp. Illus. \$22. Twenty papers.

**Analgetics.** George deStevens, Ed. Academic Press, New York, 1965. 489 pp. Illus. \$17. Medicinal Chemistry Series of Monographs, vol. 5, edited by George deStevens. Seven papers: "The physiology and pharmacology of pain and its relief" by Charles A. Winter; "Clinical measurement of pain" by Raymond W. Houde, Stanley L. Wallenstein, and William T. Beaver; "Morphine and its modifications" by Everette L. May and Lewis J. Sargent; "Synthetic analgetics with morphine-like action" by Robert A. Hardy, Jr. and M. Gertrude Howell; "Isoquinoline analgetics" by A. Brossi, H. Besendorf, L. A. Pirk, and A. Rheiner, Jr.; "Pyrazole derivatives" by Walter Krohs; and "General synthetics" by George deStevens; there is an introduction by Alfred Burger.

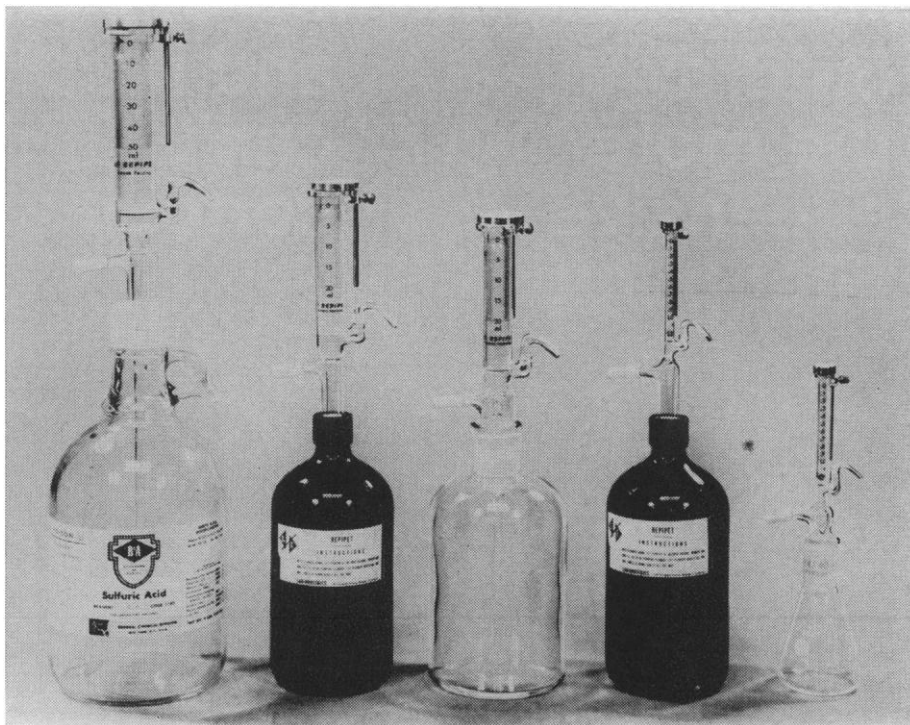
**Bioenergetics: The Molecular Basis of Biological Energy Transformations.** Albert L. Lehninger. Benjamin, New York, 1965. 274 pp. Illus. Paper, \$2.95; cloth, \$6. Biology Teaching Monograph Series, edited by Cyrus Levinthal.

**Biological Effects of Radiation.** Daniel S. Grosch. Blaisdell (Ginn), New York, 1965. 307 pp. Illus. Paper, \$3.50. A Blaisdell Book in the Pure and Applied Sciences Series.

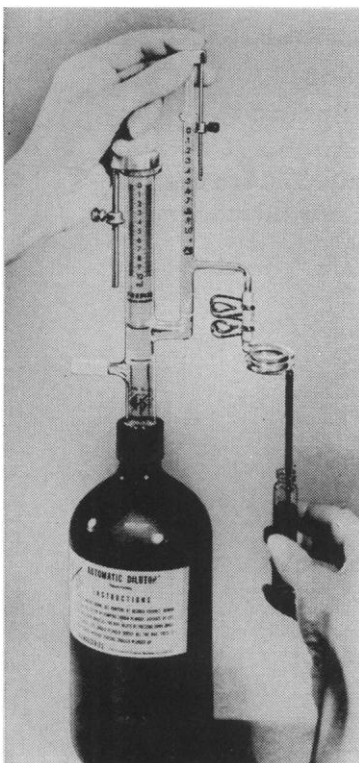
**Biology and Information: Elements of Biological Thermodynamics.** Karl Sigmundovich Trinchler. Translated from the Russian by Edwin S. Spiegelthal. Consultants Bureau, New York, 1965. 103 pp. Illus. Paper, \$17.50.

**Biomedical Electronics.** Howard M. Yanof. Davis, Philadelphia, 1965. 373 pp. Illus. \$12.50.

**Biophysical Mechanisms in Vascular Homeostasis and Intravascular Thrombosis.** Philip N. Sawyer, Ed. Appleton, Century, Crofts (Meredith), New York,



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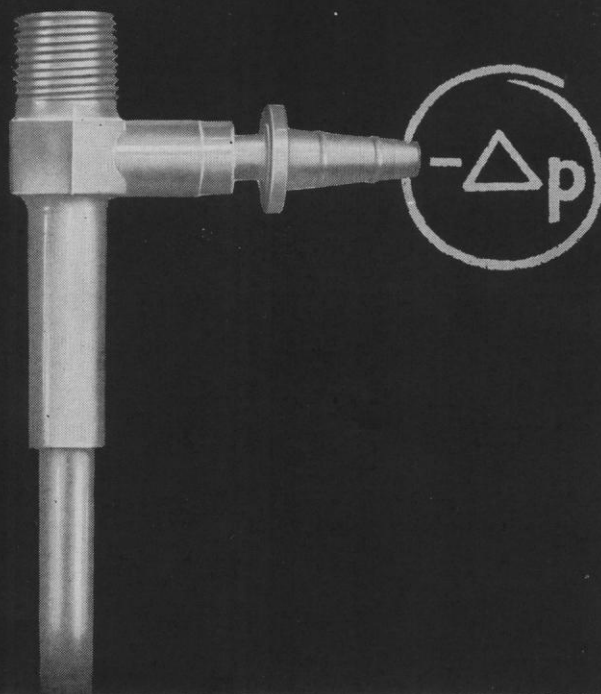
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**Cells and Tissues in Culture: Methods, Biology, and Physiology.** vols. 1 and 2. E. N. Willmer, Ed. Academic Press, London, 1965. vol. 1, 802 pp., 17 papers; vol. 2, 825 pp., 17 papers. Illus. \$25 each.

**Cellular Ultrastructure of Woody Plants.** Proceedings, Advanced Science Seminar (Upper Saranac Lake, N.Y.), September 1964. Wilfred A. Côté, Jr., Ed. Syracuse Univ. Press, Syracuse, N.Y., 1965. 617 pp. Illus. \$14. Twenty-nine papers.

**Circadian Clocks.** Proceedings, Feldafing Summer School, September 1964. Jürgen Aschoff, Ed. North-Holland, Amsterdam, 1965. 499 pp. Illus. \$15. Forty-four papers.

**Comparative Physiology and Pathology of the Skin.** Arthur J. Rook and G. S. Walton, Eds. Davis, Philadelphia, 1965. 808 pp. Illus. \$31. Fifty-five papers on the following topics: Comparative dermatology (5 papers); Hair (12 papers); Nutritional influences on the skin (3 papers); Porphyria and light sensitization (5 papers); The mast cell (6 papers); Immunology (13 papers); and Tumours of the skin (11 papers).

**Comprehensive Biochemistry.** vol. 6, *Lipids and Amino Acids and Related Compounds.* Marcel Florkin and Elmer H. Stotz, Eds. Elsevier, New York, 1965. 339 pp. Illus. \$17. Nine papers: "Fatty acids, long-chain alcohols, and waxes" by James F. Mead, David R. Howton, and Judd C. Nevenzel; "Neutral fats and oils" by J. A. Lovern; "Phospholipids and glycolipids" by Donald J. Hanahan and Hans Brockerhoff; "General chemistry of the amino acids" by R. J. F. Nivard and G. I. Tesser; "Nitrogenous bases" by N. van Thoi; "Melanins" by J. Harley-Mason; "Peptides: Synthetic methods and applications" by George W. Anderson; "Cap-sular polypeptide" by G. Ivánovics; and "Syntheses of bacterial glutamyl polypeptides" by V. Bruckner.

**Computers in Biomedical Research.** vol. 1. Ralph W. Stacy and Bruce D. Waxman, Eds. Academic Press, New York, 1965. 584 pp. Illus. \$20. Twenty-two papers.

**Deranged Memory.** A psychonomic study of the amnesic syndrome. George A. Talland. Academic Press, New York, 1965. 368 pp. Illus. \$9.50.

**Evolution of Parasites.** Third symposium, British Society for Parasitology (London), November 1964. Angela E. R. Taylor, Ed. Blackwell, Oxford, England; Davis, Philadelphia, 1965. 141 pp. Illus. Paper. \$5. Four papers: "The evolution of parasitic protozoa" by J. R. Baker; "The evolution of parasite-arthropod vector systems" by P. F. Mattingly; "The evolution of parasitic platyhelminths" by J. Llewellyn; and "Patterns of evolution in parasitic nematodes" by W. G. Inglis.

**The Genus Aspergillus.** Kenneth B. Raper and Dorothy I. Fennell. With a chapter by Peter K. C. Austwick. Williams and Wilkins, Baltimore, 1965. 698 pp. Illus. \$20.

**Grundriss der Ökologie.** Mit besonderer Berücksichtigung der Tierwelt. Wilhelm

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Kühnelt. Fischer, Jena, East Germany, 1965. 402 pp. Illus.

**Handbook of Physiology.** A critical, comprehensive presentation of physiological knowledge and concepts. Section 5, *Adipose Tissue*. Albert E. Renold and George F. Cahill, Jr. American Physiological Soc., Washington, D.C., 1965. 832 pp. Illus. \$28.

**International Conference on Gerontology.** A. Balazs, Ed. Akadémiai Kiadó, Budapest, Hungary, 1965. 939 pp. Illus. \$19.60. One hundred and thirty-three papers presented at a conference (Budapest), 1962.

**Isotopes in Experimental Pharmacology.** Lloyd J. Roth, Ed. Univ. of Chicago Press, Chicago, 1965. 502 pp. Illus. \$12.50. Thirty-six papers on the following topics: Isotopic labeling of drugs (2 papers); Activation analysis (2 papers); Autoradiography (8 papers); Compartmental analysis and dynamic measurements (10 papers); Drug biotransformation (8 papers); Biochemical pharmacology (4 papers); and Deuterium isotope effect: Elucidation of pharmacological mechanisms (2 papers).

**Mechanisms of Hormone Action.** P. Karlson, Ed. Academic Press, New York; Thieme, Stuttgart, Germany, 1965. 285 pp. Illus. \$14.50. Twenty-two papers presented at a NATO Advanced Study Institute. Most of the papers are in English, the others in German or French.

**Metabolism of Steroid Hormones.** Ralph I. Dorfman and Frank Ungar. Academic Press, New York, 1965. 726 pp. Illus. \$32.

**Methods of Animal Experimentation.** vol. 1. William I. Gay, Ed. Academic Press, New York, 1965. 398 pp. Illus. \$13.50. Nine papers: "Collection and withdrawal of body fluids and infusion techniques" by Alvin F. Moreland; "Anesthesia and sedation" by Albert Schaffer; "Care of animals during surgical experiments" by Norman Bleicher; "Radiography" by William D. Carlson; "Methods of euthanasia and disposal of laboratory animals" by Dietrich C. Smith; "Methods of parasitic infections: Outline of general principles" by Ira Singer; "Methods in germfree animal research" by Walter L. Newton; "Aerosol challenge of animals" by Joseph V. Jemski and G. Briggs Phillips; and "Principles in drug administration" by Geoffrey Woodard.

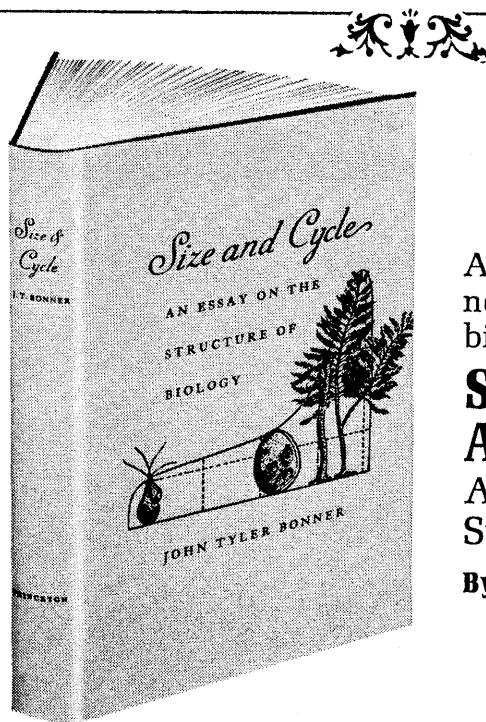
**Nutrition and Caries-Prevention.** vol. 3. *Symposia*, Swedish Nutrition Foundation (Falsterbo), August 1964. Gunnar Blix, Ed. Almqvist and Wiksells, Stockholm, 1965. 130 pp. Illus. Kr. 35. Twelve papers.

**Physiology of Digestion in the Ruminant.** Papers presented at a symposium (Ames, Iowa), August 1964. R. W. Dougherty, Ed. Butterworth, Washington, D.C., 1965. 496 pp. Illus. \$14.50. Thirty-three papers.

**Primate Behavior: Field Studies of Monkeys and Apes.** Irvén De Vore, Ed. Holt, Rinehart, and Winston, New York, 1965. 668 pp. Illus. \$10.

**The Principal Diseases of Lower Vertebrates.** H. Reichenbach-Klinke and E. Elkan. Academic Press, London, 1965. 612 pp. Illus. \$20.

**Proceedings, International Union of Physiological Sciences (Tokyo, Japan),**



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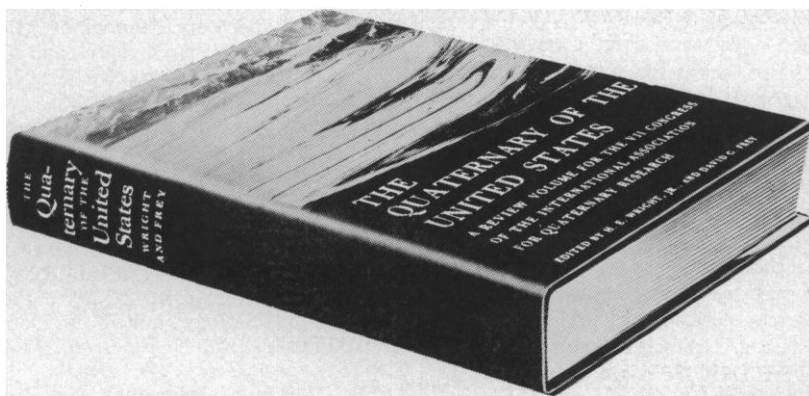
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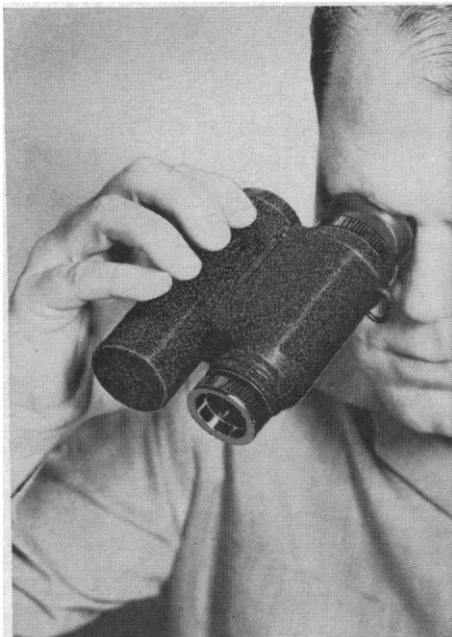
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September 1965. D. Noble, Ed. Excerpta Medica Foundation, Amsterdam, 1965. 652 pp. Illus. Paper. International Congress Series, No. 87.

**Progress in Experimental Tumor Research**, vol. 6. F. Homburger, Ed. Hafner, New York, 1965. 352 pp. Illus. \$22.25. Six papers: "The position of oncogenic viruses in a classification of viruses based on particle morphology" by J. D. Almeida and Arthur W. Ham; "Antigenic behaviour of lymphoma cell populations in mice as revealed by the spleen colony method" by Arthur Axelrad; "Effects of anticancer drugs on biochemical control mechanisms" by J. Frank Henderson; "Some unsolved problems in lung cancer etiology" by Francis J. C. Roe and Margaret A. Walters; "Approaches to the combination chemotherapy of transplantable neoplasms" by Alan C. Sartorelli; and "Transplantation methods as a tool for detection of tumor-specific antigens" by Hans Olof Sjögren.

**Recent Progress in Hormone Research**, vol. 21. Proceedings, 1964 Laurentian Hormone Conference (Lake George, N.Y.), September 1964. Gregory Pincus, Ed. Academic Press, New York, 1965. 687 pp. Illus. \$24. Fourteen papers and discussions on the following topics: Recent advances in thyroid chemistry and physiology (2 papers); Hormones in normal and pathological physiology (2 papers); Pituitary hormones (3 papers); Steroid sex hormones (3 papers); Comparative endocrinology (2 papers); and Neurohumors (2 papers).

**Selected Exercises from Microbes in Action: A Laboratory Manual of Microbiology**. Harry W. Seeley, Jr. and Paul J. VanDemark. Freeman, San Francisco, 1965. 235 pp. Illus. Paper, \$3.25.

**Selected Papers on Molecular Genetics**. A collection of reprints. J. Herbert Taylor, Ed. Academic Press, New York, 1965. 661 pp. Illus. Paper, \$5.95; cloth, \$9. Perspectives in Modern Biology Series; 55 papers.

**The Strategy of Life**. Clifford Grobstein. Freeman, San Francisco, 1965. 128 pp. Illus. Paper, \$1.75; cloth, \$3.50. A Series of Books in Biology, edited by Douglas M. Whitaker, Ralph Emerson, Donald Kennedy, and George W. Beadle.

**The Theory of Inbreeding**. Sir Ronald A. Fisher. Academic Press, New York, ed. 2, 1965. 158 pp. Illus. \$6.

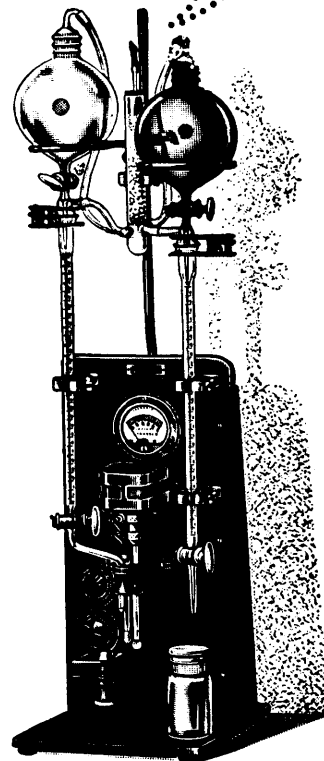
**The Uniqueness of Biological Materials**. A. E. Needham. Pergamon, New York, 1965. 613 pp. Illus. \$15. This book is part of the International Series of Monographs on Pure and Applied Biology, zoology division, vol. 25.

**Vascular Differentiation in Plants**. Katherine Esau. Holt, Rinehart, and Winston, New York, 1965. 172 pp. Illus. \$4.50. Biology Studies Series.

**Viruses, Cells, and Hosts**. M. Michael Sigel and Ann R. Beasley. Holt, Rinehart, and Winston, New York, 1965. 176 pp. Illus. Paper. Holt Library of Science Series II.

**Vitamin B<sub>12</sub>**. E. Lester Smith. Methuen, London; Wiley, New York, ed. 3, 1965. 192 pp. Illus. \$4.25. Methuen's Monographs on Biochemical Subjects, a series edited by Sir Rudolph Peters and F. G. Young.

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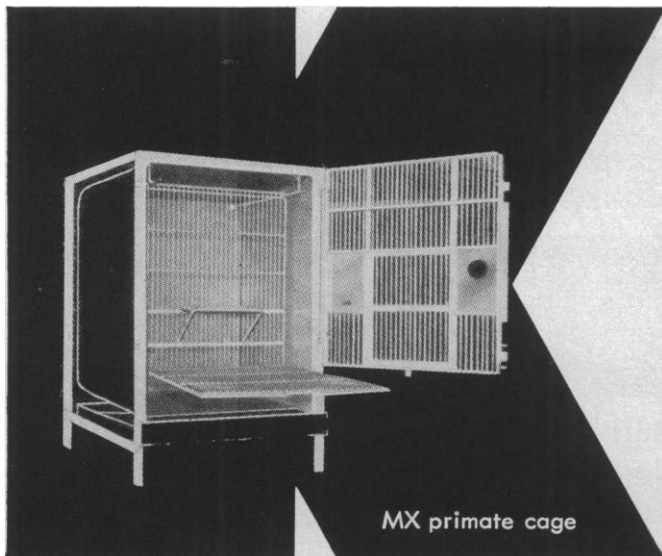
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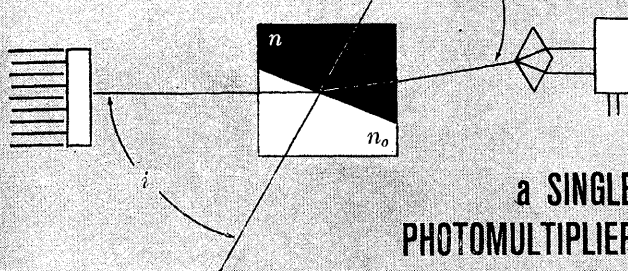
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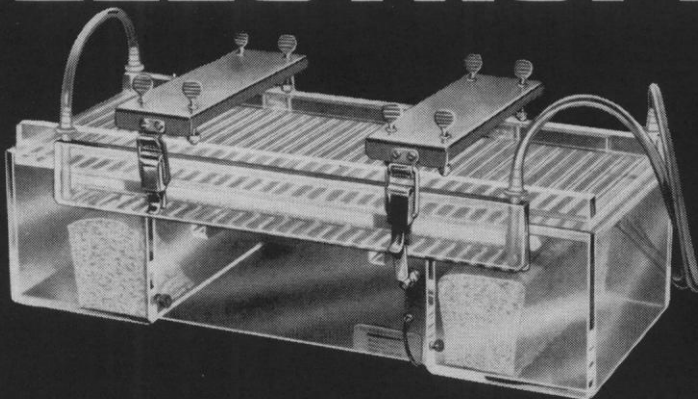
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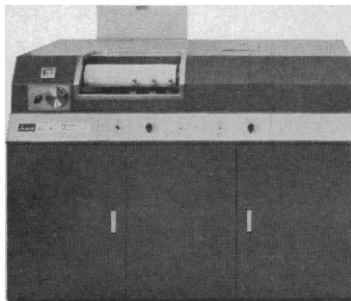
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**American Scientific Books, 1964-1965.** Phyllis B. Steckler, Ed. Bowker, New York, 1965. 260 pp. \$8. This volume covers the period April 1964 through March 1965 and is a cumulation of titles, arranged by subject, from the monthly issues of the *American Book Publishing Record*. Scientific, medical, and technical books published in the United States are included, but juveniles and texts below the college level as well as government and business publications and most serials are excluded.

**Black Brant: Sea Goose of the Pacific Coast.** Arthur S. Einarsen. Univ. of Washington Press, Seattle, 1965. 160 pp. Illus. \$5.

**Canine and Feline Nutritional Requirements.** Proceedings of a symposium organized by the British Small Animals Veterinary Association (London), May 1964. Oliver Graham-Jones, Ed. Pergamon, New York, 1965. 170 pp. Illus. \$9.50. Fifteen papers.

**The Career of Philosophy.** vol. 2, *From the German Enlightenment to the Age of Darwin*. John Herman Randall, Jr. Columbia Univ. Press, New York, 1965. 687 pp. \$12.95.

**The Case for Going to the Moon.** Neil P. Ruzig. Putnam, New York, 1965. 256 pp. Illus. \$4.95.

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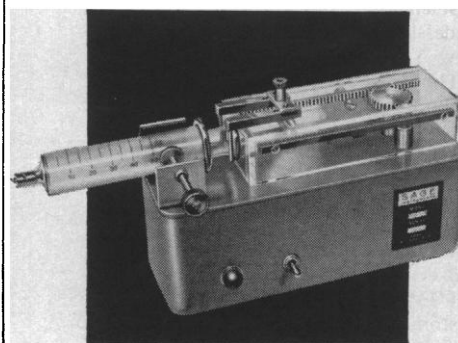
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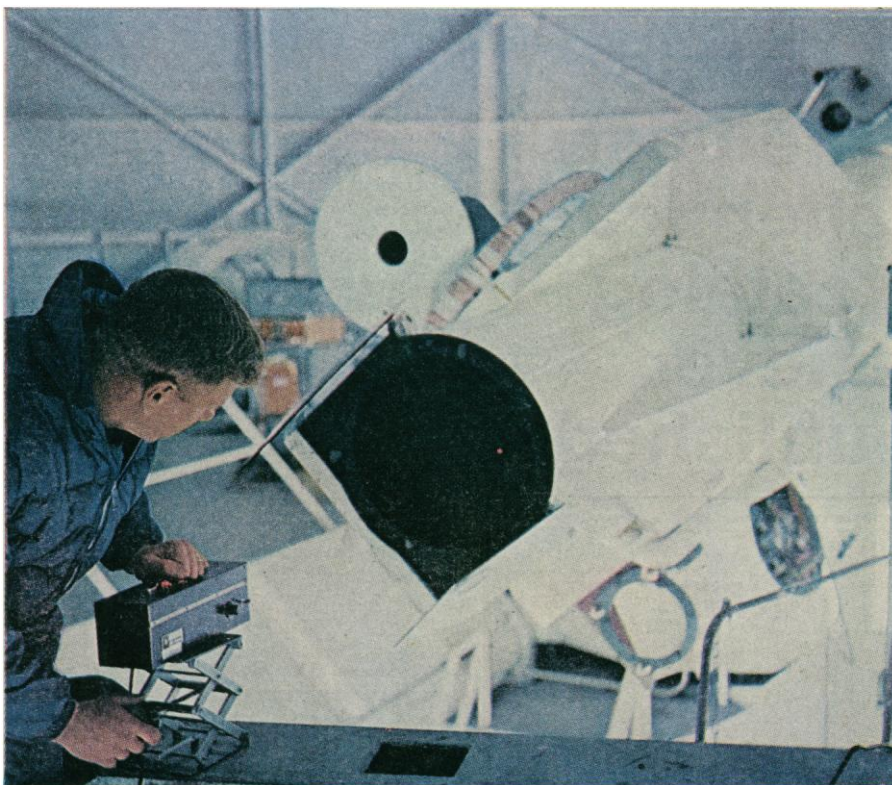
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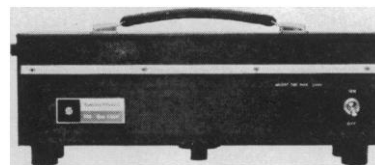
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**Elements of Chemistry: In a New Systematic Order, Containing All the Modern Discoveries.** Antoine-Laurent Lavoisier. Translated by Robert Kerr. With an introduction by Douglas McKie. Dover, New York, 1965. 623 pp. Plates. Paper, \$3.

**Experimental Researches in Electricity.** vols. 1 to 3. Michael Faraday. Dover, New York, 1965. vols. 1 and 2, 896 pp. (bound as one volume); vol. 3, 602 pp. Plates. \$15 set. Reprint; vol. 1, 1839 edition, vol. 2, 1844 edition, vol. 3, 1855 edition.

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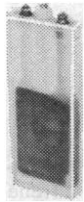
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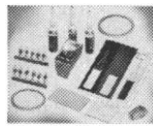
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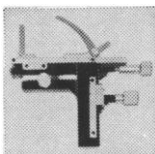
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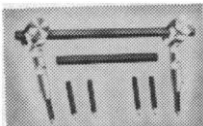
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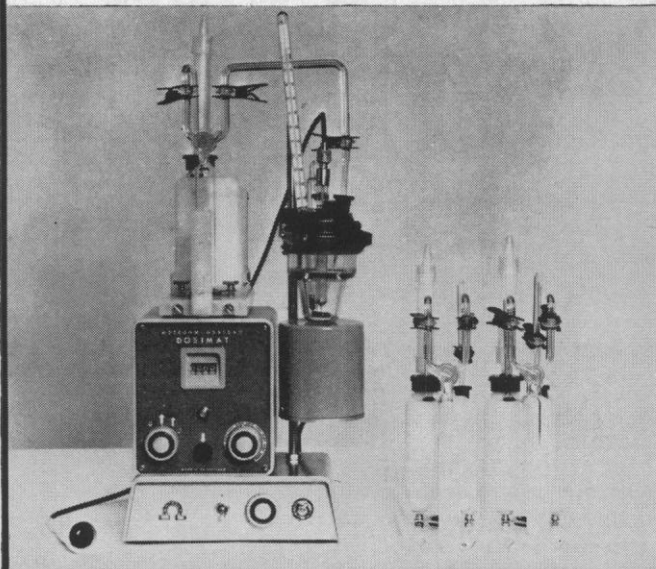
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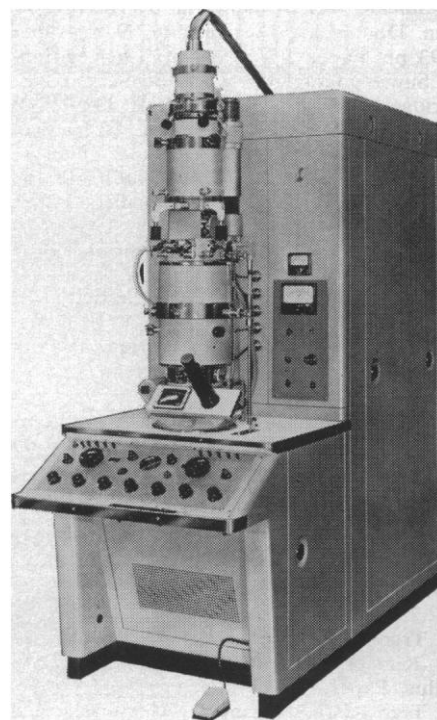
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