SCIENCE

25 June 1965
Vol. 148, No. 3678

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

TECTONIC DEFORMATION

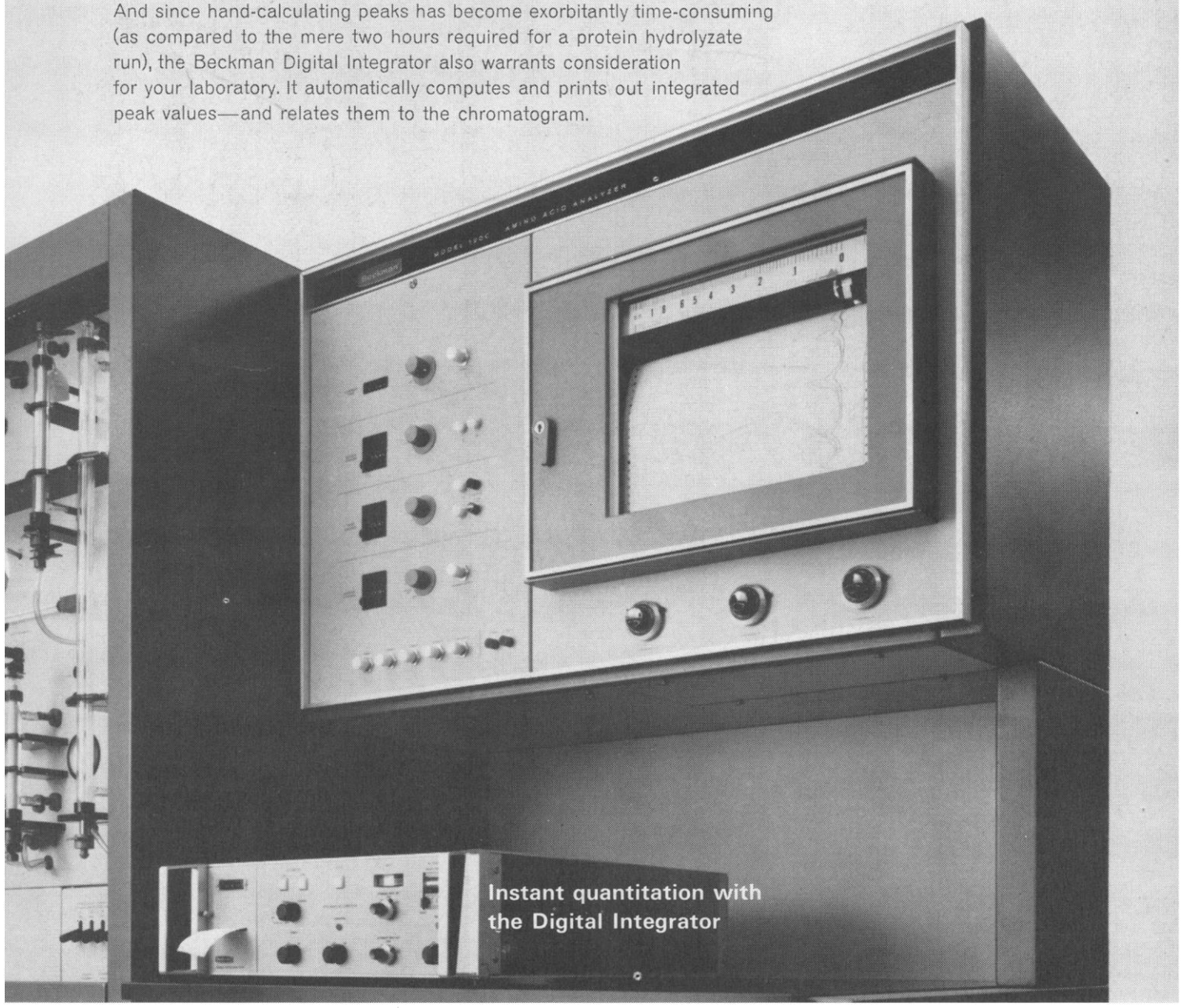
Index Issue

The New 120C Amino Acid Analyzer

The faster pace of investigations...the increasing demands being made on instrumentation...the continuing need for precise results, excellent resolution, and dependable service—all are reflected in the new Beckman Model 120C Amino Acid Analyzer and the Digital Integrator Accessory.

With the Model 120C you get large, well-defined peaks from samples as small as 0.02 micromole. You have automatic reprogramming at the touch of a button. And timing is precise—to a tenth of a minute, with all timers precisely coordinated. The Model 120C's recorder is faster. The control panel is conveniently organized.

And since hand-calculating peaks has become exorbitantly time-consuming (as compared to the mere two hours required for a protein hydrolyzate run), the Beckman Digital Integrator also warrants consideration for your laboratory. It automatically computes and prints out integrated peak values—and relates them to the chromatogram.



If you would like more information on the Integrator and the Model 120C, write for Data File SB-120-5.

Beckman® INSTRUMENTS, INC.
SPINCO DIVISION
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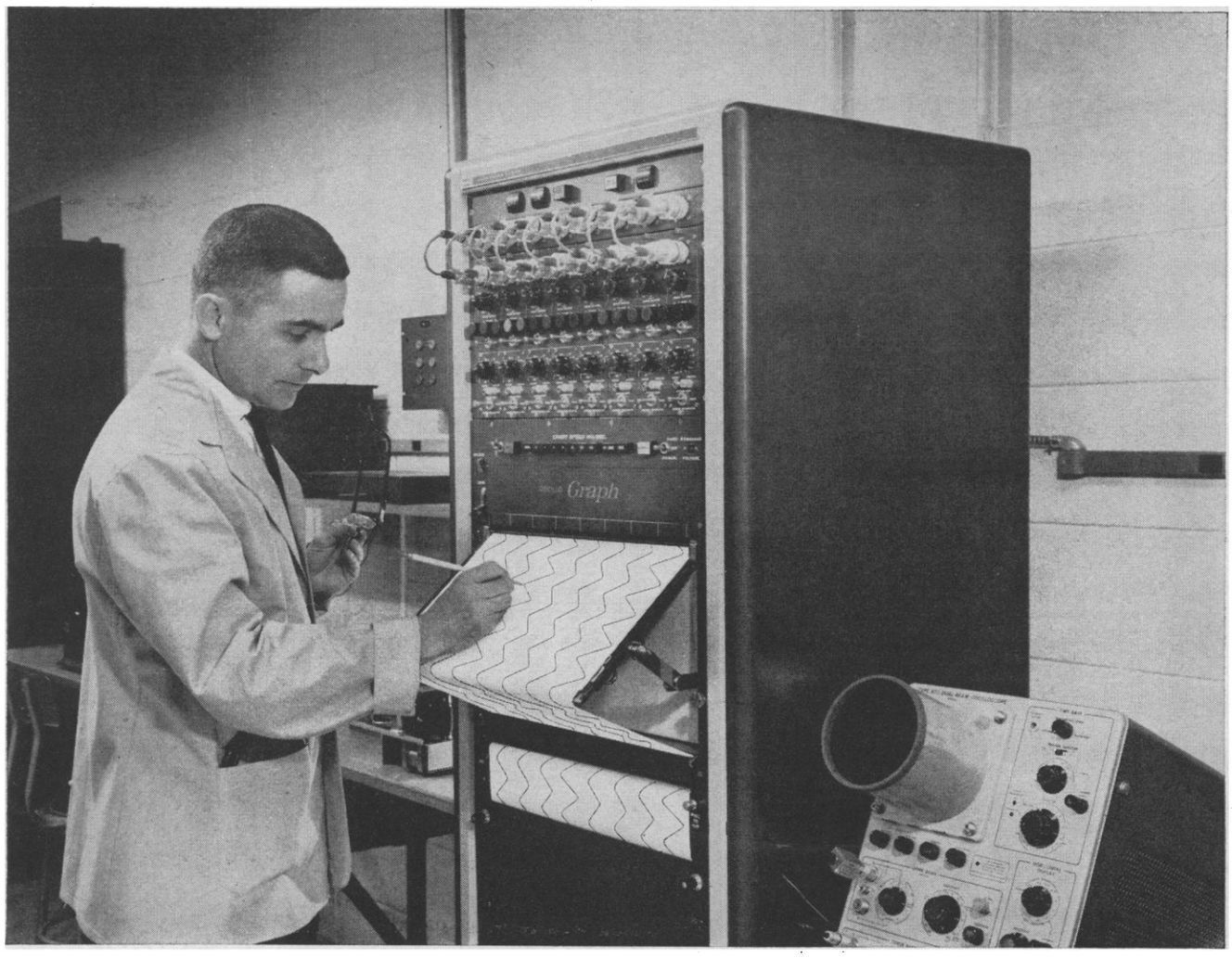
INTERNATIONAL SUBSIDIARIES: GENEVA, SWITZERLAND; MUNICH, GERMANY; GLENROTHES, SCOTLAND; PARIS, FRANCE; TOKYO, JAPAN; CAPETOWN, SOUTH AFRICA



110 cps full scale response + greatest resolution = your best Oscillo Graph buy

No other oscillograph recorder can match the frequency response of Esterline Angus . . . flat to 110 cps (±1%) at 40 mm peak-to-peak deflection.

At 140 cps, frequency response of these four, six and eight channel recorders is down only 3 db from full scale. Even at 200 cps, stylus excursion is 8 to 10 mm.

Resolution? Esterline Angus combines highest chart speeds (to 500 mm per second) with highest frequency response.

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- 0.005 inch wide trace occupies only ½% of full scale. Traces of competitive oscillographs are three times wider.
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- No start-up problems because there are no pens to clog or ink to splatter.
- No stylus temperature adjustments to bother with.

Interchangeable, plug-in amplifiers and couplers provide a multitude of signal channels to record signals from a few microvolts to hundreds of volts.

The stylus motor uses no permanent magnets. This eliminates the clutter of brushes, slip rings, armature leads and linkages normally found in stylus drive mechanisms.

For highest resolution, unequalled response and trouble-free writing, investigate Esterline Angus Oscillo Graph Recorders.

Write for informative Series "O" Catalog.

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ESTERLINE ANGUS

Excellence in instrumentation for over 60 years

25 June 1965
Vol. 148, No. 3678

SCIENCE

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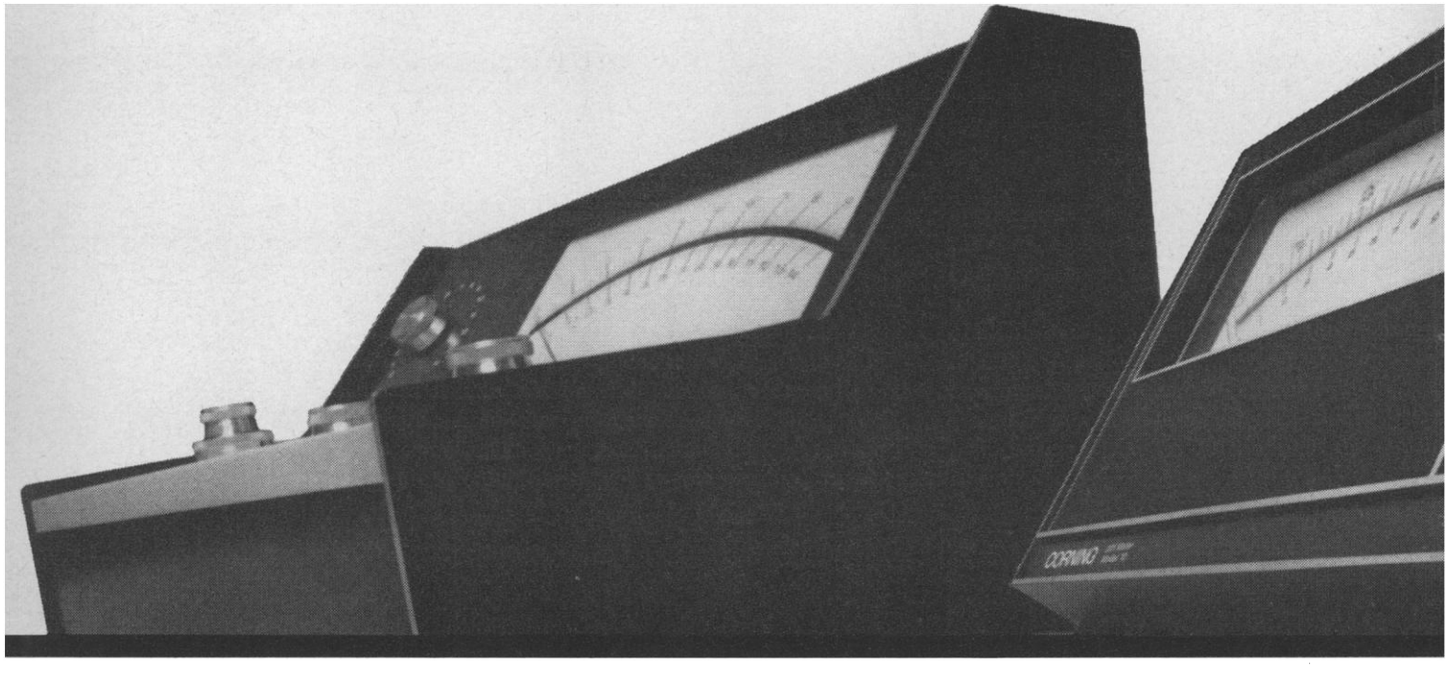
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Fault displacement associated with the 1964 Alaska earthquake. The northwest block (left) of the Hanning Bay Fault has been displaced upward between 4 and 5 meters, relative to the southeast block, along a high-angle reverse fault. The white coating on the reef rock of the upthrown block consists of the bleached remains of calcareous algae and bryozoans that lived below mean tide level. See page 1675. [George Plafker, U.S. Geological Survey]

Borrow a CORNING®



Are you demanding too little from your pH instruments? Find out.

Evaluate for yourself—in your lab, at your leisure—the new performance standards designed into CORNING meters . . . the stability that only solid-state circuitry gives to performance, the reproducibility that only taut-band suspension meters give to readings, the lab-environment durability that you get only with die-cast aluminum and protective epoxy coating.

Read the following descriptions, then choose the CORNING meter that best suits the work you do. Borrow it . . . and see if you've been demanding too little from your instruments.

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 ± 0.002 pH. Price is **$595** complete with accessory kit.

pH Meter

☐ *Check here for an evaluation loan,* and check the meter below that you want to borrow. We will have your CORNING Scientific Instruments dealer contact you to arrange a loan of the meter you specify. No obligation.

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For evaluation loan or literature, send this coupon to: Dept. SC-6, 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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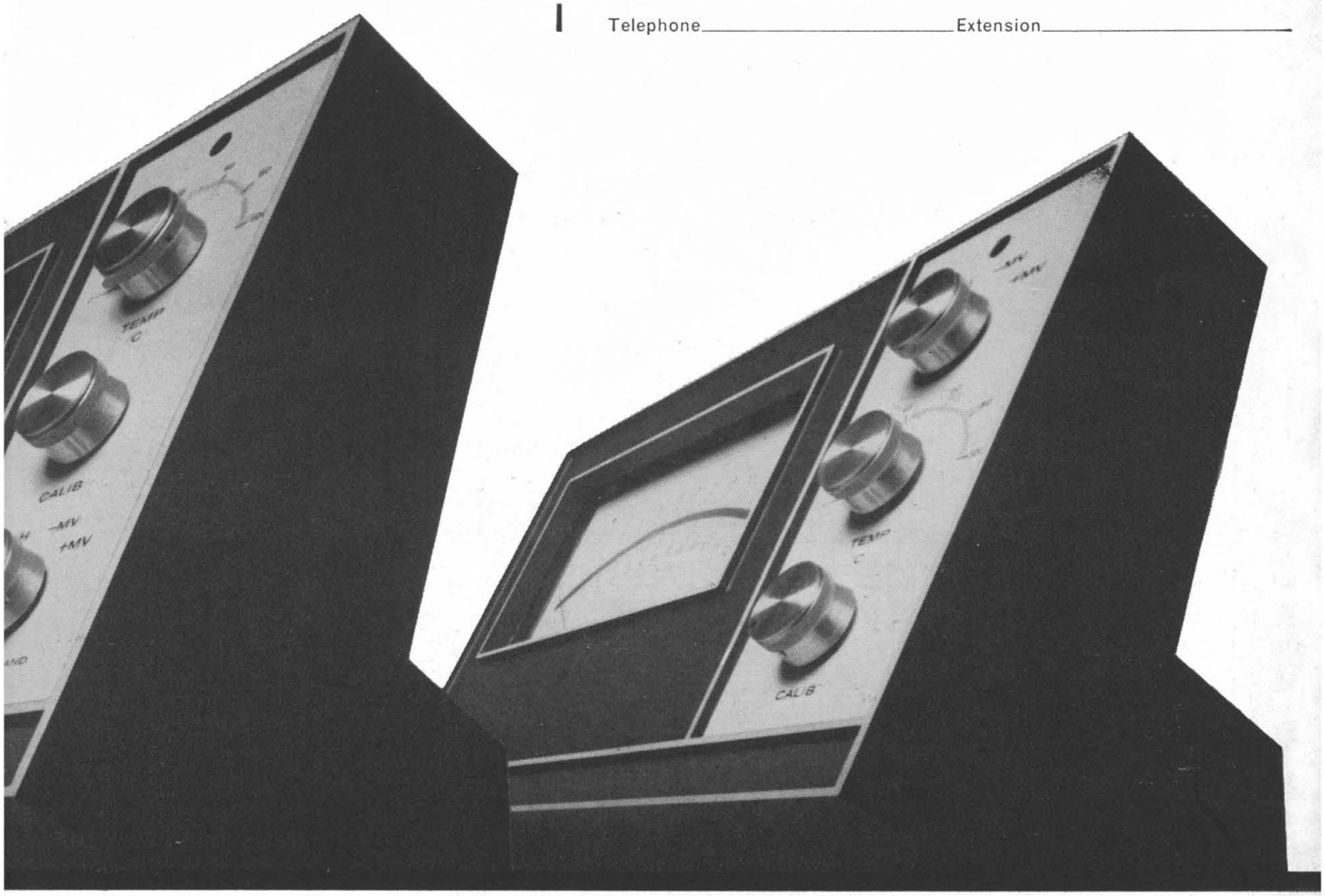

CORNING Model 10 Expanded-Scale pH Meter, center—The longest—10 inches—meter scale on any lab pH instrument lets us put more scale divisions on it, lets you read easily to 0.01 pH on full-scale expansion of any 3 pH units, and to 0.05 pH on the 0-14 range. Reproducibility is better than ±0.005 pH. $485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

CORNING Model 7 General-Purpose pH Meter, right—Speed up routine work without risking accuracy. Drift of less than 0.01 pH/day means stability that provides dependable measurements all day without restandardization. Reproducibility is better than ±0.02 pH. $330 with accessory kit.

Borrow any one of these meters and you will get the unique CORNING pH Electrode with Triple-Purpose Glass Membrane in its accessory kit. This is the *one* remarkably stable electrode that does the general-purpose, high-alkaline region, and high-temperature work that used to require *three* electrodes.

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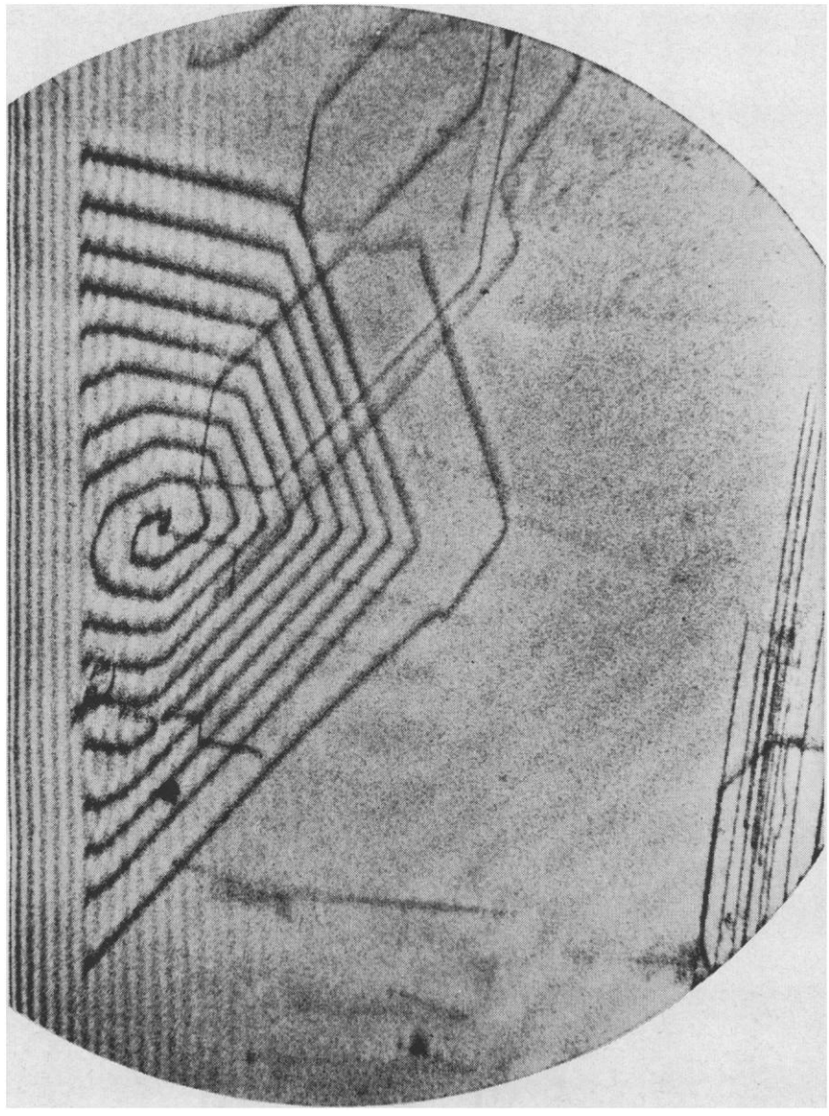
SCIENTIFIC INSTRUMENTS

X-ray Diffraction Topography

Lang Method



Dislocation structure in silicon, 100X using 40μ X-ray point source with silver radiation

The Lang Camera is useful for studying individual dislocations, low angle boundaries, internal precipitates, inclusions, growth stratifications and magnetic domains. Materials may range from diamond to indium antimonide in atomic number. Other Jarrell-Ash related equipment: Dislocation Cameras, Single Crystal Cameras, Diffractometers, High Temperature Cameras, Powder Cameras, Low Angle Scattering Cameras, Microfocus X-Ray Generator, and Servomet Spark Cutting Machine.

Write for information on the Lang camera and other Jarrell-Ash X-Ray Diffraction equipment.

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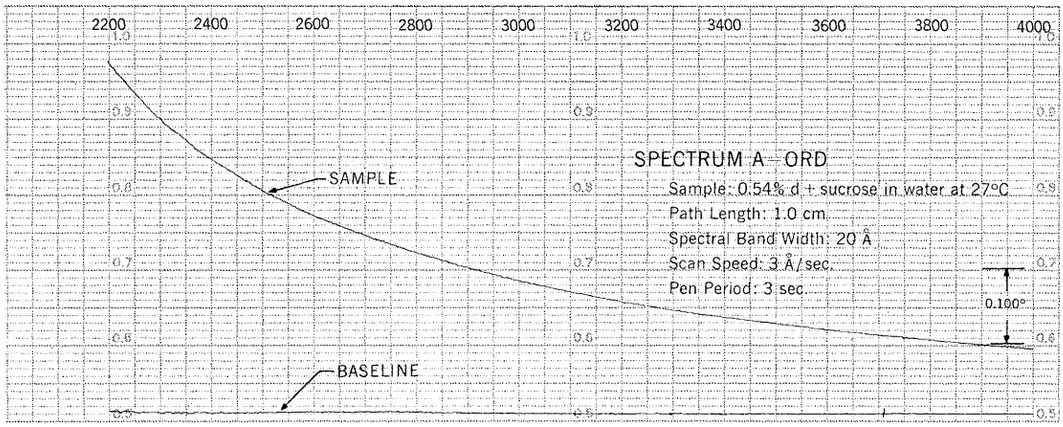
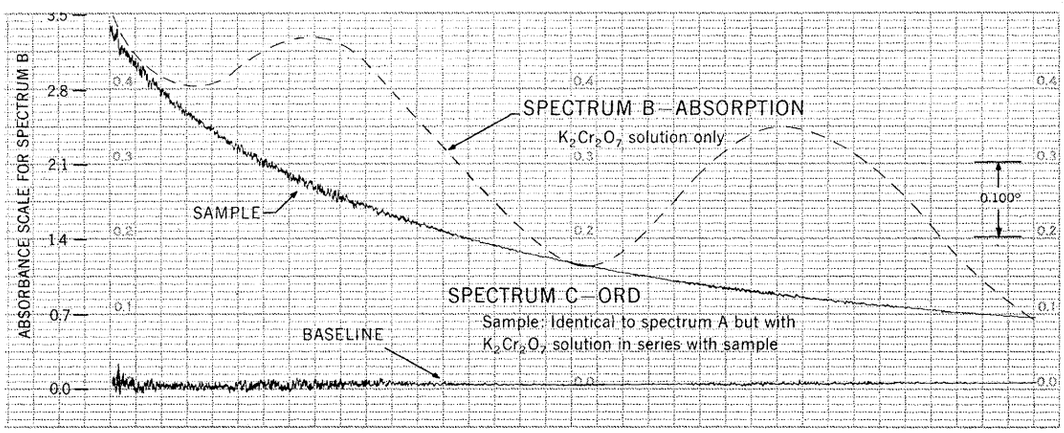
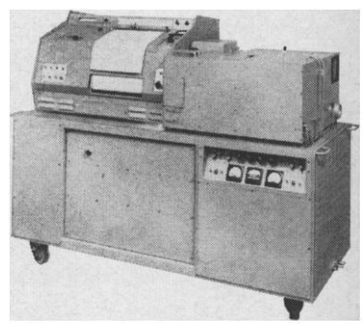
Take full advantage of ORD technique...
WITH CARY MODEL 60 SPECTROPOLARIMETER



The comparison spectra, A and C, show a sucrose sample recorded under different absorbance conditions. Spectrum C demonstrates the ability of the CARY 60 to provide valid dispersion data in regions of high total absorbance, so often a critical need. Note that except for the expected increase in noise due to increased absorbance, the original dispersion spectrum is accurately reproduced. Sucrose was chosen because it gives a simple one term Drude curve on which deviations are easily seen.





Make your own analysis of Model 60 performance. A portfolio of ORD spectra for a variety of samples is available by writing for Data File **E501-65.**

The CARY 60 provides the capability to utilize the ORD technique fully: Its high resolution precisely defines peaks and troughs, minimizes effects of rotation from adjacent bands, provides sharp spectra for more accurate peak-to-trough measurements. High sensitivity permits measurement of very dilute samples. Excellent stability (baseline drift less than 2 millidegrees per 8 hours) assures that precision is maintained even over long periods.

Maximum versatility is achieved with controls that provide operator freedom to utilize superior instrument performance over a variety of sample conditions in either static or kinetic applications.

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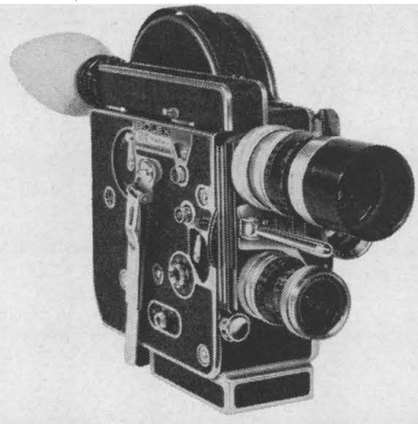

The money camera takes its movies seriously.

Don't you?

When you've stopped shooting films of your kids. When you realize what you take is serious business. Take the camera that takes its movies seriously. Bolex 16: "the money camera."

You see, "the money camera" is just that. The camera that you can count on. When there's something at stake. When your shots are not just fun, but money.

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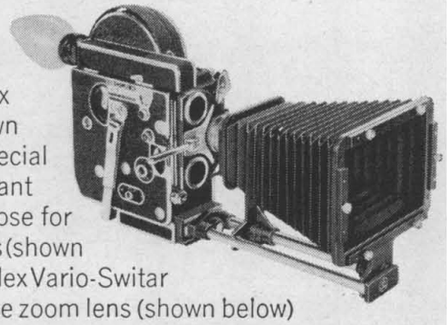
It starts with reflex viewing. The kind that never lets you lose sight of your subject. Gives you automatic threading and spool ejection to speed loading. And then gives you 3 of the world's great lenses: the Switar 25mm f/1.4, Switar 10mm f/1.6 and Switar 75mm f/1.9. And then gives you over 100 other combinations of lenses and accessories.

For example, want to split frame (above) or film charts, shoot opticals? You can add the Bolex matte box (shown right). Or our special lens support. Want to shoot time-lapse for extended periods (shown left)? Add the Bolex Vario-Switar 86EE electric eye zoom lens (shown below) that adjusts automatically to varying light conditions.



Want to go underwater? Or into the Arctic? Anywhere. Anything. The Bolex 16 can take it. And deliver.

That's why we call it "the money camera." Because it's versatile, rugged, dependable. Because when the professionals have something on the line, they put their stock in it. See the Bolex 16. For public relations, sales promotions, research and study, it's the camera to put your money on. Bolex: "the money camera." You can depend on it.

For free Bolex 16 catalog, write: Paillard Incorporated, 1900 Lower Road, Linden, N.J. 07036.

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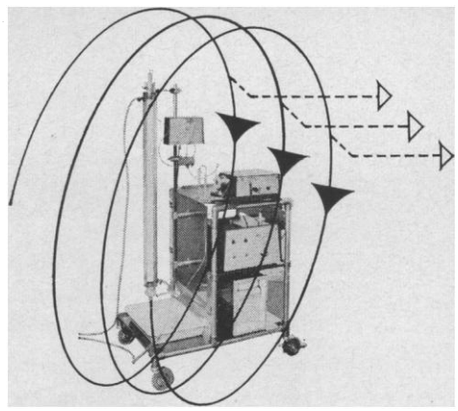
NEW INSTRUMENTATION FOR A NEW TECHNIQUE* IN CHROMATOGRAPHIC SEPARATION



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 operations 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 µl—a reproducible and non-critical method.

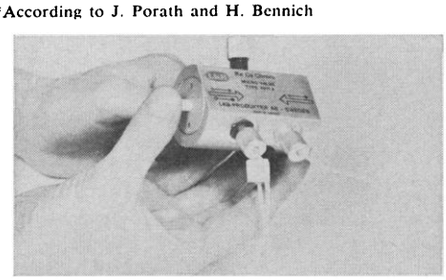
The four main components of the ReCyChrom, namely, a separation column, a peristaltic pump, a selector valve and a flow analyzer are available separately for incorporation into other instrument setups. The specially constructed columns with adjustable plungers at both ends can be sealed completely to 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

Request literature file 4900S-5 for details



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

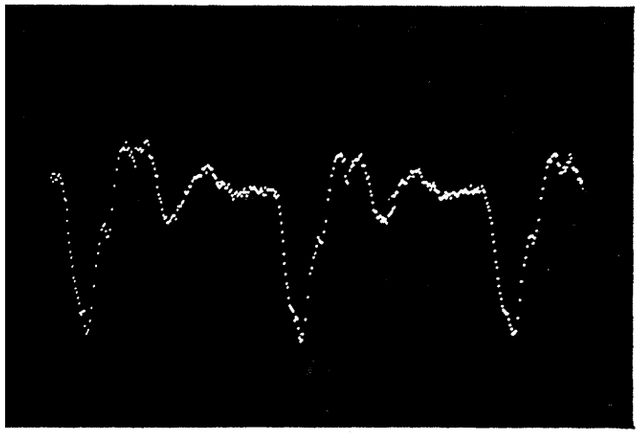
The Peristaltic Pump has many other uses when not in service for the ReCyChrom.

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

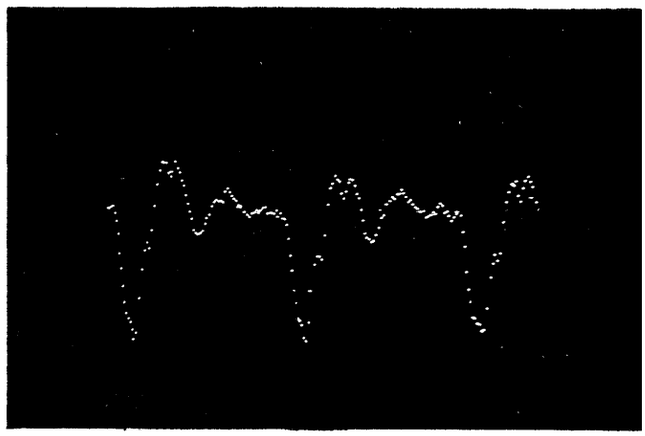
LKB PRODUKTER AB, P.O. Box 12220, Stockholm 12, Sweden

Why settle for this...

400 DATA POINTS

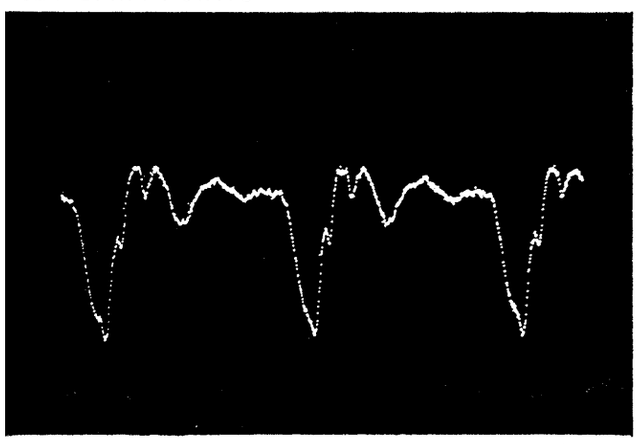


200 DATA POINTS

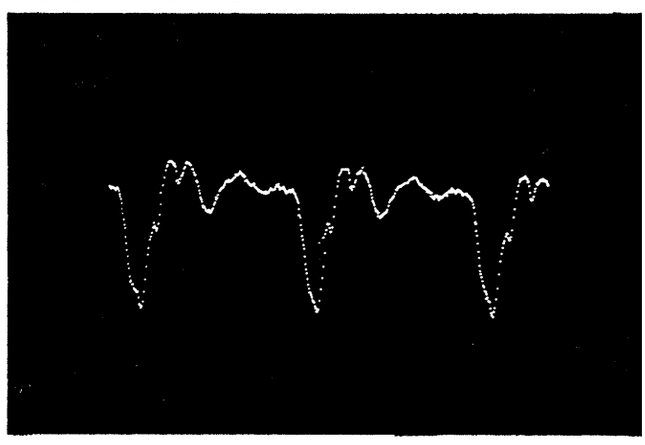


when Enhancetron 1024 gives you this

1024 DATA POINTS



512 DATA POINTS



Unequalled *resolution*—that's the big difference between Enhancetron 1024 and other signal averaging computers. In fact, with its 1024 data points Enhancetron offers almost three times the signal definition of more expensive competitive units. It gives you a precise picture of every peak and valley in the most complex wave forms.

The benefits of Enhancetron 1024 are even more apparent in simultaneous dual input operation. Each signal is digitized at 512 data points (without time sharing)—still a clearly defined signal. Compare this with other computers (see photos) that *start* with 400 data points, then divide them for multiple input use.

Special digitizing process: So effective is Enhancetron 1024, it extracts signals from random electrical noises 10 to 40 times greater in magnitude than the signal of interest. Through a patented digitizing process, repetitive signals are added in direct proportion to the number of samples taken, while noise adds in proportion to the square root of samples taken. Result: a clear signal of interest that literally grows out of the noise for display on your external oscilloscope.

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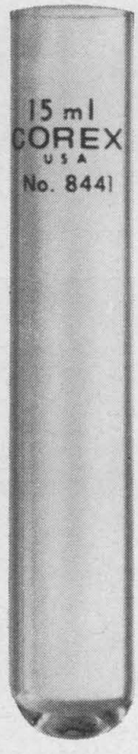
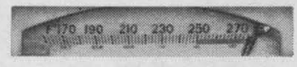


... the *sterilizability* of glass



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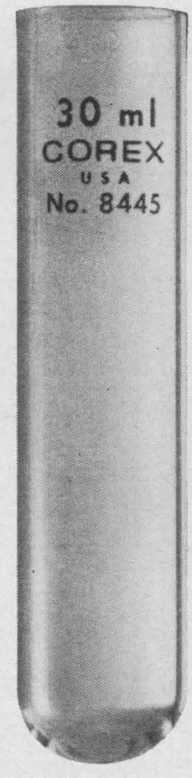

Our 1965 warranty covers COREX high-speed tubes. Any you buy which are unserviceable as of December 31, 1965, will be replaced without charge.

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Write for complete information on high- and low-speed COREX tubes and for new sizes and types soon to be released. Laboratory Glassware Dept., Corning Glass Works, 9206 Crystal Street, Corning, N. Y.

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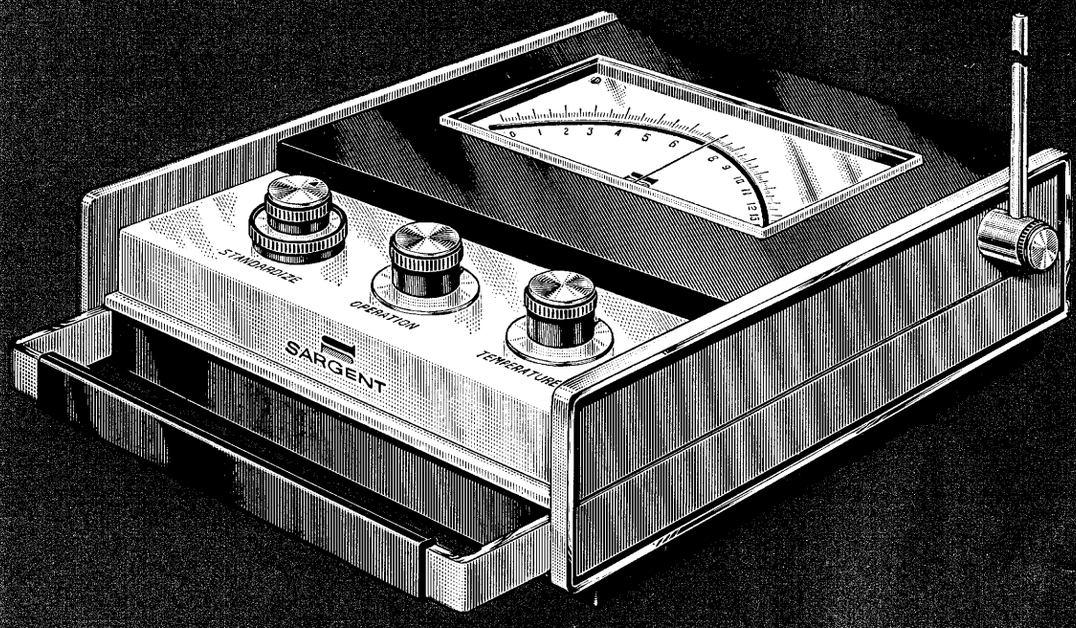
 30-ml No. 8445 tube with 8445 adapter fits 50-ml cavities in these rotors	SS-1 HB-4 SS-34 SP/X	862 856	9 RA 16 RA
 150-ml No. 1265 bottle with adapter fits 250-ml cavity in this rotor	GSA	—	—

A new concept in pH meters...



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Accuracy and stability found heretofore only in the highest-priced meters.

Rugged construction for use in any environment under field conditions.

SARGENT

MODEL PB—with modular mercury cell power source providing over 6 months of normal usage in the field.

MODEL PL—with modular Zener reference line power source for continuous use in the laboratory.

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MODEL PL Cat. No. S-30008 with line power source, buffers and electrodes . . . $295.00
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And to whet your interest in case you haven't decided, here are some of the many advantages of NATIONAL's CO_2 Incubator:

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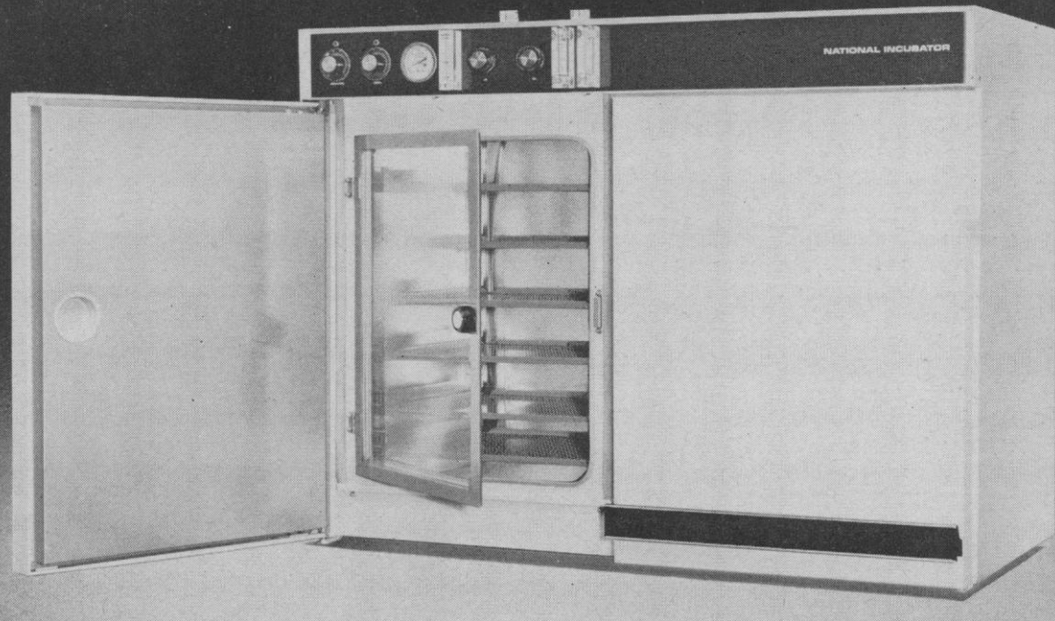
- Pre-heater for gas mixture to protect your work
- Corrosion-proof construction inside and out
- High humidity without condensation on inner walls
- Exclusive non-magnetic door mechanism . . . won't stick or click!



NATIONAL #3321 WATER JACKETED CO_2 INCUBATOR

NATIONAL INCUBATORS and other laboratory apparatus have led the field for more than forty years. Continuing research and development is designed to keep it that way. If **you** won't settle for second best, specify NATIONAL. **At right,** #3212 Water-Jacketed Incubator; #3211 Anhydro Incubator; #3512 Air-Flow Incubator. There is a NATIONAL Incubator tailored to **your** needs!

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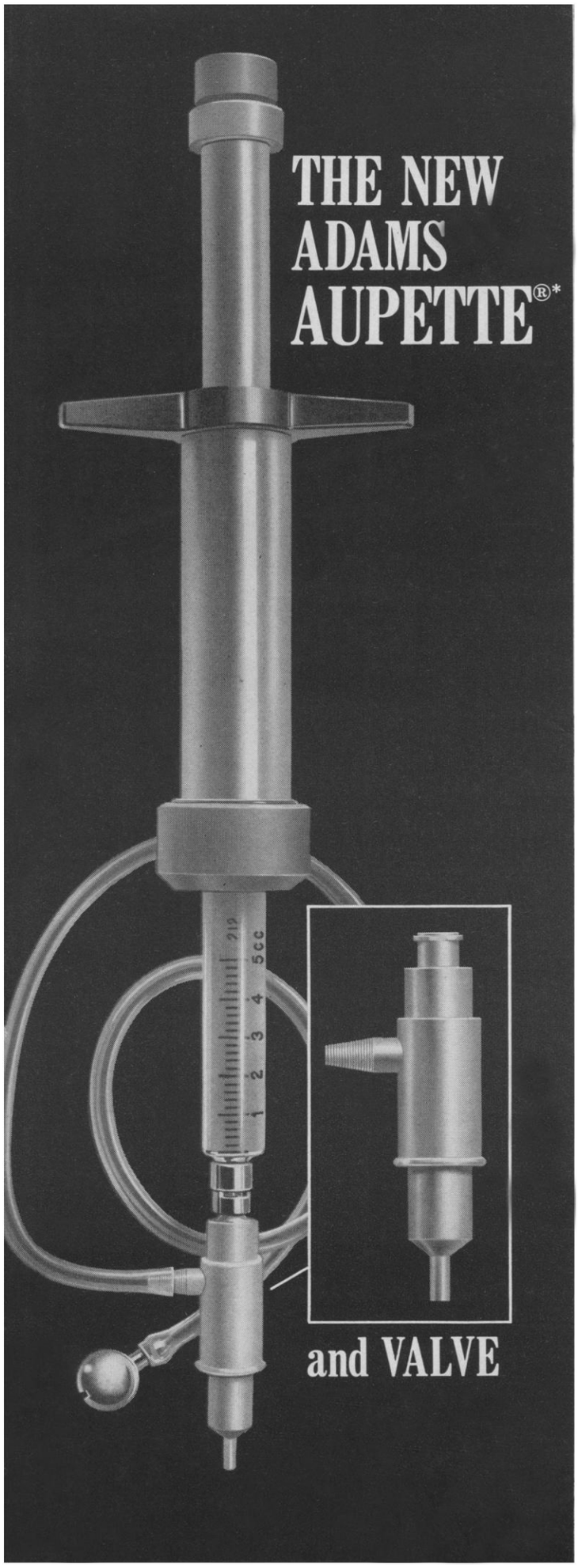
General Sales Office: Box 3102, Stamford, Connecticut 06905



—an automatic pipetting device for delivering predetermined quantities of liquid repeatedly—without resetting or remeasuring!

The Adams Aupette saves time by eliminating the tedious task of measuring the individual quantity for each delivery. It is ideally suited for research, clinical and classroom laboratories. The Adams Aupette provides:

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Easy, *one hand* operation.

SAFETY
No danger of contamination,—eliminates mouth suction.

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Accurate to ±1.5%;—micrometer adjustment allows for accurate, precise setting.

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Use with any standard 10, 5, or 1 cc. tuberculin type syringe with adapters,— may be operated with one hand or mounted on any laboratory stand with standard clamps.

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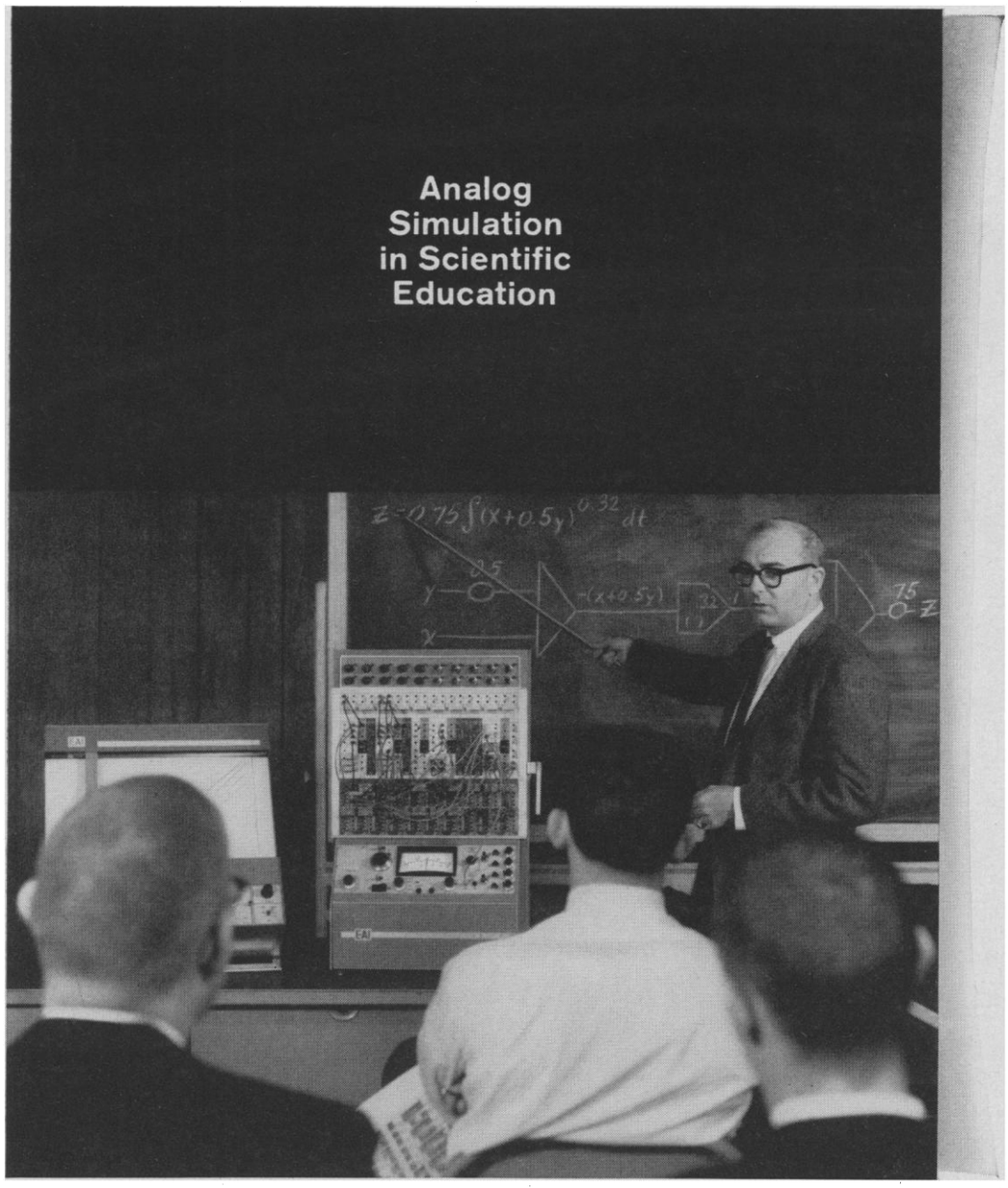

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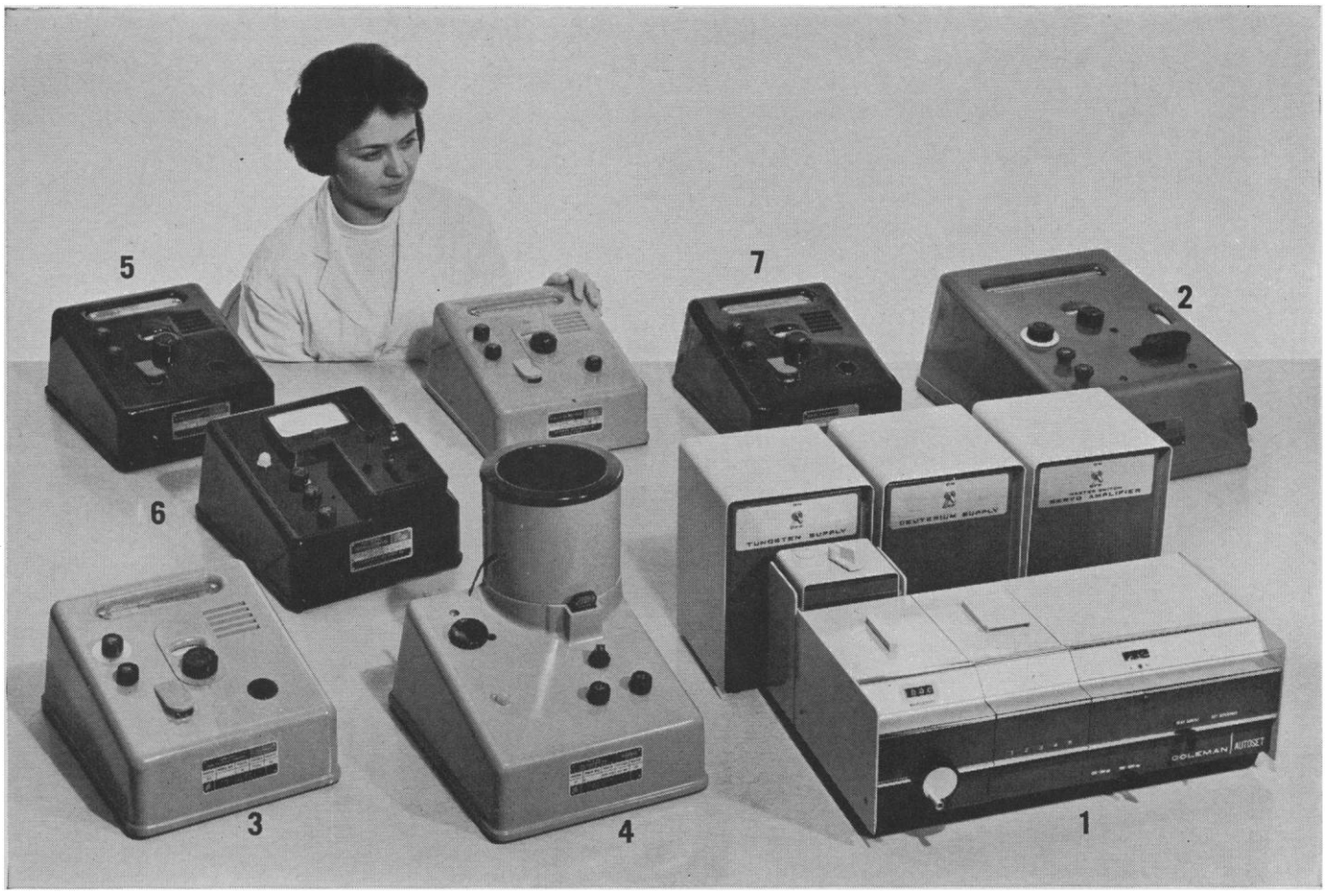

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Coleman photometric instruments offer unique opportunities to coordinate precision, speed, and convenience in chemical analysis. In fact, many of these instruments are used in combination to give results that are faster — surer — more accurate than comparable equipment. See how Coleman Instruments can help you to solve your analytical problems quickly and economically:

COLEMAN

① Autoset™ Spectrophotometer

Digital readout—automated operation. The first spectrophotometer engineered to eliminate time-consuming operations, reduce the possibility of human error and deliver analytical results directly in numerical form. "Autoset" automatically adjusts its photometer to the absorbance of the reference solution—eliminates manual adjustments of sensitivity, slit width and dark current. Wave length range is 200 to 1000 mμ and a bipartite diffraction grating provides operation at favorable energy levels all across the spectrum. Accommodates wide range of sample sizes, from 0.12 to 25 ml; provides light paths from 1 to 100 mm. Price for UV-Visible range instrument—$2675.00.

② Universal Spectrophotometer

Combines the functions of a spectrophotometer, nephelometer, fluorometer, titrator, galvanometer. An excellent instrument for the laboratory using a variety of techniques and/or requiring a high work output. The Universal Spectrophotometer provides a choice of two precise measurement systems—direct deflection galvanometer readings or readings from a calibrated slide wire. Other features: rapid sample handling; accepts round, square, oblong and cylindrical cuvettes; utilizes long or short light paths. Wave length range is 325 to 825 mμ. Five choices of power supplies—Prices start at $674.00.

③ Junior Spectrophotometer

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The instrument has a diffraction grating monochromator which does not require complicated slit adjustments and has no vacuum tubes or electronic amplifiers; it functions precisely, day after day, with no down-time for repairs.

Wave length range is 400—700 mμ. Three models available; prices start at $396.50.

④ Flame Photometer

For analysis of sodium, potassium, calcium, magnesium and lithium. Offering a wide analytical range, proven precision, and great dependability at a low cost, the Coleman Flame Photometer is the "best buy" in its field. Widely used for analyzing specific constituents of foods, soils, fertilizers, ceramics and biological materials. The Flame Photometer uses the Coleman Junior or Universal Spectrophotometer, the Nepho-Colorimeter, Colorimeter or Galv-O-Meter as a readout instrument. For those who already own one of these, the price of the Flame Photometer is gratifyingly low. The total cost including the readout instrument is far below that of any other Flame Photometer—and you add the versatility of spectrochemistry, nephelometry or colorimetry to your laboratory techniques. The Flame Photometer costs only $495.00.

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Measures haze in liquids that is indiscernible to the human eye. This unique Coleman instrument can detect haze in liquids that appear crystal-clear. In beverage industries it is used to predict formation of long-term precipitates; in the life sciences, to determine bacterial growth rates. Coleman Nephelos Standards provide the only universally recognized numerical notation for expressing degrees of haze. The instrument may be used also as a precise colorimeter. Accepts the same wide range of sample sizes accommodated by the Junior Spectrophotometer—from 0.007 to 25 ml. The instrument is extremely stable; analyses are completely reproducible. Comes with a choice of power supplies; prices start at $471.50.

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Precise—convenient—wide sample range. The Coleman Colorimeter applies to colorimetric analysis the convenience and versatility which characterize the Junior Spectrophotometer—sloping panel with simple controls; rapid sample handling; a sample size range from 0.007 to 25 ml. The filter series is carefully planned to cover the spectrum from 390 mμ to 655 mμ. Special filters are available for specific analyses; filter holders enable the analyst to use his own selection of filters for special applications. Available with a choice of power supplies; prices start at $204.50.

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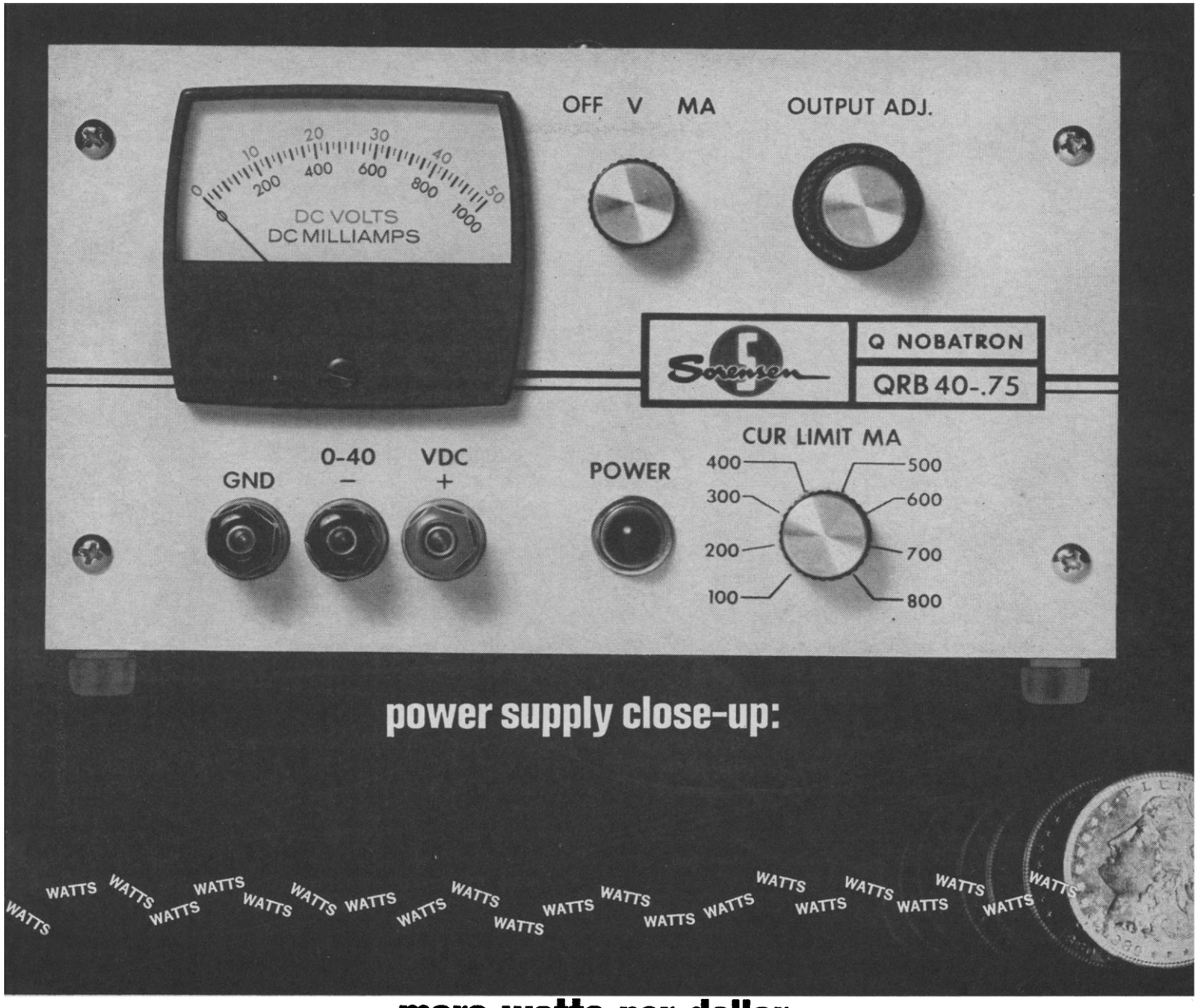

more watts per dollar

Check the specs and the price ($145) and you will find: Sorensen's new QRB40-.75 "ranger" delivers 1½ times the watts per dollar of most competitive power supplies... with no stinting on performance.

CONSTANT CURRENT... Unit can be externally converted to a highly regulated (0.15%) constant current supply.

CURRENT LIMITING... Provides automatic protection against short circuit or overload. Also acts to provide automatic transfer from the normal constant voltage mode to a constant current mode whenever the load demands more current than the limiter has been set to supply.

RESOLUTION... Output can be finely adjusted to 4mv on the 40-volt model; 3mv on the 30-volt model; and 2mv on the 20-volt and 15-volt models.

OTHER QRB FEATURES include programmability, series/parallel operation, and remote sensing.

For complete data on the QRB series and other Sorensen products send for the new, 140-page "Controlled Power Catalog and Handbook." Write Sorensen, Richards Avenue, South Norwalk, Connecticut. Or use reader service card number 200.

ELECTRICAL & MECHANICAL SPECIFICATIONS

MODEL NUMBER	OUTPUT VOLTAGE RANGE (VDC)	OUTPUT CURRENT (AMPS.)	% REG. (LINE & LOAD COMB.)	RMS RIPPLE	RESP. TIME (MICROSEC.)	TEMP. COEF. (%/°C.)	CABINET SIZE INCHES WIDTH	CABINET SIZE INCHES HEIGHT	CABINET SIZE INCHES DEPTH	RACK PANEL INCHES HEIGHT	WEIGHT (LBS.)
QRB15-2	0-15	0-2	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅛	9	5¼	10.75
QRB20-1.5	0-20	0-1.5	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅛	9	5¼	10.75
QRB30-1	0-30	0-1	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅛	9	5¼	10.75
QRB40-.75	0-40	0-.75	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅛	9	5¼	10.75

Sorensen

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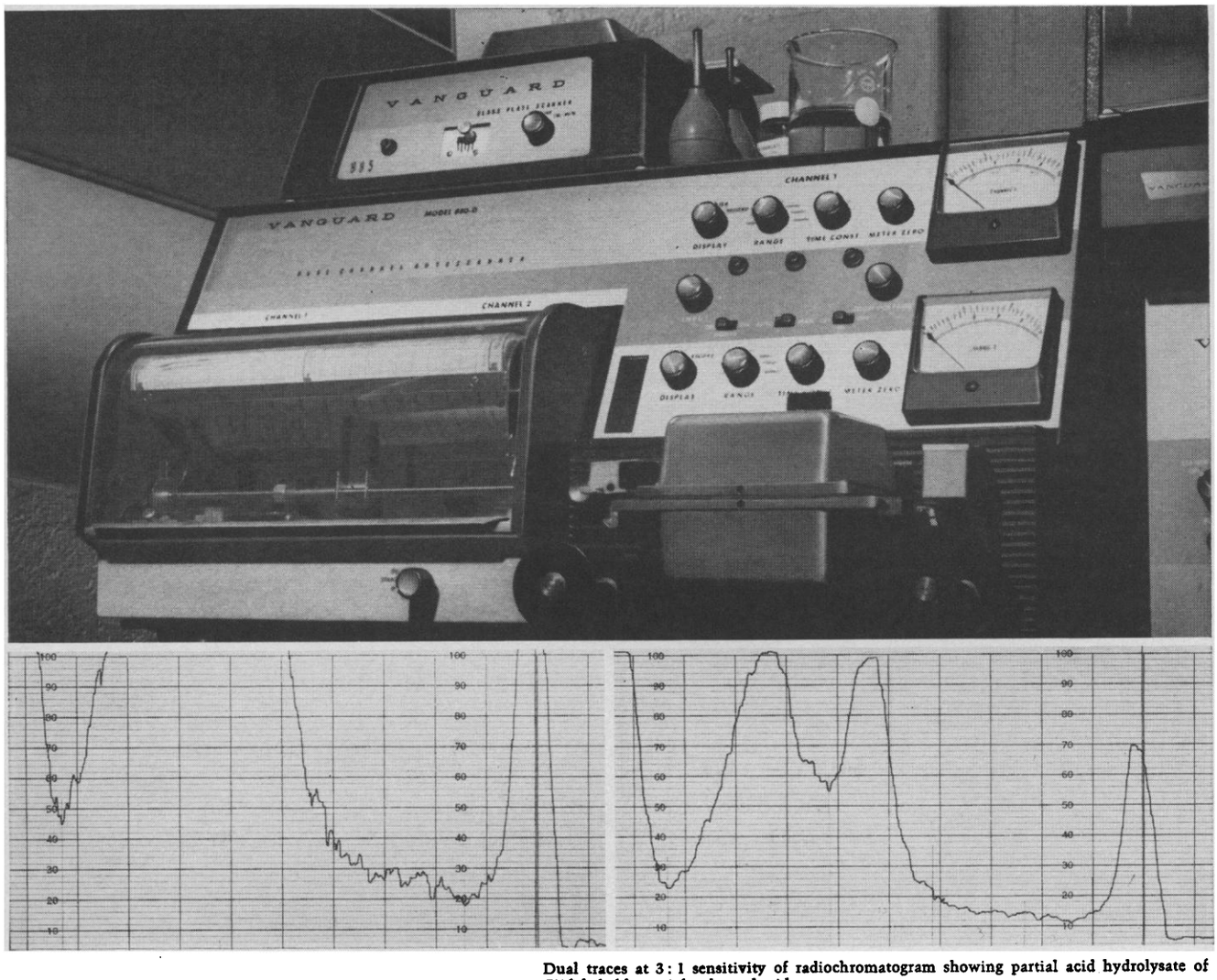

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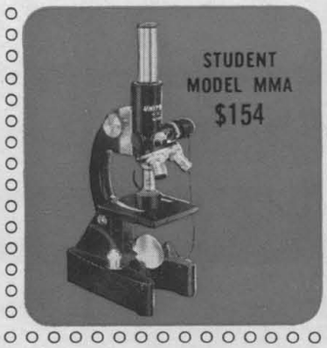
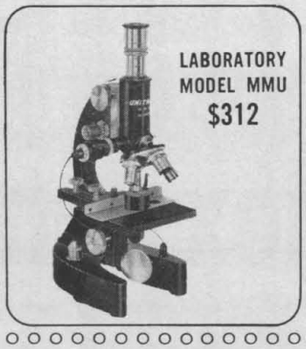


STUDENT MODEL MMA $154



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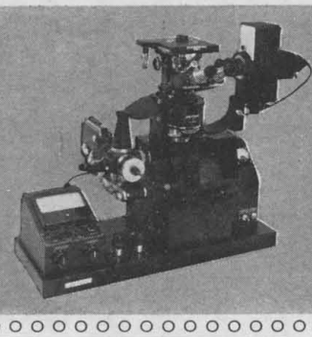

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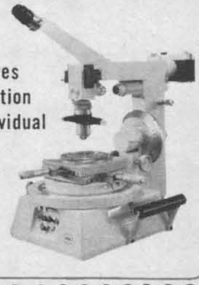
Measures orientation of individual grains



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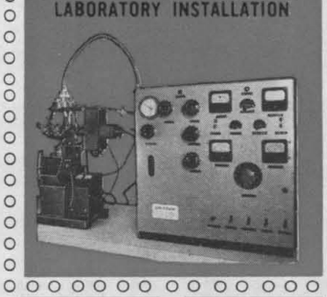

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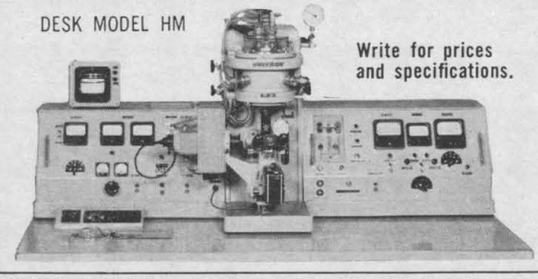

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Widefield Filar Micrometer $105

Stereoscopic MSL.....$110

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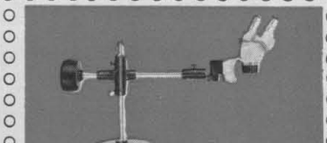

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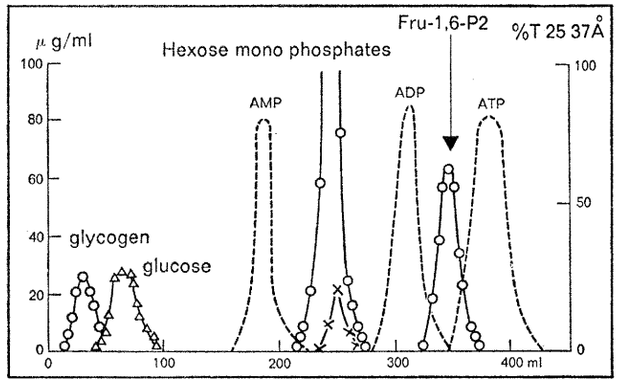

Model experiment with glycogen, glucose, sugar phosphates and adenosine phosphates on a column of DEAE-Sephadex A-25. Reproduced from Biochim. Biophys. Acta 74 (1963) 588, by permission of the author.

Type	Description	Ionic form	Capacity meq/g	Hemoglobin cap. g/g at pH	Particle size microns	Availability
DEAE- A-25 Sephadex A-50	Weakly basic anion exchanger Functional groups: diethylaminoethyl	Cl^-	3.5 ± 0.5	0.5;8.8 1.4;8.8	40-120	100 g bottles 500 g bottles bulk quantities
CM- C-25 Sephadex C-50	Weakly acidic cation exchanger Functional groups: carboxymethyl	Na^+	4.5 ± 0.5	0.7;6.5 4.7;6.5		
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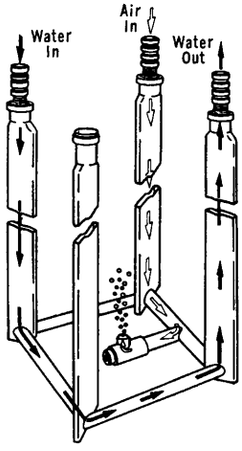

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*Patent Pending

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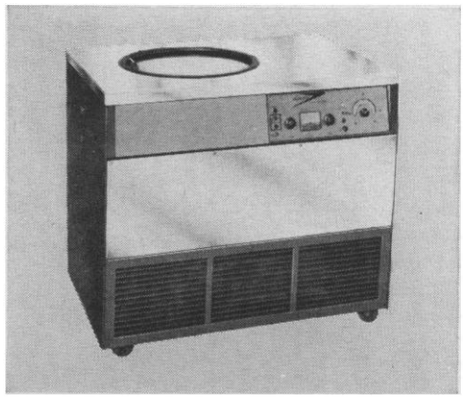

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SUBJECTS LARGER VOLUMES TO GREATER FORCES

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400 ml to 28,700 x G

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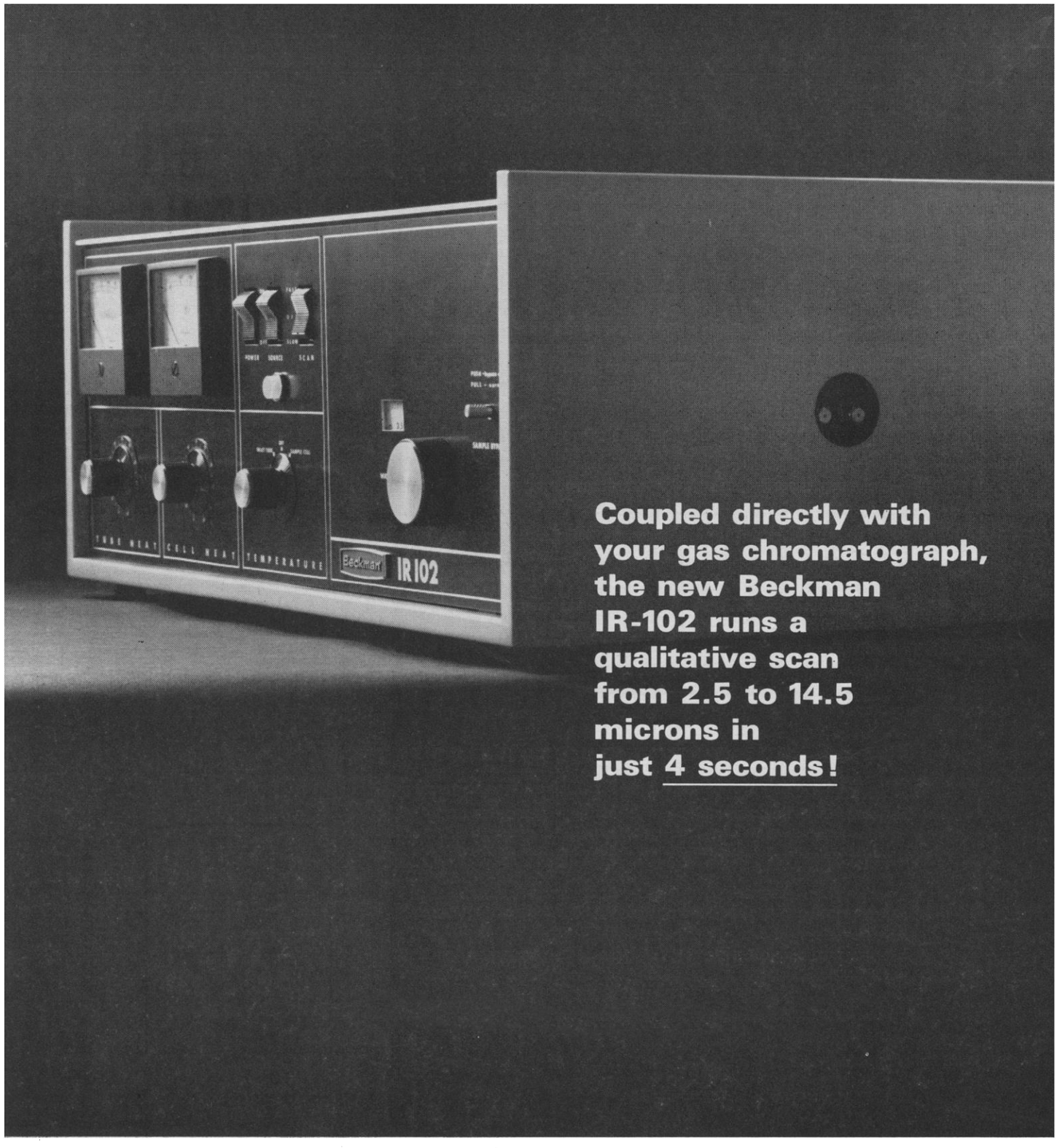

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June, 1965

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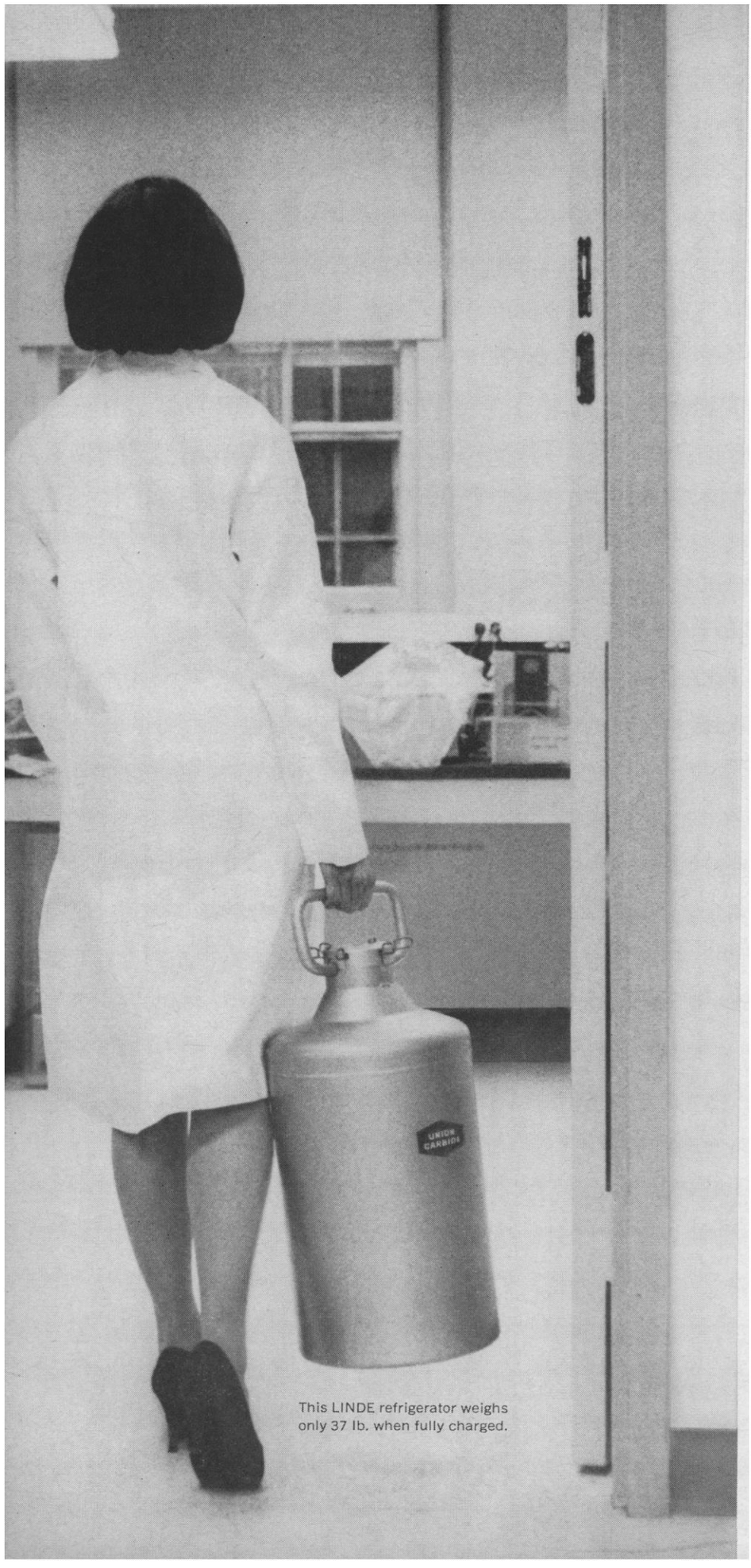

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UNION CARBIDE **CRYOGENIC PRODUCTS**

heart of conversation [see F. Fremont-Smith, *Amer. Inst. Biol. Sci. Bull.* **11**, 17 (1961); also "Conversation as Communication," 3rd Yates Lecture (Michigan Tuberculosis and Respiratory Disease Association, 1961)]. The problems of pride, egotism, tension, and rivalries referred to in the editorial are usually reduced to manageable proportions when one can establish for the group an atmosphere of "free-floating security."

At the New York Academy of Sciences we are developing a training program for conference organizers, chairmen, and discussion leaders to improve the management of such small conferences by university centers, research organizations, and professional organizations. I would be grateful for information about other ongoing conference programs which have been organized primarily for discussion and exchange of ideas.

FRANK FREMONT-SMITH
New York Academy of Sciences, 16 East 52 Street, New York 10022

Language among Scientists

President de Gaulle desires wider use of French at international scientific meetings (News and Comment, 16 Apr., p. 350). Some problems should be noted. Working documents for intergovernmental meetings are usually prepared at the last minute by a small and overworked secretariat. In scientific fields it is not uncommon for this work to be done in English. In order for such working papers to be translated into French (or other languages of possibly greater scientific importance), the original version must be turned over to a group of translators, who may not accord a high priority to the job and who almost certainly are unfamiliar with the scientific terminology. In the fullness of time, draft translations are returned to the originating office, which is then faced with a substantial and time-consuming editing job if the original meaning is to be preserved. Thus the distribution of working papers is further delayed, and the participants at such meetings may find themselves in plenary session before having access to the necessary background information. Needless to say, the translation process not only slows down considerably the already ponderous international machinery, but costs a great deal of money that might be put to better use. Most participants in international scientific meetings can at least read English and would probably prefer to receive background papers as early as possible, even if not in their own language.

Another problem concerns interpretation at meetings, particularly those of an informal character (steering committees, working groups, and the like). Interpretation, whether consecutive or simultaneous, is expensive, and good interpreters are hard to find. It often occurs that everyone in the room could work comfortably in English, yet for chauvinistic reasons a participant will insist on using his own language, thus slowing down communication and increasing expenses.

As noted in the article in *Science*, English seems to have become the lingua franca of science. Scientists from the non-English-speaking world have learned to live with this in the interests of getting their work done. One hopes that President de Gaulle, having said his piece for the glory of France, will let the scientists go about their business in the *ad hoc* way they have devised.

WARREN S. WOOSTER
Scripps Institution of Oceanography, University of California, La Jolla

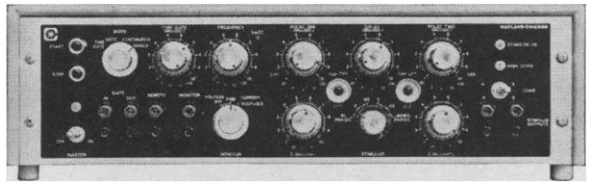
Metric Conversion: Petition to Congress

The following resolution was passed unanimously by the American Institute of Nutrition at its annual meeting on 10 April:

Whereas, more than 90% of the world's population now operates under the metric system, and whereas the *Journal of Nutrition, Poultry Science, Journal of Animal Science, Journal of Dairy Science, Food Chemicals Codex*, and publications of the National Academy of Sciences–National Research Council now use or will use metric weights and measures exclusively, be it therefore resolved that the American Institute of Nutrition in its Annual Meeting, April 10, 1965, recommends *passage of the bills now before Congress to study feasibility and practicability of conversion to the metric system of weights and measures for general use in the United States.* Be it further resolved that copies of this resolution be sent to committees concerned with metric conversion study bills S. 774, H.R. 2626, H.R. 38, and H.R. 1154 to achieve the above objective.

R. W. ENGEL
Department of Biochemistry and Nutrition, Virginia Polytechnic Institute, Blacksburg 24061

This new stimulator extends the scope and enhances the precision of evoked-response studies



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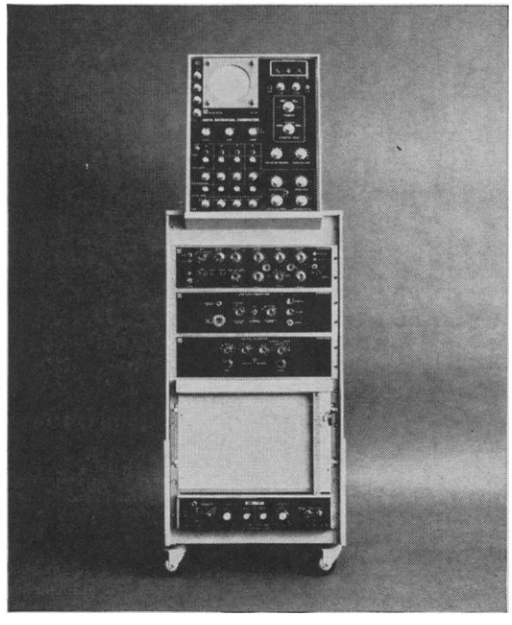

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New Directions for the National Science Foundation

On 22 June, the Subcommittee on Science, Research and Development opened the first comprehensive legislative review—as distinct from annual appropriations hearings—that the National Science Foundation has had since its establishment 15 years ago (*Science*, 11 June 1965). The hearings are sure to include an examination of the Foundation's programs and activities, its operational policies, and the extent to which it has met its large responsibilities. We hope that the committee members and the witnesses who appear before them will go beyond these matters to a consideration of the Foundation's future role.

The Foundation's record is, on the whole, a fine one and there is little point in taking up much time at the legislative hearings either in criticisms or compliments. Nor should overmuch attention be given to such topics as overhead rates, geographic distribution, or the relative merits of different forms of support, for although these matters still press for decision, they are already widely discussed.

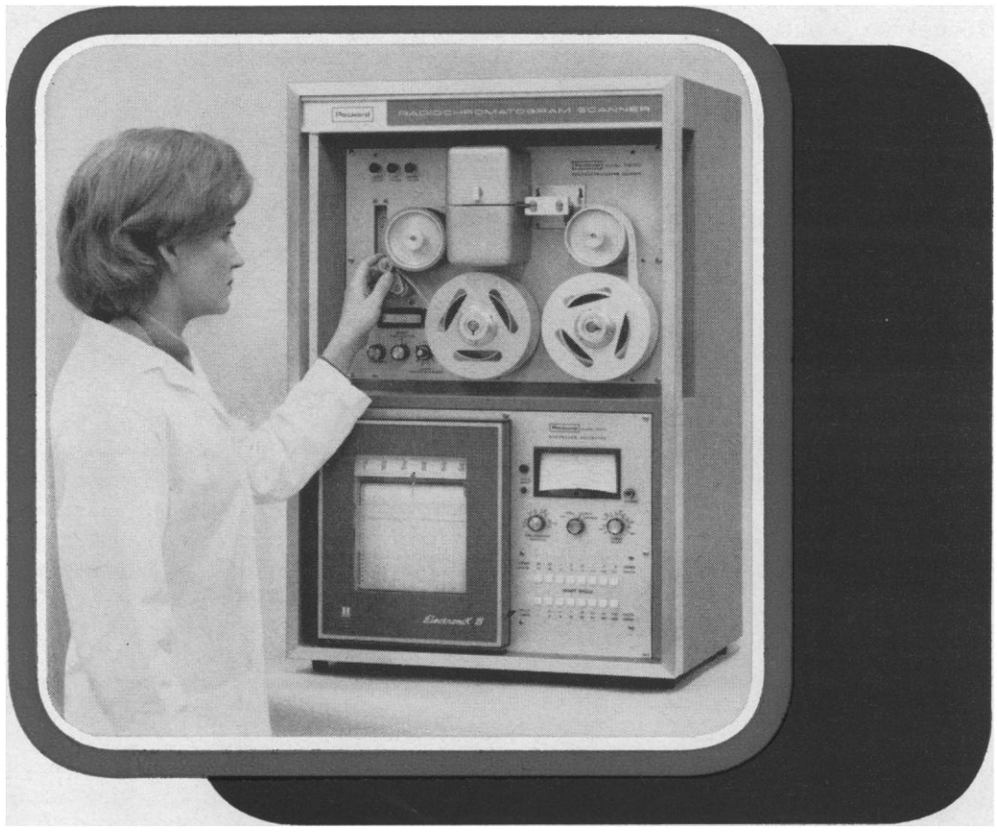
There are other, newer, and more fundamental issues that concern the Foundation's future. One deals with scope. Should the Foundation, as a number of recent observers have recommended, assume a much larger fraction of the federal responsibility for supporting basic research, perhaps becoming the major source of federal funds for academic research, while the agencies with primary responsibilities of a more practical character become relatively less important in the support of basic research?

This is not the only possibility of change. The nation needs better means for seeing that new knowledge is put to civilian use. Should the Foundation expand in the direction of greater involvement in the applications of science to much needed technological developments such as weather control, solar energy, earthquake prediction, transportation improvement, and others in which Congress and the nation would welcome successful end items?

There is need for such work, but there are also arguments for keeping the Foundation as one major scientific agency that does not have responsibilities for practical missions. In fact, the Foundation might move in the direction of scientific purity. If it were to leave operations and technology to other agencies and were to relinquish some of its educational responsibilities to the increasingly vigorous U.S. Office of Education, it could concentrate its energies on the support and improvement of basic research and graduate education in the sciences. Such a retraction of scope seems unlikely but would be welcomed by some scientists.

As still another direction of change, the Foundation might evolve into an agency of broad responsibility for higher education, one that would fuse the strengths and techniques that have been developed by the Foundation with the almost overwhelming responsibilities of the Office of Education and the incipient activities of the prospective National Foundation on the Arts and Humanities. The science programs of the federal government have led the way in the establishment of stronger and broader interactions between the federal government and the total educational effort of the nation. The next step could be a union that would frighten some of the interested parties and appear to others to be a new frontier of intellectual leadership undreamed of when the National Science Foundation was planned or established.

The Foundation cannot take all of these diverging courses, but surely it will change, and its future may be as different from the present as the present Foundation is from the one envisioned 15 years ago. The current hearings provide an opportunity for some thoughtful speculation about how the Foundation can best meet future needs.—DAEL WOLFLE



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2–3. British Soc. for **Immunology**, summer meeting, Glasgow, Scotland. (I. Roitt, Courtauld Inst., Middlesex Hospital, London W.1, England)

2–4. **Astronomical League**, Milwaukee, Wis. (W. M. DuVall, 518 Emmertsen Rd., Racine, Wis. 53406)

2–5. **Meteorological Data Processing**, Uccle and Brussels, Belgium. (World Meteorological Organization, 41, avenue Giuseppe Motta, Geneva, Switzerland)

2–9. International Union of **Pure and Applied Chemistry**, 23rd conf., Paris, France. (R. Morf, c/o F. Hoffman-La Roche, Ltd., Grenzacherstr. 124, Basel, Switzerland)

4–10. American **Library** Assoc., annual, Detroit, Mich. (D. H. Clift, American Library Assoc., 50 E. Huron St., Chicago, Ill.)

5–6. Low-Level **Radioactivity Measurements**, symp., London, England. (N. G. Trott, Physics Dept., Royal Marsden Hospital, Surrey Branch, Downs Rd., Sutton, Surrey, England)

5–7. **Astrophysical**, intern. symp., Liege, Belgium. (P. Swings, Inst. D'Astrophysique, Cointe-Sclessin, Belgium)

5–7. American Soc. of **Heating, Refrigerating, and Air-Conditioning Engineers**, Portland, Ore. (R. C. Cross, 345 E. 47 St., New York 10017)

5–10. French Soc. for the **Advancement of Science**, 84th annual congr., Tours. (The Association, 28 rue Serpente, Paris 6e, France)

5–6 Aug. American **Mathematical** Soc., summer inst. on algebraic groups and discontinuous subgroups, Boulder, Colo. (G. L. Walker, 190 Hope St., Providence, R.I. 02906)

6–8. **Water Resources Research**, western conf., Colorado State University, Fort Collins. (Office of Conference Services, 204 Administration Bldg., Colorado State Univ., Fort Collins 80521)

6–9. American **Dental** Soc. of Europe, annual, Florence, Italy. (A. Sturridge, 35 Harley St., London W.1, England)

6–9. **Miscroscopy**, 12th intern. symp., Sheffield, England. (MICRO-65, McCrone Research Inst., 451 E. 31 St., Chicago, Ill.)

6–10. **Plant Viruses**, 5th intern. conf., Wageningen, Netherlands. (State Agricultural Univ. of Wageningen, Laboratory of Virology, Salverdaplein 10, Wageningen)

7–9. **Molecular Relaxation Processes**, symp., Aberystwyth, Wales. (General Secretary, Chemical Soc., Burlington House, London W.1, England)

7–11. Society for the Study of **Fertility**, annual, Edinburgh, Scotland. (C. A. Simmons, 129 Harley St., London, W.1)

8–16. British **Medical** Assoc., annual, Swansea, England. (D. Gullick, BMA, Tavistock Sq., London, W.C.1, England)

9–11. **Heat Flow below 100°K**, and Its Technological Applications, Grenoble, France. (J. Wilks, Commission 1, Intern. Inst. of Refrigeration, c/o Clarendon Laboratory, Parks Rd., Oxford, England)

10–17. **Education and Health**, intern. conf., Madrid, Spain. (L. P. Aujoulat, 1 rue de Tilsit, Paris 8e, France)

11–15. **Psychoanalysis**, 2nd intern. forum, Zurich, Switzerland. (G. Chrzanowski, 4 E. 95 St., New York 10028)

11–15. American **Veterinary Medical**

Assoc., annual, Portland, Ore. (AVMA, Dept. of Public Information, 600 S. Michigan Ave., Chicago 5, Ill.)

12–14. **Biological Sciences** Symp., 16th annual, Univ. of Michigan, Ann Arbor. (L. B. Mellett, Dept. of Pharmacology, Univ. of Michigan Medical School, Ann Arbor)

12–14. Physiology and Biochemistry of **Muscle as a Food**, symp., University of Wisconsin, Madison. (E. J. Briskey, College of Agriculture, Univ. of Wisconsin, Madison 53706)

12–15. Japan Soc. of **Constitutional and Diathetic Medicine**, congr., Kyoto, Japan. (The Society, Dept. of Pathology, Kyoto Univ., Kyoto)

12–15. **Nuclear and Space Radiation Effects**, annual conf., Univ. of Michigan, Ann Arbor. (S. C. Rogers, Radiation Effects Dept., 5312, Sandia Corp., Albuquerque, N.M.)

12–17. **Spectroscopy**, 12th intern. colloquium, University of Exeter, Exeter, England. (C. E. Arregger, 1 Lowther Gardens, Prince Consort Rd., London, S.W.7, England)

12–18. **Pure and Applied Chemistry**, 20th intern. congr., Moscow, U.S.S.R. (N. A. Kleimenov, Inst. of Chemical Physics, Acad. of Sciences, Vorobyevskoye chaussee 2-b, Moscow)

13–15. **Aerospace Vehicle Flight Control**, Soc. of Automotive Engineers/NASA conf., Los Angeles, Calif. (SAE, 485 Lexington Ave., New York 10017)

13–16. Royal **Medico-Psychological** Assoc., annual, Glasgow, Scotland. (RMPA, 11 Chandos St., London W.1, England)

14–15. **Reinforced Plastics**, regional conf., Soc. of Plastics Engineers, Seattle, Wash. (J. B. Meyer, RETEC Registration, c/o J. B. Meyer Co., P.O. Box 6664, Seattle)

15–16. **Water Quality Management** in River and Reservoir Systems, seminar, Vanderbilt Univ., Nashville, Tenn. (W. H. Wisely, American Soc. of Civil Engineers, 345 East 47 St., New York 17)

15–18. Properties and Applications of **Low Temperature Plasma**, symp., Moscow, U.S.S.R. (E. S. Starkman, College of Engineering, Univ. of California, Berkeley)

15–21. **Education of Professional Physicists**, intern. conf., London, England. (Miss P. N. Boston, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1)

18–24. **Dental**, 2nd intern. congr., Rio de Janeiro, Brazil. (P. F. Reis Filho, Associacao Brasileira de Odontologia, Rua da Baia 570, 5.º Andar, C. Postal 2357, Minas Gerais, Brazil)

18–24. International **Ophthalmic-Optical** Congr., Dublin, Ireland. [E. Pemberton, Assoc. of Ophthalmic Opticians (Ireland), 11 Harrington St., Dublin]

19–21. **Surgery of the Hand,** 1st intern. congr., Rio de Janeiro, Brazil. (Sociedade Brazileira de Mäo, Rio de Janeiro)

19–21. **Swine in Biomedical Research**, intern. symp., Richland, Wash. (L. K. Bustad, Biology Dept., Battelle-Northwest, P.O. Box 999, Richland 99352)

19–22. Association of **Food and Drug Officials** of the U.S., 69th annual, New York, N.Y. (The Association, P.O. Box 9095, Austin, Tex.)

19–22. **Space,** 5th European symp., Munich, Germany. (Executive Secretary, British Interplanetary Soc., 12, Bessborough Gardens, London, S.W.1, England)

19–23. Study of **Nuclear Structure** with Neutrons, intern. conf., Antwerp, Belgium. (M. Neve de Mevergnies, Neutron Physics Dept., CEN-CSK, Mol, Belgium)

19–23. Society for **Analytical Chemistry,** conf., Nottingham, England. (C. A. Johnson, 14 Belgrave Sq., London, S.W.1, England)

20–23. American **Malacological** Union, Wagner College, New York, N.Y. (J. J. Parodiz, Carnegie Museum, Pittsburgh, Pa.)

21–31. **Mental Health,** 5th Caribbean conf., Fort-de-France, Martinique, French West Indies. (Caribbean Federation for Mental Health, Mme. Charles Saint-Cyr, Ravine Vilaine, Fort-de-France)

22–24. International Assoc. for **Dental Research,** 43rd general meeting, Toronto, Ont., Canada. (G. H. Rovelstad, U.S. Navy Dental School, Natl. Naval Medical Center, Bethesda, Md.)

22–26. **Rorschach and Projective Methods,** 6th intern. congr., Paris, France. (A. Morali-Daninos, 7 avenue Trudaine, Paris 9e)

22–27. Thermodynamics of **Nuclear Materials and Atomic Transport in Solids,** Vienna, Austria. (C. E. Holley, Jr., Div. of Research and Laboratories, Intern. Atomic Energy Agency, Kärntnerring 11, Vienna 1)

24–4 Sept. **Organism-Sediment Interrelationship,** NSF seminar, Bermuda Biological Station. (K. E. Chave, Marine Science Center, Lehigh Univ., Bethlehem, Pa. 18015)

25–28. American Assoc. of **Dental Schools,** Toronto, Canada. (C. V. Rault, Georgetown Univ., Washington, D.C.)

25–29. Pacific **Dermatologic** Assoc., Portland, Ore. (G. MacDonald, 4294 Orange St., Riverside, Calif.)

25–30. **Neurochemical,** intern. conf., Oxford, England. (J. N. Cummings, Dept. of Chemical Pathology, Natl. Hospital, Queen Sq., London, W.C.1, England)

25–30. International **Psycho-Analytical** Assoc., 24th congr., Amsterdam, Netherlands. (R. P. McKnight, Austin Riggs Center, Stockbridge, Mass.)

26–29. American Inst. of **Aeronautics and Astronautics,** 2nd annual, San Francisco, Calif. (D. L. Raymond, 1290 Sixth Ave., New York 10019)

26–30. Interpretation and Therapy of **Cardiac Arrhythmias,** conf., Hahnemann Medical College and Hospital, Philadelphia 2, Pa. (L. S. Dreifus, Dept. of Medicine, Hahnemann Medical College and Hospital, 230 North Broad St., Philadelphia)

27–29. **Positron Annihilation,** conf., Wayne State Univ., Detroit, Mich. (A. T. Stewart, Physics Dept., Univ. of North Carolina, Chapel Hill)

27–29. **Research Program Effectiveness,** Washington, D.C. (Secretary, Research Conf. Committee, Room 808, Old Post Office Bldg., 12th St. and Pennsylvania Ave., NW, Washington, D.C. 20368)

28–30. **Library Science,** symp., Syracuse Univ., Syracuse, N.Y. (D. Bergen, School of Library Science, Syracuse Univ., Syracuse 13210)

28–30. **Reactor Operating Experience,** Jackson Lake Lodge, Wyo. (F. Schroeder, Phillips Petroleum, Idaho Falls, Idaho)

28–30. **Reliability and Maintainability,** 4th annual conf., Los Angeles, Calif. (J. de S. Coutinho, 32 Dartmouth St., Garden City, N.Y.)

28–31. Spanish **Biochemists,** 3rd meeting, Oviedo, Spain. (J. R. Villanueva, Centro de Investigaciones Biológicas, Velázquez 138, Madrid 6, Spain)

29–2. **Microcalorimetry,** intern. symp., Marseille, France. [E. Calvert, Institut de Microcalorimétrie et de Thermogénèse, 26, rue du 1414 RIA (3e), Marseille]

29–5. **Protozoology,** 2nd intern. conf., London, England. (R. S. Bray, London School of Hygiene and Tropical Medicine, Keppel St., London, W.C.1)

30–31. **Animal Reproduction,** 7th biennial symp., Michigan State Univ., East Lansing. (W. Hansel, Dept. of Animal Husbandry, Cornell Univ., Ithaca, N.Y.)

31–7. **Universala Medicina Esperanto-Asocio,** meeting, during the 50th intern. esperanto congr., Tokyo, Japan. (H. Shinoda, Kasumicho, Yamagata, Japan)

August

1–5. American Soc. of **Animal Science,** Michigan State Univ., East Lansing. (J. E. Oldfield, Dept. of Animal Science, Oregon State Univ., Corvallis)

1–8. **Chemistry,** 9th Latin American congr., San Juan, P.R. (Secretary, 9th Latin American Chemical Congr., Box 2647, Rio Piedras, P.R.)

2–4. Society for **Cryobiology,** 2nd annual, Madison, Wis. (G. Rapatz, American Foundation of Biological Research, RFD 1, Madison 53716)

2–5. **Comparative Endocrinologists,** 3rd European conf., Copenhagen, Denmark. (C. Barker-Jørgensen, Universitets Zoofysiologiske Laboratorium Juliane Maries Vej 32, Copenhagen Ø)

2–6. **High Pressure,** intern. conf., Saône et Loire, France. (B. Vodar, Centre National de la Recherche Scientifique, B.P. 30, Bellevue, Seine et Oise, France)

2–6. **Instrumentation Science,** 2nd research conf., Instrument Soc. of America, Geneva, N.Y. (K. B. Schnelle, Jr., ISA, 539 William Penn Pl., Pittsburgh, Pa.)

3–7. **Acta Endocrinologica,** 5th congr., Hamburg, Germany. (A. Jores, 2 Medizinische Klinik, Eppendorfer Krankenhaus, Hamburg 20)

3–7. **Poultry Science** Assoc., Univ. of Georgia, Athens. (C. B. Ryan, Texas A&M Univ., College Station 77843)

4–6. **Space and Ballistic Missile Technology,** 10th symp., U.S. Naval Training Center, San Diego, Calif. (C. T. Morrow, Aerospace Corp., Box 95085, Los Angeles, Calif. 90045)

4–7. **Genetics,** G. Mendel memorial symp., Brno, Czechoslovakia. (M. Sosna, G. Mendel Memorial Symp., Na cvicisti 2, Prague 6, Czechoslovakia)

5–12. **EEG and Neurophysiology,** 6th intern. congr., Vienna, Austria. (K. Pateisky, Wiener Medizinische Akademie, Alserstr. 4, Vienna 9)

8–11. **Heat Transfer,** 8th natl. conf., Los Angeles, Calif. (K. O. Beatti, Jr., Dept. of Chemical Engineering, North Carolina State College, Raleigh)

8–14. **Anatomists**, 8th intern. conf., Wiesbaden, Germany. (M. Watzka, Anatomisches Institut der Universität, Mainz, West Germany)

8–27. **Fracture Mechanics**, workshop, Denver Research Inst., Denver, Colo. (D. L. Wells, University Technology Corp., P.O. Box 7, Dayton, Ohio 45449)

9–11. **Mutation Process**, symp., Prague, Czechoslovakia. (M. Sosna, Na cvicisti 2, Prague 6)

9–13. **Meteor Orbits and Dust**, intern. symp (invitation only), Cambridge, Mass. (G. S. Hawkins, Smithsonian Astrophysical Observatory, 60 Garden St., Cambridge 02138)

9–15. Nordic **Entomology** Congr., Oslo, Norway. (Norwegian Natl. Travel Office, 290 Madison Ave., New York 10017)

9–20. **Electromagnetic Measurements and Standards**, Natl. Bureau of Standards, Boulder, Colo. (Bureau of Continuation Education, University Memorial Center, Univ. of Colorado, Boulder)

10–20. **Theory of Groups**, intern. conf., Intern. Mathematical Union, Canberra, Australia. (L. G. Kovacs, Dept. of Mathematics, Australian Natl. Univ. Inst. of Advanced Studies, Box 4, G.P.O., Canberra)

11–13. **Calorimetry**, 20th conf., Ames, Iowa. (R. Hultgren, Univ. of California, Berkeley)

11–15. European **Malacological** Union, 2nd congr., Copenhagen, Denmark. (G. Høpner Peterson, c/o Zoologisk Museum, 5 Afdeling, Universitetsparken 15, Copenhagen)

12–21. **Veterinary Education**, 2nd intern., Copenhagen, Denmark. (Inter. Agency Liaison Branch, Office of the Director General, Food and Agriculture Organization, Via delle Terme di Caracalla, Rome, Italy)

14–20. Australian **Medical** Assoc., 2nd medical congr., Perth, Western Australia. (O. R. Corr, 8 King's Park Rd., West Perth, Western Australia)

14–20. **Molecular Spectroscopy**, 8th European congr., Copenhagen, Denmark. (The Congress, Universitetsparken 5, København Ø, Denmark)

14–6. **Digital Computers** for College Teachers of Science, Mathematics, and Engineering, Univ. of Southwestern Louisiana, Lafayette. (J. R. Oliver, Box 133, USL Station, Lafayette 70506)

14–19 Sept. International Assoc. for **Quaternary Research**, 7th congr., Boulder and Denver, Colo. Field conf., *14–29 Aug.* and *5–19 Sept.*; general assembly, *30 Aug–5 Sept.* (G. M. Richmond, Room 2462, Bldg. 25, Denver Federal Center, Denver 80225)

15–20. American Inst. of **Biological Sciences**, Urbana, Ill. (AIBS, 3900 Wisconsin Ave., NW, Washington, D.C. 20016)

The following societies will meet in conjunction with the AIBS. Unless otherwise indicated, the local chairmen are at the University of Illinois, Urbana.

American **Bryological** Soc. (G. N. Jones, Dept. of Botany)

American **Fern** Soc. (G. N. Jones, Dept. of Botany)

American **Fisheries** Soc. (G. Bennett, Aquatic Biology Section)

American **Genetic** Assoc. (S. Price, Room 210 S. Bldg., Plant Industry Station, Beltsville, Md.)

American **Microscopical** Soc. (L. J. Thomas, Dept. of Zoology)

American Soc. for **Horticultural Science**. (C. J. Birkeland, Dept. of Horticulture)

American Soc. of **Limnology and Oceanography**. (W. Larrimore, Illinois Natural History Survey, Urbana)

American Soc. of **Plant Physiologists**. (J. B. Hanson, Dept. of Agronomy)

American Soc. of **Plant Taxonomists**. (W. Payne, Dept. of Botany)

American Soc. of **Zoologists**. (L. Ingle, Dept. of Zoology)

Animal Behavior Soc. (G. P. Waldbauer, Dept. of Entomology)

Botanical Soc. of America. (D. J. Paolillo, Dept. of Botany, 302 Natural History Bldg.)

Ecological Soc. of America. (L. C. Bliss, Dept. of Botany)

Mycological Soc. of America. (D. P. Rogers, Dept. of Botany)

National Assoc. of **Biology Teachers**. (H. Weaver, Dept. of Recreation and Municipal Park Administration)

Nature Conservancy. (L. T. Stannard, Illinois Natural History Survey, Urbana)

Phycological Soc. of America. (L. Hoffman, Dept. of Botany)

Society for **Industrial Microbiology**. (L. D. Witter, Food Science Dept.)

Society for the Study of **Development and Growth**. (D. L. Nanney, Dept. of Zoology)

Society for the Study of **Evolution**. (L. J. Stannard, Illinois Natural History Survey, Urbana)

Society of **Nematologists**. (D. P. Taylor, 106 Horticulture Field Laboratory)

Tomato Genetics Cooperative. (A. Thompson, Dept. of Horticulture)

15–20. **Energetics**, American Soc. of Mechanical Engineers, conf., Rochester, N.Y. (ASME, 345 E. 47 St., New York 10017)

15–21. **Ophthalmology**, 8th Pan American congr., Rio de Janeiro, Brazil. (W. D. Estrada, Praca Cardea, Arcoverde 25, Copacabana, Rio de Janeiro)

16–18. **Guidance and Control**, conf., Minneapolis, Minn. (D. L. Mellen, Mail Station 677, Military Products Group, Aeronautical Div., Honneywell, Inc., Minneapolis 55440)

16–20. Australian–New Zealand Assoc. for the **Advancement of Science**, Univ. of Tasmania, Hobart, Tasmania, Australia. (K. D. Nicolls, Div. of Soils, CSIRO, Stowell Ave., Hobart)

16–20. **Liquid Crystals**, conf., Kent State Univ., Kent, Ohio. (G. H. Brown, Dept. of Chemistry, Kent State Univ., Kent)

16–20. American Soc. for **Pharmacology and Experimental Therapeutics**, fall meeting, Univ. of Pennsylvania, Philadelphia. (E. B. Cook, 9650 Wisconsin Ave., Washington, D.C. 20014)

16–21. Electron Diffraction and the Nature of **Defects in Crystals**, intern. conf., Melbourne, Australia. (R. I. Garrod, Astronautical Research Laboratories, Box 4331, G.P.O., Melbourne)

16–3. **Kinematical and Chemical History of the Galaxy**, NATO inst., Sussex, England. (R. Wooley, Herstmonceaux Castle, Sussex)

16–3. **Radiation** Trapped in the Earth's Magnetic Field, NATO institute, Bergen,

Norway. (B. M. McCormac, Geophysics Div., IIT Research Inst., 10 W. 35 St., Chicago, Ill. 60515)

17–20. **Anesthesiology**, symp., Czechoslovak Medical Soc., Prague. (J. Hoder, Unemocnice 2, Prague 2)

17–20. **Atmospheric Pollution**, 2nd Clean Air Conf., Sydney, Australia. (J. L. Sullivan, New South Wales Dept. of Health, P.O. Box 31, George St. North Post Office, Sydney)

17–27. **Infrared Spectroscopy**, 16th annual inst., Fisk Univ., Nashville, Tenn. (Director, Fisk Infrared Inst., Fisk Univ., Nashville 8)

18–20. American **Astronautical** Soc., natl. meeting, San Francisco, Calif. (J. N. Nielsen, P.O. Box 642, Los Altos, Calif.)

18–25. Upper **Atmosphere Chemistry** Circulation and Aerosols, symp., Intern. Assoc. of Meteorology and Atmospheric Physics, Visby, Sweden. (The Association, Commission of Atmospheric Chemistry and Radioactivity, c/o Natl. Center for Atmospheric Research, Boulder, Colo.)

20–21. American Inst. of **Ultrasonics in Medicine**, 1st Pan American meeting, Lima, Peru. (C. Bustamante Ruiz, Dept. of Physical Medicine and Rehabilitation, Hospital Obrero, Lima)

21. American Assoc. of **Electromyography and Electrodiagnosis**, annual, Philadelphia, Pa. (16861 Wyoming Ave., Detroit, Mich. 48221)

21. **Spectroscopy**, 5th, Intern. Union of Pure and Applied Physics commission, Copenhagen, Denmark. (W. Price, Dept. of Physics, Kings College, Univ. of London, London, W.C.2, England)

21–25. **Insect Endocrinology**, symp., Prague, Czechoslovakia. (F. Hrabal, Foreign Relations Dept., Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

22–25. **Soil Conservation** Soc. of America, Philadelphia, Pa. (H. W. Pritchard, 7515 Ankeny Rd., Ankeny, Iowa)

22–27. **Medical Electronics and Biomedical Engineering**, Tokyo, Japan. (K. Suhara, Japan Soc. of Medical Electronics and Biological Engineering, Old Toden Bldg., 1-1 Shiba-tamura-cho, Minato-ku, Tokyo)

22–27. **Microchemical Techniques**, intern. symp., Pennsylvania State Univ., University Park. (H. Francis, Jr., Pennsalt Chemicals Corp., 900 First Ave., King of Prussia, Pa.)

22–27. American Acad. of **Physical Medicine and Rehabilitation**, Philadelphia, Pa. (M. K. Newman, 16861 Wyoming Ave., Detroit, Mich. 48221)

22–28. Physiology of Giant **Algal Cell**, conf., Australian Acad. of Science, Canberra, Australia. (The Academy, Gordon St., Canberra)

22–28. **Industrial Research**, 16th annual conf., Tuxedo, N.Y. (R. T. Livingston, School of Engineering and Applied Science, Columbia Univ., New York, N.Y.)

22–28. **Lunar Geology**, intern. field conf., Bend, Ore. (L. Staples, Dept. of Geology, Univ. of Oregon, Eugene)

23–25. **Cryogenic Engineering**, conf., Houston, Tex. (K. D. Timmerhaus, Engineering Research Center, Univ. of Colorado, Boulder 80304)

23–25. American Soc. of **Human Genetics**, Seattle, Wash. (J. B. Graham, Dept. of Pathology, Univ. of North Carolina, Chapel Hill)

23–25. **Plant Phenolics** Group of North America, annual, Albany, Calif. (V. C. Runeckles, Imperial Tobacco Co. of Canada, P.O. Box 6500, Montreal, Quebec)

23–26. **Clay Minerals** Soc., 2nd annual, Univ. of California, Berkeley. (J. A. Pask, Dept. of Mineral Technology, Univ. of California, Berkeley 94720)

23–26. **Quantum Chemistry**, Physical Chemistry Div., Chemical Inst. of Canada, Edmonton, Alta. (The Institute, 48 Rideau St., Ottawa 2, Ont.)

23–27. Control Procedures in **Drug Production**, seminar, Univ. of Wisconsin, Madison. (W. Blockstein, Extension Services in Pharmacy, Univ. of Wisconsin, Madison)

23–27. **Neurological Surgery**, 3rd intern. congr., Copenhagen, Denmark. (DIS Congress Service, Sankt Peders Straide 19, Copenhagen K)

23–27. American **Ornithologists** Union, Ohio State Univ., Columbus. (R. Mewaldt, San Jose State Teachers College, San Jose, Calif.)

23–27. **Space**, 5th annual conf., Virginia Polytechnic Inst., Blacksburg. (M. L. Collier, Jr., Virginia Polytechnic Inst., Blacksburg)

23–29. European Soc. of **Haematology**, 10th congr., Strasbourg, France. (R. Waitz, Faculté de Médecine, Inst. d'Hématologie, 1, Pl. de l'Hôpital, Strasbourg, Bas-Rhin, France)

23–29. **Logopaedics and Phoniatrics**, 13th intern. congr., Vienna, Austria. (Mrs. A. M. Jorg, Vienna Acad. of Medicine, Alserstr. 4, Vienna 9)

23–30. **Limnology**, 16th intern. congr., Warsaw, Poland. (G. E. Hutchinson, Yale Univ., New Haven, Conn.)

24–26. Association for **Computing Machinery**, 20th natl. conf., Cleveland, Ohio. (G. J. Moshos, P.O. Box 4741, Cleveland 44126)

24–26/28–29. **History of Science**, 11th intern. congr., Warsaw and Krakow, Poland. (W. Voisé, Inst. of the History of Science and Technology, Polish Acad. of Sciences, Nowy Swiat 72, Room 19, Warsaw 1)

24–27. Western **Electronic** Conv. (WESCON), San Francisco, Calif. (E. L. Rogers, Wescon, Suite 203, 780 Welch Rd., Palo Alto, Calif.)

24–27. **Pharmaceutical Sciences**, 25th intern. congr., Prague, Czechoslovakia. (Pharmaceutical Section, Czechoslovak Medical Soc., J. E. Purknye, U Elektry 8, Prague)

24–28. **Electron Microscope** Soc., 23rd annual, New York, N.Y. (L. Ross, Anatomy Dept., Cornell Univ. Medical College, 1300 York Ave., New York)

24–28. American **Physiological** Soc., Univ. of California, Los Angeles. (R. G. Daggs, 9650 Wisconsin Ave., Washington, D.C. 20014)

25–27. **Gas Dynamics**, 6th biennial conf., Evanston, Ill. (A. B. Cambel, Gas Dynamics Symp., Northwestern Univ., Evanston 60201)

25–27. **Thymus**, Ciba Foundation symp., Melbourne, Australia. (Ciba, 41, Portland Place, London, W.1, England)

25–27. **X-Ray Analysis**, 14th annual conf., Denver, Colo. (Metallurgy Div., Denver Research Inst., Univ. of Denver 80210)

25–28. Systems Engineering for **Control System Design**, Tokyo, Japan. (H. M. Paynter, Mechanical Engineering Dept., Massachusetts Inst. of Technology, Cambridge 39)

25–28. **Photochemistry**, intern. conf., Tokyo, Japan. (I. Tanada, Laboratory of Physical Chemistry, Tokyo Inst. of Technology, Ookayama, Meguro-ku, Tokyo)

25–28. International **Phycological** Soc., Halifax, N.S., Canada. (E. G. Young, Natl. Research Council of Canada, Halifax)

25–28. **Seaweed**, 5th intern. symp., Halifax, N.S., Canada. (E. G. Young, Natl. Research Council of Canada, Halifax)

26–28. **Helium Superfluidity**, symp., St. Andrews, Scotland. (J. F. Allen, St. Andrews Univ., St. Andrews)

26–28. **Neurovirulence**, symp., Munich, Germany. (Permanent Section of Microbiological Standardization, Intern. Assoc. of Microbiological Societies, Inst. d'Hygiène, Geneva, Switzerland)

26–28. National Council of **Teachers of Mathematics**, Vancouver, B.C., Canada. (J. D. Gates, 1201 16th St., NW, Washington, D.C. 20036)

29–2. American Assoc. of **Clinical Chemists**, 17th natl., Chicago, Ill. (M. E. Hanke, 8424 Rhodes Ave., Chicago 60619)

29–2. **Illuminating Engineering** Soc., New York, N.Y. (A. D. Hinckley, 345 East 47 St., New York 10017)

29–3. AAAS, Laurentian **Hormone** Conf., Mont Tremblant, Quebec, Canada. (J. C. Foss, Laurentian Hormone Conf., 222 Maple Ave., Shrewsbury, Mass.)

29–10. **Forest Hydrology**, intern. symp., Pennsylvania State Univ., University Park. (W. E. Sopper, School of Forestry, Pennsylvania State Univ., University Park)

30–31. **Past and Future of Science**, symp., Krakow, Poland. (B. Suchodolski, Polish Acad. of Sciences, Palace of Culture and Sciences, Warsaw)

30–1. **Antennas and Propagation**, intern. symp., Washington, D.C. (R. J. Adams, Code 5330, U.S. Naval Research Laboratory, Washington 20390)

30–1. Applied **Mechanics**, West Coast conf., Univ. of California, Los Angeles. (P. M. Naghdi, Div. of Applied Mechanics, Univ. of California, Berkeley 94720)

30–1. **Rare Earth Research**, 5th conf., Iowa State Univ., Ames. (S. Legvold, Dept. of Physics, Iowa State Univ., Ames 50012)

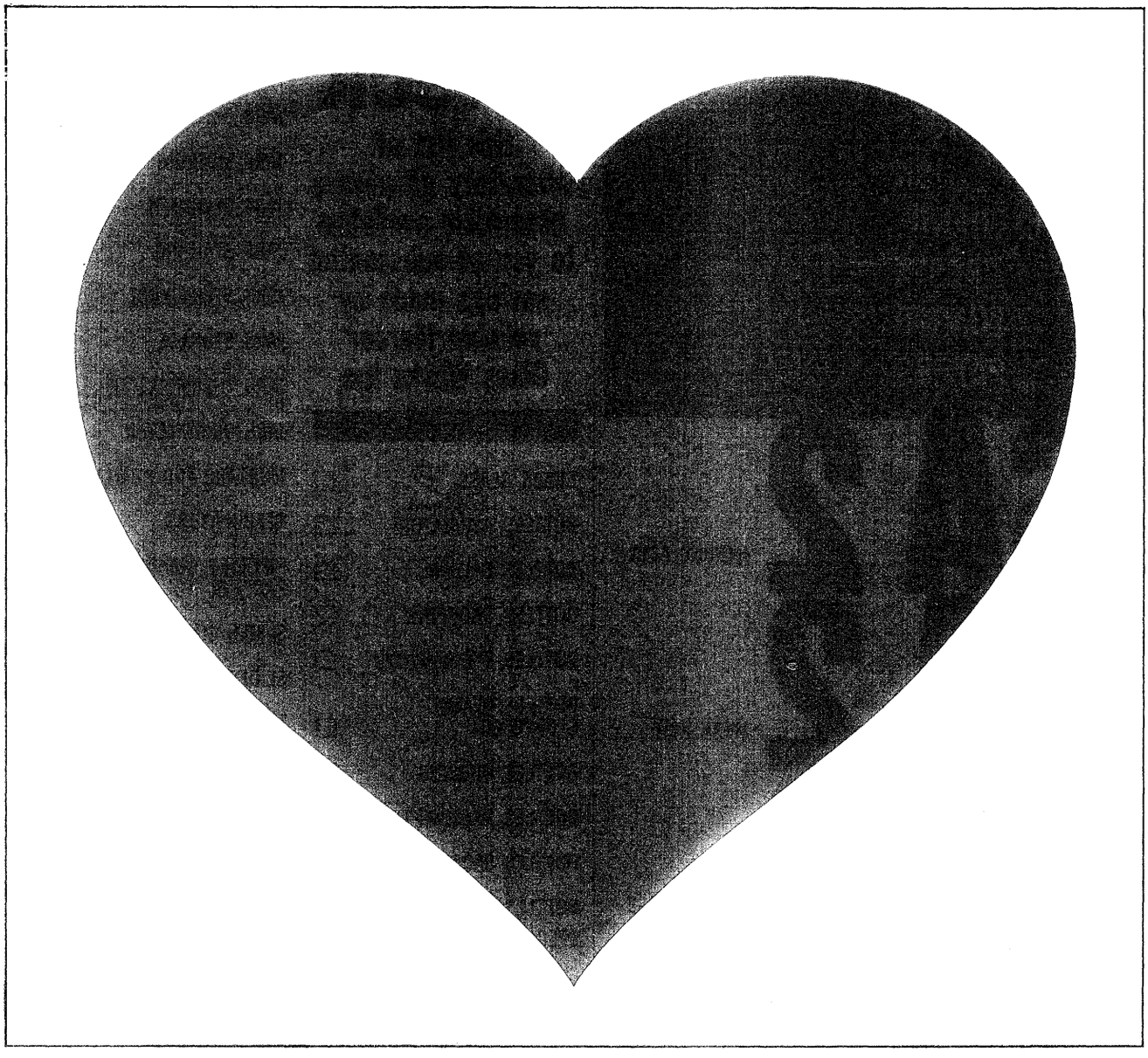
30–1. **Structural Dynamics and Aeroelasticity**, conf., Boston, Mass. (F. C. Hung, Space Information Systems Div., North American Aviation, Inc., Downey, Calif.)

30–2. **Fluorine Chemistry**, 3rd intern. symp., Munich, Germany. (F. Weygand, Inst. für Organische Chemie, Technische Hochschule München, Arcisstr. 21, 8 Munich 2)

30–2. **Mathematical** Assoc. of America, 46th summer, Cornell Univ., Ithaca, N.Y. (H. M. Gehman, State University of New York at Buffalo, Buffalo 14214)

30–2. **Regional Science** Assoc., 5th European congr., Krakow, Poland. (H. Wood, Dept. of Regional Science, Univ. of Pennsylvania, Philadelphia 19104)

30–2. American **Sociological** Assoc., Chicago, Ill. (G. M. Sykes, ASA, 1755 Massachusetts Ave., NW, Washington, D.C.)



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New Products

Automatic viscometer, Mechrolab model 5901A, measures efflux time in glass-capillary, U-type viscometers and provides automatic influxing in preparation for the measurement. Efflux time is measured by a solid-state electronic counter using a stable quartz-crystal oscillator as a time-base reference. The counter measures efflux time by utilizing photocell detectors mounted at the upper and lower reference points on the glass viscometer. Each detector consists of a miniature light source and photocell in a submersible unit. The viscometer is loaded with sample and placed in the constant-temperature bath (model 5910A, an accessory). The "influx" button is pushed, and an air-pressure and manifold system pumps the liquid into the measuring bulb until the meniscus passes the upper detector. This stops the pump; a valve vents the viscometer to the atmosphere, and the liquid begins to fall by gravity. The meniscus starts the electronic counter as it passes the upper detector and stops it when it passes the lower detector; the counter essentially counts the number of time-base oscillations during this interval. Time-base oscillator is accurate to 1 part in 10^5; stable to 3 parts in 10^9 per day. Direct digital readout of time on neon Nixie tubes is to five significant places (maximum resolution, 0.001 second); correct placement of decimal point is automatic. Four sets of detectors are provided for continuous operation; channel desired to be read is chosen by a selector switch. Range and resolution: up to 1000 seconds, ±0.01 second; up to 100 seconds, ±0.001 second. Accuracy: ±0.01 second (based on reproducibility of efflux times up to 300 seconds). Constant-temperature bath utilizes an electronic proportional controller to provide temperature control and uniformity within 0.005°C up to 75°C; within 0.01°C from 75° to 150°C. The bath, designed specifically for this purpose, has ports for four viscometers. Dimensions: viscometer, 8.5 by 13 by 10 inches high (22 by 33 by 25 cm); bath, 14 by 19 by 22.5 inches high.—D.J.P. (Hewlett Packard Mechrolab Division, 1062 Linda Vista Ave., Mountain View, Calif.)

Circle 1 on Readers' Service card

Doppler ultrasonic blood flowmeter-telemetry system, model 1501, permits blood-flow measurements on unrestrained animals from transducers chronically implanted on such vessels as the coronary, aorta, carotid, iliac, hepatic, and renal. Three basic modules, each measuring 1.125 inches in diameter by 3 inches long (2.9 by 7.6 cm) and weighing 3 oz (85 gm), along with a battery, are mounted directly on the animal. The transducer, implanted by surgery, is a loose-fitting, rigid cuff containing two piezoelectric crystals. (Transducer assembly can be cold sterilized.) Transducer exciter provides 100 mw of high-frequency power to one of the crystals on the vessel. Some of the ultrasonic energy from this crystal is reflected by cellular components of the blood; the frequency of the reflected energy is shifted proportionally to the flow velocity of the blood. A second crystal receives this reflected sound energy and converts it to electrical energy which is conducted to the signal-conditioning module. Audiofrequencies equal to the Doppler shift (and proportional to blood flow) are produced and conducted to the transmitter. These audiofrequencies are converted to FM and transmitted to receivers distant up to 0.5 miles (0.8km), under ideal conditions. The received information is converted to a d-c voltage proportional to blood flow in the vessel and easily recordable. Information on changes in blood-flow velocity thus may be obtained from free animals as they sleep, eat, and exercise. An advantage of this Doppler system is that zero flow produces zero d-c output; a disadvantage (in some applications) is that it does not sense flow direction. The flowmeter measures the average velocity of the volume of blood mutually enclosed by the projection of each crystal beam angle. Information on volume flow requires special calibration. List: complete system for telemetry of a single channel of flow data, with output for direct recording, $2690—D.J.P. (Ward Associates, P.O. Box 9067, San Diego, Calif.)

Circle 2 on Readers' Service Card

Chronometric infusion pump, Watkins-USCI Chronofusor, a compact, self-contained apparatus for long-term continuous drug therapy in ambulatory patients, injects small volumes of parenteral drug solution at a fixed accurate rate through a fine catheter passing to a blood vessel or body cavity. Aluminum case, 5 by 2.5 by 1.25 inches deep (13 by 6 by 3 cm), houses roller pump (driven by a spring mechanism) and the supply bag for the drug solution. Total weight: 15 oz (426 g). The hand-wound motor drives the pump approximately 12 hours. Delivery rate 0.2 cm^3/hour. Disposable bag holds 25 cm^3. A short section of molded silastic tubing, clamped into the semicircular track segment, delivers infusate from the bag to the monoflow valve-catheter connector assembly; infusate is pumped at a precise rate by the action of four rollers driven by the chronometric motor; the valve assembly assures one-way flow. Teflon catheters, 40 inches long, are of 0.020-inch bore by 0.040 inches in outside diameter. The motor is wound by a key inserted from the back of the case. A priming key purges air from the pump tubing and begins infusate flow. Applications include intra-arterial or intravenous infusion of antimetabolite drugs for cancer chemotherapy, administration of test drugs in unrestrained experimental animals, and continuous parenteral administration of concentrated antibiotics or heparin. Successful ambulatory infusion of various cancer chemotherapeutic agents has lasted as long as 9 months.—D.J.P. (United States Catheter and Instrument Corp., Glens Falls, N.Y.)

Circle 3 on Readers' Service card

The material in this section is prepared by Denis J. Prager (D.J.P.), Laboratory of Technical Development, National Heart Institute, Bethesda 14, Md. (medical electronics and biomedical laboratory equipment).

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Neither *Science* nor the writer assumes responsibility for the accuracy of the information. A Readers' Service card for use in mailing inquiries concerning the items listed is included on pages 1647 and 1773. Circle the department number of the item in which you are interested on this card.

NEW BOOKS

(Continued from page 1712)

Safety and Accident Prevention in Chemical Operations. Howard H. Fawcett and William S. Wood, Eds. Interscience (Wiley), New York, 1965. 637 pp. Illus. $19.75. Thirty-one papers contributed by George T. Austin, Arthur H. Christian, Howard H. Fawcett, John H. Foulger, Michael A. Gimbel, Alfred J. Gorand, John V. Grimaldi, Joseph Guelich, Arthur B. Guise, W. G. Hudson, D. J. Kilian, Alan L. Kling, David M. Liston, Jr., Elliott MacDermod, Eleanor Mort, Jeremiah J. O'Driscoll, Donald Richmond, Jack S. Snyder, Stanley F. Spence, Elwood Swisher, William S. Wood, Edmund D. Zeratsky, Robert W. Van Dolah, and David T. Smith.

Science in Action. George K. Stone and Lucy W. Stephenson. Prentice-Hall, Englewood Cliffs, N.J., 1965. 414 pp. Illus. $5.32 (juvenile book; teachers' edition, 320 pp., paper, $2.24).

Science You Can Use. George K. Stone and Lucy W. Stephenson. Prentice-Hall, Englewood Cliffs, N.Y., ed. 2, 1965. 415 pp. Illus. $5.32 (juvenile book).

The Scientist. Henry Margenau, David Bergamini, and the editors of *Life*. Time Inc., New York, 1965. 199 pp. Illus. $3.95. Life Science Library, René Dubos, Henry Margenau, and C. P. Snow, Consulting Editors.

Scientists on Science. Informal, informative talks from the David Sarnoff Industry-Science Training Program. Merwin Dembling. Dutton, New York, 1965. 160 pp. Illus. $3.95.

SER 1: Environmental Abstracts. Directed by C. Theodore Larson. Architectural Research Laboratory, Univ. of Michigan, Ann Arbor, 1965. 765 pp. Illus. $15.

Sexual Inversion: The Multiple Roots of Homosexuality. Judd Marmor, Ed. Basic Books, New York, 1965. 368 pp. $8.50. Sixteen papers: The View of the Biological Sciences (3 papers); The View of the Social Sciences (5 papers); and The View of the Clinician (8 papers).

The Solar System and the Constellations: A Guidebook. Clifford N. Anderson. Vantage Press, New York, 1965. 286 pp. Illus. Charts. $8.50.

Subcortical Mechanisms of Behavior. The psychological functions of primitive parts of the brain. Robert A. McCleary and Robert Y. Moore. Basic Books, New York, 1965. 160 pp. Illus. $2.95. Basic Topics in Physiological Psychology Series, edited by Edwin G. Boring.

Symposium on Personnel Dosimetry for Accident High-Level Exposure to External and Internal Radiation (Vienna, Austria), March 1965. International Atomic Energy Agency, Vienna, 1965. Addendum (in original languages); unpaged. Paper. Sixty-two abstracts of papers; the majority are in English and the others are in French and Russian.

Three Centuries of Microbiology. Hubert A. Lechevalier and Morris Solotorovsky. McGraw-Hill, New York, 1965. 544 pp. Paper, $4.95.

Ticks of the Genus Ixodes in Africa. Don R. Arthur. Univ. of London Press, London; Oxford Univ. Press, New York, 1965. 356 pp. Illus. $11.20.

Tizard. Ronald W. Clark. M.I.T. Press, Cambridge, Mass., 1965. 478 pp. Illus. $10.

Translators and Translations: Services and Sources in Science and Technology. Frances E. Kaiser, Ed. Special Libraries Assoc., New York, ed. 2, 1965. 224 pp. Paper, $14.50. A list of 470 freelance translators and 87 commercial translating firms, located principally in the U.S. Part 3 covers 342 pools and other sources of translated information (for example, the Arctic Institute of North America and the Argus Information Service), and part 4 cites 194 bibliographies and lists of translated literature. The five computer-produced indexes cover languages, subjects, geographical distribution, and international and national information centers, depositories, and societies.

U.S. Military Strategy in the Sixties. Robert N. Ginsburgh. Norton, New York, 1965. 160 pp. $4.

La vie dans les mers. Jean-Marie Pérès. Presses Universitaires de France, Paris, 1965. 128 pp. Paper. "Que Sais-je?-' Le Point des Connaissances Actuelles, No. 72.

Volcanism, Tectonism, and Plutonism in the Western United States (*Spec. Pap. Geol. Soc. Am.* No. 80). James Gilluly. Geological Soc. America, New York, 1965. 79 pp. Illus. Paper.

Wanderers in the Sky: The Motions of Planets and Space Probes. Thornton Page and Lou Williams Page, Eds. Macmillan, New York, 1965. 352 pp. Illus. $7.95. A compilation of 99 articles published during the last 30 years in *The Telescope, The Sky,* and *Sky and Telescope.* The subject headings are: The Dawn of Understanding (11 papers); Newton's Mechanical System (15 papers); Recent Probing of Space (30 papers); The Hazards of Interplanetary Space (12 papers); and Our Moon, A Big Satellite (31 papers).

Warriors of the Colorado: The Yumas of the Quechan Nation and Their Neighbors. Jack D. Forbes. Univ. of Oklahoma Press, Norman, 1965. 398 pp. Illus. $5.95.

The Water Story in Central Iowa (Water Atlas No. 1). F. R. Twenter and R. W. Coble. Iowa Geological Survey, Iowa City, 1965. 97 pp. Illus. Paper.

Weed Control Handbook. Issued by the the British Weed Control Council. E. K. Woodford and S. A. Evans, Eds. Blackwell, Oxford; Davis, Philadelphia, ed. 4, 1965. 452 pp. Illus. $6.50.

Where Science and Politics Meet. Jerome B. Wiesner. McGraw-Hill, New York, 1965. 310 pp. $6.95.

The Works of Charles Darwin. An annotated bibliographical handlist. R. B. Freeman. Dawsons, London, 1965. 91 pp. 55s.

The World of Engineering. John R. Whinnery, Ed. McGraw-Hill, New York, 1965. 316 pp. Illus. Paper, $3.95; cloth, $5.95. Eleven papers contributed by John R. Whinnery, L. Talbot, W. R. Hibbard, Jr., Rolf Eliassen, J. R. Pierce, Charles Süsskind, Leonardo Zeevaert, Charles T. Morrow, M. P. O'Brien, Irene Carswell Peden, and F. E. Terman.

Zuni Grammar (*Univ. New Mex. Publs. Anthrop.* No. 14). Stanley Newman. Univ. of New Mexico Press, Albuquerque, 1965. 77 pp. Paper, $2.

Mathematics, Physical Sciences, and Engineering

Absorption Spectra in the Ultraviolet and Visible Region. vol. 5. L. Lang, Ed. Academic Press, New York, 1965. 416 pp. Illus. (including cumulative index, vols. 1–5, 112 pp.). $23.

The Atomic Nucleus. M. Korsunsky. Translated from the Russian by G. Yankovsky. Gordon and Breach, New York; Noordhoff, Groningen, Netherlands, 1965. 457 pp. Illus. $12.50.

Automatic Control Systems Engineering. vols. 1 and 2. vol. 1, *Control Systems Engineering* (395 pp.); vol. 2, *Advanced Control Systems Engineering* (783 pp.). A. W. Langill, Jr. Prentice-Hall, Englewood Cliffs, N.J., 1965. Illus. $16 each. International Series in Engineering of the Physical Sciences, edited by James B. Reswick and Warren M. Rohsenow.

Basic Quantum Chemistry. Leon F. Phillips. Wiley, New York, 1965. 190 pp. Illus. Paper, $3.95; cloth, $5.50.

Chemistry of the Iron Group Metallocenes: Ferrocene, Ruthenocene, Osmocene. pt. 1. Myron Rosenblum. Interscience (Wiley), New York, 1965. 257 pp. Illus. $12.50. The Chemistry of Organometallic Compounds Series, edited by Dietmar Seyferth.

The Classical Atom. Francis L. Friedman and Leo Sartori. Addison-Wesley, Reading, Mass., 1965. 128 pp. Illus. Paper, $2.50. Addison-Wesley Series in Physics: Origins of Quantum Physics, vol. 1, David Lazarus, Consulting Ed.

The Classical Moment Problem: And Some Related Questions in Analysis. N. I. Akhiezer. Translated from the Russian edition (Moscow, 1961) by N. Kemmer. Hafner, New York, 1965. 263 pp. Illus. $10. University Mathematical Monographs, edited by D. E. Rutherford.

Concepts of Calculus. A. H. Lightstone. Harper and Row, New York, 1965. 507 pp. Illus. $8.75. Harper's Modern Mathematics Series (undergraduate title), edited by I. N. Herstein and Gian-Carlo Rota.

A Concise Text-Book of Organic Chemistry. C. G. Lyons, S. McLintock, and Nora H. Lumb. Pergamon, London, 1965. 263 pp. Illus. Paper, 21s. The Commonwealth and International Library Series, edited by Sir Robert Robinson and Athelstan Spilhaus.

A Course in Mathematical Analysis. vol. 3, pt. 2, *Integral Equations Calculus of Variations*. Édouard Goursat. Translated from the French ed. 5 (Paris, 1956) by Howard G. Bergmann. Dover, New York, 1964. 401 pp. Illus. Paper, $2.75.

Diffusion Processes and Their Sample Paths. Kiyosi Itó and Henry P. McKean, Jr. Academic Press, New York; Springer, Berlin, 1965. 339 pp. Illus. $14.50. Die Grundlehren der Mathematischen Wissenschaften in Einzeldarstellungen, vol. 125, edited by J. L. Doob, E. Heinz, F. Hirzebruch, E. Hopf, H. Hopf, W. Maak, S. MacLane, W. Magnus, F. K. Schmidt, and K. Stein.

Double Layer and Electrode Kinetics. Paul Delahay. Interscience (Wiley), New York, 1965. 333 pp. Illus.

Dynamics of Nonhomogeneous Fluids. Chia-Shun Yih. Macmillan, New York, 1965. 320 p. Illus. $11.95. Macmillan Series in Advanced Mathematics and Theo-

retical Physics, edited by Mark Kac and others.

Electron and Ion Beam Science and Technology. First International Conference (Toronto, Canada), May 1964. Robert Bakish, Ed. Wiley, New York, 1965. 957 pp. Illus. $24.50. Forty-seven papers presented at the conference which was sponsored by the Electrothermics and Metallurgy Divisions of the Electrochemical Society in cooperation with the Metallurgical Society.

Electrospark Machining of Metals. vol. 3. B. A. Krasyuk, Ed. Translated from the Russian edition (Moscow, 1963). Consultants Bureau, New York, 1965. 184 pp. Illus. Paper, $22.50.

Elementary Applied Thermodynamics. Irving Granet. Wiley, New York, 1965. 298 pp. Illus. $8.

Elementary Differential Equations. William E. Boyce and Richard C. DiPrima. Wiley, New York, 1965. 375 pp. Illus. $7.75.

Epoxides and Their Derivatives. M. S. Malinovskii. Translated from the Russian edition (Moscow, 1961) by L. Balig and I.P.S.T. Staff. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1965. 511 pp. Illus. $20.25.

Error in Digital Computation. vol. 1. Proceedings of an advanced seminar (Madison, Wis.), October 1964. Louis B. Rall, Ed. Wiley, New York, 1965. 334 pp. Illus. $6.75. Five papers: "The problem of error in digital computation" by John Todd; "Techniques for automatic error monitoring and control" by Robert L. Ashenhurst; "The automatic analysis and control of error in digital computing based on the use of interval numbers" by Ramon E. Moore; "Error in digital solution of linear problems" by Ernest L. Albasiny; and "The propagation of error in the digital integration of ordinary differential equations" by Peter Henrici.

Essentials of Modern Organic Chemistry. William A. Bonner and Albert J. Castro. Chapman and Hall, London; Reinhold, New York, 1965. 665 pp. Illus. $8.95.

Functional Analysis. Kôsaku Yosida. Academic Press, New York; Springer, Berlin, 1965. 470 pp. Illus. $16.50. Die Grundlehren Der Mathematischen Wissenschaften, vol. 123.

Functionals and Their Applications. Selected topics, including integral equations. Griffith Conrad Evans. Dover, New York, 1964. 159 pp. Illus. Paper, $1.50. Enlarged and corrected republication of *Cambridge Colloquium, 1916*, pt. 1, 1918.

Fundamental Chemistry. Donald H. Andrews and Richard J. Kokes. Wiley, New York, ed. 2, 1965. 825 pp. Illus. $8.50.

Fundamentals of College Physics. W. Wallace McCormick. Macmillan, New York, 1965. 831 pp. Illus. $10.95.

Handbook for Theoretical Computation of Line Intensities in Atomic Spectra. I. B. Levinson and A. A. Nikitin. Translated from the Russian edition (Leningrad, 1962) by Z. Lerman. C. Roth, Translation Ed. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1965. 248 pp. Illus. $12.75.

Handbook of Compositions at Thermodynamic Equilibrium. Charles R. Noddings and Gary M. Mullet. Interscience (Wiley), New York, 1965. Unpaged. $15.

Handbook of Vacuum Physics. vol. 2,

Physical Electronics. A. H. Beck, Ed. pt. 1, *Fundamentals of Electric Discharges in Gases*. Grey Morgan. Pergamon, London; Macmillan, New York, 1965. 186 pp. Illus. Paper, $6.

Introductory Numerical Analysis of Elliptic Boundary Value Problems. Donald Greenspan. Harper and Row, New York, 1965. 176 pp. Illus. $7. Harper's Series in Modern Mathematics, edited by I. N. Herstein and Gian-Carlo Rota.

Irreducible Representations of the Space Groups. O. V. Kovalev. Translated from the Russian edition (Kiev, 1961) by A. Murray Gross. Gordon and Breach, New York, 1965. 158 pp. Illus. $7.

Lattice Dynamics. Proceedings of the international conference (Copenhagen, Denmark), August 1963. R. F. Wallis, Ed. Pergamon, London; Macmillan, New York, 1965. 746 pp. Illus. $28.50. One hundred papers on the following topics: Phonon dispersion curves (32 papers); Anharmonic effects (11 papers); Optical and dielectric effects (18 papers); Defects and lattice vibrations (20 papers); Elasticity (8 papers); and Recent developments (11 papers).

Lectures in General Algebra. A. G. Kurosh. Translated from the Russian (Moscow, 1962) by Ann Swinfen. P. M. Cohn, Translation Ed. Pergamon, London; Macmillan, New York, 1965. 374 pp. Illus. $7.50.

Mathematical Analysis: Functions, Limits, Series, Continued Fractions. L. A. Lyusternik and A. R. Yanpol'skii, Eds. Translated from the Russian edition (Moscow, 1961) by D. E. Brown. E. Spence, Translation Ed. Pergamon, London; Macmillan, New York, 1965. 418 pp. Illus. $10.

Mathematical Methods in Engineering and Physics. Special functions and boundary-value problems. David E. Johnson and Johnny R. Johnson. Ronald Press, New York, 1965. 283 pp. Illus. $9.50.

The Matrix Analysis of Vibration. R. E. D. Bishop, G. M. L. Gladwell, and S. Michaelson. Cambridge Univ. Press, New York, 1965. 414 pp. Illus. $19.50.

Mechanics and Thermodynamics of Propulsion. Philip G. Hill and Carl R. Peterson. Addison-Wesley, Reading, Mass., 1965. 575 pp. Illus. $15.

Methoden der Organischen Chemie (Houben-Weyl). vol. 6, pt. 3, *Sauerstoffverbindungen*. G. Dittus, H. Kröper, and H. Meerwein. Thieme, Stuttgart, 1965 (order from Intercontinental Medical Book Corp., New York). 880 pp. Illus. DM. 212.

Metallurgical Achievements. Selection of papers presented at the Birmingham Metallurgical Society's Diamond Jubilee Session, 1963–1964. W. O. Alexander, Ed. Pergamon, London; Macmillan, New York, 1965. 340 pp. Illus. $12.75. Fifteen papers by G. V. Raynor, H. W. G. Hignett, N. P. Inglis, G. E. Gardam, J. B. Cotton, R. G. Baker, M. R. Horne, V. Kondic, E. J. Bradbury, W. O. Alexander, F. B. Pickering, A. H. Cottrell, A. M. Gear, J. W. Cuthbertson, and H. J. Miller.

New Physical and Chemical Properties of Metals of Very High Purity. International Symposia of the Centre National de la Recherche Scientifique (Paris), October 1959. Georges Chaudron, Ed. Gordon and Breach, New York, 1965. 502 pp. Illus.

$24.50. Thirteen papers: "Application of radioelements to investigating the purification of metals by the zone refining method: Systematic analysis after irradiation with neutrons" by P. Albert; "The application of electrical resistivity measurements at very low temperatures to the study of metal purification by the Pfann method, known as the zone refining method" by F. Montariol; "Physical and chemical properties of zone refined aluminum" by O. Dimitrov; "Low temperature electrical resistivity measurements for studying the elimination of lattice defects from pure aluminum" by M. Wintenberger; "New physical, mechanical, and magnetic properties of zone refined iron" by S. Besnard; "Study of the polygonization of zone-refined iron, competition between polygonization and recrystallization and the case of other metals" by J. Talbot; "Study of the polygonization of zone-refined aluminum, competition between this phenomenon, and recrystallization" by J. Montuelle; "Techniques and results of zone refining applied to titanium and iron" by J. L. Rutherford, R. J. Smith, M. Herman, and G. E. Spangler; "The vertical zone refining of copper" by J. Le Héricy; "New improvements of the zone refining method" by J. P. Langeron; "Improvement in floating zone technique" by W. G. Pfann, K. E. Benson, and D. W. Hagelbarger; "The floating method of zone refining with heating by electron bombardment" by A. Calverley; and "On the structure of the oxidation interface of iron and on the insolubility of oxygen in high-purity and zone-refined iron" by R. Sifferlen and R. Collongues.

Die Physikalischen Grundlagen der Kernstrahlungsmessungen. E. Fenyves and O. Haiman. Akadémiai Kiadó, Budapest, Hungary, 1965. 727 pp. Illus. $17.50.

Principles of Astronautics. M. Vertregt. Elsevier, New York, ed. 2, 1965. 353 pp. Illus. $9.

Principles of Electrical Engineering. Vincent Del Toro. Prentice-Hall, Englewood Cliffs, N.J., 1965. 799 pp. Illus. $17. Prentice-Hall Electrical Engineering Series, edited by William L. Everitt.

Principles of Mathematics. Paul K. Rees. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1965. 397 pp. Illus $6.95. A revision of *Freshman Mathematics* (1959).

Problems of Atmospheric and Space Electricity. Proceedings, Third International Confernce (Montreux, Switzerland), May 1963. Samuel C. Coroniti, Ed. Elsevier, New York, 1965. 630 pp. Illus. $35. Sixty-six papers and short contributions presented at a conference sponsored by the International Association of Meteorology and Atmospheric Physics, the International Association of Geomagnetism and Aeronomy, and the International Union of Geodesy and Geophysics.

Proceedings of the Third International Congress on Catalysis. Amsterdam, July 1964. vols. 1 and 2. W. M. H. Sachtler, G. C. A. Schuit, and P. Zwietering, Eds. North-Holland, Amsterdam; Interscience (Wiley), New York, 1965. vol. 1, xvi + 762 pp.; vol. 2, viii + 683 pp. Illus. $49 set. Ninety-eight papers: Reaction Mechanism in Heterogeneous Catalysis (81 papers) and Selectivity of Heterogeneous Catalysts (17 papers), as well as six invited papers by H. Hoog, R. S. Nyholm, V. V.

Voevodskii, G. Ehrlich, J. Halpern, and G. K. Boreskov.

The Propagation of Gamma Quanta in Matter. O. I. Leipunskii, B. V. Novozhilov, and V. N. Sakharov. Translated from the Russian edition (Moscow, 1960) by Prasenjit Basu. K. T. Spinney, J. Butler, and J. B. Sykes, Translation Eds. Pergamon, London; Macmillan, New York, 1965. 234 pp. Illus. $15. International Series of Monographs on Nuclear Energy, Division X: Reactor Design Physics, vol. 6, edited by J. V. Dunworth.

Quantum Electrodynamics. A. I. Akheizer and V. B. Berestetskii. Translated from the second Russian edition (1959) by G. M. Volkoff. Interscience (Wiley), New York, 1965. 886 pp. Illus. $22.50. Interscience Monographs and Texts in Physics and Astronomy, vol. 11, edited by R. E. Marshak.

Radio Spectrum Utilization. A report of the Joint Technical Advisory Committee, Institute of Electrical and Electronics Engineers and Electronic Industries Association. Institute of Electrical and Electronics Engineers, New York, 1964. 284 pp. Illus. $10.

Scalar and Vector Fields: A Physical Interpretation. Richmond B. McQuistan. Wiley, New York, 1965. 330 pp. Illus. $5.95.

The Second Law: An Introduction to Classical and Statistical Thermodynamics. Henry A. Bent. Oxford Univ. Press, New York, 1965. 441 pp. Illus. $6.

Selected Problems in Quantum Mechanics. Collected and edited by D. ter Haar. Academic Press, New York, 1965. 412 pp. Illus. $8.50. Revised and augmented second edition of Gol'dman, Krivchenkov, Kogan, and Galitskii, *Problems in Quantum Mechanics*.

Semimicro Qualitative Organic Analysis: The Systematic Identification of Organic Compounds. Nicholas D. Cheronis, John B. Entrikin, and Ernest M. Hodnett. Interscience (Wiley), New York, ed. 3, 1965. 1072 pp. Illus. $29.50.

Solar System Radio Astronomy. Lectures presented at the NATO Advanced Study Institute, National Observatory, Athens, Greece (Cape Sounion), August 1964. Jules Aarons, Ed. Plenum Press, New York, 1965. 428 pp. Illus. $17.50. Eighteen papers.

Solid Organoalkali Metal Reagents: A New Chemical Theory for Ionic Aggregates. Avery A. Morton. Gordon and Breach, New York, 1964. 256 pp. Illus. $7.50.

Soviet Advances in Nuclear Geophysics. F. A. Alekseev, Ed. Translated from the Russian edition (Moscow, 1963). Consultants Bureau, New York, 1965. 197 pp. Illus. Paper, $27. Seventeen papers.

Space Probes and Planetary Exploration. William R. Corliss. Van Nostrand, Princeton, N.J., 1965. 552 pp. Illus. $7.75. Written under the sponsorship of the National Aeronautics and Space Administration.

Stabilization of Synthetic High Polymers. G. Ya. Gordon. Translated from the Russian edition (Moscow, 1963) by A. Mercado. Israel Program for Scientific Translations, Jerusalem, 1964; Davey, New York, 1965. 224 pp. Illus. $14.

Statistical Mechanics: An Advanced Course with Problems and Solutions. Ryo-