

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.

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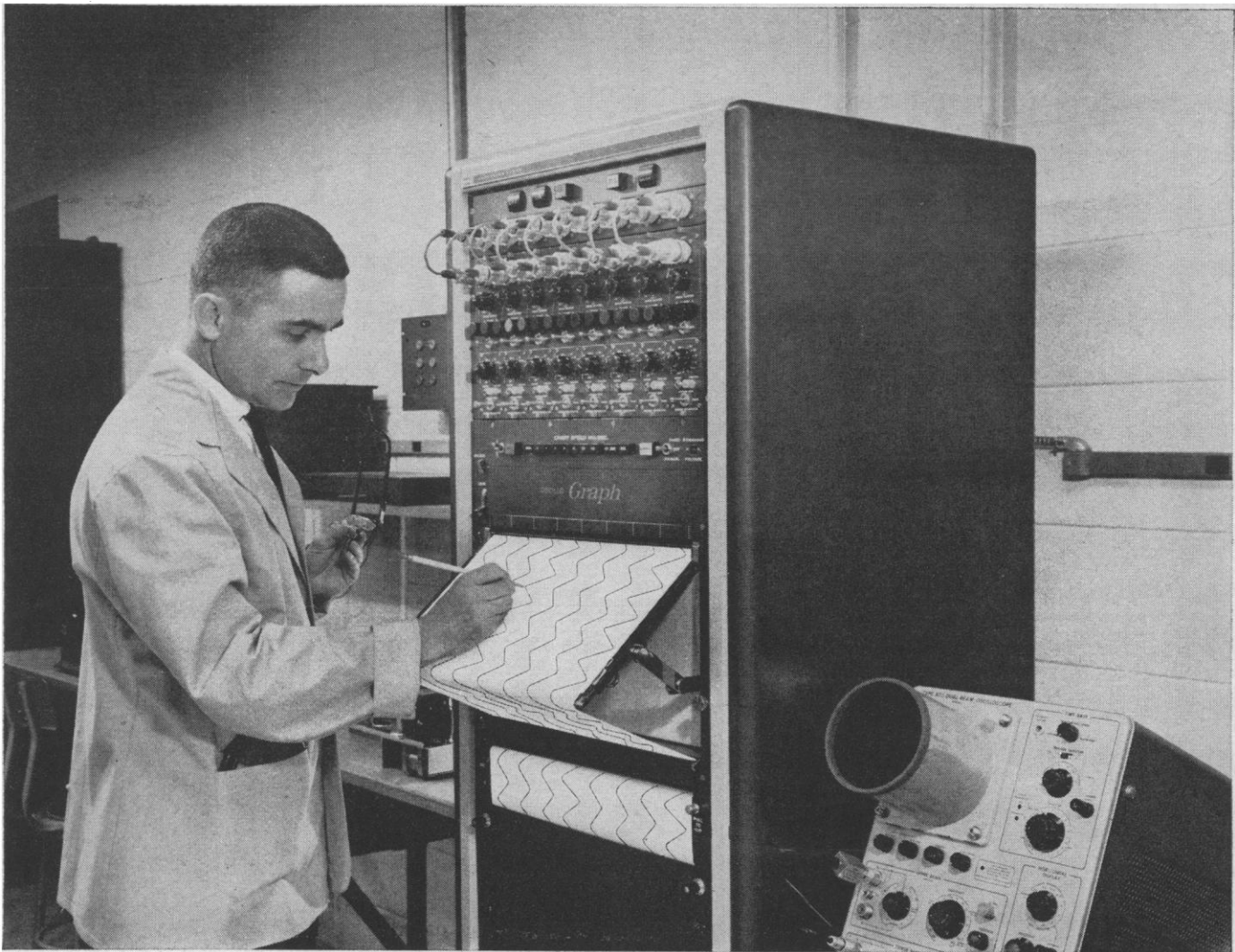
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25 June 1965

Vol. 148, No. 3678

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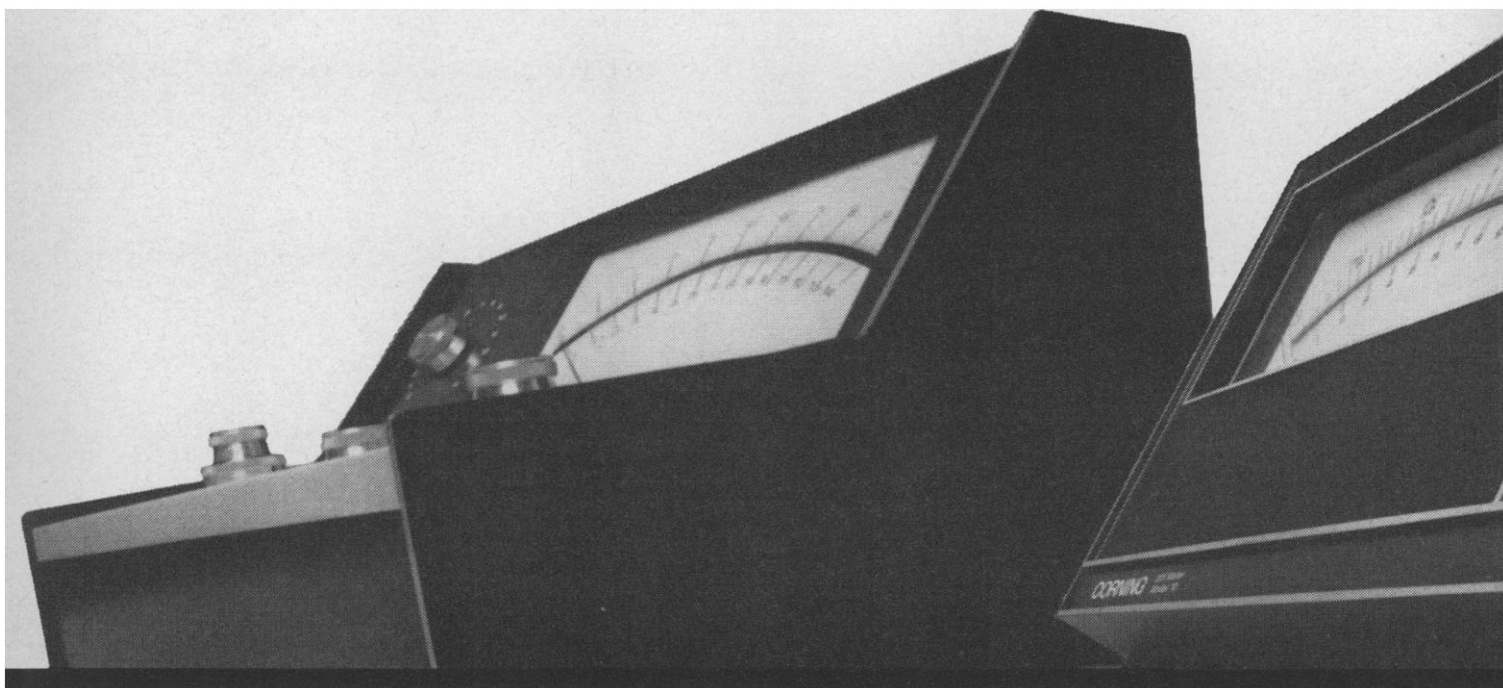
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Fault displacement associated with the 1964 Alaska earthquake. The northwest block (left) of the Hanning Bay Fault has been displaced upward between 4 and 5 meters, relative to the southeast block, along a high-angle reverse fault. The white coating 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]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1947. Its objects are to further the work of scientists, to facilitate cooperation among them, to prove the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

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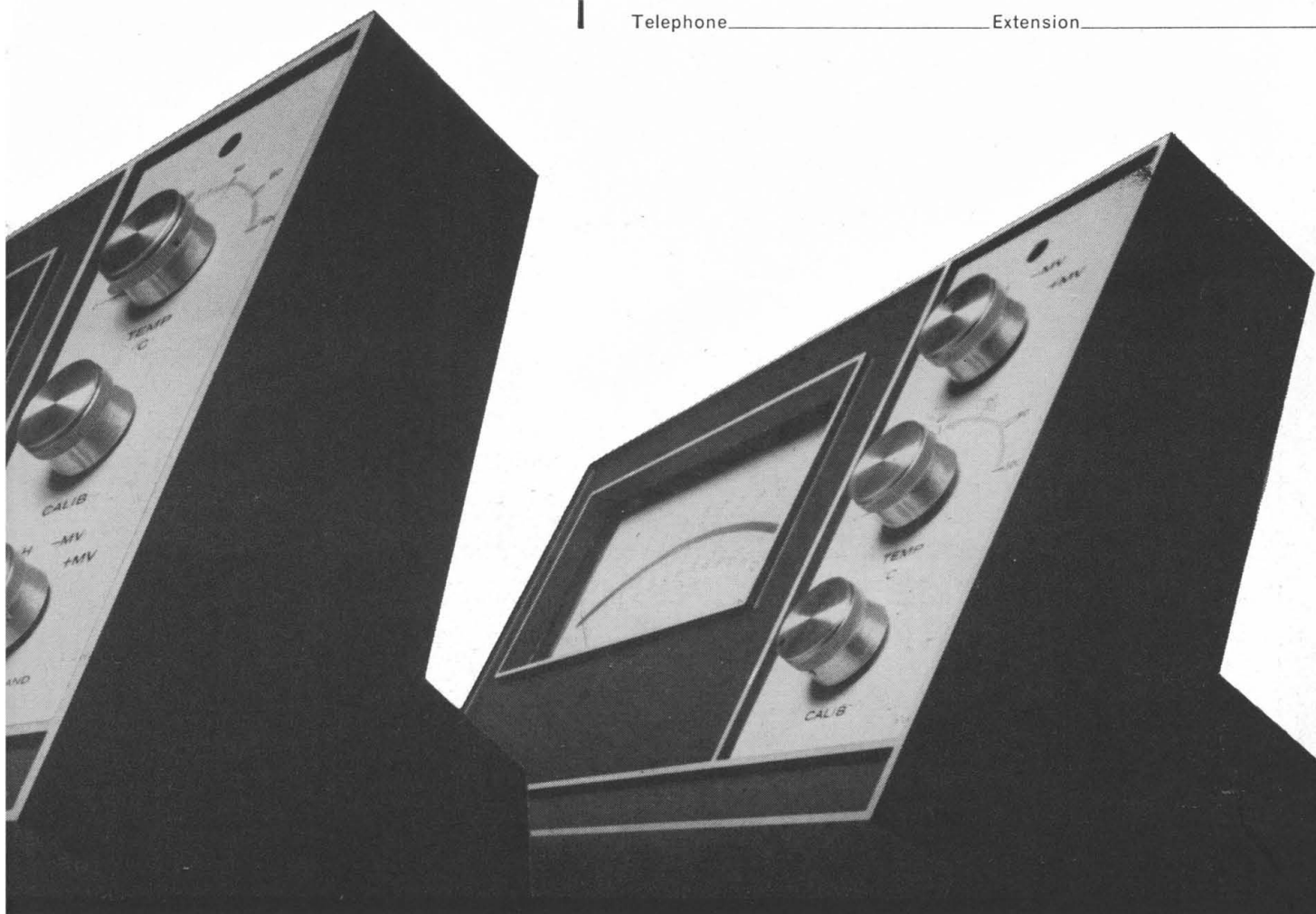
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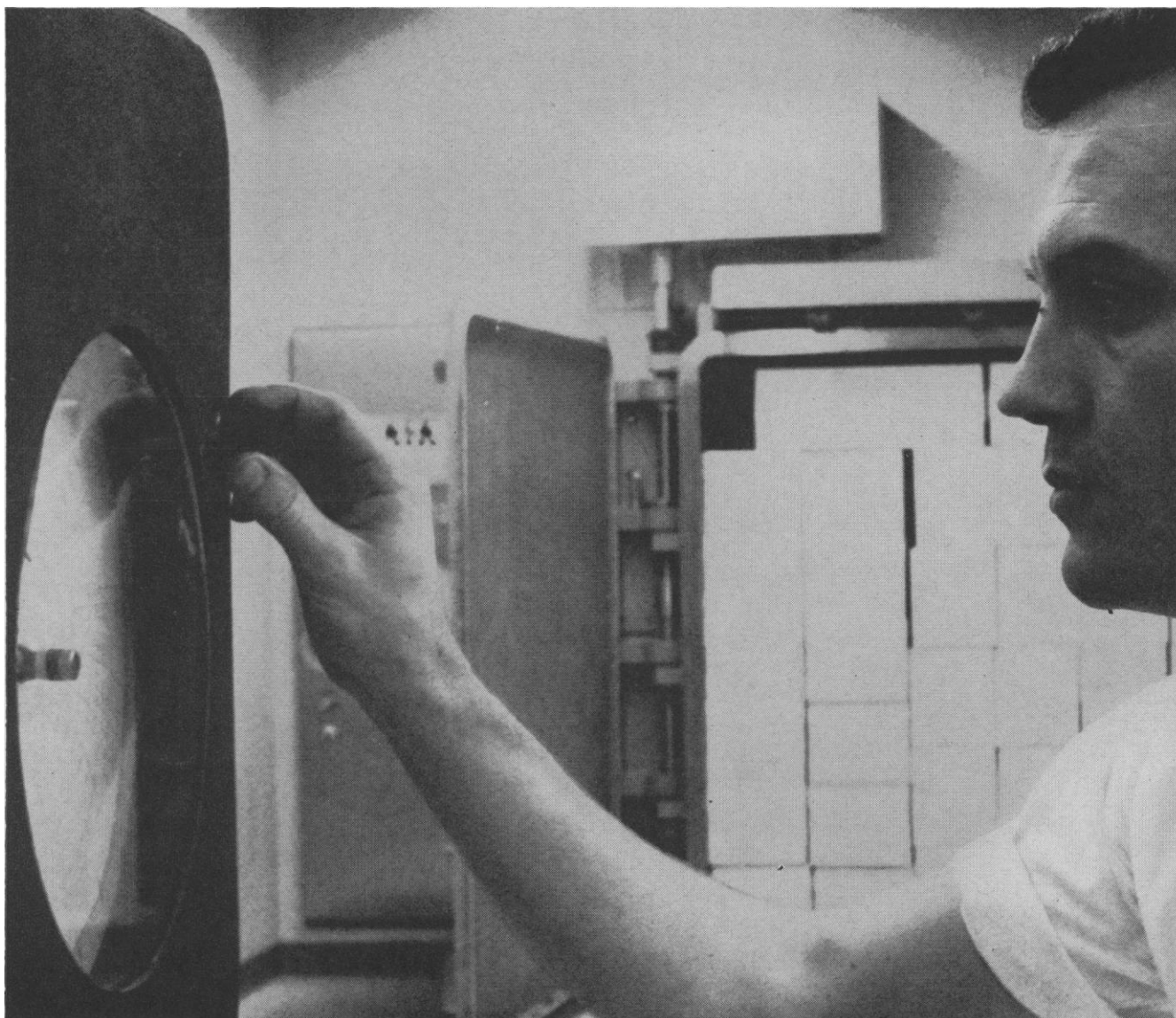
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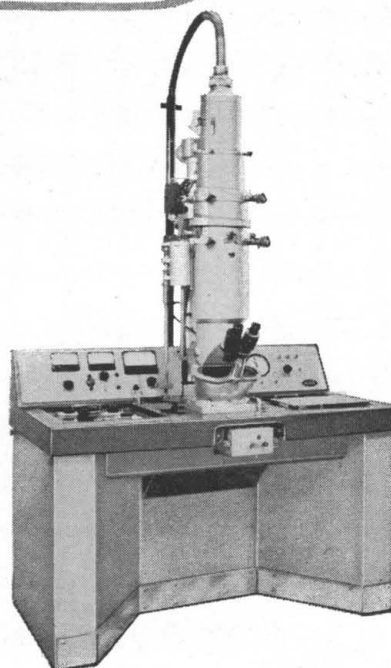
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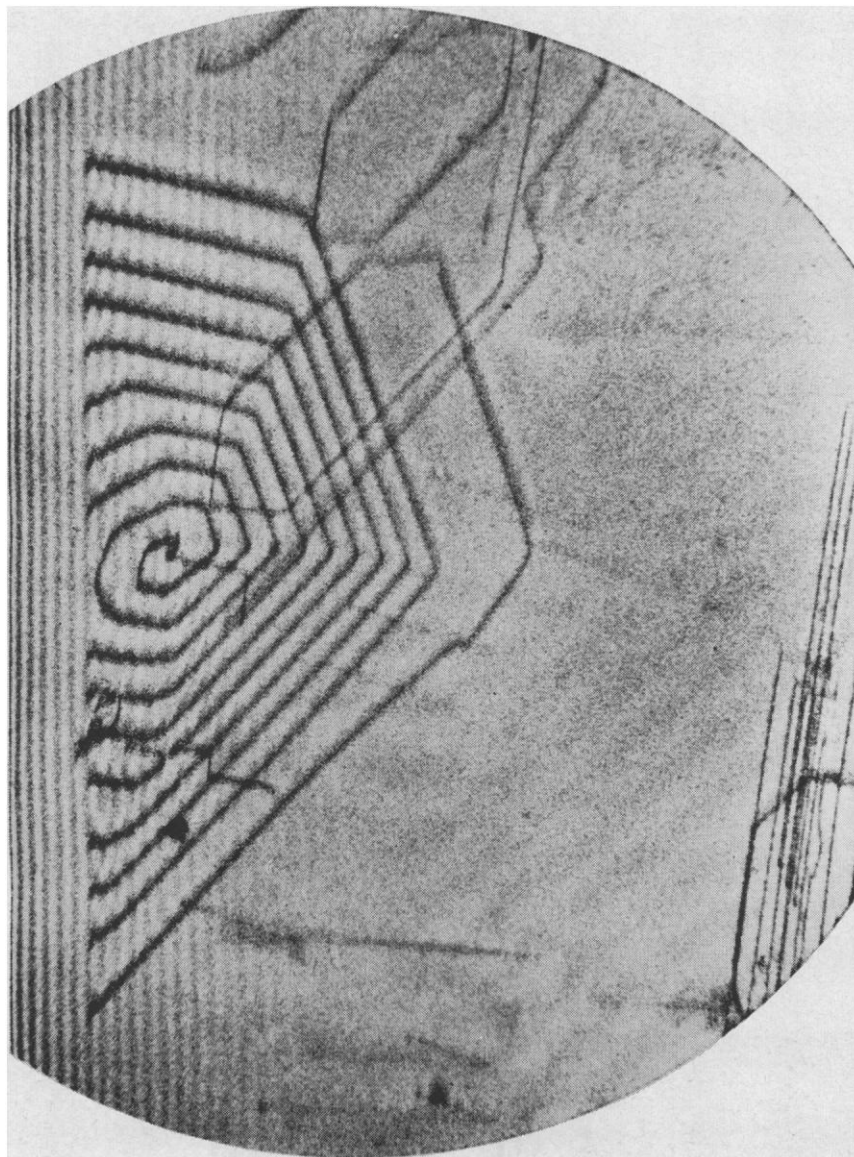
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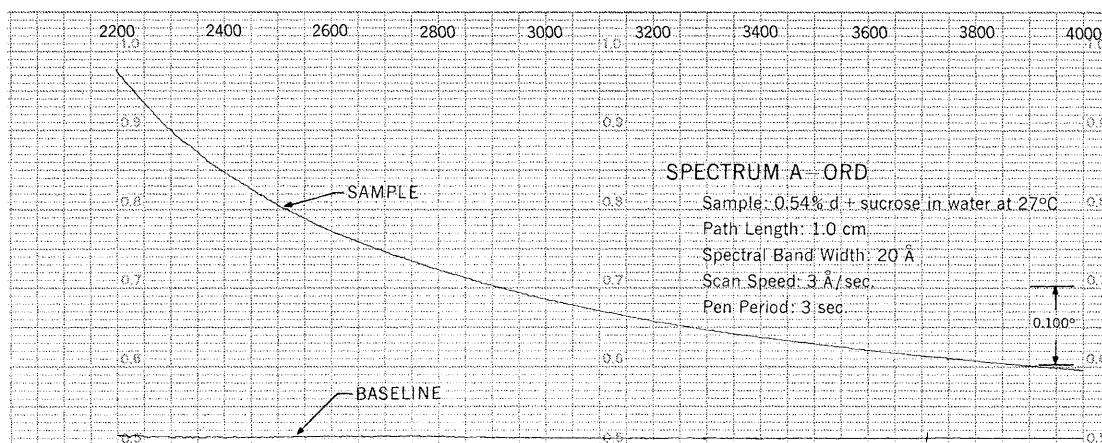
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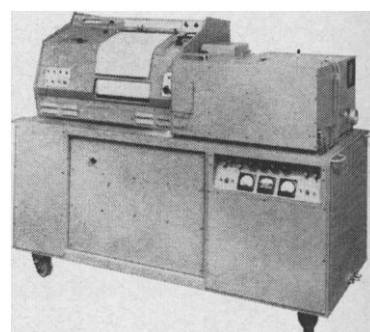
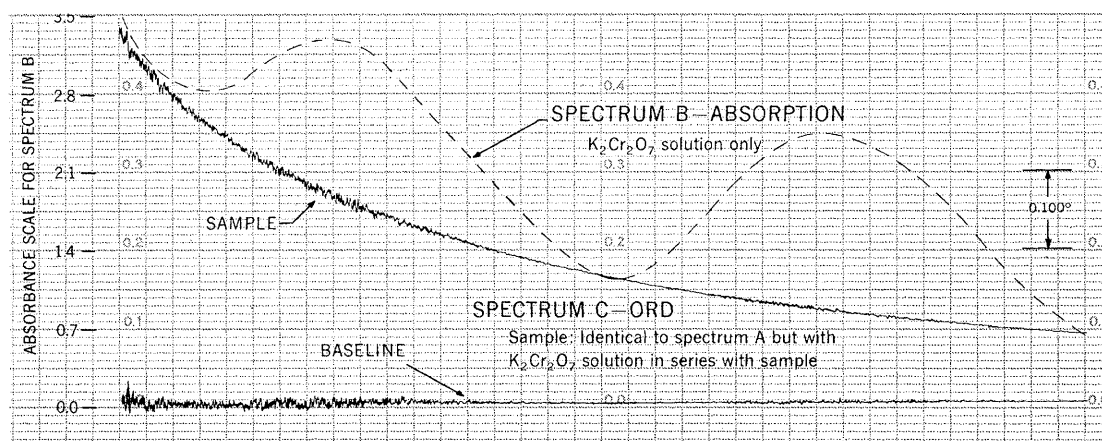
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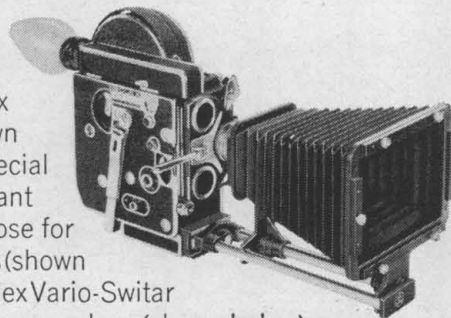


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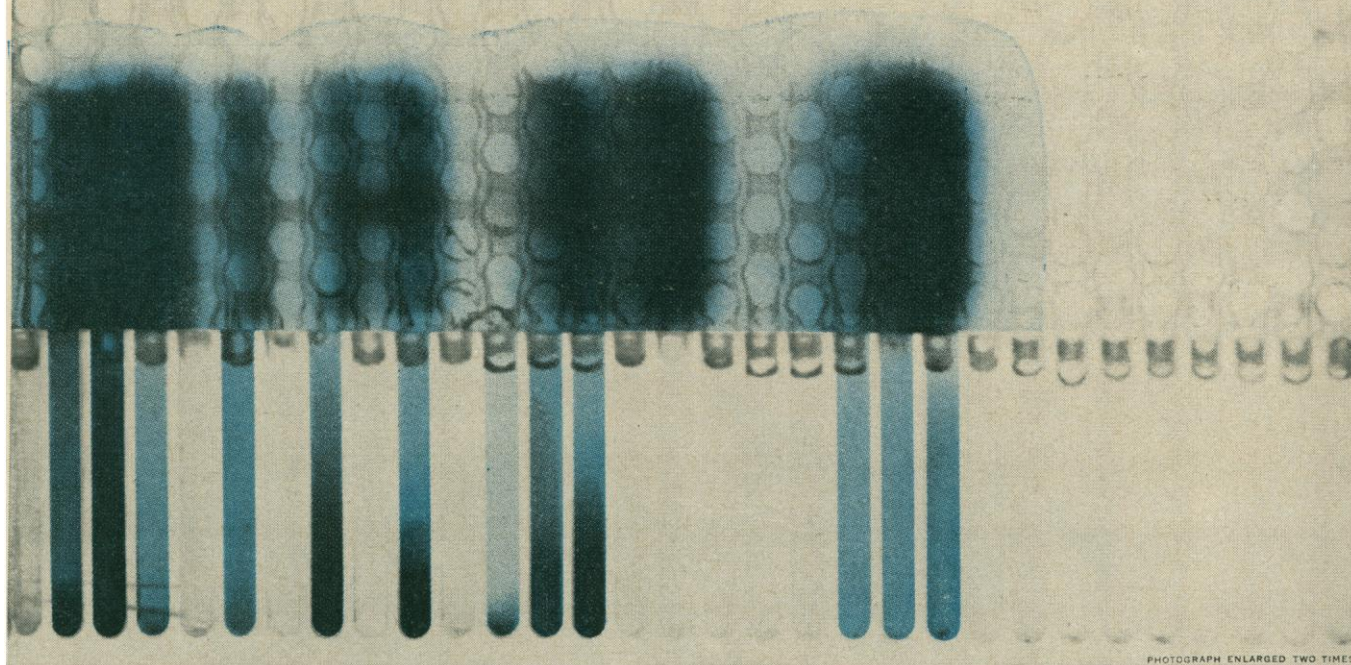
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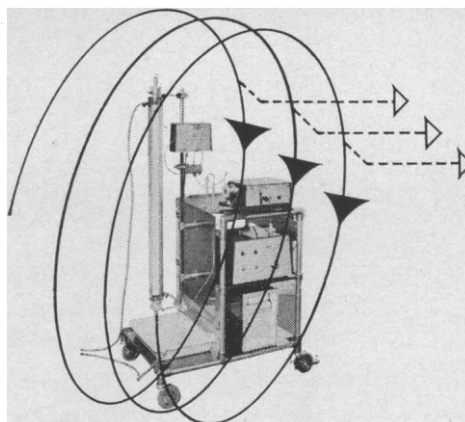
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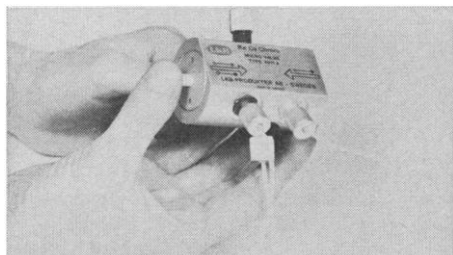
tions or for separation of peptides and amino acids from proteins, a sample of up to 150 ml is not unusual, whereas for purity controls of radioactively tagged concentrated preparations, quantities down to 1/100 of this volume are feasible. Sample application by pipette is eliminated. The pump sucks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

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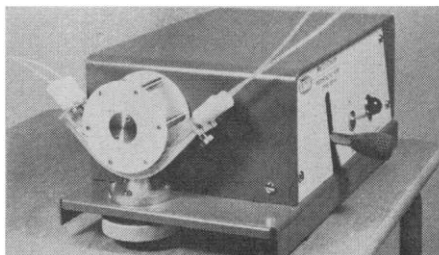
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*According to J. Porath and H. Bennich



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

Request literature file 49005-5 for details

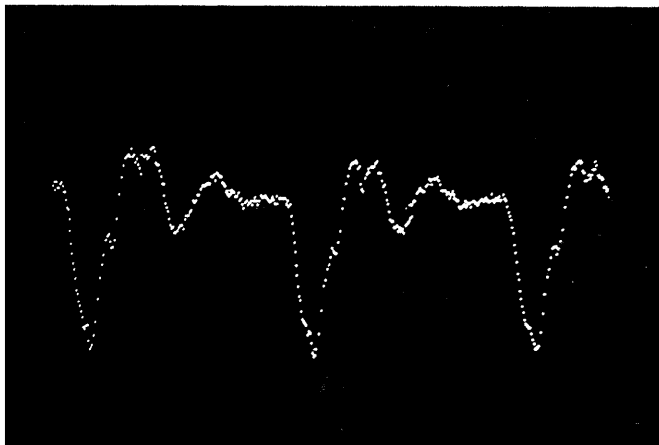


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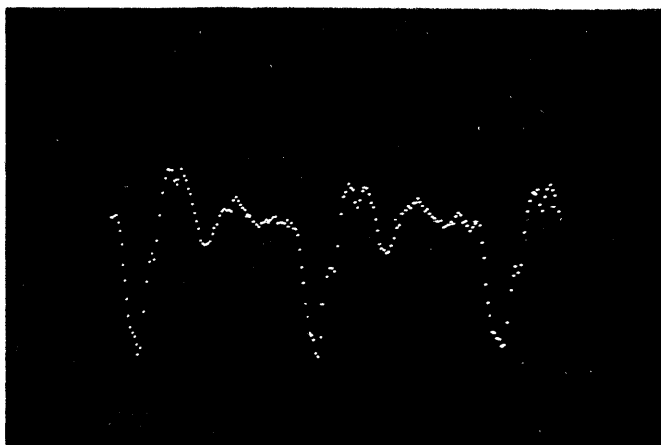
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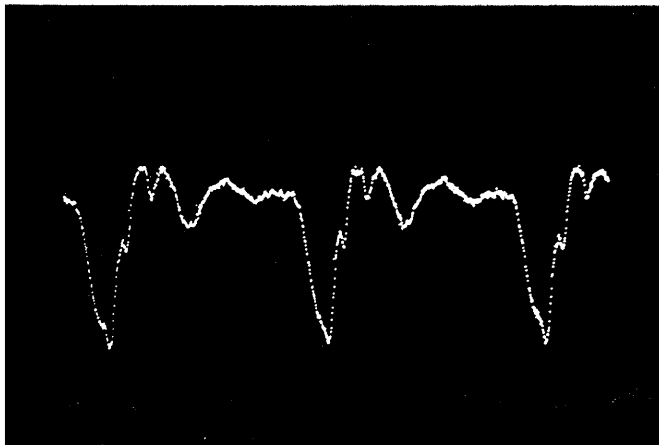


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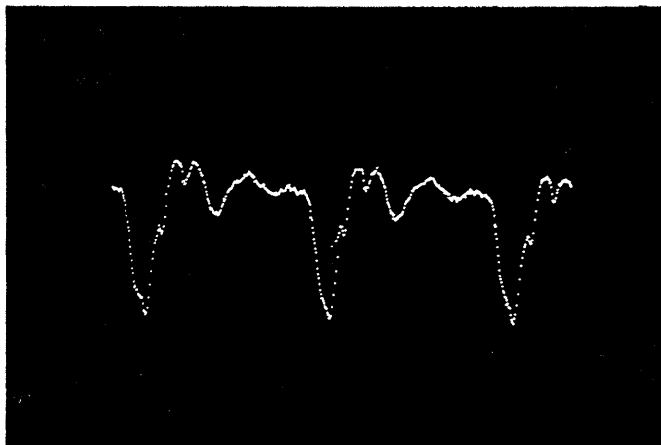


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Special digitizing process: So effective is Enhancetron 1024, it extracts signals from random electrical noises 10 to 40 times greater in magnitude than the signal of interest. Through a patented digitizing process, repetitive signals are added in 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.

Get complete data on the resolution, speed and efficiency of Enhancetron 1024. Write for your copy of Bulletin 1024.



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See the advantages you get with new, super strong COREX® high-speed glass centrifuge tubes:



...the *strength* that protects samples at 40,000 g's or 20,000 RPM

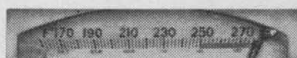


...the *transparency* of glass

...the *resistance* of glass to practically *all solvents*



...the *sterilizability* of glass



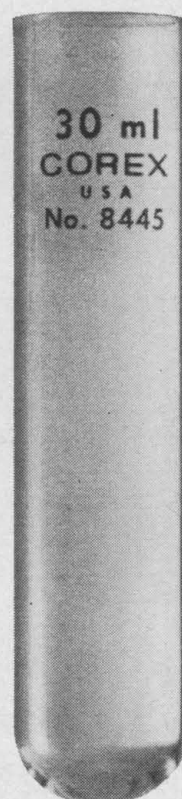
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Prices:

No. 8441, 15 ml, 60 cents each, \$25.92 per case of 48. These must be used with 8441 rubber-sleeve adapter, \$1.60 each, \$17.28 per case of 12.

No. 8445, 30 ml, 90 cents each, \$29.16 per case of 36. These must be used with 8445 rubber-sleeve adapter, \$1.70 each, \$18.36 per case of 12.

Greater discount savings are available to you on larger quantities.









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

New, and available now, for speeds up to 15,000 g's No. 1265 bottle, 150 ml, with autoclavable cap. For speeds up to 5,000 g's or 5,000 RPM, there are five low-speed COREX tubes.

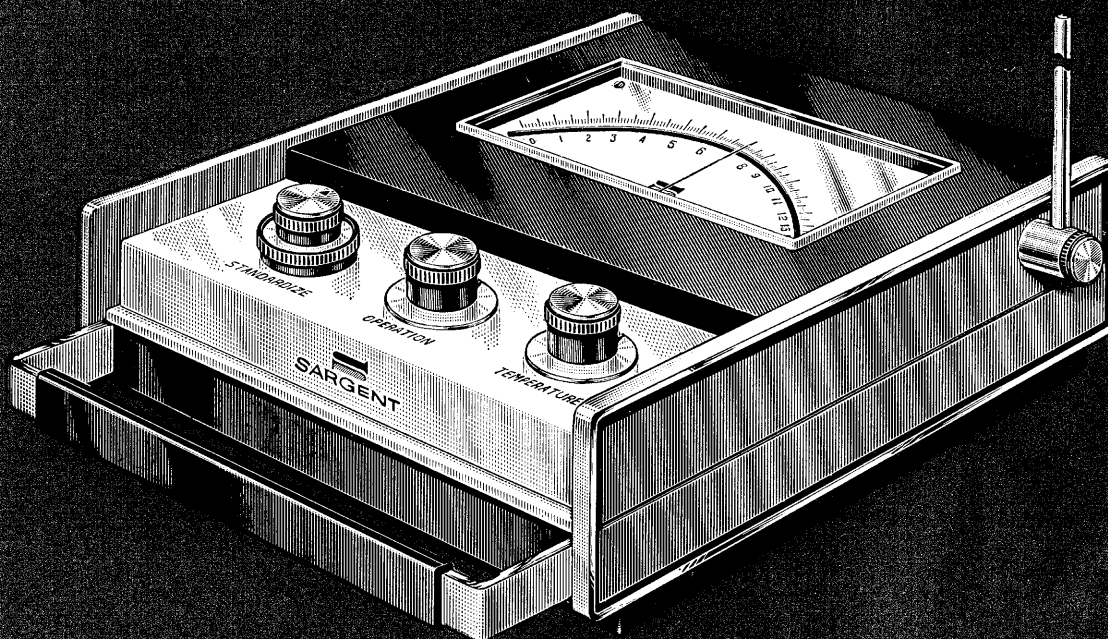
Write for complete information on high- and low-speed COREX tubes and for new sizes and types soon to be released. Laboratory Glassware Dept., Corning Glass Works, 9206 Crystal Street, Corning, N. Y.

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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	—	—

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

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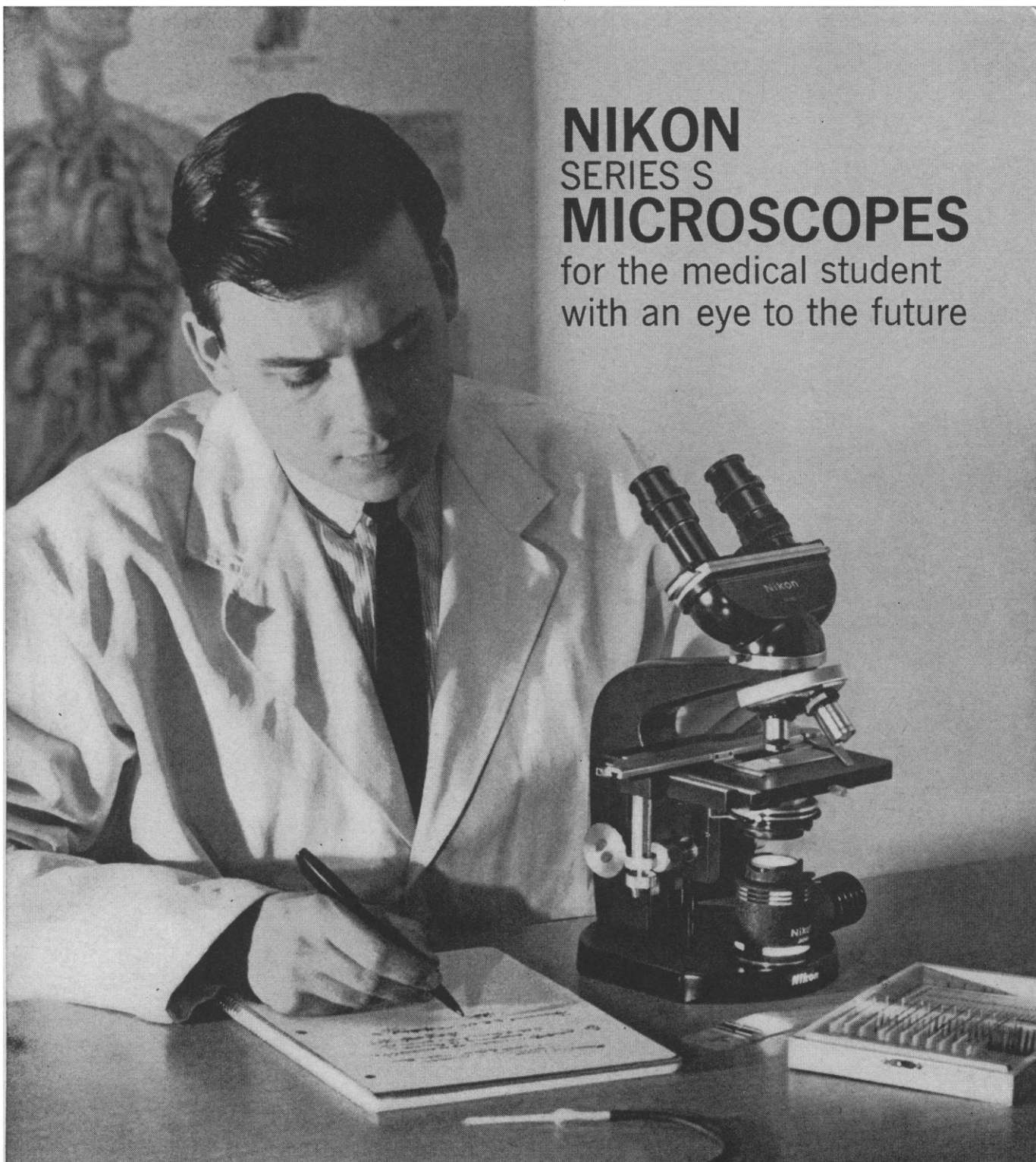
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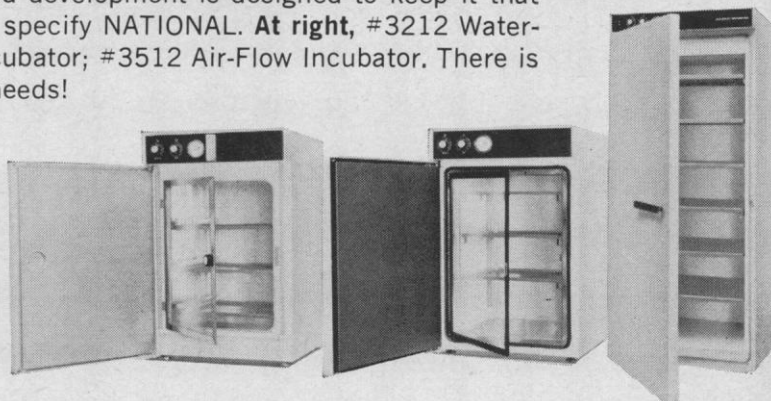
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All are equipped with IEC's famous Minot Custom Microtome . . . the precision instrument for both paraffin and frozen sectioning. Cuts sections

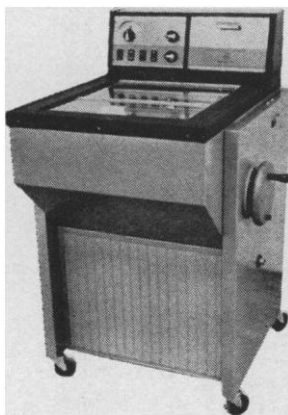
from 2 to 16 microns, with 18 to 40 micron sectioning optional. 100% rustproof. Autoclavable. Many other high precision features.

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

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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.

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NEW ADAMS AUPETTE VALVE[†]

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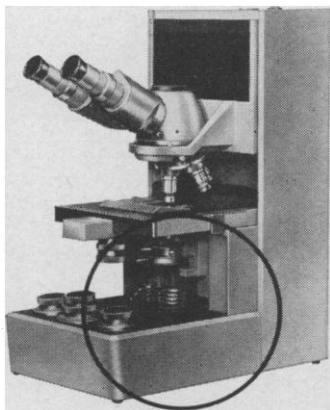
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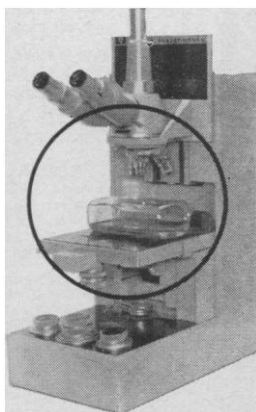
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**These six features, available only on the
VICKERS M-32 Microscope/Camera System, give you
new research capabilities unavailable with any other microscope!**



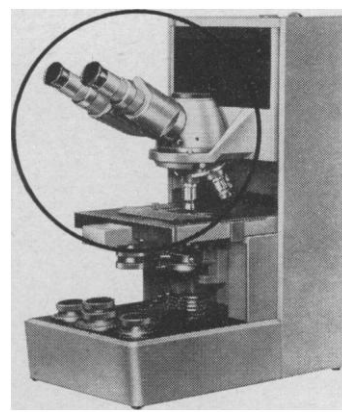
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100 Watt Quartz iodine lamp is built in with full controls for true Kohler illumination. Variable intensity control at front of operating panel. Sufficient light for micro projection.



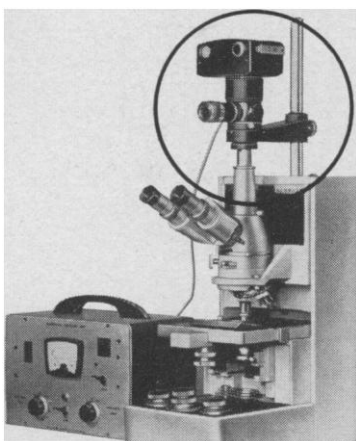
Accepts Specimens to 90mm High

The microscope body can be raised on its slide to give a clearance which will accommodate very large objects such as tissue culture flasks and other special experimental set-ups.



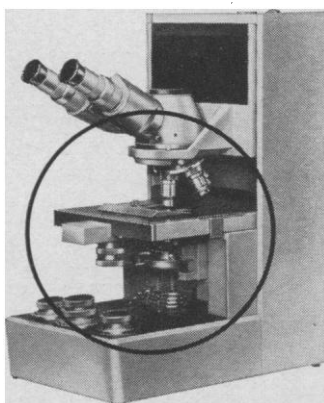
Variety of Beamsplitter/Body Combinations

Two beam-splitter boxes are offered — one varying instantaneously from 50% visual 50% camera to 100% camera — the other 100% visual to 100% camera. Monocular or binocular bodies fit as required to prism box in use.



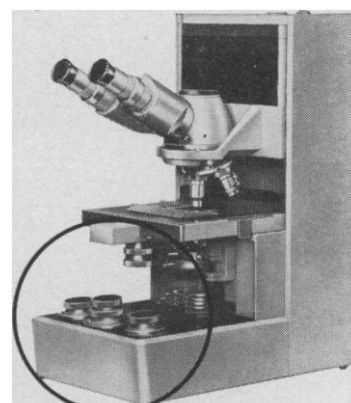
A Unitized Camera/Microscope System

Any of the Vickers cameras can be integrally mounted and quickly interchanged. Available are 35mm, Polaroid®, plate and cine time-lapse: — with choice also of fully automatic 35mm and auto-exposure 35mm and Polaroid®.



Fixed Stage with Large Work Area

Stage does not move in focusing, giving it the stability necessary in micromanipulation and other special techniques. Stage is 7½" x 9" with graduated 2" x 3" movement.



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All controls for focus and illumination are grouped on a central panel with stage and condenser adjustments directly above. All operations can be carried out conveniently with either right or left hand. All focusing and stage motions are ball-bearing.

Send for M-32 Catalog which fully describes many other design features of this microscope and lists the wide range of optical and photomicrographic accessory equipment offered.

Vickers Instruments

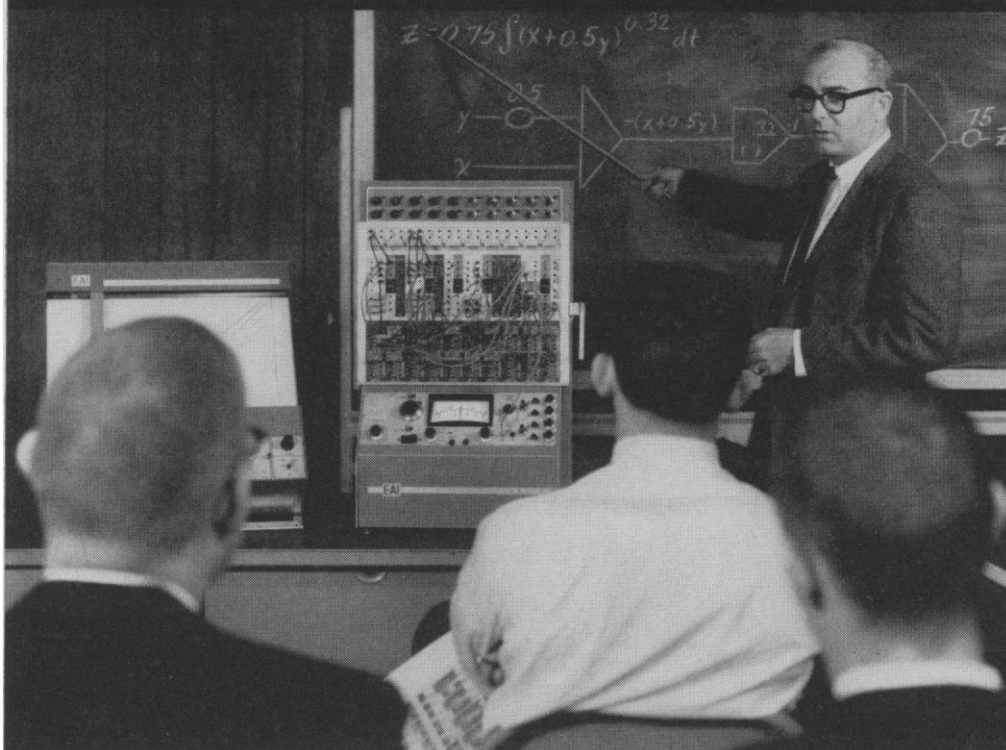
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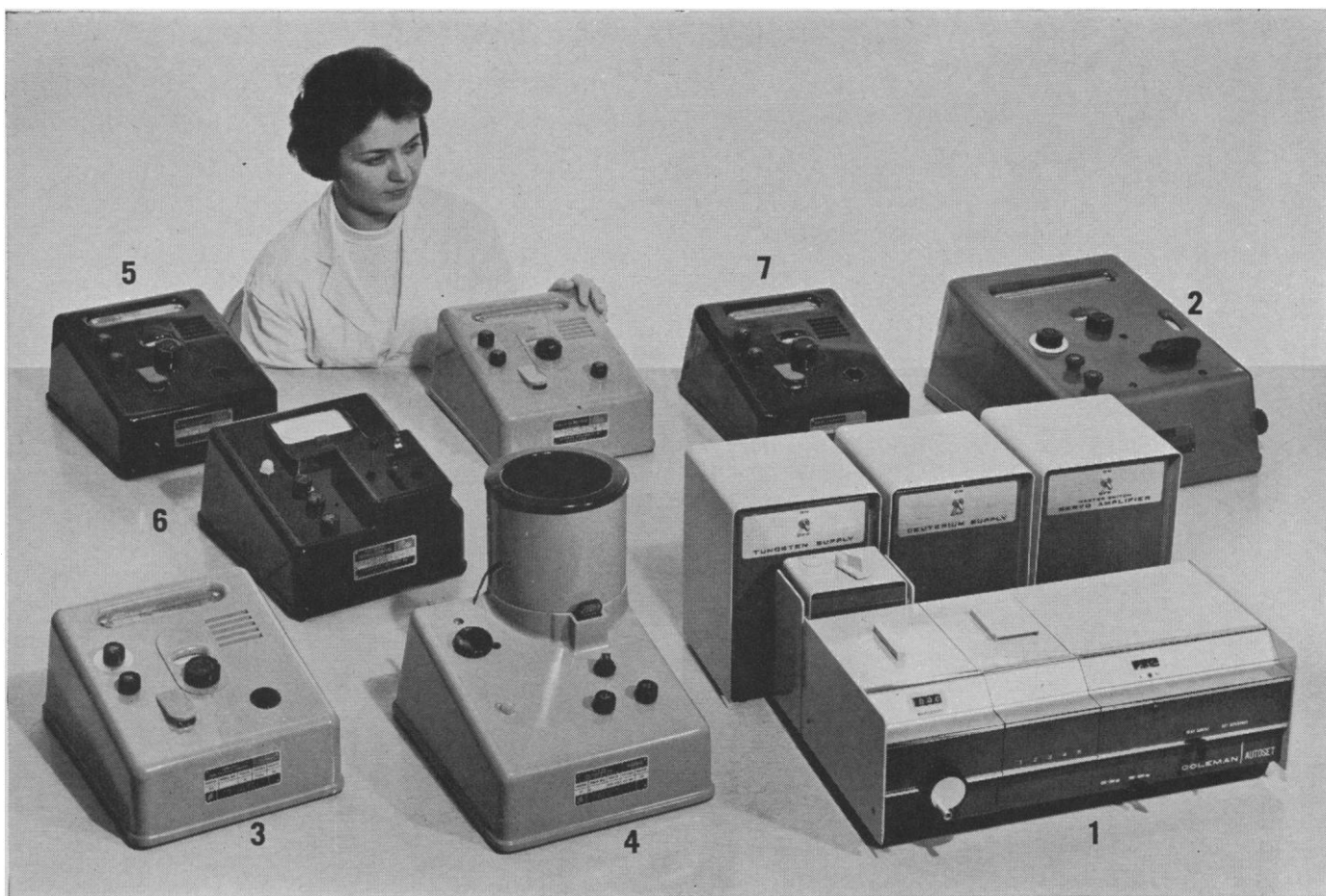
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② Universal Spectrophotometer

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 $m\mu$. Five choices of power supplies—Prices start at \$674.00.

③ Junior Spectrophotometer

Unmatched for rapid, routine analysis. World's most widely used spectrophotometer. With its simple controls and direct reading scales, the Junior Spectrophotometer is ideal for industrial laboratories performing repeated analyses, where precise readings can be obtained in 3 to 4 seconds. The Junior Spectrophotometer handles the widest range of sample sizes—from 0.007 ml to 25 ml.

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 $m\mu$. 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.

NEW BROCHURE . . "Photometric Instrumentation for the Analytical Laboratory" Bulletin SB-298 fully describes the entire Coleman line of photometric instruments. Ask your Coleman dealer for a copy of this 32 page book, or write to Coleman Instruments Corporation, Maywood, Illinois 60154.

⑤ Nepho-Colorimeter

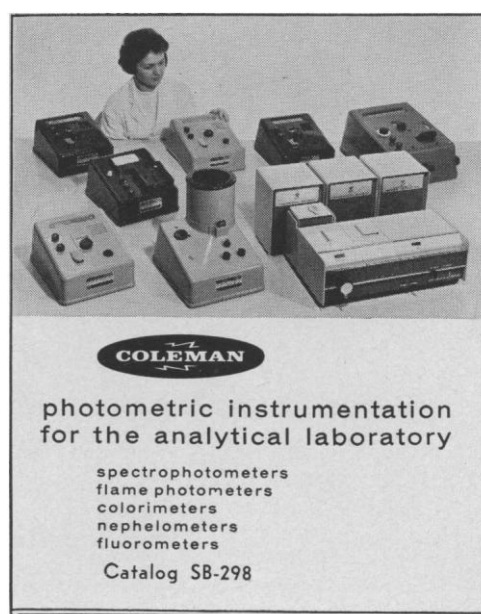
Measures haze in liquids that is indiscernible to the human eye. This unique Coleman instrument can detect haze in liquids that appear crystal-clear. In beverage industries it is used to predict formation of long-term precipitates; in the life sciences, to determine bacterial growth rates. Coleman Nephelos 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.

⑥ Electronic Photofluorometer

For fluorescence analysis of vitamins, drugs, metal complexes and other fluorophors. This highly sensitive instrument is easy to operate and standardize. Design of the Coleman Photofluorometer minimizes irradiation of sample, reducing drift in instrument readings and errors in analyses. The inherently high sensitivity can be increased 15 times by using a Coleman Spectrophotometer as a readout device. This permits accurate measurement of faint fluorescence without the cost or inherent uncertainty of photomultipliers or high gain amplifiers. Stability is further assured by built-in voltage regulation of both the phototube amplifier and the mercury vapor lamp. Comes complete with lamp and transformer. Priced from \$475.00.

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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 $m\mu$ to 655 $m\mu$. 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.



Duphar Cyclotron on its way to Petten, Holland

Philips-Duphar will soon be able to operate its own cyclotron in the new Isotope Laboratory at the Reactor Centre, Petten, Holland. This cyclotron will be the first one in the world to be operated by a private firm and will be used for the production of carrier-free radioactive isotopes exclusively. The cyclotron is of the isochronous type, manufactured in the Philips Works at Eindhoven. The truck in the picture carried its 90-ton cloverleaf magnet during a 2-night transport from Eindhoven to Petten.

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Delivery program besides cyclotron isotopes: reactor isotopes, C14/H3 compounds, industrial sources and Nuclear Pharmaceuticals. Catalogues and pricelists on request.

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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.

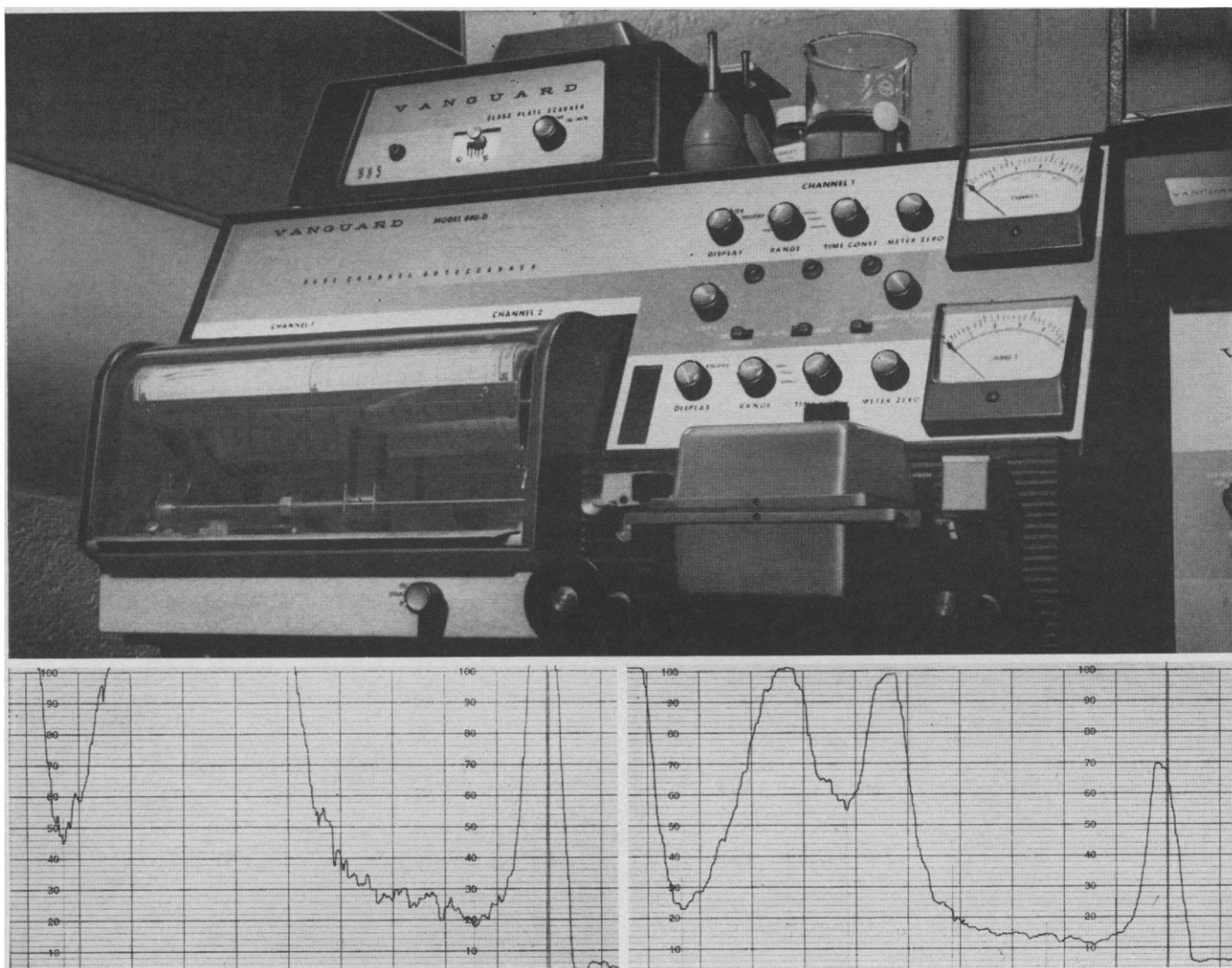
For complete data on the QRB series and other Sorensen products send for the new, 140-page "Controlled Power Catalog and Handbook." Write Sorensen, Richards Avenue, South Norwalk, Connecticut. Or use reader service card number **200**.

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		RACK PANEL		WEIGHT (LBS.)
							WIDTH	INCHES HEIGHT	DEPTH	INCHES HEIGHT	
QRB15-2	0-15	0-2	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5½	9	5¼	10.75
QRB20-1.5	0-20	0-1.5	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5½	9	5¼	10.75
QRB30-1	0-30	0-1	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5½	9	5¼	10.75
QRB40-.75	0-40	0-.75	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5½	9	5¼	10.75



A UNIT OF RAYTHEON COMPANY



Dual traces at 3:1 sensitivity of radiochromatogram showing partial acid hydrolysate of C^{14} labeled bacterial polysaccharide.

Simple way to get quantitative data from both strong and weak areas of radioactivity

The TMC-Vanguard 880-D dual channel, low background autoscanner provides two channels with independent controls so that paper strip may be analyzed at high and low levels simultaneously.

The two channels use a common input from geiger chambers and a common high-voltage supply. Pulses from the chambers are summed under the condition that they are not coincident in time, and are then supplied to the two channels for analysis.

Each channel has its independent range and time-constant selector and its independent recorder channel. So, for example, one channel may be set with a high range and a short time constant and the other set for a low range and a long time constant. In this way, where there are intense areas of radioactivity interspersed with weak areas on the paper chromatogram, each will be presented on one of the two channels without running off the top of the recording or yielding a peak so

small that it cannot be interpreted.

This compact, completely transistorized, one-unit system provides better than 2% accuracy of count rate on all ranges and is adaptable to direct digital quantitation.

Application assistance and field service are assured by TMC's world-wide facilities. For complete details contact nearest office, or write: Vanguard Instrument Corporation, 441 Washington Ave., North Haven, Conn.



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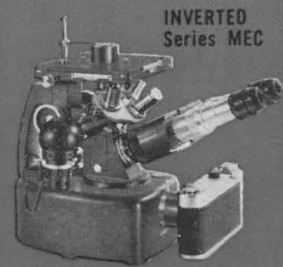
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STUDENT
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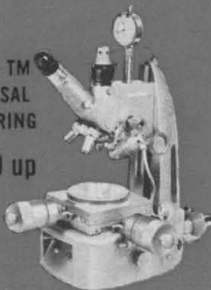


LABORATORY
MODEL MMU
\$312

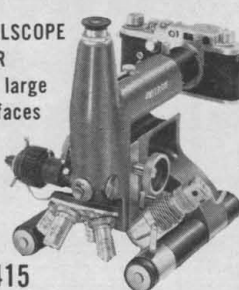


INVERTED
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Monocular Model \$416
Binocular Model \$719

SERIES TM
UNIVERSAL
MEASURING
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ROLLSCOPE
DMR
For large
surfaces

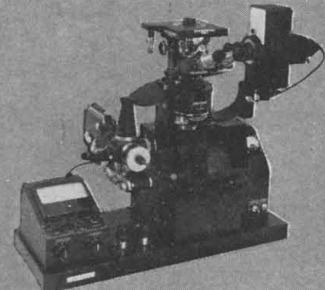


\$415

"SERIES N" METALLOGRAPHS

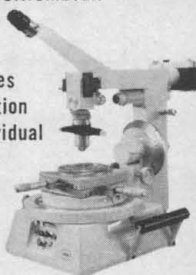
New budget-priced models with flatfield objectives, widefield eyepieces, coaxial stage controls, and many optional accessories. Models with combined xenon-tungsten or tungsten illumination available.

From
\$1398 up

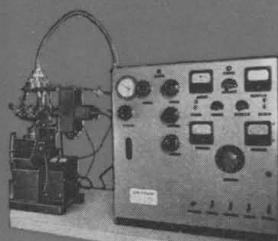


MICROGONIOMETER

Measures
orientation
of individual
grains



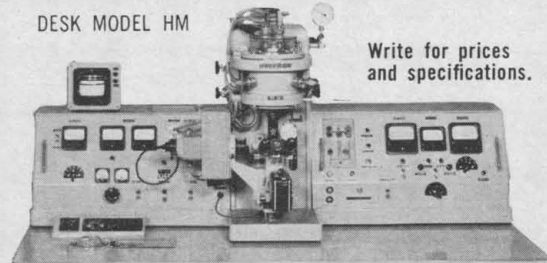
HTL HIGH TEMPERATURE LABORATORY INSTALLATION



UNITRON'S HIGH-TEMPERATURE RESEARCH METALLOGRAPH

DESK MODEL HM

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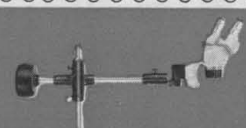
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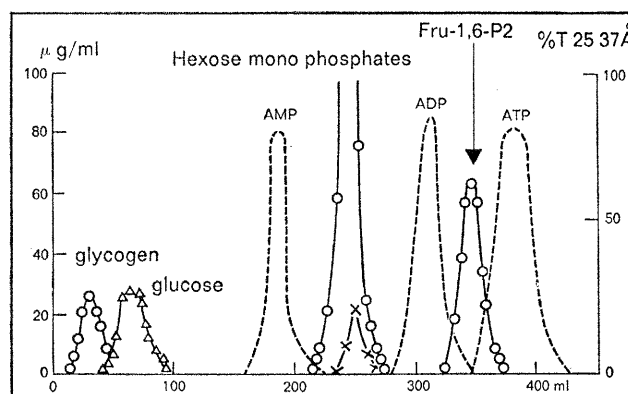
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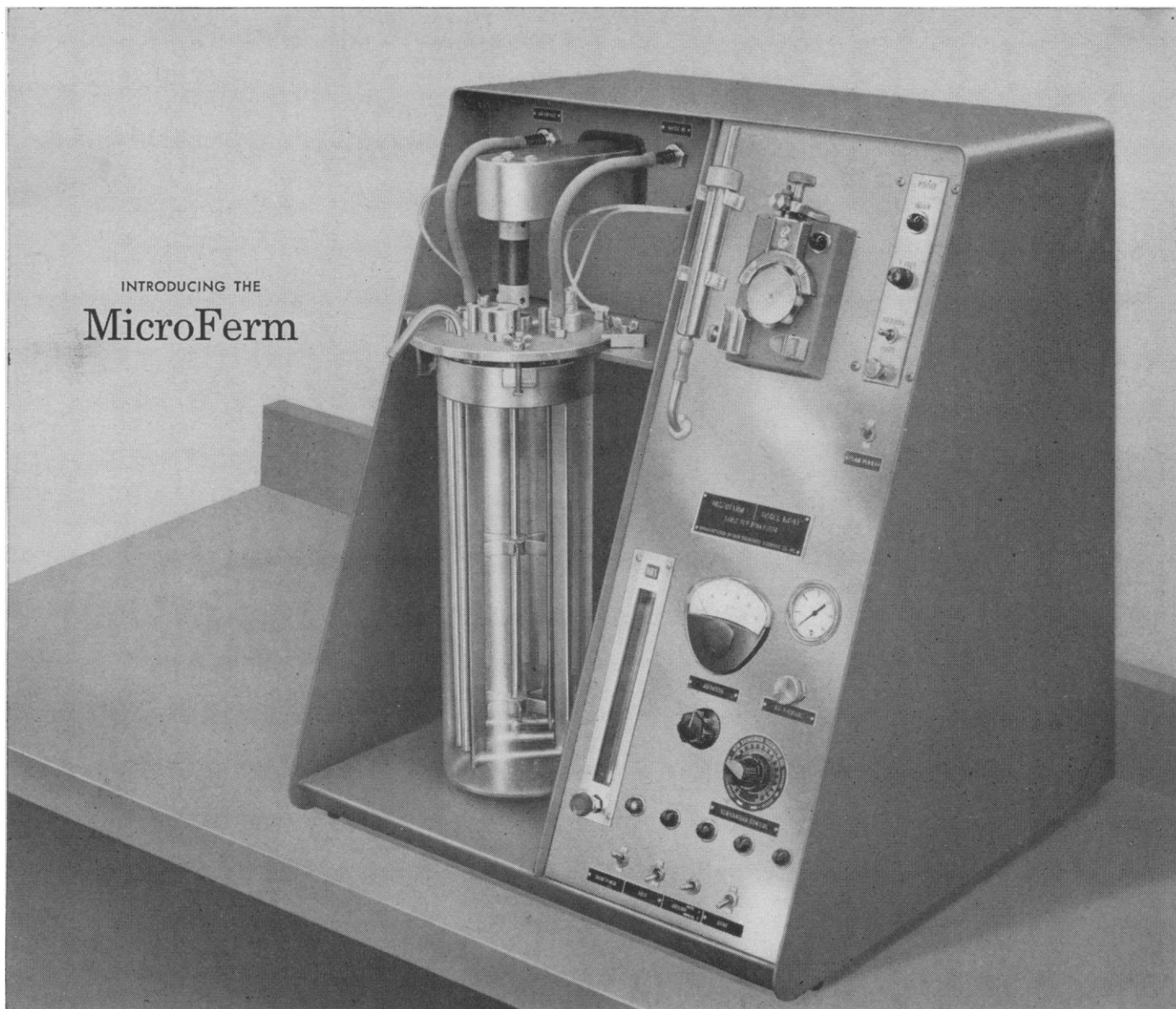


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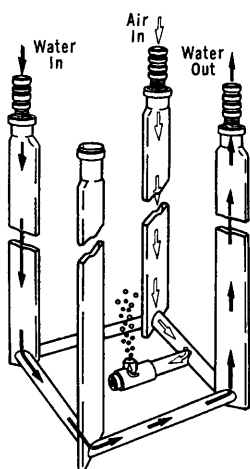
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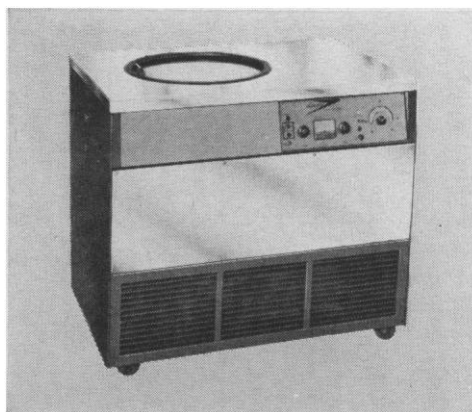
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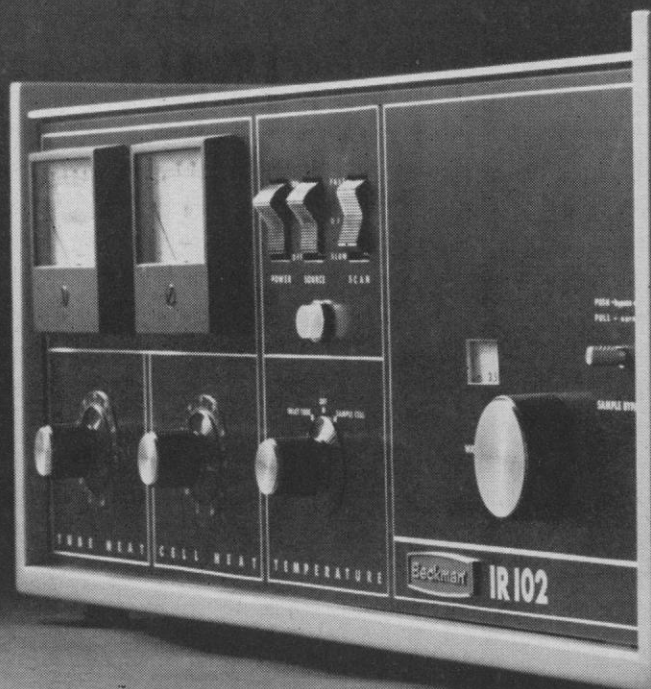
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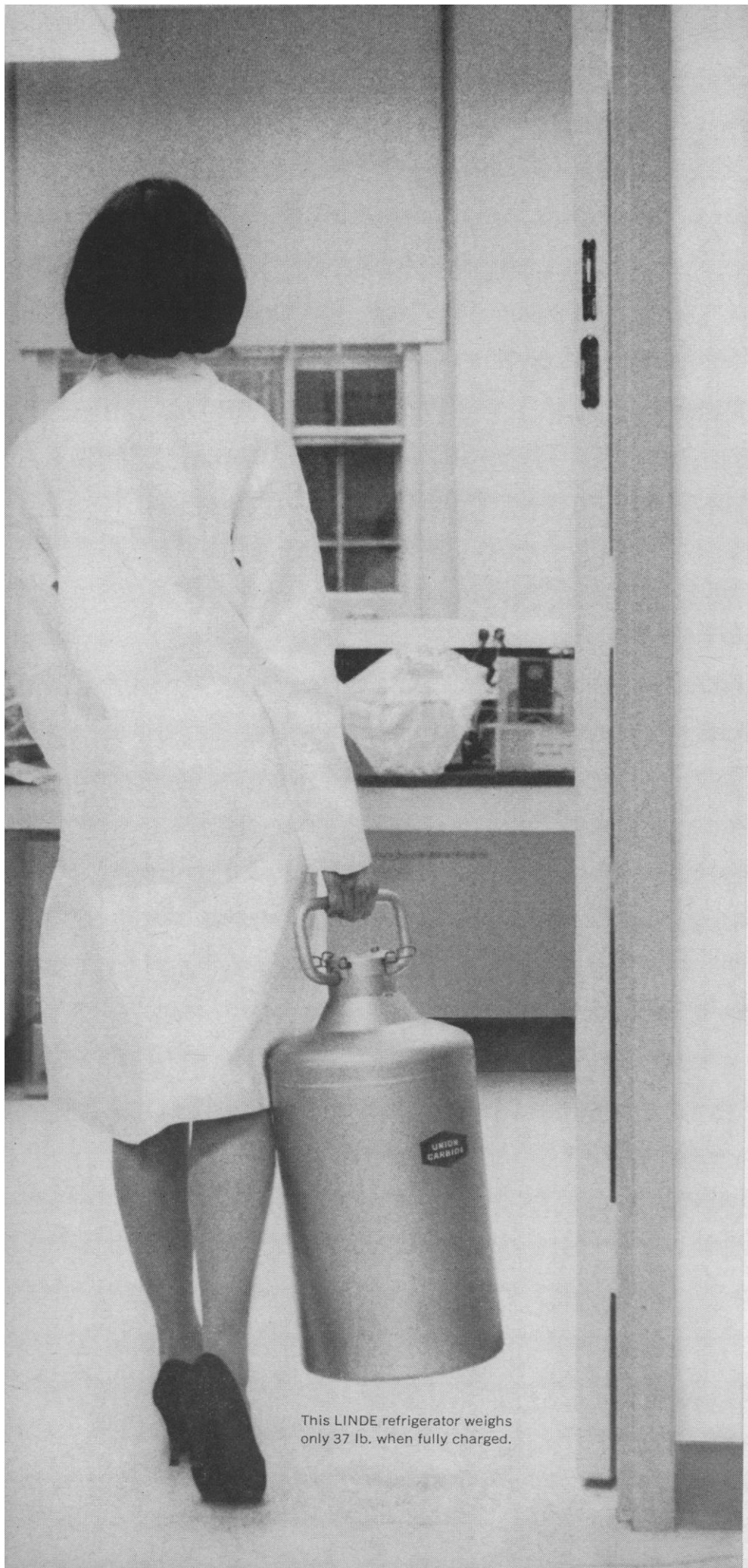
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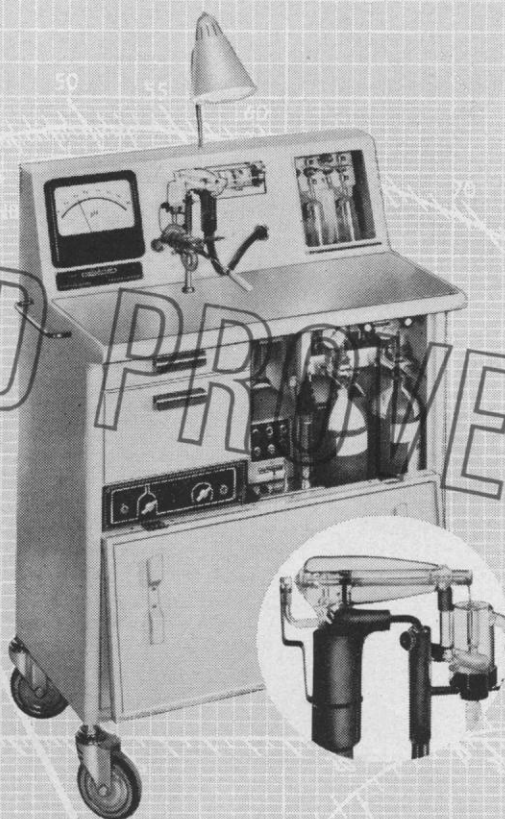


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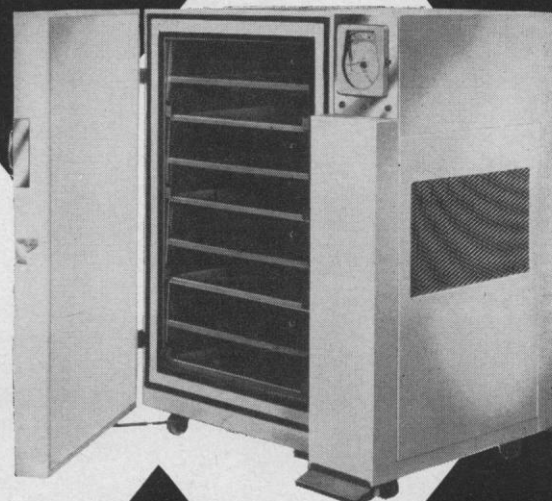
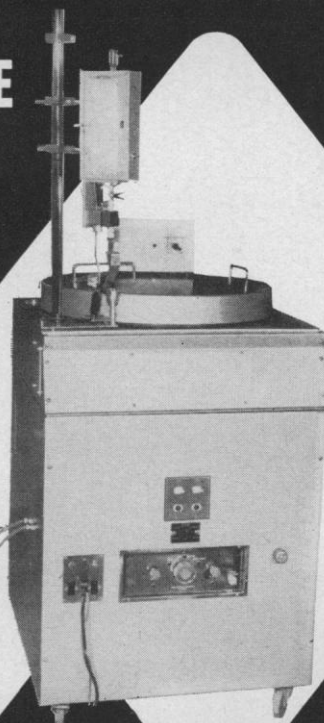
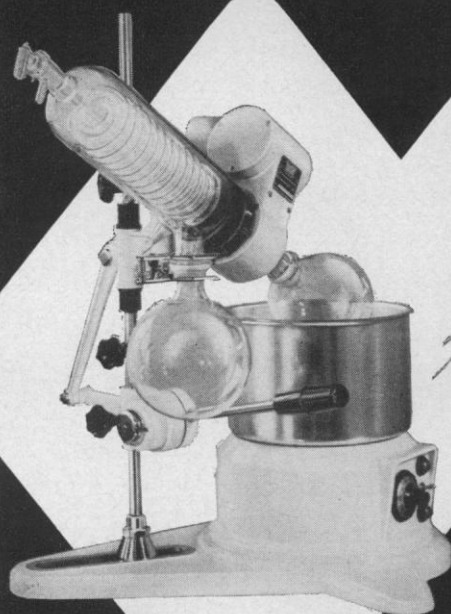
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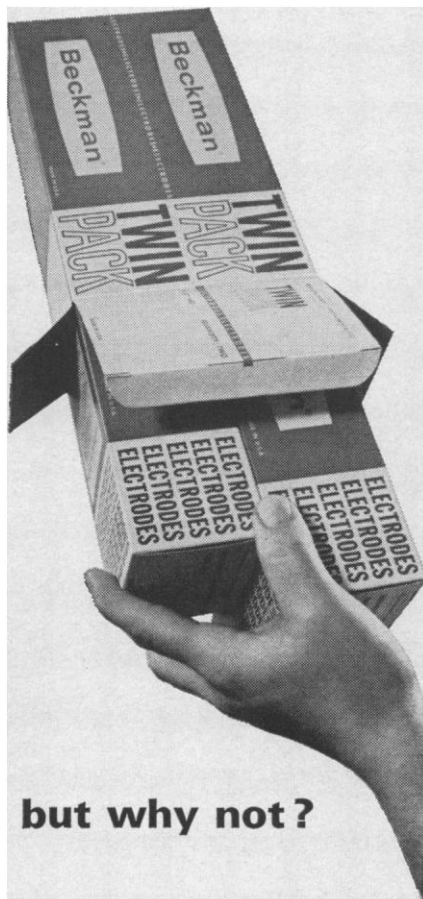
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heart of conversation [see F. Fremont-Smith, *Amer. Inst. Biol. Sci. Bull.* 11, 17 (1961); also "Conversation as Communication," 3rd Yates Lecture (Michigan Tuberculosis and Respiratory Disease Association, 1961)]. The problems of pride, egotism, tension, 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

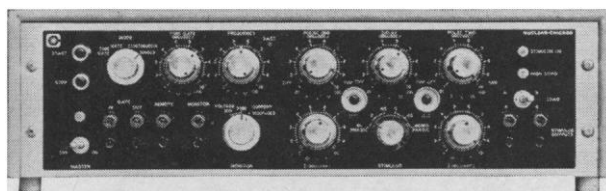
Metric Conversion: Petition to Congress

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
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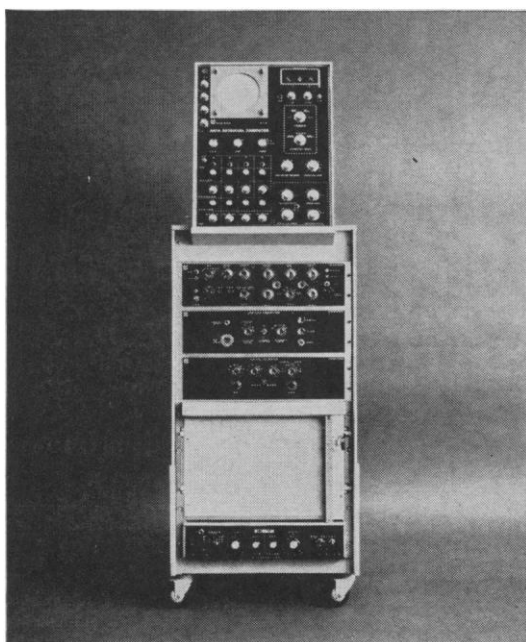
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NUC-Q-4-265



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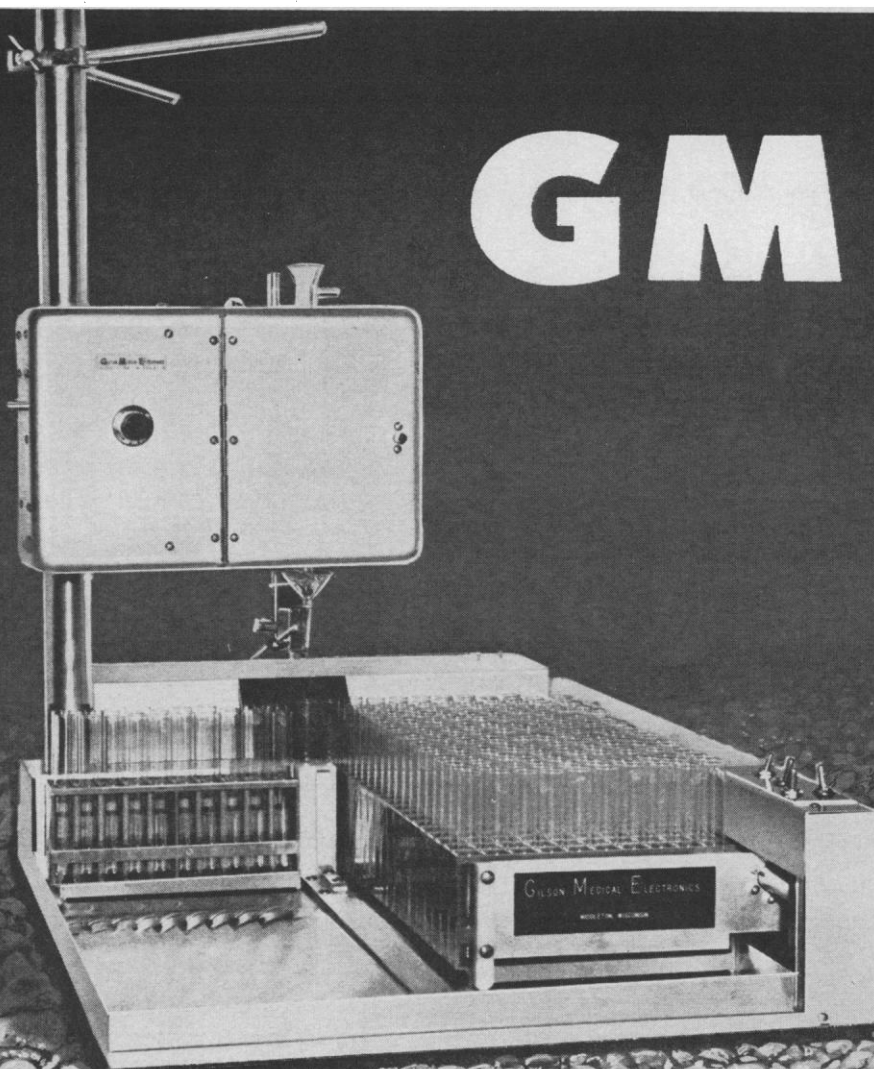
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New Directions for the National Science Foundation

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.

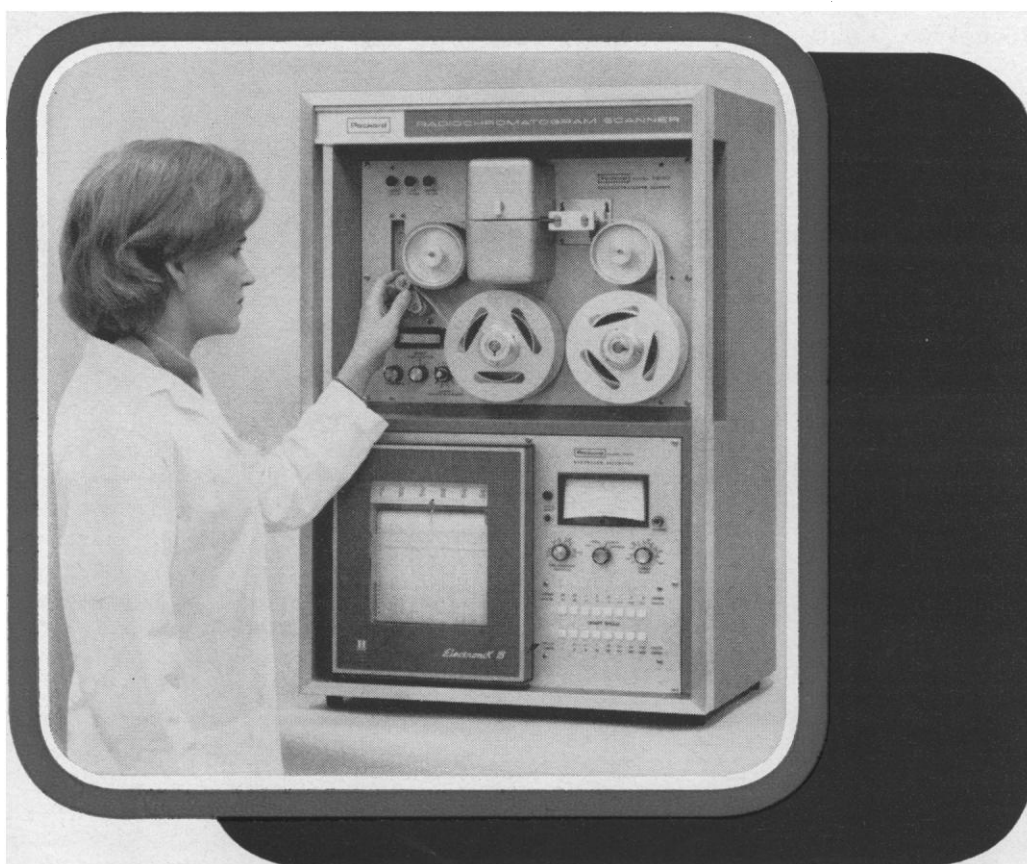
There are other, newer, and more fundamental issues that concern the Foundation's future. One deals with scope. Should the Foundation, as a number of recent observers have recommended, assume a much larger fraction of the federal responsibility for supporting basic research, perhaps becoming the major 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-Sclussin, 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 6^e, 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. Microscopy, 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. Simons, 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 8^e, 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 Brasileira de Mão, 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.)

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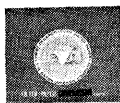
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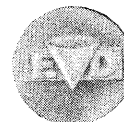
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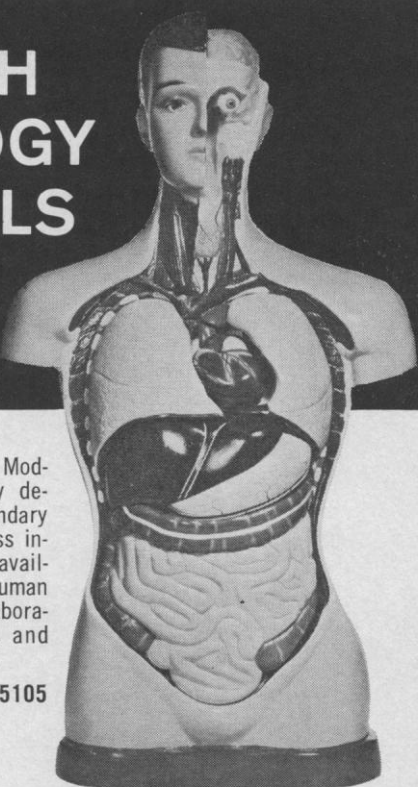
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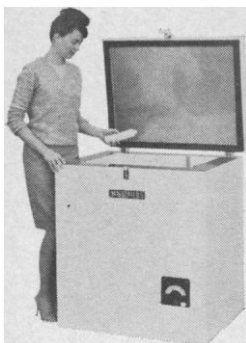
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19-22. **Space**, 5th European symp., Munich, Germany. (Executive Secretary, British Interplanetary Soc., 12, Bessborough Gardens, London, S.W.1, England)

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 (3^e), 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)

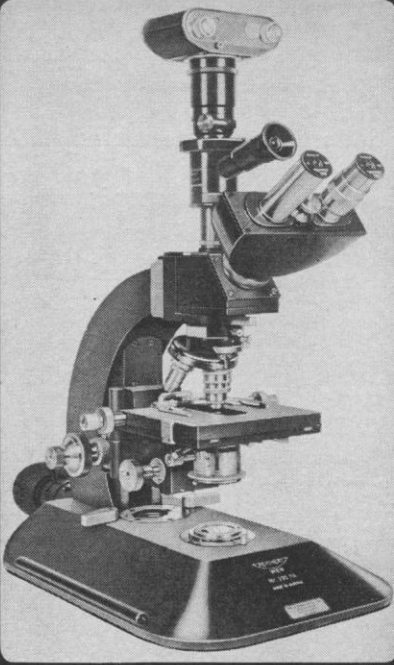
3-7. **Poultry Science Assoc.**, Univ. of Georgia, Athens. (C. B. Ryan, Texas A&M Univ., College Station 77843)

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)



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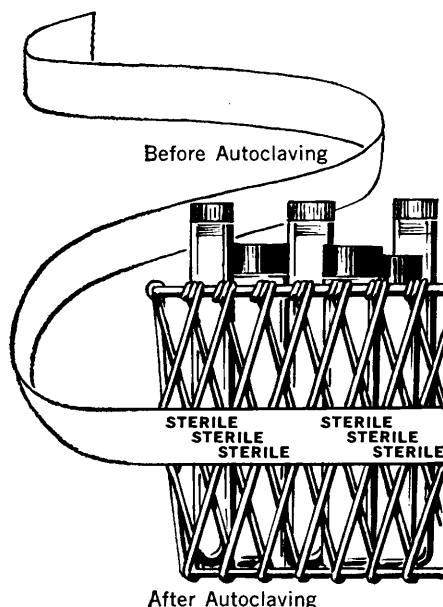
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8-14. **Anatomists**, 8th intern. conf., Wiesbaden, Germany. (M. Watzka, Anatomisches Institut der Universität, Mainz, West Germany)

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. Højner 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.)

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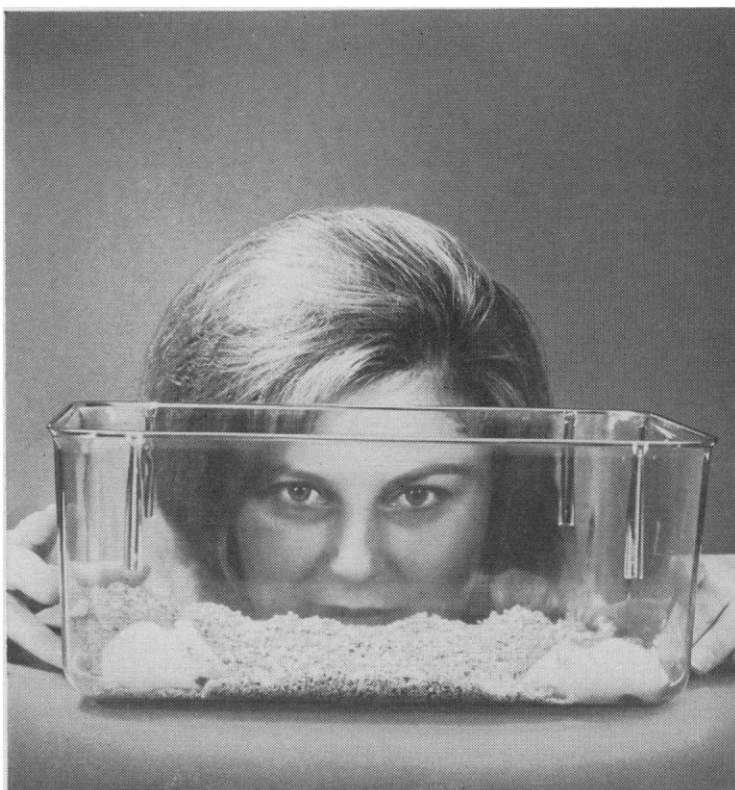
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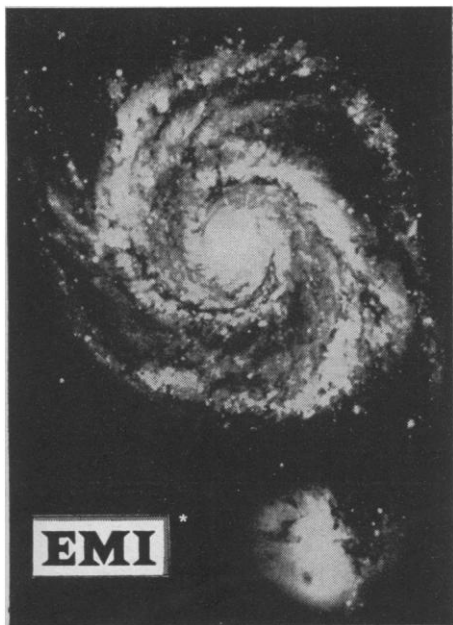
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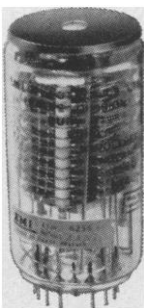
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American Soc. for Horticultural Science. (C. J. Birkeland, Dept. of Horticulture)

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., Honeywell, 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, Herstmonceux Castle, Sussex)

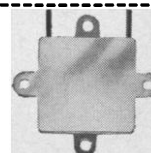
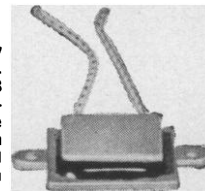
16-3. **Radiation Trapped in the Earth's Magnetic Field**, NATO institute, Bergen,

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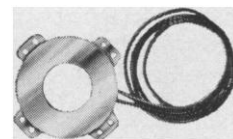


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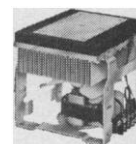
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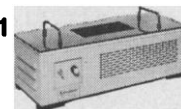


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Norway. (B. M. McCormac, Geophysics Div., IIT Research Inst., 10 W. 35 St., Chicago, Ill. 60515)

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.)

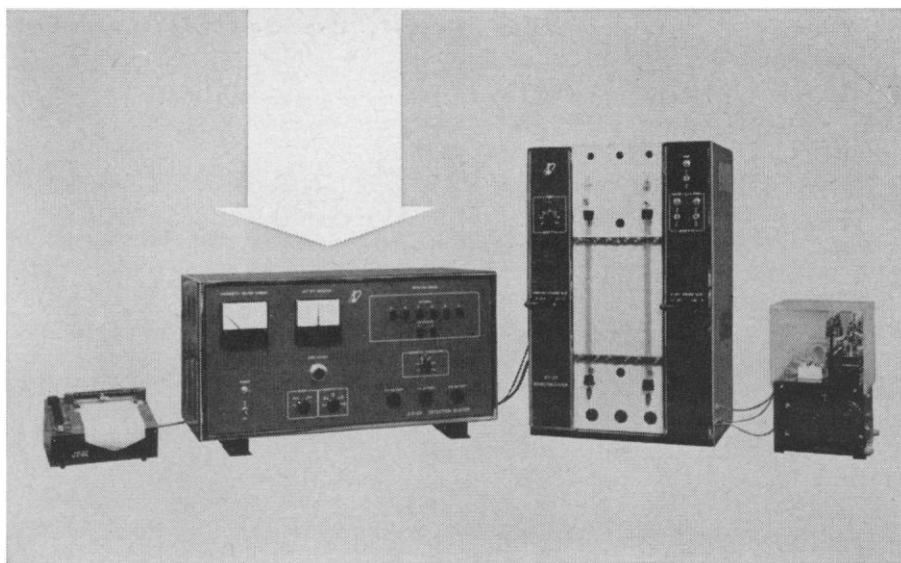
22-28. **Lunar Geology**, intern. field conf., Bend, Ore. (L. Staples, Dept. of Geology, Univ. of Oregon, Eugene)

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)

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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. Purkny, 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 Con-**

trol 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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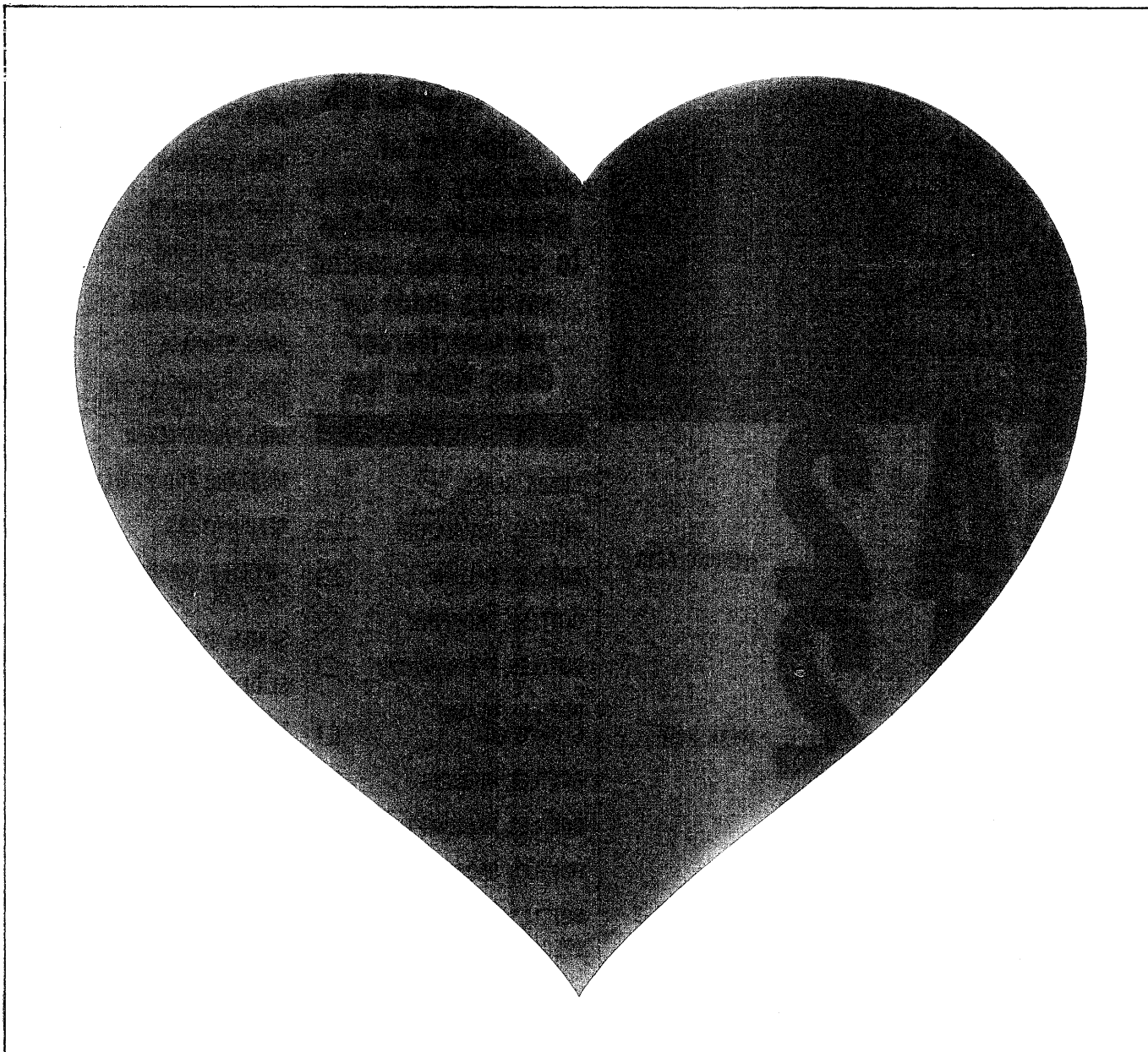
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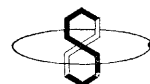
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Automatic viscometer, Mechrolab model 5901A, measures efflux time in glass-capillary, U-type viscometers and provides automatic influx in preparation for the measurement. Efflux time is measured by a solid-state electronic counter using a stable quartz-crystal 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 (0.8 km), 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.)

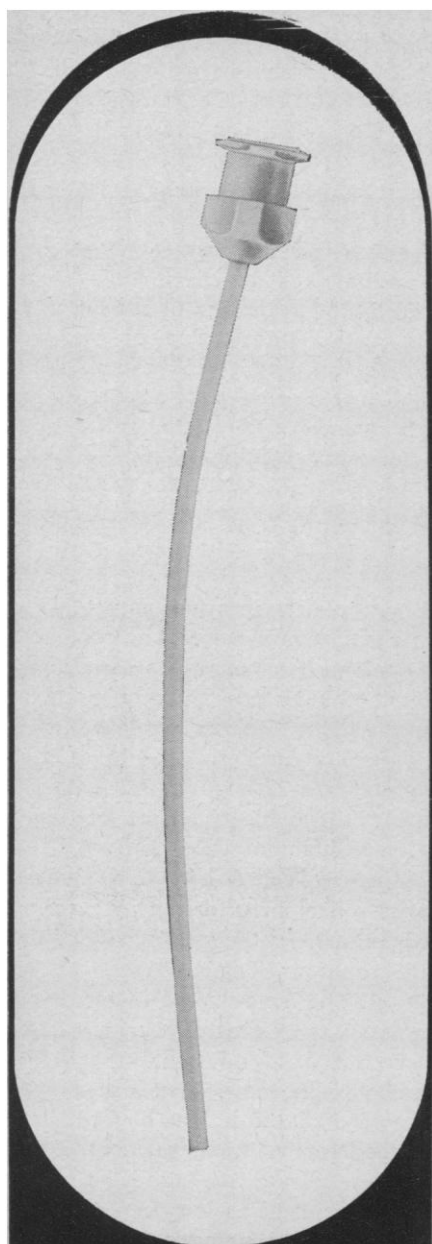
Circle 2 on Readers' Service Card

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 $0.2\text{ cm}^3/\text{hour}$. 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.



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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 MacDermid, 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).

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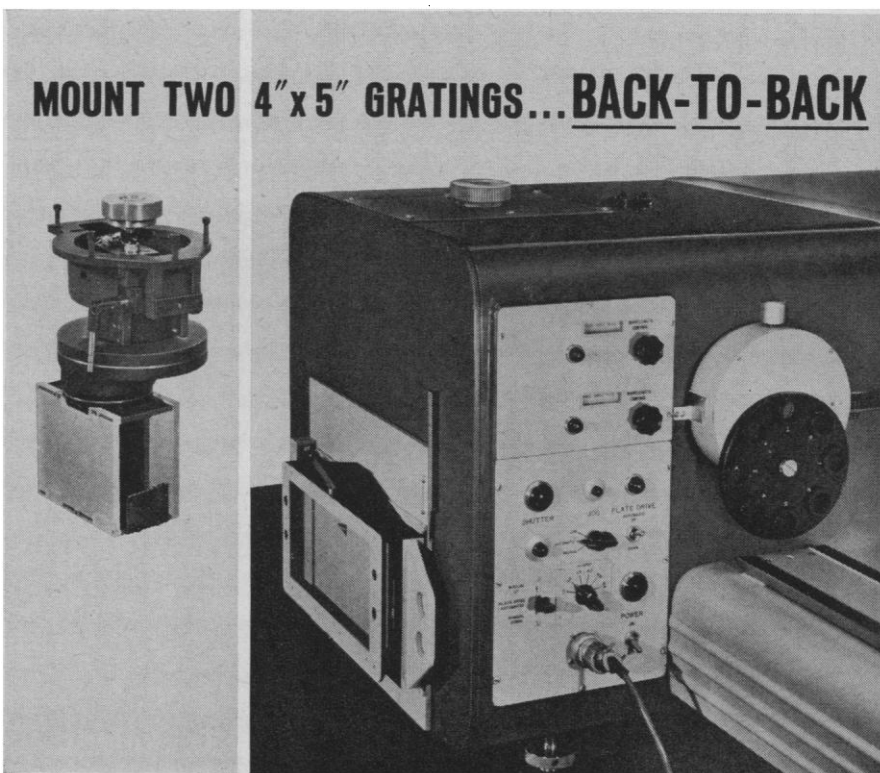
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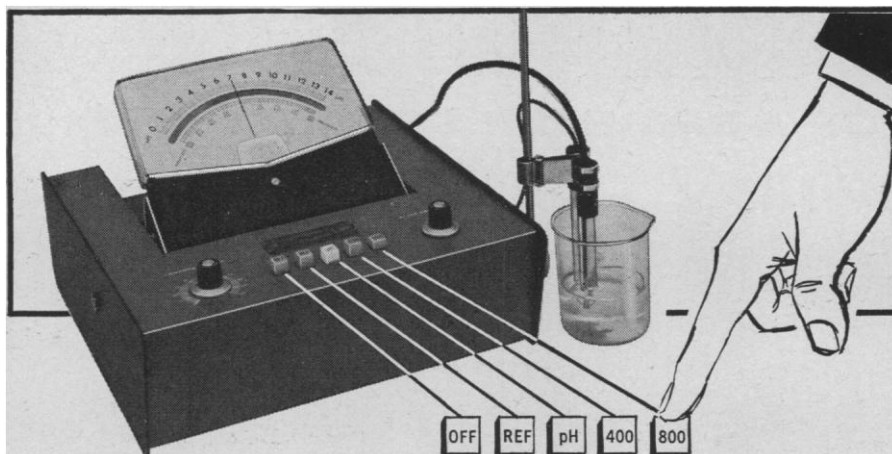


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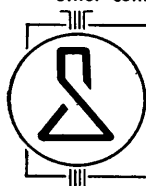
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Moore; "Error in digital solution of linear
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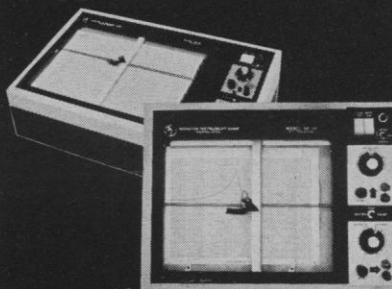
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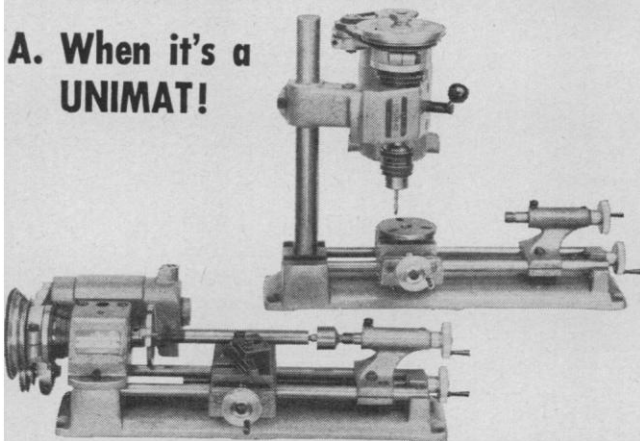
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Write for Bulletin 65-10A

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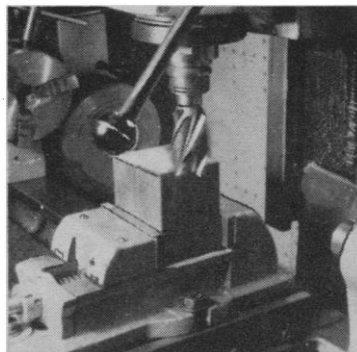


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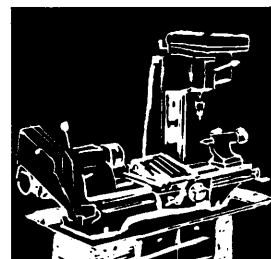


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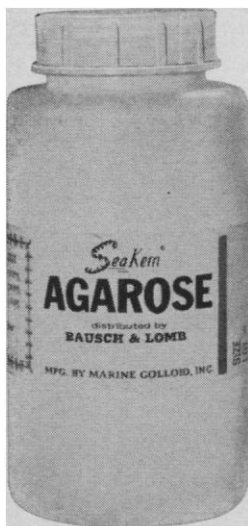
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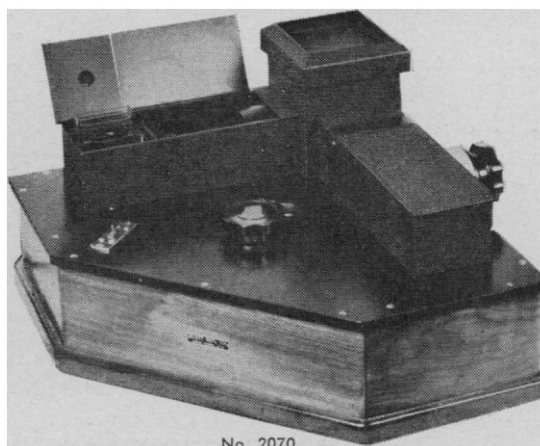
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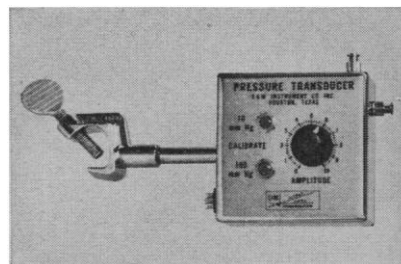
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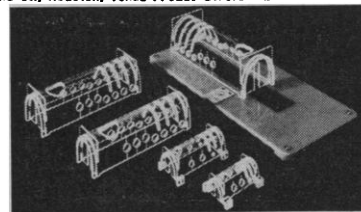
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Physical Electronics. A. H. Beck, Ed. pt. 1, *Fundamentals of Electric Discharges in Gases*. Grey Morgan. Pergamon, London; Macmillan, New York, 1965. 186 pp. Illus. Paper, \$6.

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.

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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.

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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.

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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.

25 JUNE 1965



The delicate nose

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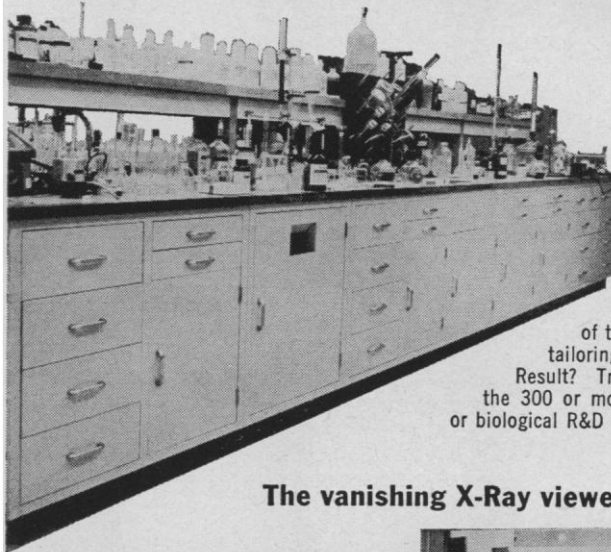
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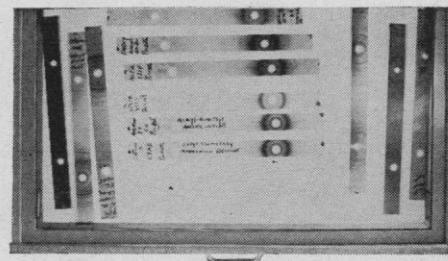
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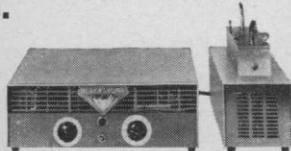
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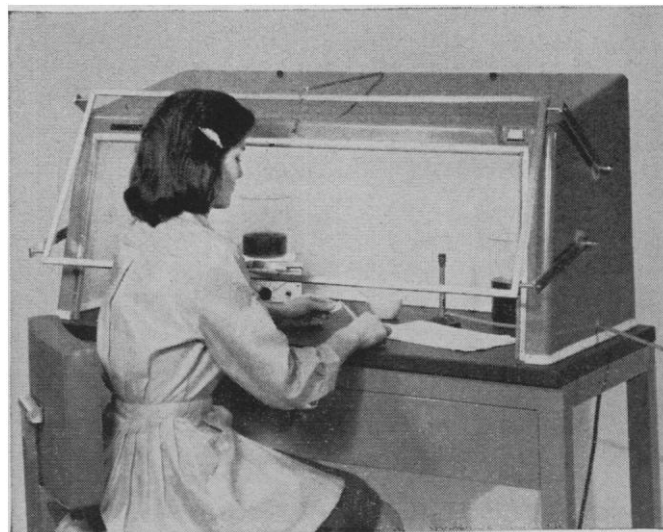
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Die Physikalischen Grundlagen der Kernstrahlungsmessungen. E. Fenyves and O. Haiman. Akadémiai Kiadó, Budapest, Hungary, 1965. 727 pp. Illus. \$17.50.

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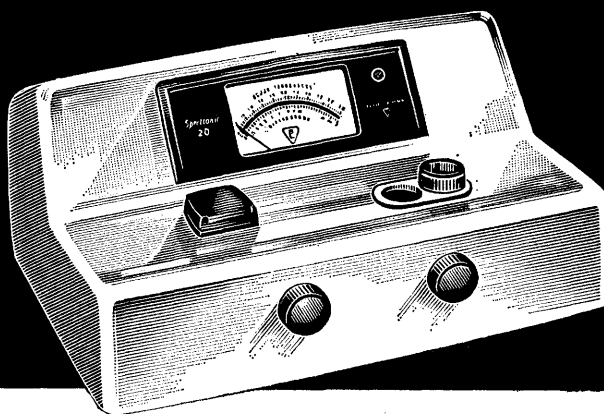
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Proceedings of the Third International Congress on Catalysis. Amsterdam, July 1964. vols. 1 and 2. W. M. H. Sachtler, G. C. A. Schuit, and P. Zwietering, Eds. North-Holland, Amsterdam; Interscience (Wiley), New York, 1965. vol. 1, xvi + 762 pp.; vol. 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.

25 JUNE 1965

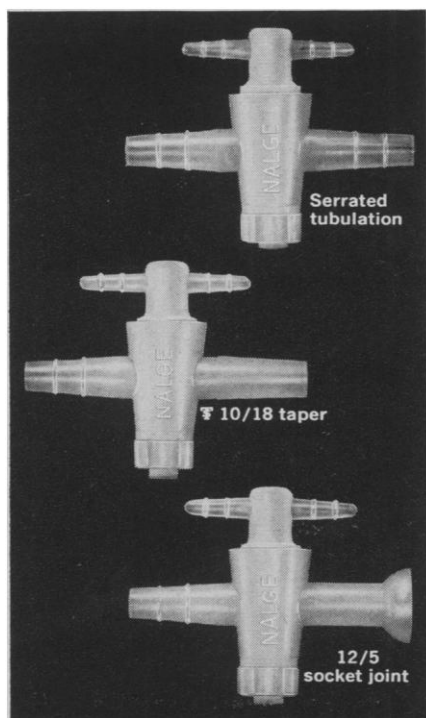
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The Propagation of Gamma Quanta in Matter. O. I. Leipunskii, B. V. Novozhilov, and V. N. Sakharov. Translated from the Russian edition (Moscow, 1960) by Prasennjit Basu, K. T. Spinney, J. Butler, and J. B. Sykes, Translation Eds. Pergamon, London; 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.

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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.

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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.

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Compiled by the AAAS
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AAAS Symposium Volume No. 74

Editor: Carle Hodge, Associate Editor:
Peter C. Duisberg. 604 pages,
98 illustrations, references, index.

Price: \$12.00. AAAS Member's cash orders:
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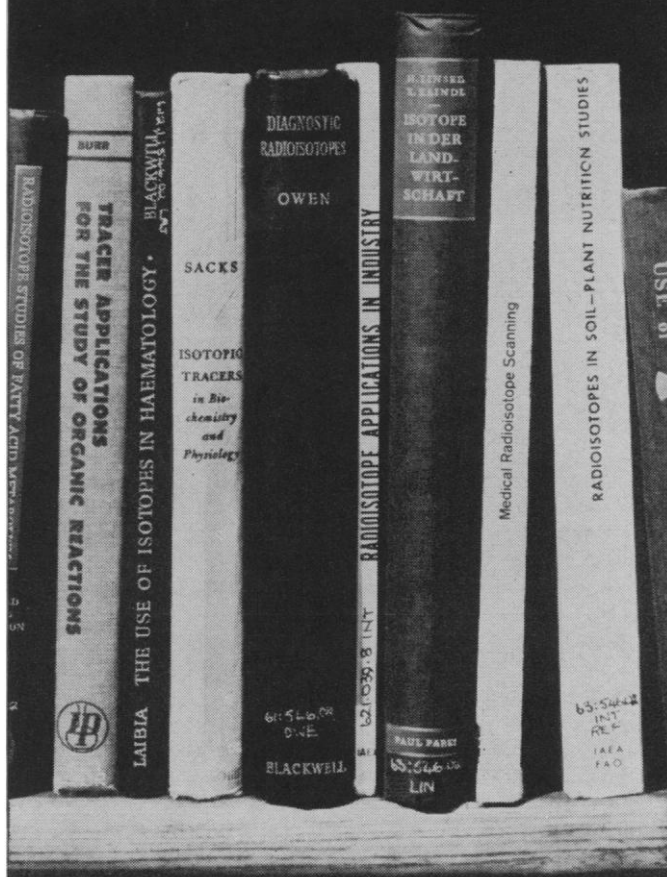
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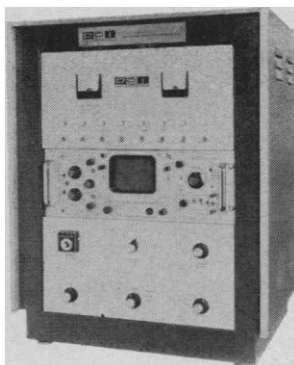
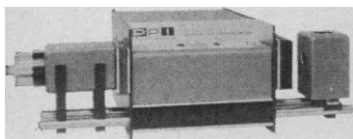
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