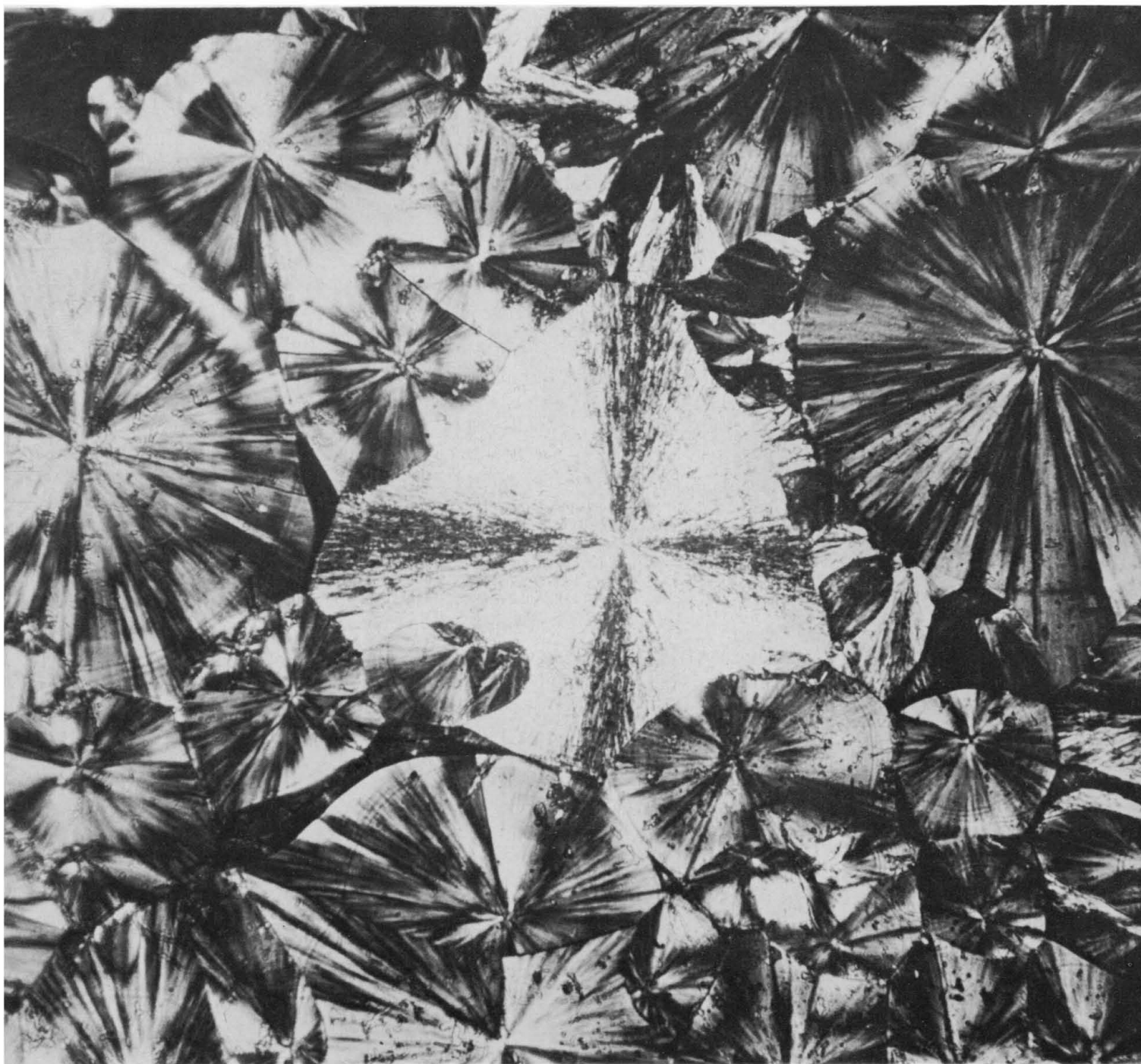


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Vol. 142, No. 3597

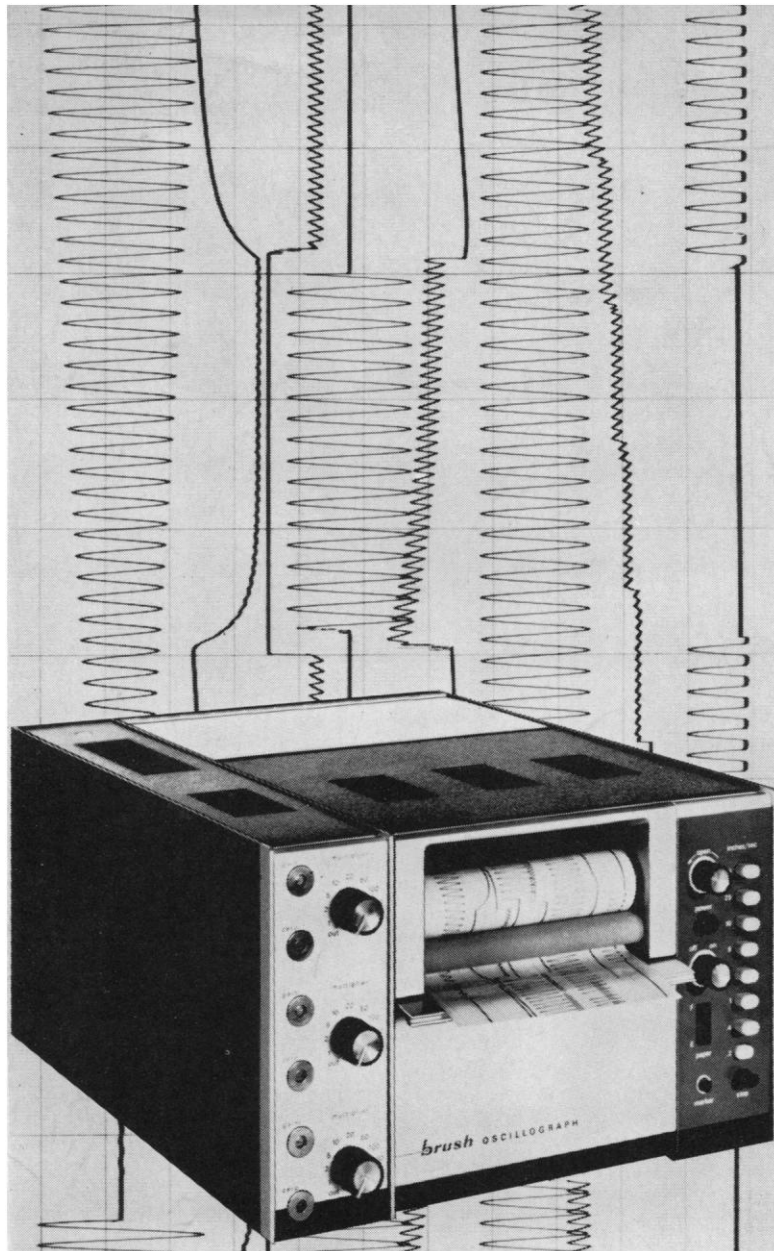
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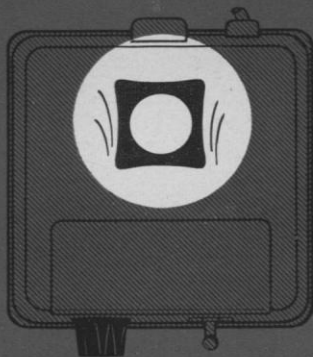
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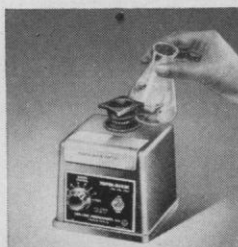
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|-------------------------|---|------|
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| <b>EDITORIAL</b>        | Course Content Improvement, British Style .....   | 1263 |
| <b>ARTICLES</b>         | Intermetallic Compounds: <i>W. W. Scanlon</i> .....   | 1265 |
|                         | These compounds are formed by the interaction of two or more metallic or semimetallic elements.   |      |
|                         | Lethal Genes and Analysis of Differentiation: <i>S. Gluecksohn-Waelsch</i> .....  | 1269 |
|                         | In higher organisms lethal genes serve as tools for studies of cell differentiation and cell genetics.  |      |
| <b>NEWS AND COMMENT</b> | New Administration—Few Changes for Scientific and Academic Communities<br>U.S.-Soviet Relations—Clearer Channels; FDA—Science Overhauled.....   | 1277 |
| <b>BOOK REVIEWS</b>     | <i>New Directions in Mathematics</i> , reviewed by <i>E. P. Vance</i> ; other reviews .....   | 1284 |
| <b>REPORTS</b>          | Ozone Formation in Air Exposed to Cobalt-60 Gamma Radiation:<br><i>Z. I. Kertesz and G. F. Parsons</i> .....  | 1289 |
|                         | Miocene-Pliocene Boundary in the Philippines as Related to Late Tertiary<br>Stratigraphy of Deep-Sea Sediments: <i>O. L. Bandy</i> .....  | 1290 |
|                         | Phosphate Glass Electrode with Good Selectivity for Alkaline-Earth Cations:<br><i>A. H. Truesdell and A. M. Pommer</i> .....  | 1292 |
|                         | Diurnal Rhythm and Photoperiodism in Testicular Recrudescence of the<br>House Finch: <i>W. H. Hamner</i> .....  | 1294 |

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|--|------|
| Oxygen Uptake from a Reservoir of Limited Volume by the Human Cornea in vivo:<br><i>R. M. Hill and I. Fatt</i> .....                   | 1295 |
| Heparin Bonding on Colloidal Graphite Surfaces:<br><i>V. L. Gott, J. D. Whiffen, R. C. Dutton</i> .....                                | 1297 |
| Nasal Salt Gland: Independence of Salt and Water Transport: <i>T. Inoue</i> .....  | 1299 |
| Nasal Salt Excretion and the Possible Function of the Cloaca in Water<br>Conservation: <i>K. Schmidt-Nielsen et al.</i> .....          | 1300 |
| Synthesis of $\alpha$ -Linolenic Acid by the Protozoan, <i>Leishmania enrietti</i> :<br><i>E. D. Korn and C. L. Greenblatt</i> .....   | 1301 |
| Lactate Dehydrogenase in Testis: Dissociation and Recombination of Subunits:<br><i>W. H. Zinkham, A. Blanco, L. Kupchik</i> .....      | 1303 |
| Persistent Mitosis of Transfused Homologous Leukocytes in Children Receiving<br>Antileukemic Therapy: <i>R. H. Levin et al.</i> .....  | 1305 |
| Galactose Metabolism by Rat Liver Tissue: Influence of Age:<br><i>S. Segal, H. Roth, D. Bertoli</i> .....                              | 1311 |
| Blood Pressure Changes during Human Sleep: <i>F. Snyder, J. A. Hobson, F. Goldfrank</i> ...  | 1313 |
| Ultraviolet Radiation Effects on Low Molecular Weight Inorganic Phosphates<br>of Yeast: <i>E. M. Lieberman and P. A. Swenson</i> ..... | 1315 |
| Microstructure of Polymers by Tritium Autoradiography:<br><i>J. D. Moyer and R. J. Ochs</i> .....                                      | 1316 |
| Upper Temperature Limit of Life: <i>E. S. Kempner</i> .....  | 1318 |
| Red Blood Cells: Change in Shape in Capillaries: <i>M. M. Guest et al.</i> .....   | 1319 |
| New Serum Group, Gm(p): <i>M. Waller et al.</i> .....  | 1321 |

|                            |   |      |
|----------------------------|---|------|
| <b>ASSOCIATION AFFAIRS</b> | 130th Annual Meeting, Cleveland, 26-30 December ..... | 1323 |
|----------------------------|---|------|

|                 |  |      |
|-----------------|--|------|
| <b>MEETINGS</b> | Embryology; Meeting Notes; Forthcoming Events..... | 1367 |
|-----------------|--|------|

|                    |                    |      |
|--------------------|--------------------|------|
| <b>DEPARTMENTS</b> | New Products ..... | 1379 |
|--------------------|--------------------|------|

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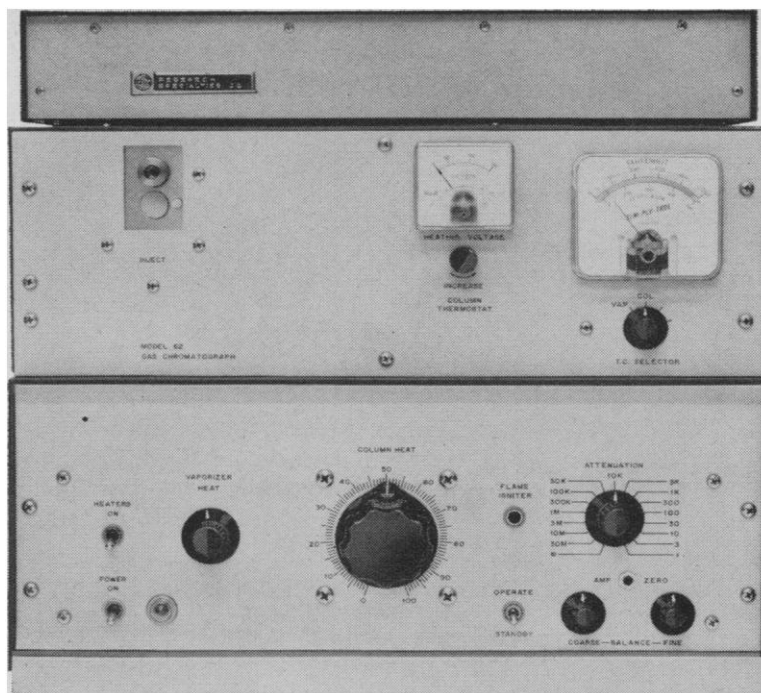
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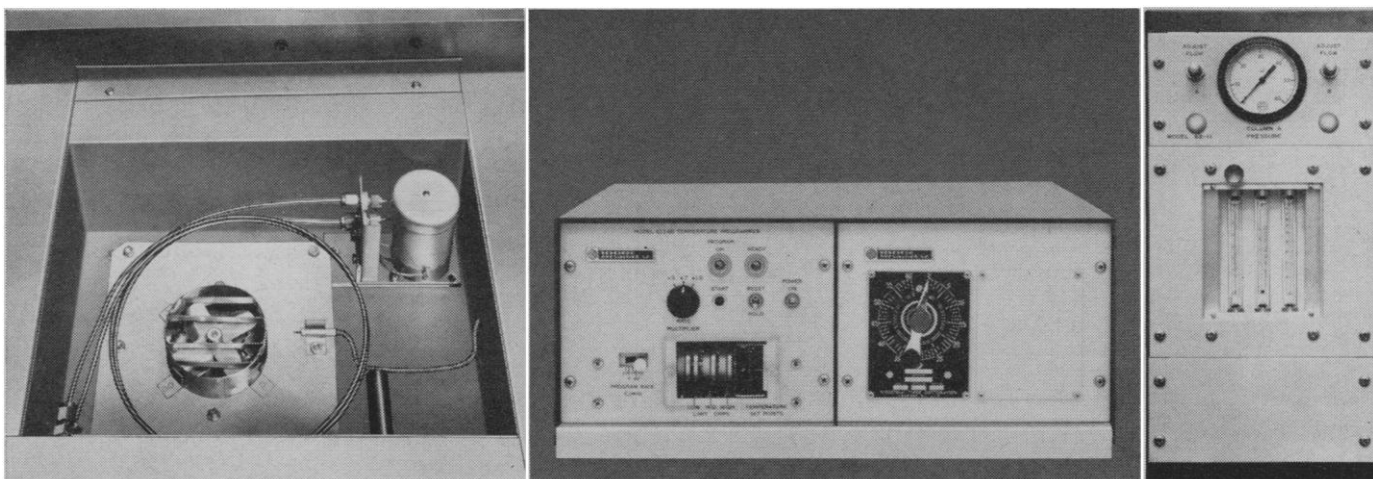
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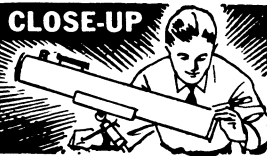


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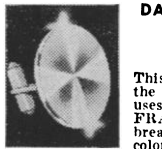
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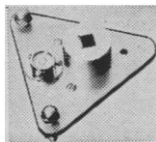
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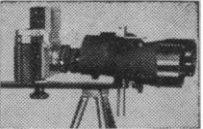
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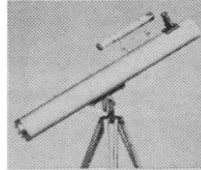
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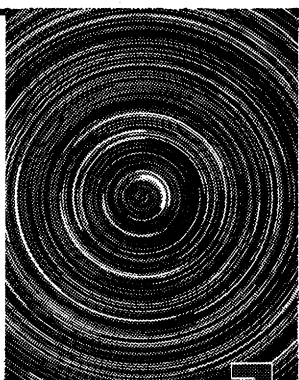
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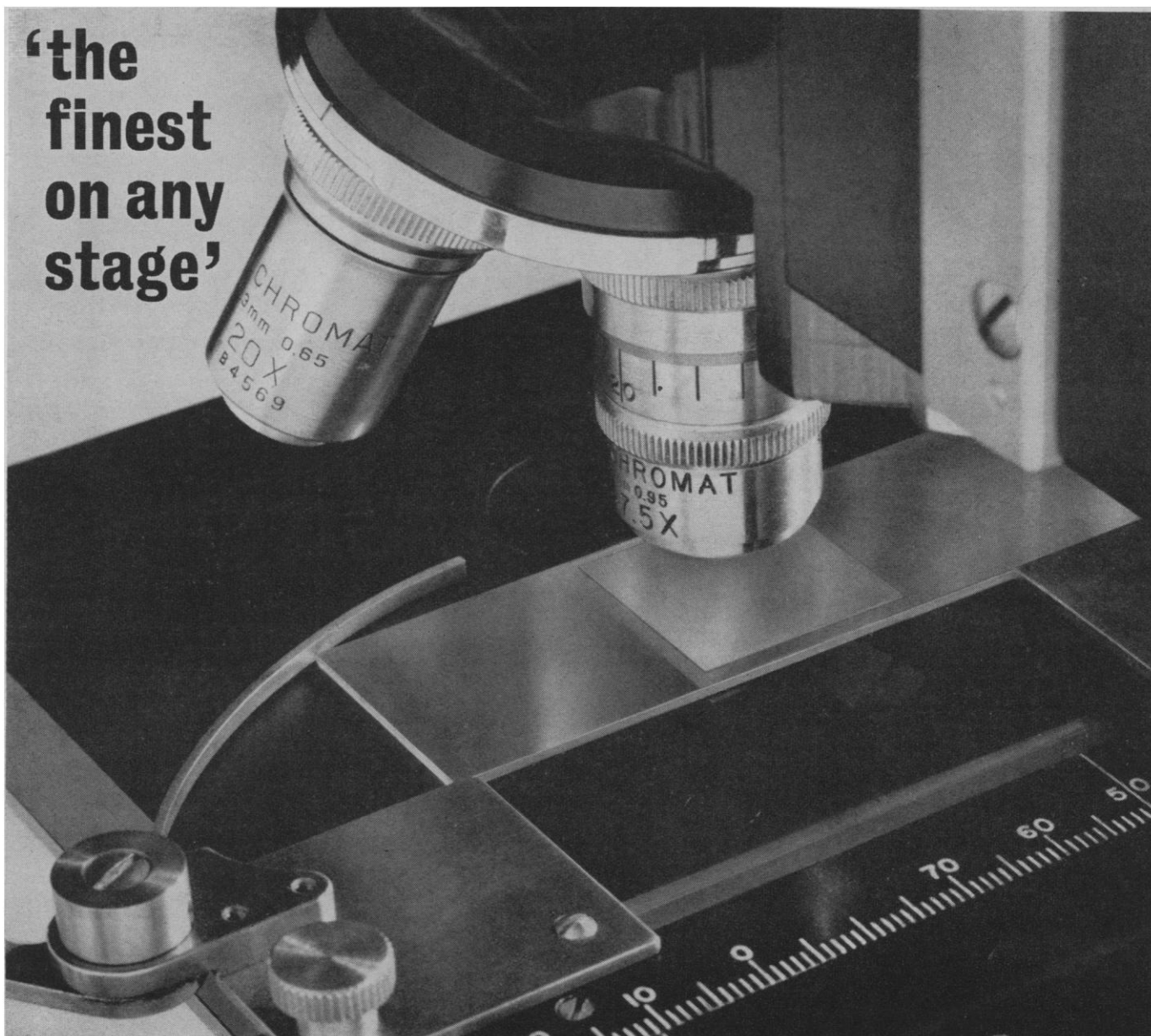
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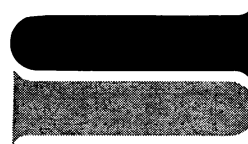
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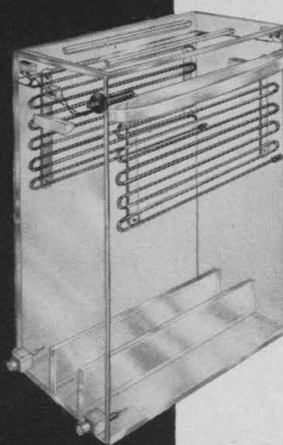
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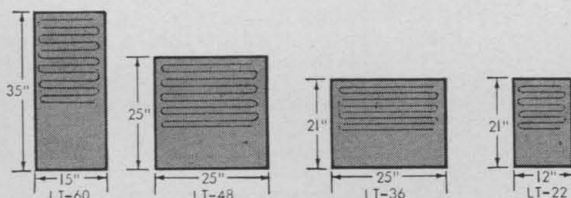
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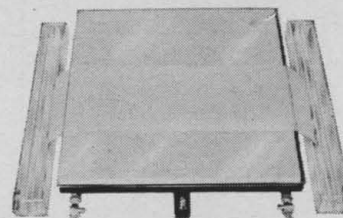


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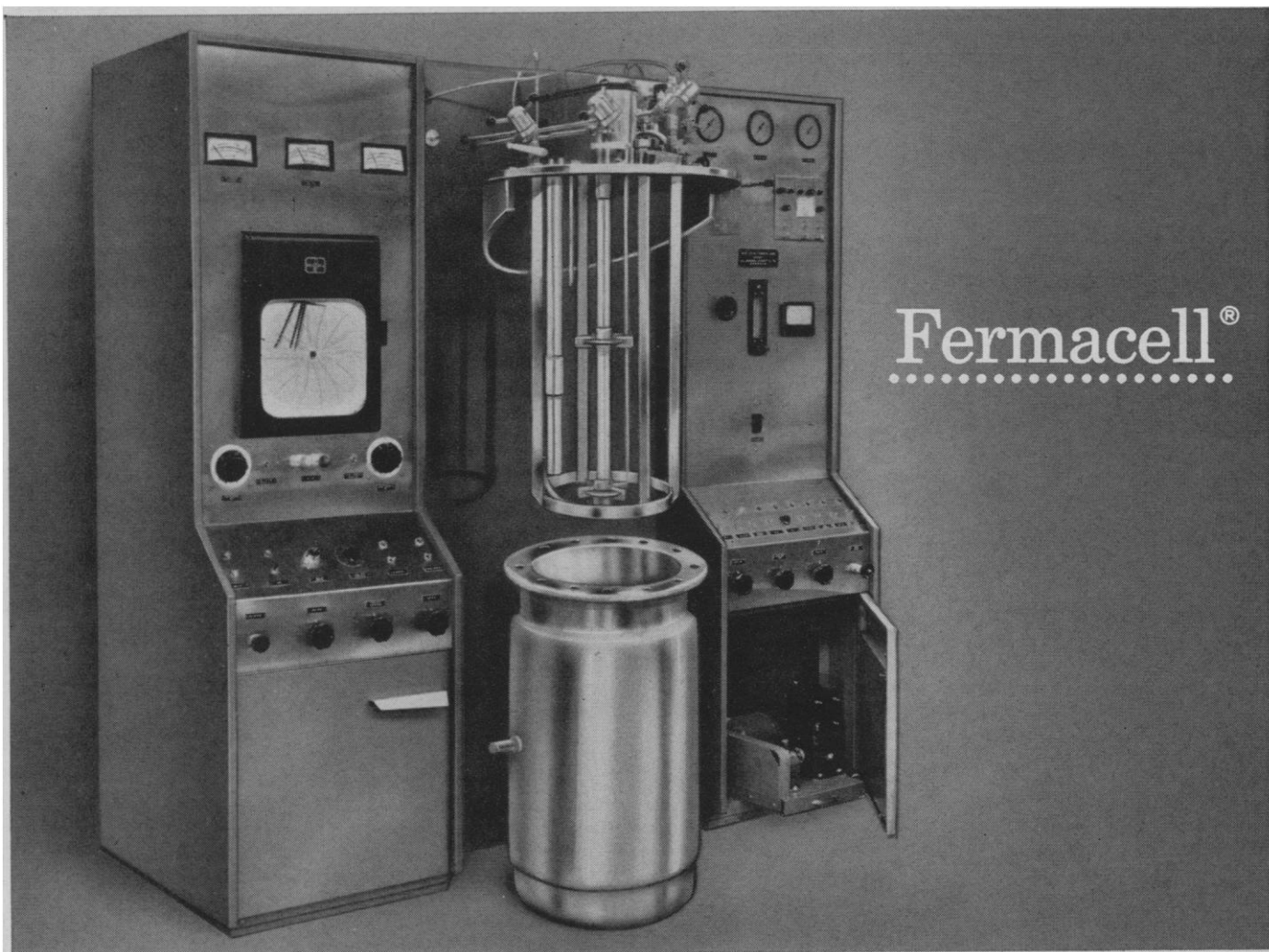
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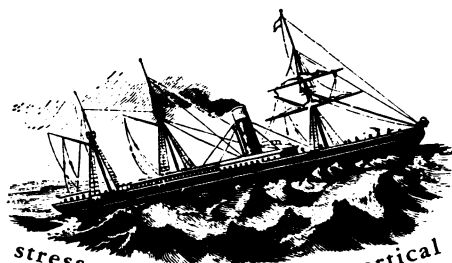
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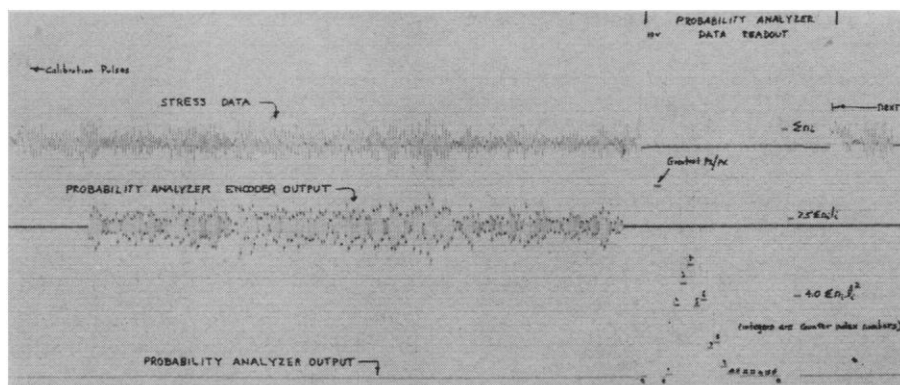
The data were also fed through a probability distribution analyzer and this processed output was fed into the

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Top trace: Stress data as recorded on ship. Middle trace: Probability distribution analyzer encoder output. Bottom trace: Probability distribution analyzer output. Work performed under NOBS Contracts: #88349, Ships Structures Committee; #88451, Office Chief of Transportation, Dept. of Army.



The Honeywell reproducing and amplifying tape system and the Model 906 Visicorder Oscillograph in Lessells' Boston laboratory.

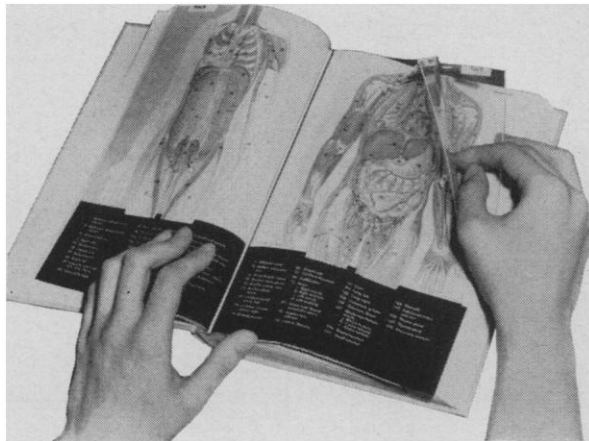
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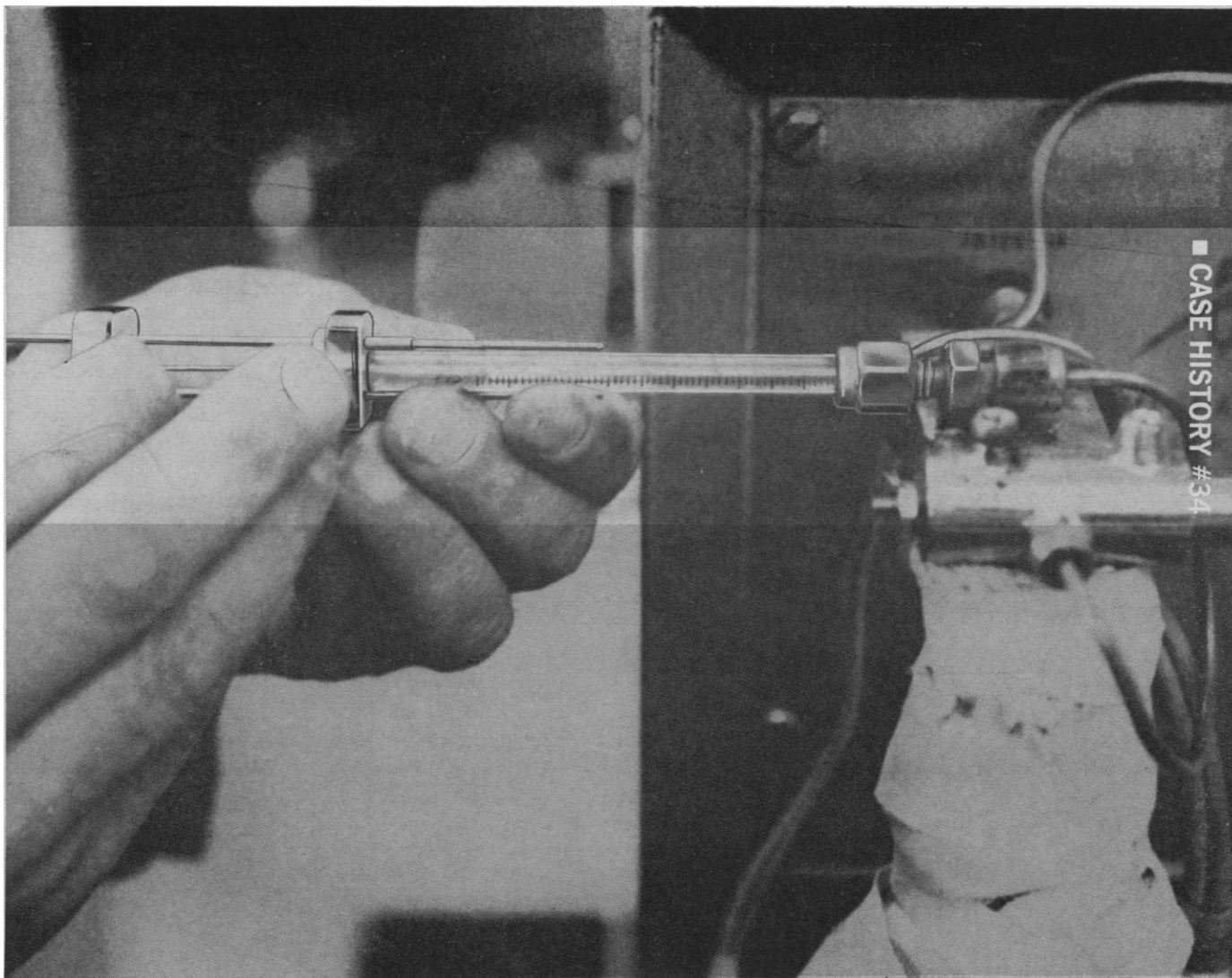
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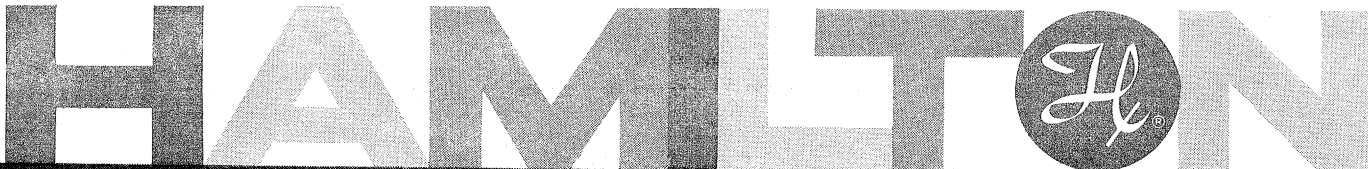
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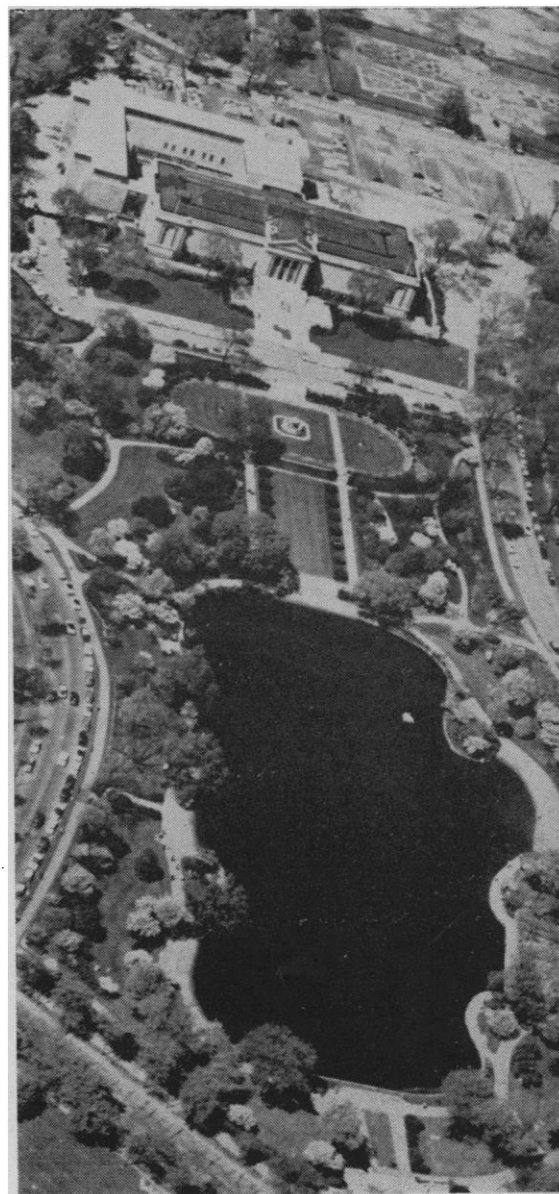
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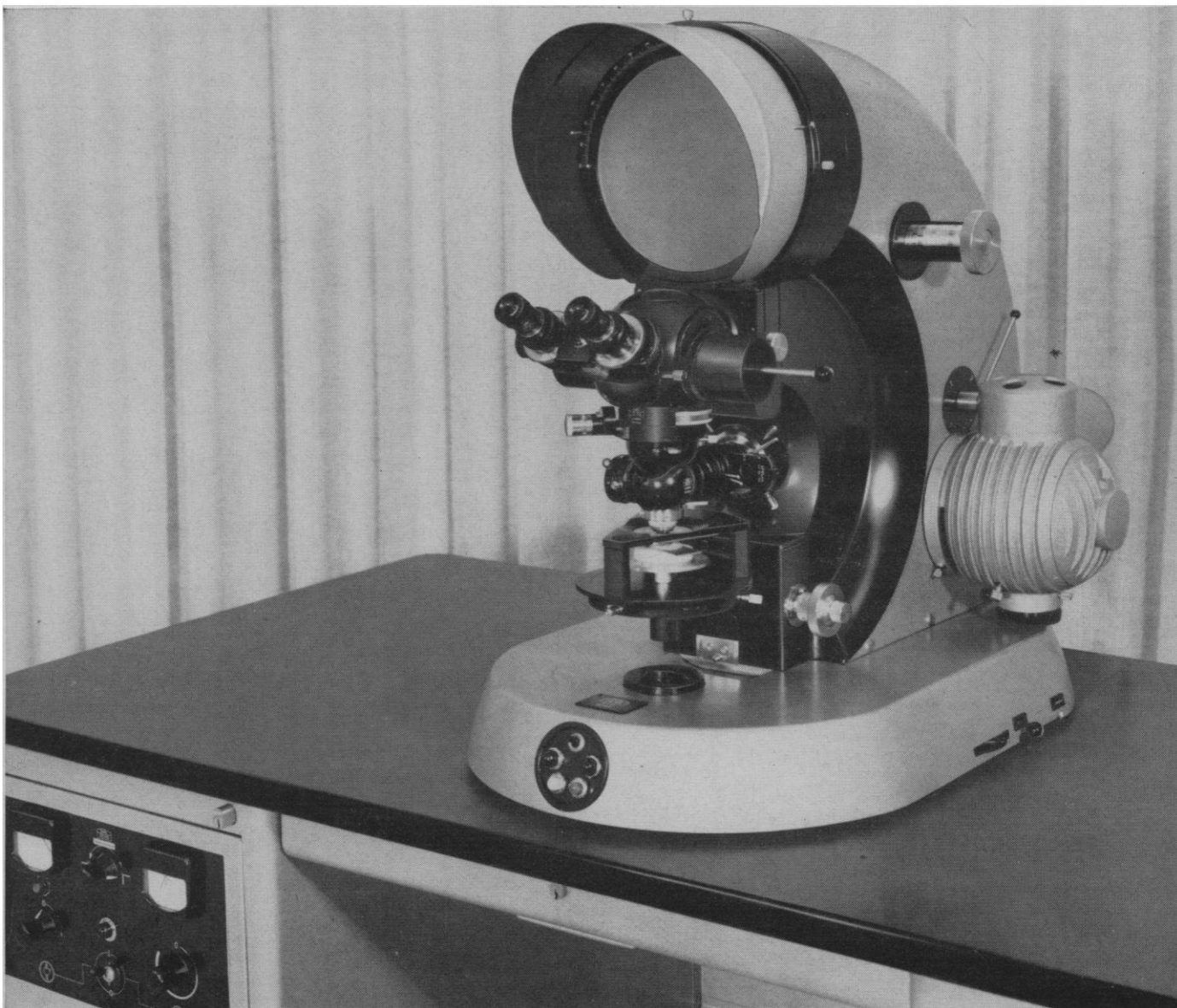
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# LINDE CRYOBIOLOGY NEWS

REPORT NO. 4 FROM UNION CARBIDE CORPORATION, LINDE DIVISION

## More preservation progress using liquid nitrogen

Notes on preserving parasitic protozoa, tissue  
cultures...successful applications of new cryogenic  
cooling systems...latest cryobiology equipment.

Significant achievements were recently reported on the use of liquid nitrogen for freezing and storage of biological specimens. Diamond, et al.<sup>1</sup> successfully applied cryogenic techniques to preserve a selected group of parasitic protozoa for extended periods. Using two- or three-step freezing cycles and storing at liquid nitrogen temperature (-196°C.), this research team was able to preserve *Entamoeba histolytica*, *Trichomonas gallinae*, *T. vaginalis*, *T. foetus*, *T. hominis*, *Trypanosoma cruzi*, and *T. ranarum*, for unprecedented times. In evaluating the efficiency of this liquid nitrogen preservation technique, they reported:

"No difference in yields were found between samples of a given species thawed 24 hours after freezing and those thawed after the longest period of storage. This indicated absence of decay during storage . . ."

At dry ice temperature, degradative activity commonly occurs.

Greaves, et al.<sup>2</sup> designate the two major biological products requiring low temperature storage as: (1) the preservation of cells for tissue culture and (2) the preservation of erythrocytes of rare blood groups. These authors note that the key to very low temperature storage is reliability, and: "The LINDE containers require recharging only once a week as routine and in an emergency (they) will last from 28 to 90 days."

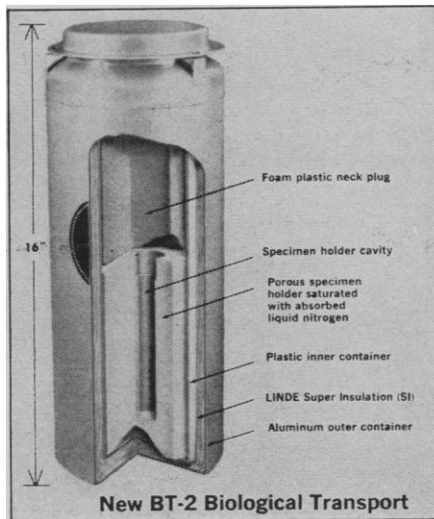
In this paper the authors also describe a modification to the plug of the LINDE LR-25B Refrigerator, which serves as a controlled-rate cooling device.

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(1) Diamond, L. S., Meryman, H. T., and Kafig, E., *CULTURE COLLECTIONS, PERSPECTIVES AND PROBLEMS* (Ed. Martin, S. M.): University of Toronto Press (1963). (2) Greaves, R. I. N., Nagington, J., and Kellaway, T. D., *Fed. Proc.*, 22:90 (Jan.-Feb.) 1963.

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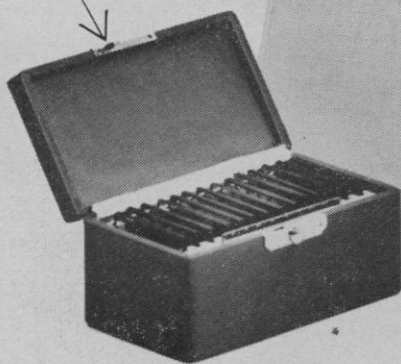
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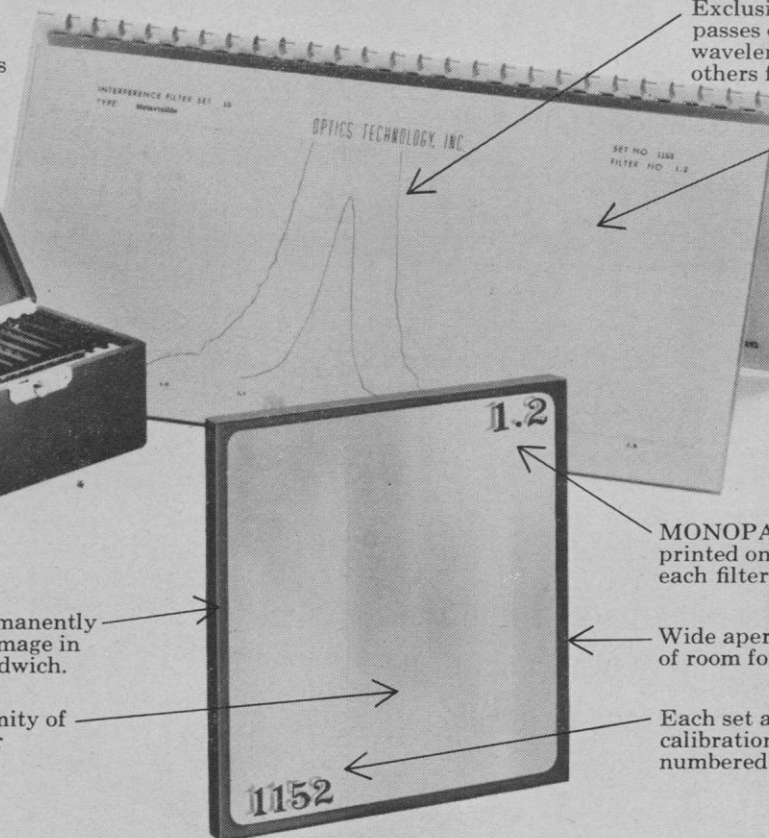
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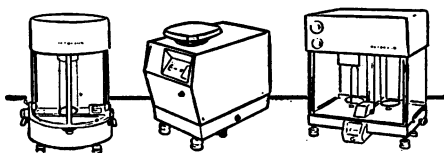
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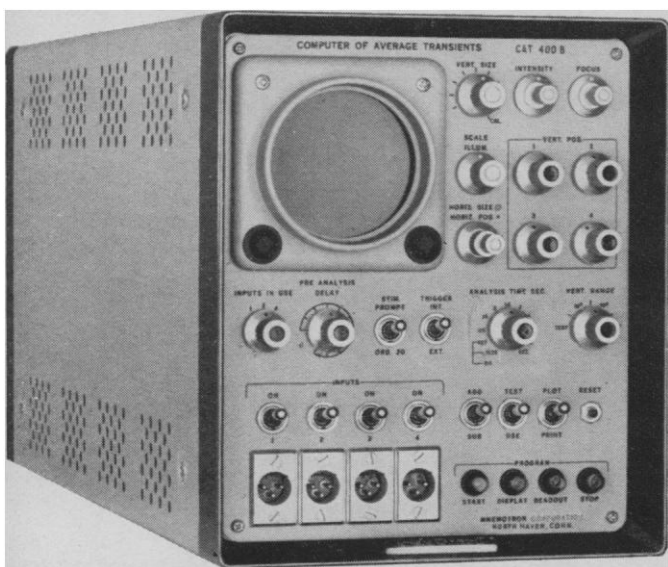


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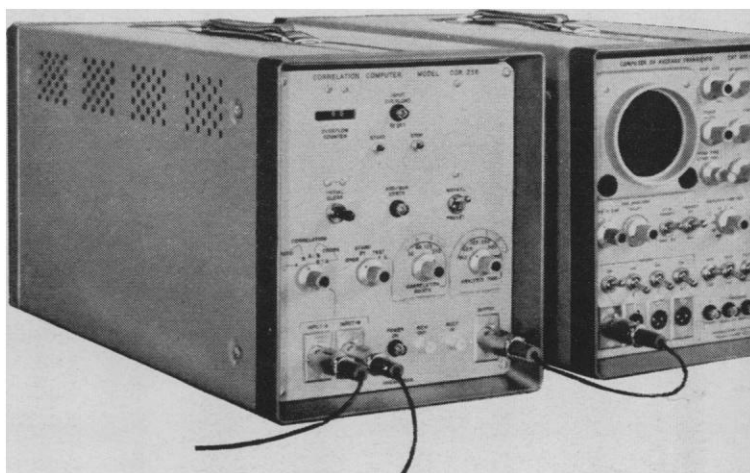
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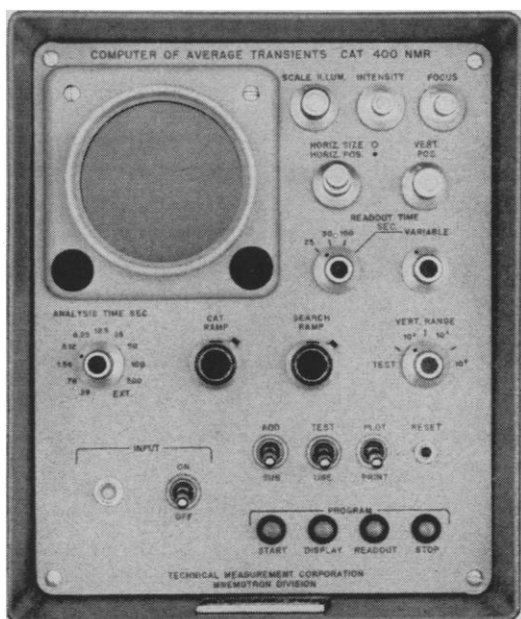
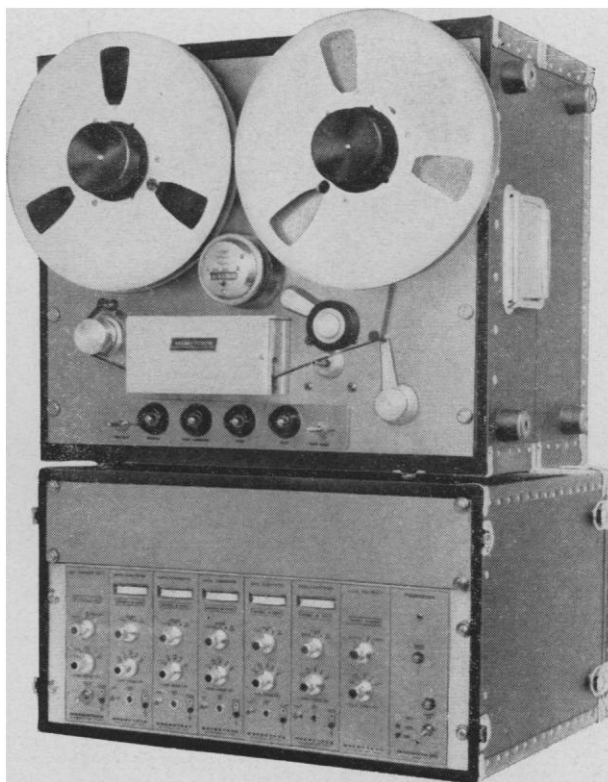
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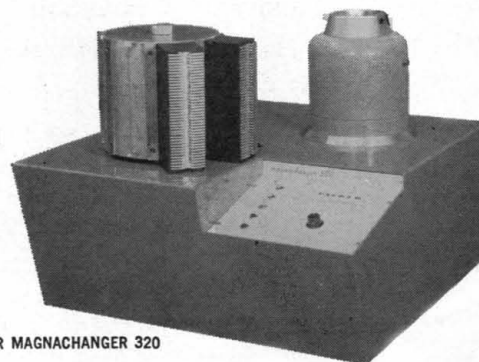
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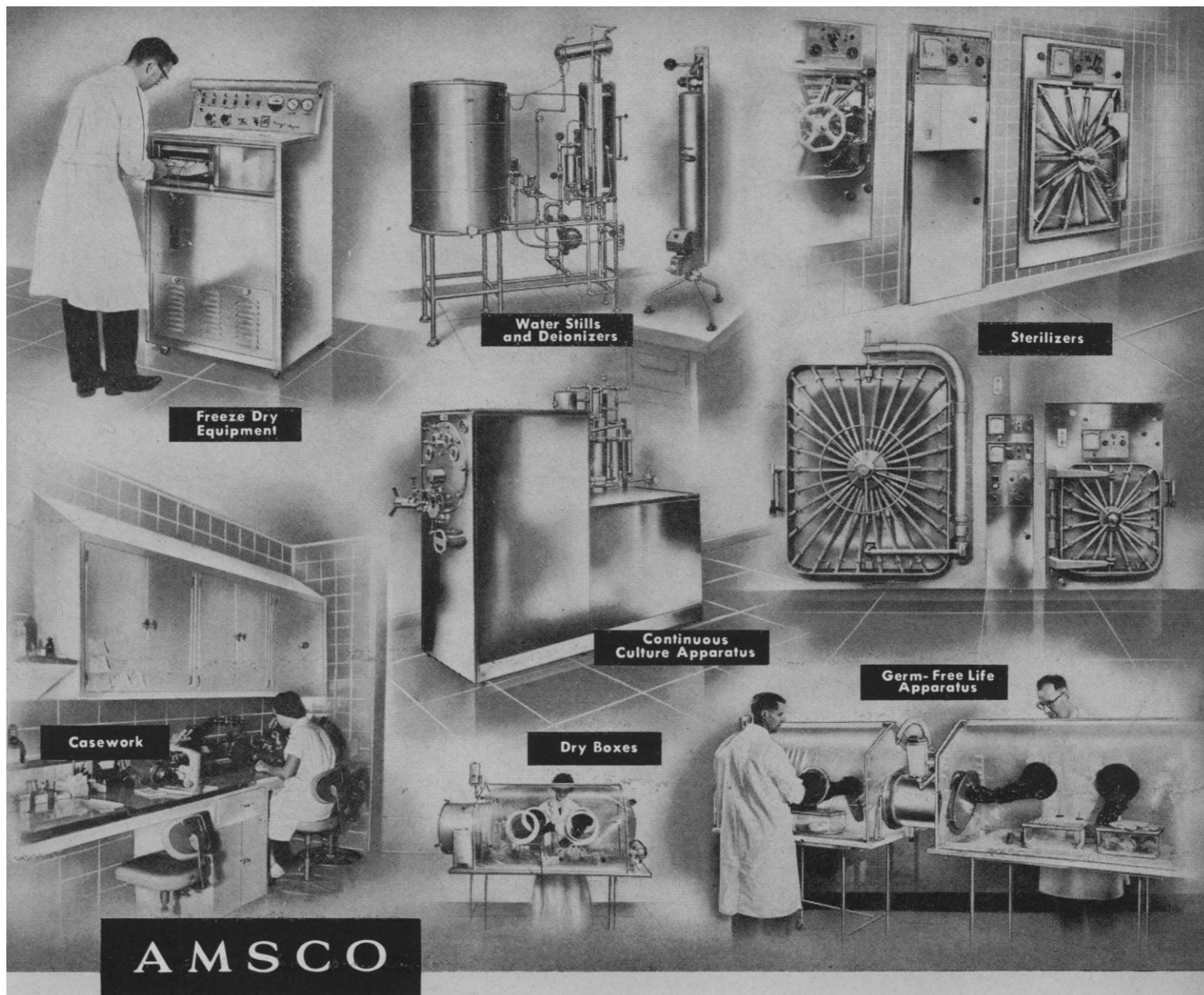
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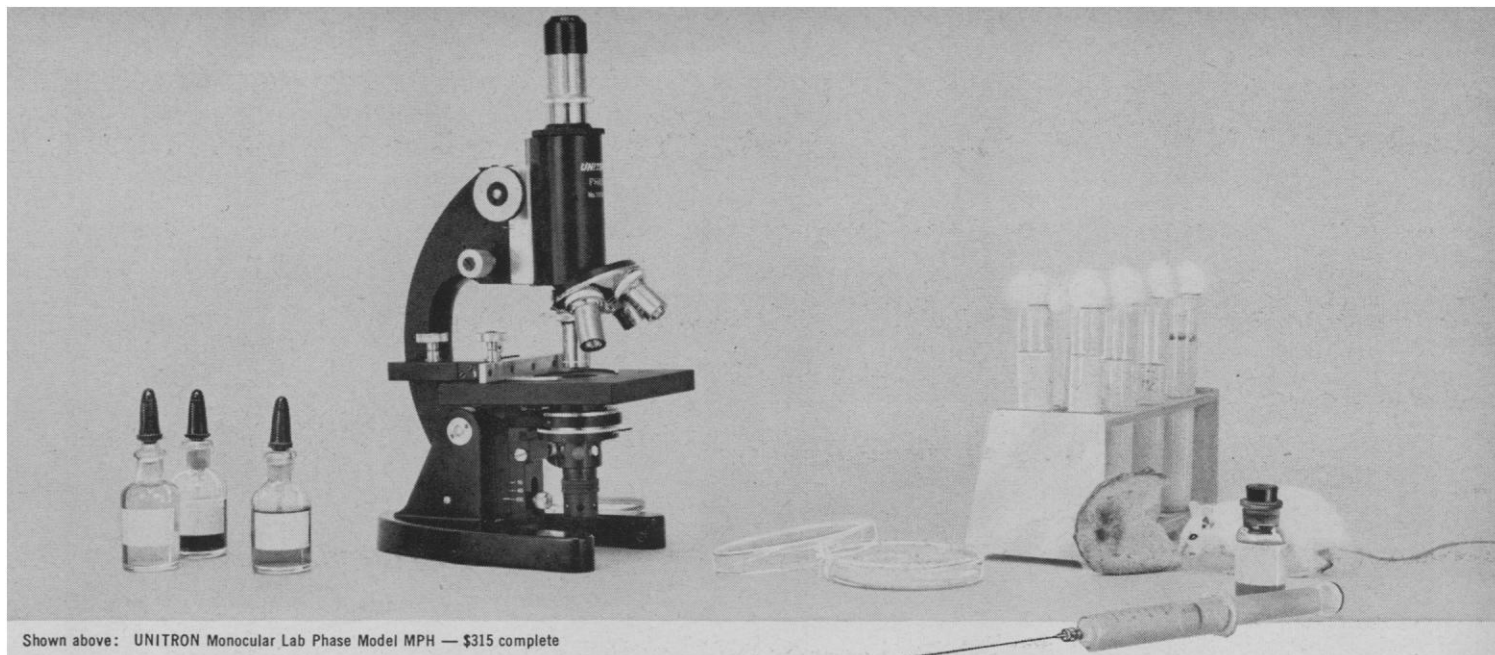
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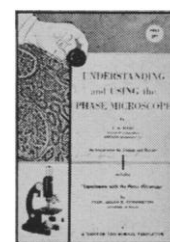
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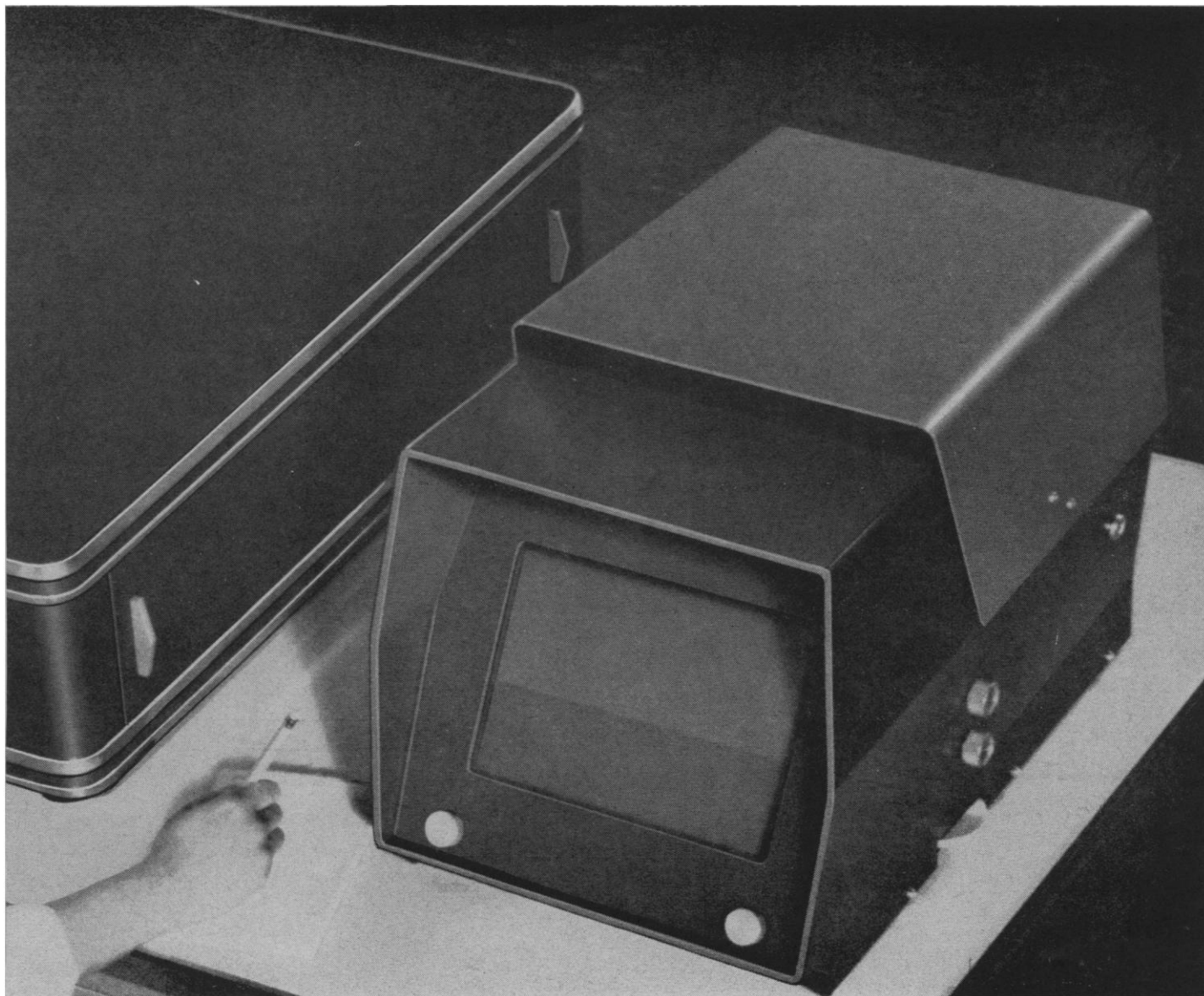
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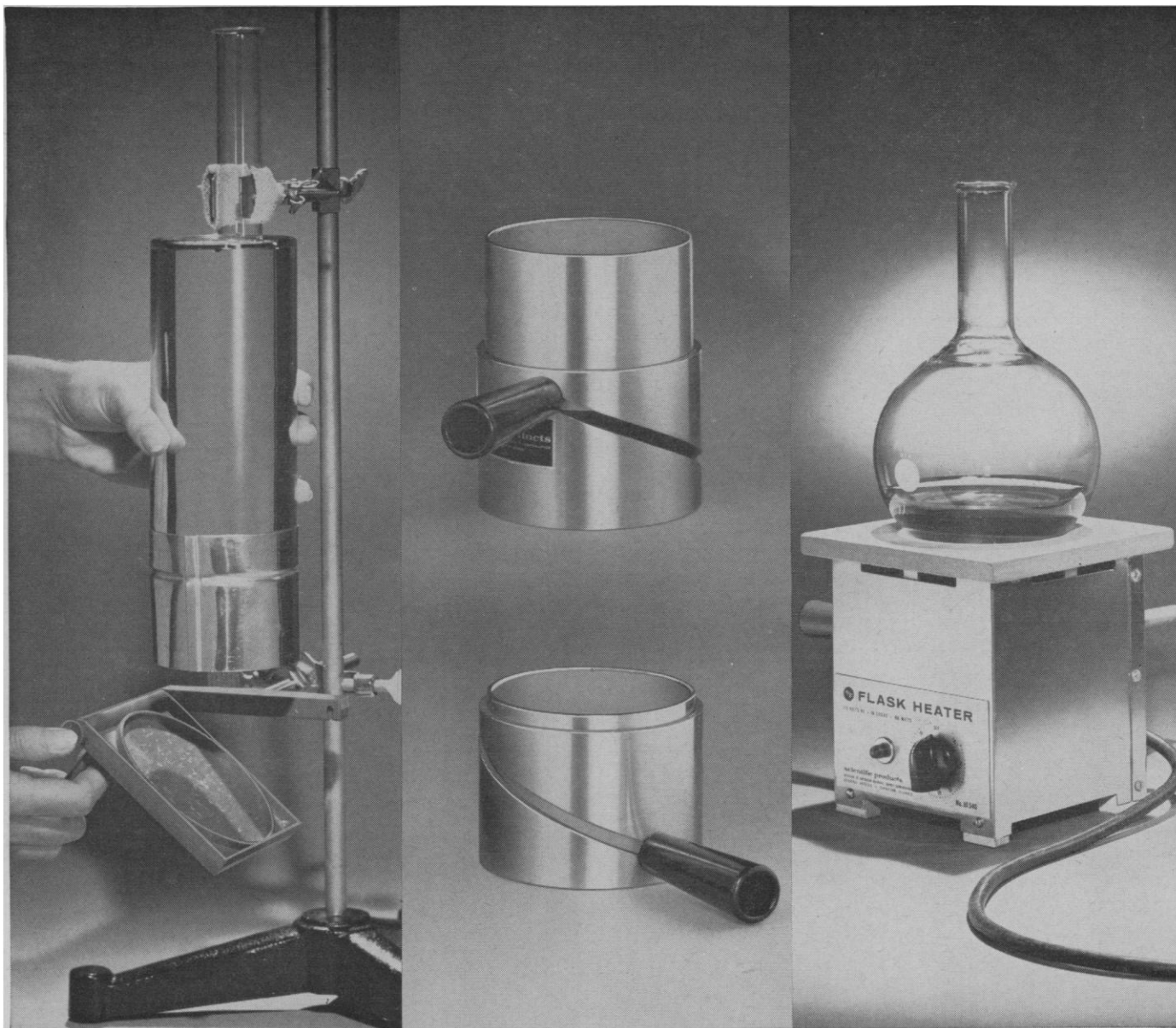


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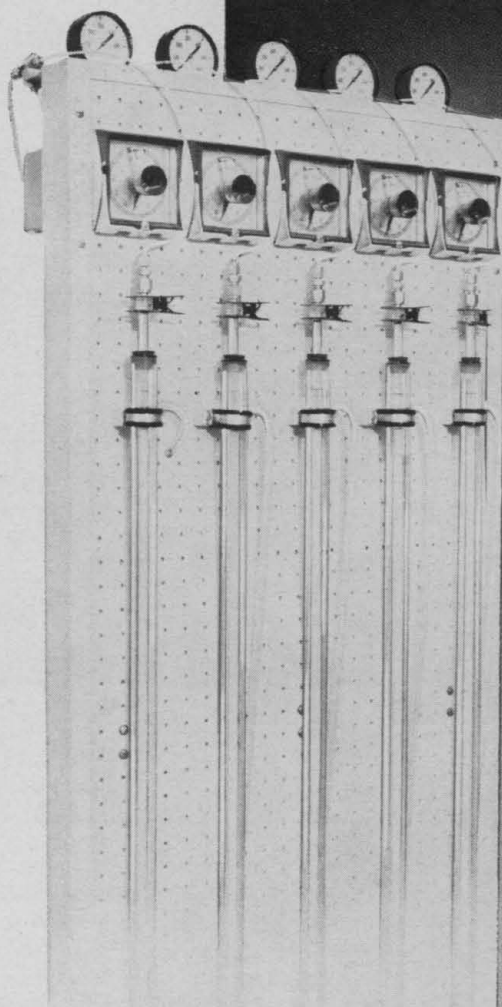
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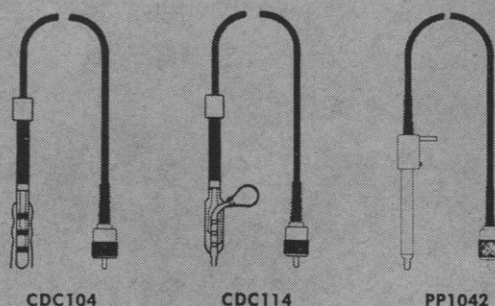
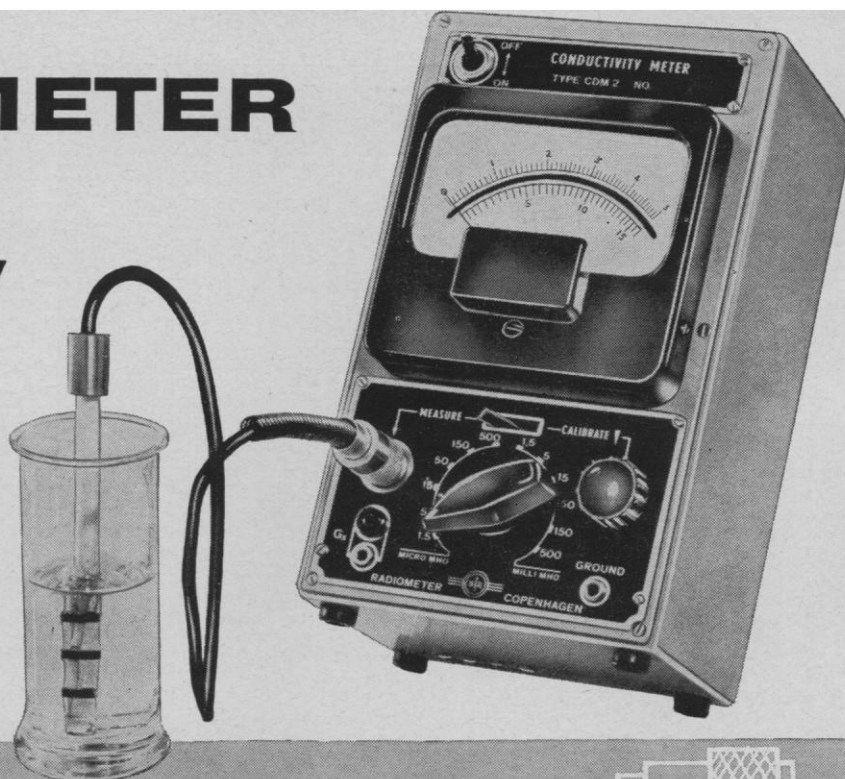
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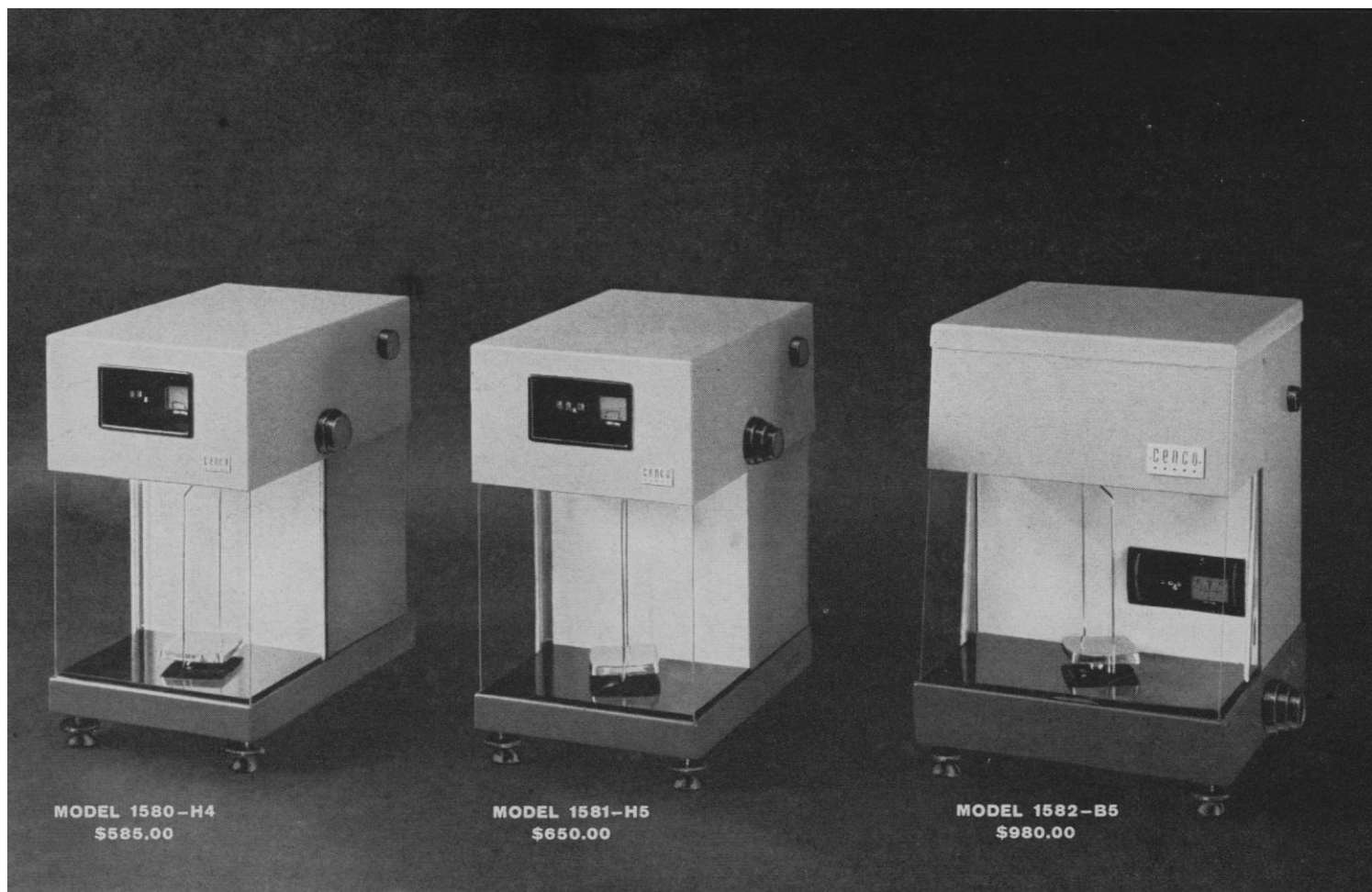


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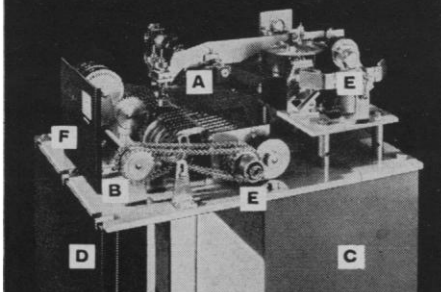


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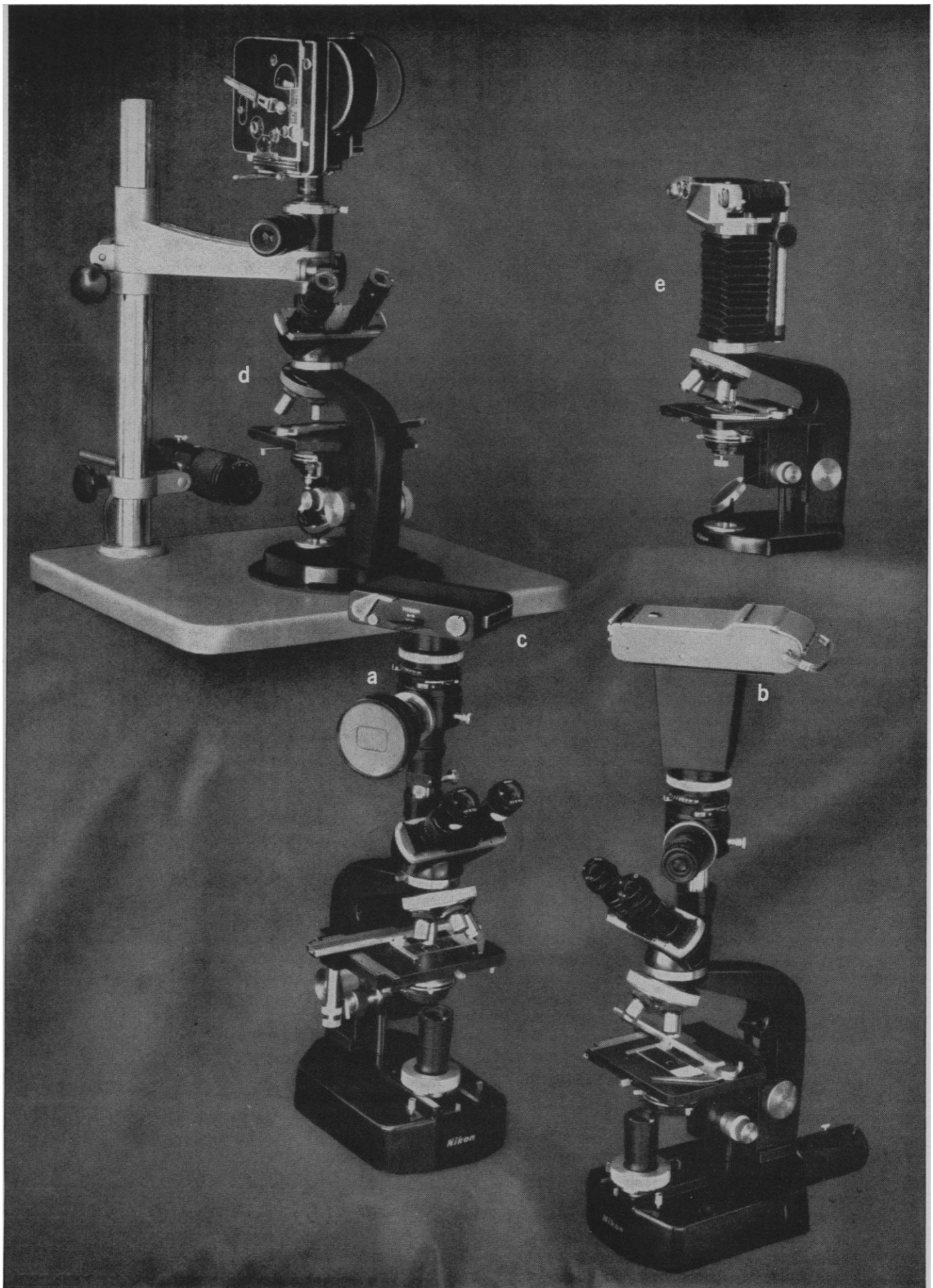
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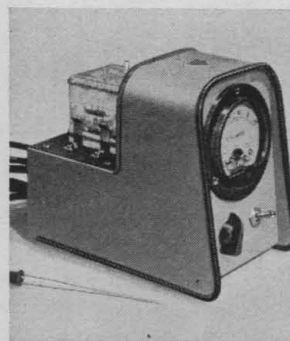


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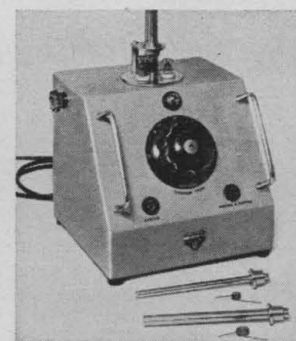
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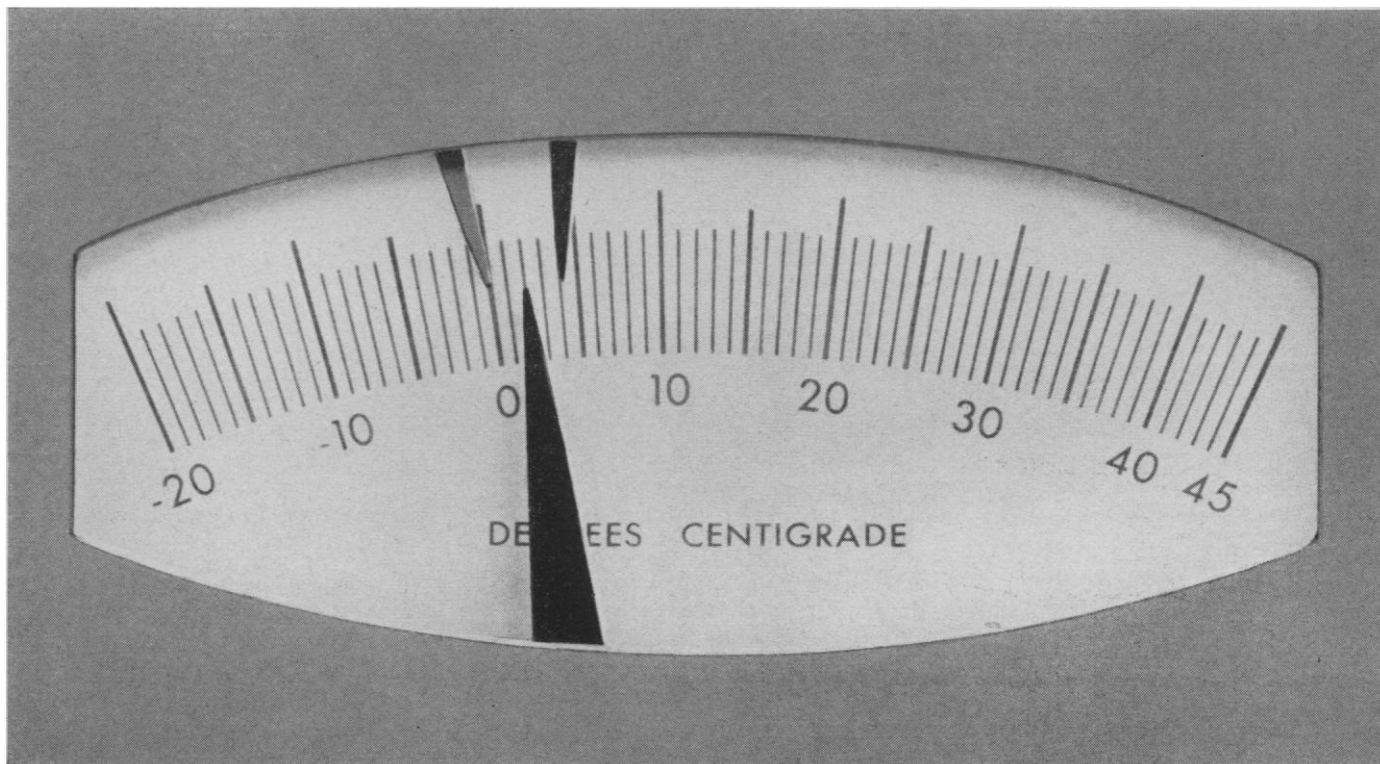
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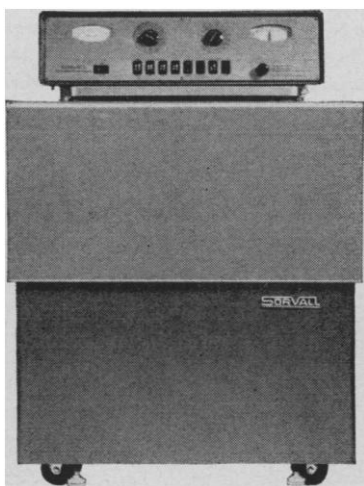
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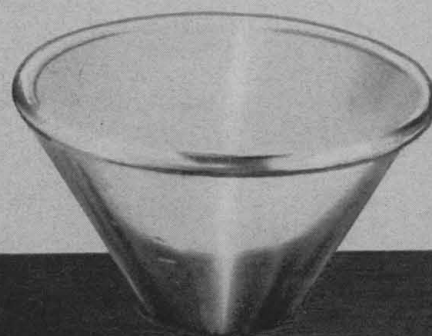
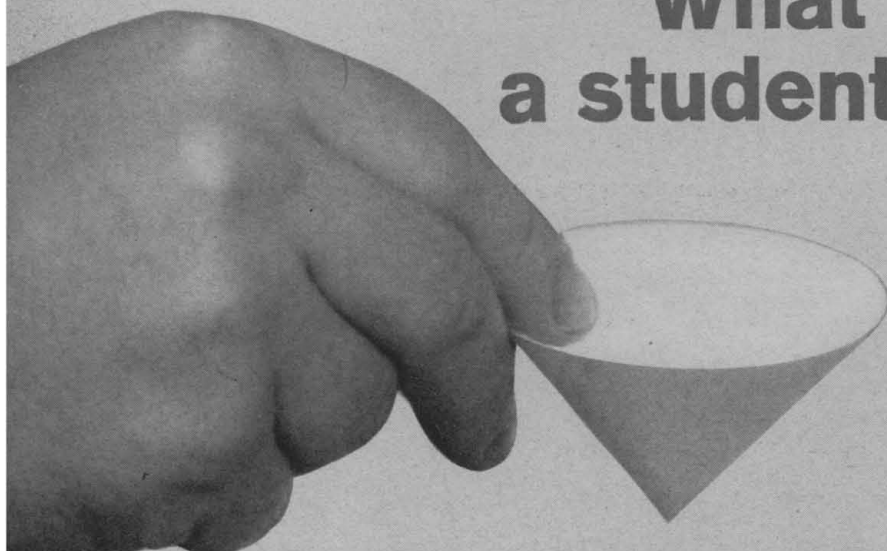
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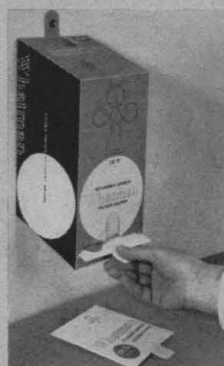
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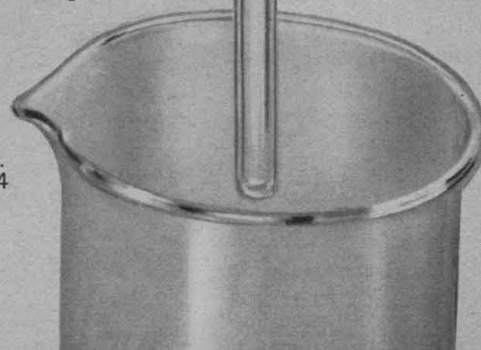
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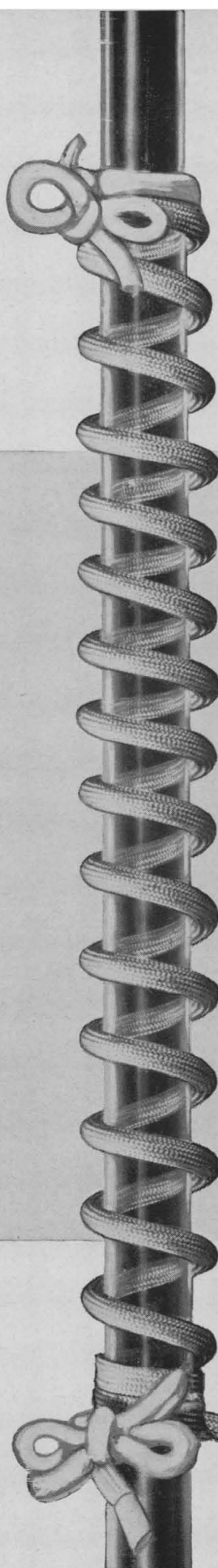
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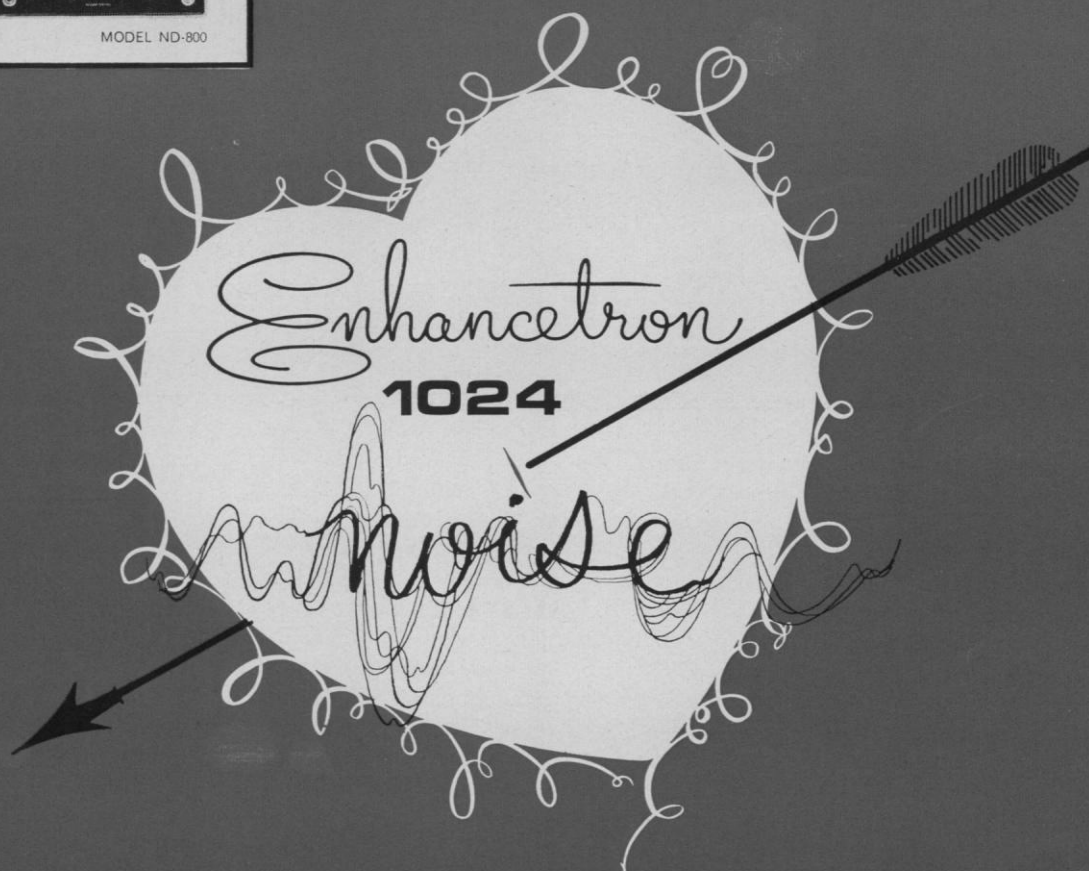
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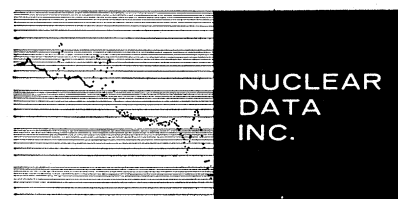
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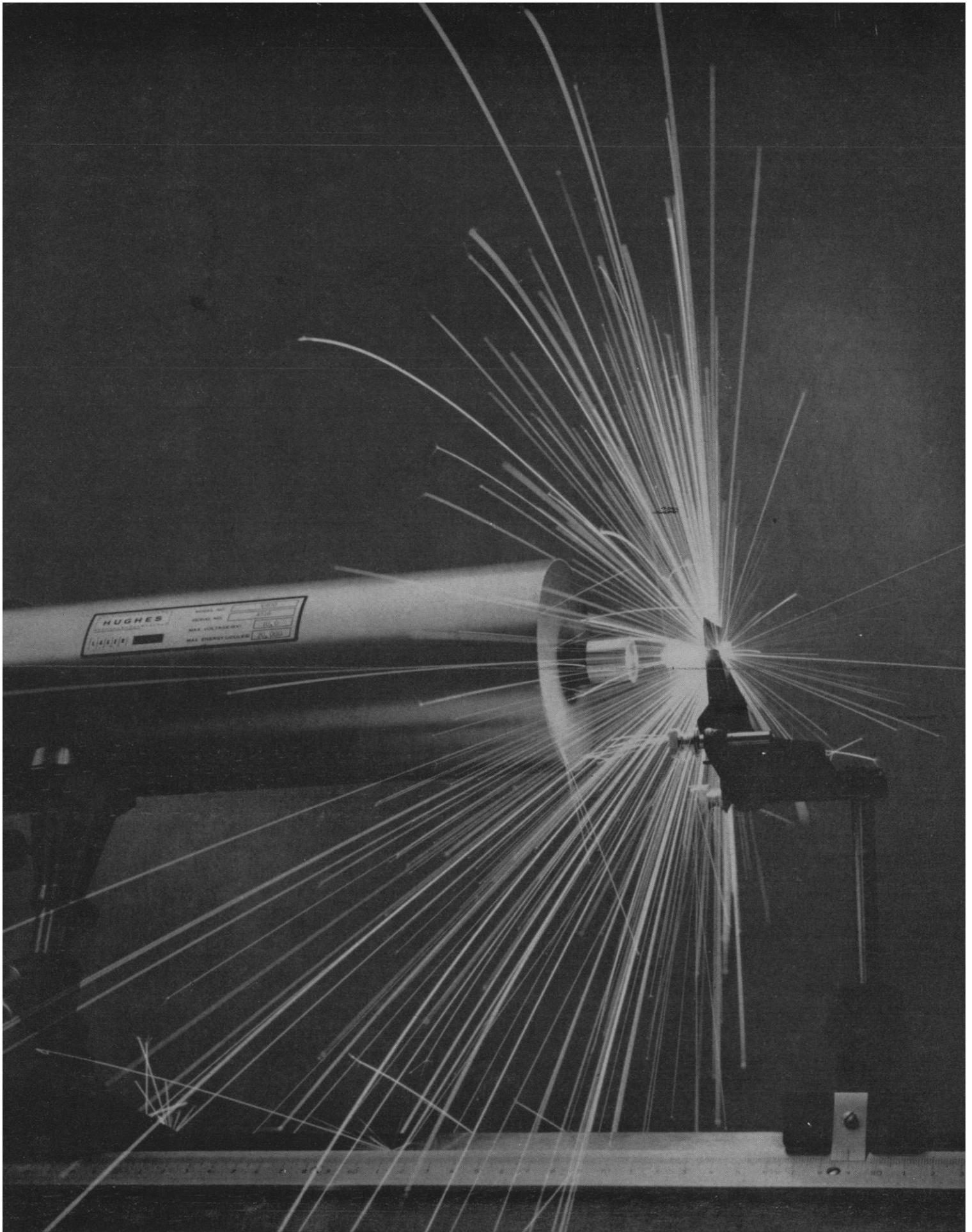
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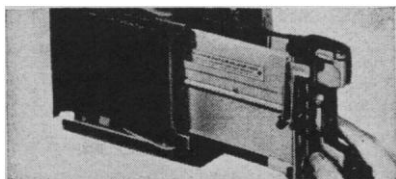
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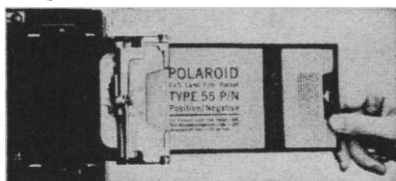
**Larry Foster** of Hughes Aircraft Company had a fully developed negative and positive just 20 seconds after he took this picture of a laser beam piercing a sheet of tantalum. He used a Graphic view camera and **Polaroid Land 55 P/N 4x5 Film**.

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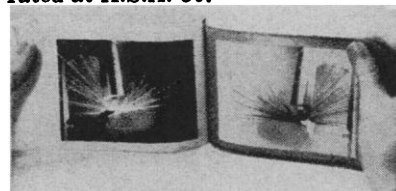
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*et al. (1)*, using an electrophysiological technique.

4) We agree with Wharton *et al.* that our assignment of a band at 12.5  $\mu$  to an isopropylidene group was an unfortunate one. The assignment was based on the absence of this band from the infrared spectrum of the hydrogenated attractant. Gas chromatography of the hydrogenated attractant and the synthetic saturated product on packings different from those described has indeed shown the presence of several peaks, identical in the two preparations.

In spite of the marked instability of our cockroach sex attractant, we are attempting to synthesize this material. In the final analysis, only synthesis can serve as the decisive factor.

MARTIN JACOBSON  
MORTON BEROZA

Entomology Research Division,  
U.S. Department of Agriculture,  
Beltsville, Maryland

### References

1. J. Boeckh, E. Priesner, D. Schneider, M. Jacobson, *Science* **141**, 716 (1963).

### Biological Mechanisms of Aging

In a recent very stimulating paper [*Science* **141**, 686 (1963)] Curtis has discussed biological aging processes and concluded, quite justly, that somatic mutations appear to have a primary importance in reducing longevity of living creatures. I think, however, that he has been unjust in holding up the "wear and tear" hypothesis of Selye, Comfort, and others as antithetical to the "somatic mutation" hypothesis which he espouses so effectively.

While Curtis has shown conclusively that certain stresses, even when applied systematically and repeatedly, do not accelerate aging, he has *not* shown that a wide variety of such stresses (such as are the burden of every living thing) will not do so. As he points out, certain stresses cause irremediable damage to some organ or tissue and thus make eventual failure at that point relatively likely. The beauty of radiation as an experimental stress is that it is general, striking all sensitive tissues at once. But from the experiments reported by Curtis we cannot say that application of a number of specific chemical and disease stresses will not bring about a general loss of

viability similar to that caused by radiation. The advance Curtis has made is to suggest (implicitly) that the wear-and-tear hypothesis is *commuted* to the somatic-mutation hypothesis by the recognition that viability-reducing stresses are those which are mutagenic in certain susceptible tissues: those in which mitosis is slow. The two hypotheses are more alike than they first seemed.

Experiments like those of Curtis's group are suggested, in which mice during their laboratory lifetimes are subjected to a carefully selected *range* of stresses. Like Selye, I would include various types of psychological stress, in addition to numerous chemicals and diseases, because such stresses are notorious as "imbalancers" of function in many of the organs now shown to be most susceptible to weakening by somatic mutation.

RICHARD O. WHIPPLE

Department of Chemistry,  
University of Singapore,  
Singapore, Malaysia

I think Whipple's suggestion is excellent and am inclined to agree that if just the right combination of stresses were found it would shorten the life span. But the question would then be: What does this have to do with natural aging? It is apparent there is abundant room for future research.

HOWARD J. CURTIS

Department of Biology,  
Brookhaven National Laboratory,  
Upton, New York

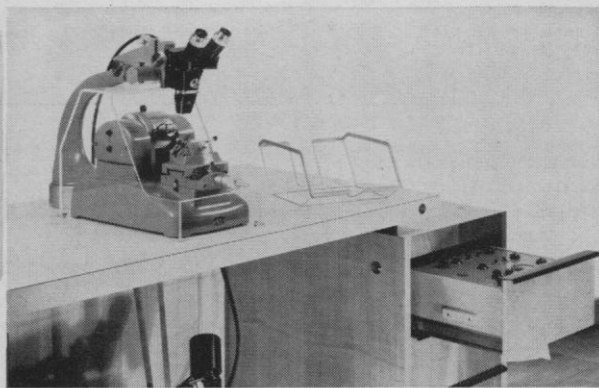
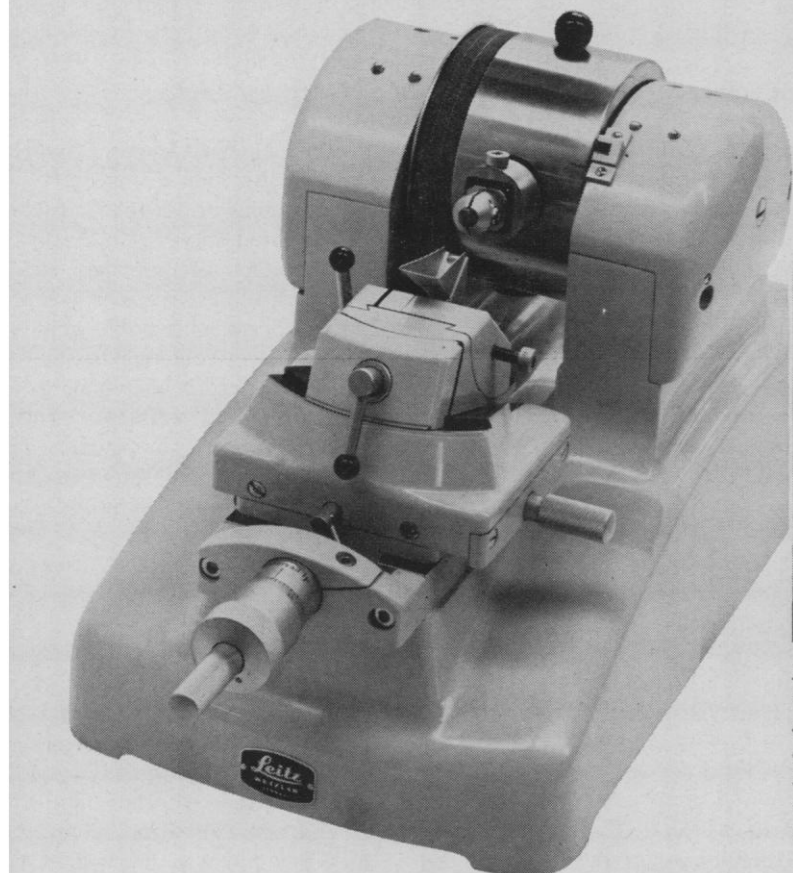
### Blood of Anthropoid Apes

Readers using the report by Wiener and Moor-Jankowski on blood groups in apes and baboons [*Science* **142**, 3588 (4 Oct. 1963)] will probably also be interested in a neglected paper by Yvan Berezney [*Bull. Soc. Roy. Zool. Anvers No. 10* (1959)]. Berezney gives detailed data on blood groups, chemistry, counts, various measurements, and immunoelectrophoretic patterns for nine chimpanzees, six gorillas, and two orang-utans. A finding in some contrast to that of Wiener and Moor-Jankowski concerns the blood groups of gorillas: Berezney reports type O in four *Gorilla gorilla beringei* and one *G. g. gorilla*, type A in one *G. g. beringei*.

GEORGE B. RABB

Chicago Zoological Park,  
Brookfield, Illinois

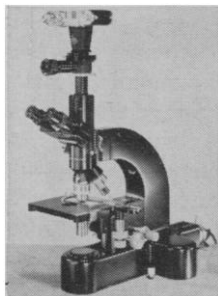
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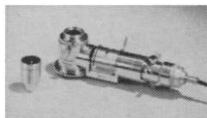
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## Course Content Improvement, British Style

Publication of the first general report of the British Nuffield Foundation Science Teaching Project provides an opportunity to compare British and American approaches to the problem of improving science teaching. There is much in common between the two. The Nuffield statements that "the central objective is 'science for all'—not merely for future specialists," and that "present-day science teaching should place much more emphasis on imaginative enquiry and the judgment of evidence, and much less emphasis on dogmatic assertion and the memorising of facts" might just as well have been written in this country. So might the description of working arrangements. Organized groups of scientists and teachers are producing new texts, guides, demonstrations, experiments, and teaching aids. Experimental use of the new materials in selected schools will determine the changes to be made before they are released for general use.

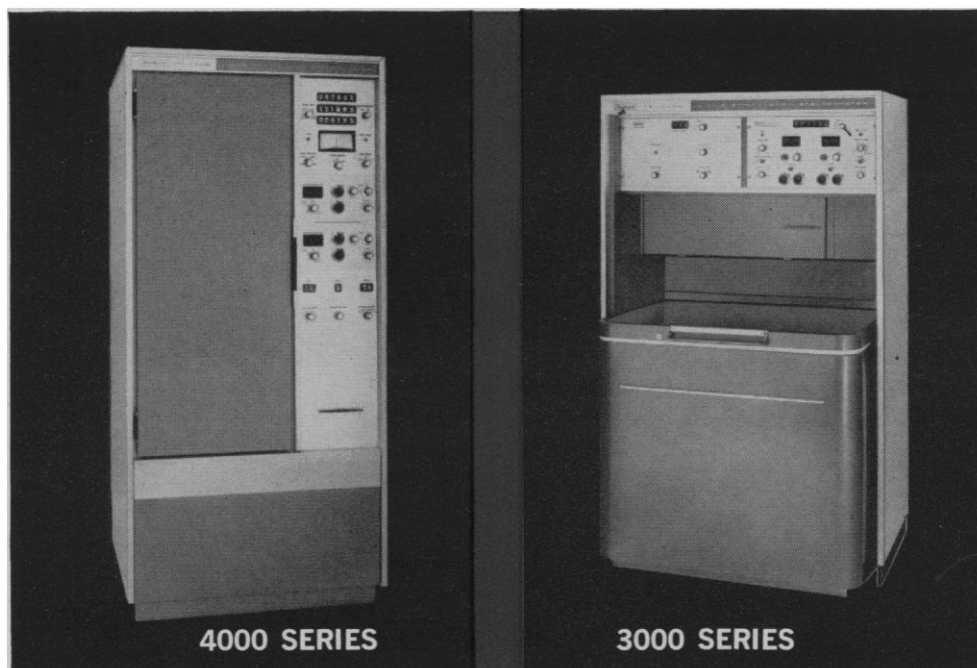
There are also significant differences between British and American approaches. Curriculum organization in this country called for 1-year courses in biology, chemistry, and physics. The British system has permitted the Nuffield group to start with 5-year sequences in each of these fields, for children aged 11 to 16 in selective secondary schools. Thus they have been able to adopt a much more longitudinal or developmental approach than we have.

Work on science for children from 8 to 13 in primary schools and nonselective secondary schools will get started early in 1964, and the group hopes to start a parallel program in mathematics within the year. Later on they may proceed to the development of other courses: one for 16- to 18-year-old students who wish to specialize in science; one for students of like age with other interests; one for 13- to 16-year-olds of less than average ability; and a combined physical and biological science course for the 11 to 16 range.

As a matter of general policy for all courses, pupils' guides, teachers' handbooks, films, apparatus, experimental guides, and collections of problems and questions are intended to be sufficiently flexible to permit a considerable amount of adaptation to different levels of ability and to differences in the plans and wishes of individual teachers. Commendably, the development of new examinations that will better fit the major objectives instead of rewarding the parroting of a mass of detail is getting earlier attention than it has in most of the American programs. While this emphasis is made necessary by the British examination system, it is in any event desirable as a basis for evaluating the whole venture.

The Nuffield group has had the opportunity to profit from both successes and mistakes of the American programs that started a few years earlier. Included on the steering committees, central staff, and writing groups are a number of recent participants in American summer institutes, writing groups, and visiting programs. There is a reciprocal opportunity for us to profit. Work here began at the senior high school level and is now being extended to higher and lower ages. But work at elementary and junior high school levels is not yet far along, and not yet have we really tackled the problem of articulating the whole program from elementary beginnings into the early collegiate years. The British system of sequential courses forced the Nuffield group to look at some problems we have so far neglected. The results of their experience—which might best be imported through participation by a few American scientists—can enable us to move more rapidly toward the kind of articulated program that should soon become our objective.—D.W.

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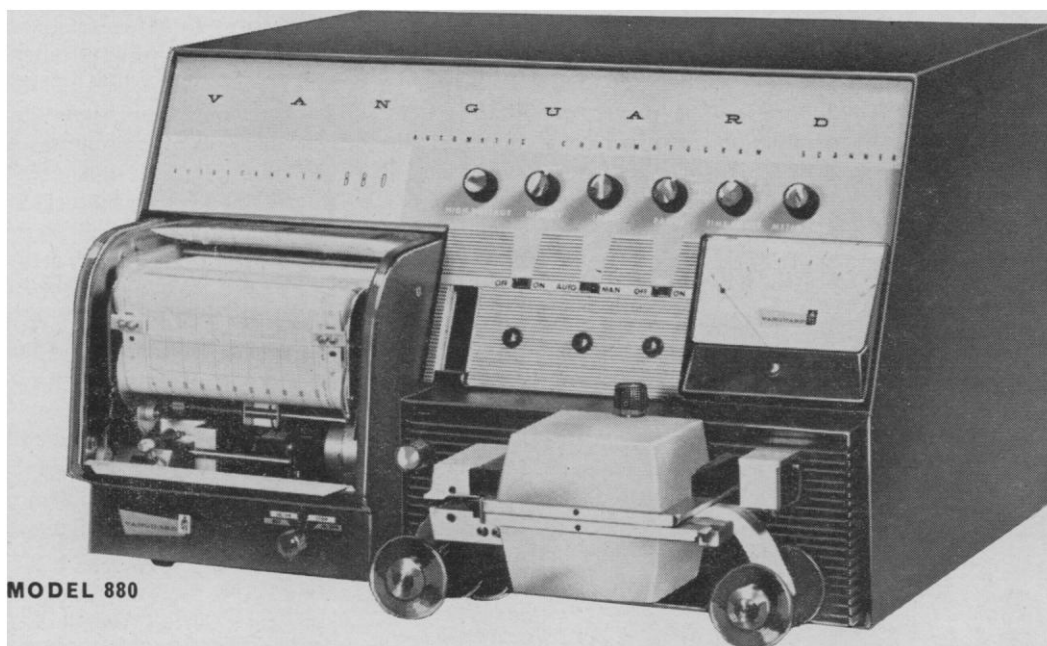
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Hill, Ford Foundation. New patterns of agricultural research and education in India, A. H. Moseman. An efficient approach in modernizing agriculture, T. W. Schultz, University of Chicago.

## Industrial Science

Monday 30 December

**Retiring Vice Presidential Address and Luncheon.** Alfred T. Waidelich, The Austin Company, will preside. Instruments and industrial research—some educational implications, Henry F. Dever, Minneapolis-Honeywell Regulator Co. and retiring vice president for section on Industrial Science (P).

The Industrial Science Section together with the Office of Economic and Statistical Studies, National Science Foundation, is sponsoring two additional symposia: "The Role of Instruments and Equipment Use in Science Research Program Planning" and "The Planning and Management of Science Research Programs."

## Education

Friday 27 December

**Address.** Joint session of the section on Education (Q) and the Council for Exceptional Children. Arranged by Dorothy Norris, Cleveland Board of

Education, who will also preside. A study of gifted children in Cleveland's major work program, Edward C. Frier-son, Kent State University.

Sunday 29 December

**Contributed Papers, Session I, and Vice-Presidential Address.** Arranged by Herbert A. Smith, Pennsylvania State University. Joseph Novak, Purdue, will preside. Remedial research: approach and models available to education research, David Mostofsky, Boston University. Studies of televising, 1949-63, Paul A. Witty, Northwestern. Herbert A. Smith will preside at the vice-presidential address, Science and civic responsibility by Harold E. Wise, University of Nebraska.

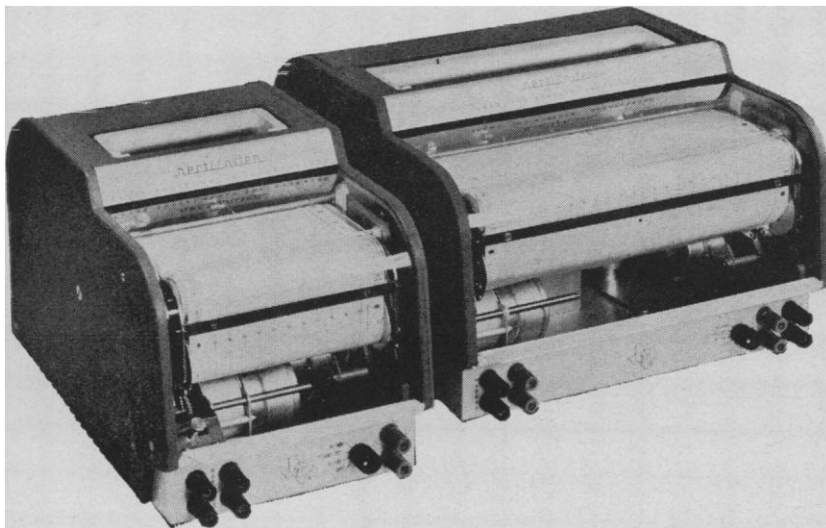
**Contributed Papers, Session II.** Arranged by Herbert A. Smith. Harold E. Wise will preside. The coming crisis in secondary education, Ivor Kraft, U.S. Department of Health, Education, and Welfare. "Needed: a redefinition of status and roles in American society," Annette Rosenstiel, Mills College of Education. Science, education, and students from the undeveloped nations, Wilbur N. Moulton, Southern Illinois University. Science training program for high ability secondary school students: the development of man, an enrichment program, Dolores Elaine Keller, Fairleigh Dickinson University.

Monday 30 December

**Career Developments of Scientists: Grade School to Graduate School.** Symposium, joint session of section on Education and the American Educational Research Association. Arranged by William W. Cooley, Harvard, who will also be the principal speaker. Herbert A. Smith will preside. Discussants include Lindsay R. Harmon, National Academy of Sciences, and Howard J. Hausman, National Science Foundation.

**Contributed Papers, Session III.** Arranged by Herbert A. Smith. William E. Martin, U.S. Office of Education, will preside. Comparison of manifest needs of open and closed minds, C. Gratton Kemp, Ohio State University. Learning, human behavior, and clinical brain anatomy, Ralph H. Pino. The classroom computer in the social and natural sciences, John S. Jackson, University of Kentucky.

**Contributed Papers, Session IV.** Arranged by Herbert A. Smith. William McCollum, Iowa State University, will preside. Free versus guided experimentation, Brenda Lansdown and Thomas Dietz, Brooklyn College. The role of

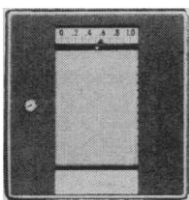


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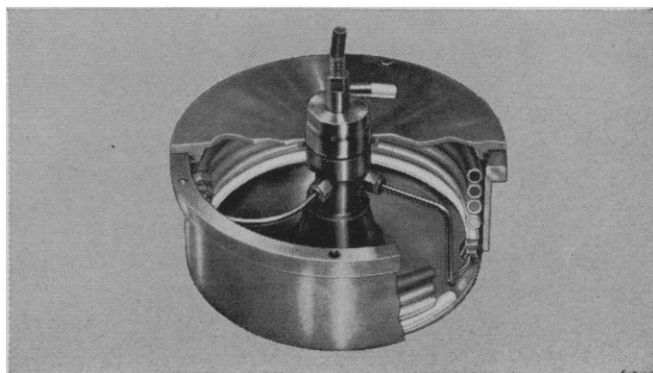
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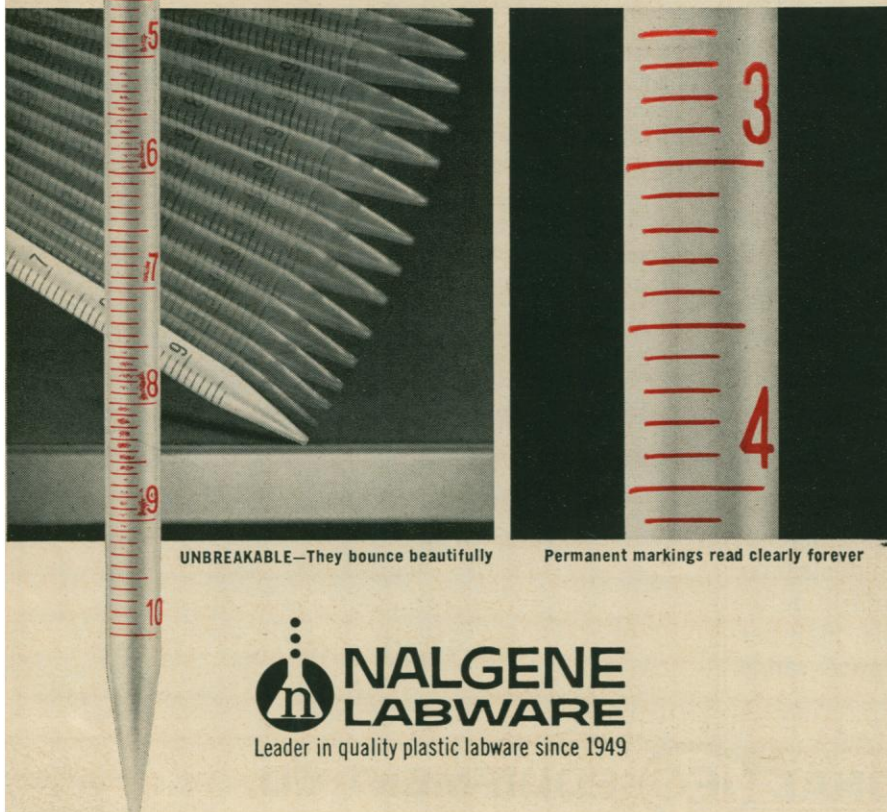
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### **AAAS Cooperative Committee on the Teaching of Science, Mathematics**

**Sunday 29 December**

**Panel. Report of the Commissions on College Science.** Program of AAAS Arranged by John R. Mayor, AAAS. J. W. Buchta, American Association of Physics Teachers, will preside. Panel: Advisory Council on College Chemistry, Charles C. Price, University of Pennsylvania; Commission on College Physics, E. Leonard Jossem, Ohio State University; Commission on Undergraduate Education in the Biological Sciences, Thomas S. Hall, Washington University; Geological Education Orientation Study, William W. Hambleton, University of Kansas; and Commission on Engineering Education, Newman A. Hall.

### **Science Service**

**Monday 30 December**

**Interrelation of Science Youth Activities.** Arranged by Leslie V. Watkins, Science Service. Watson Davis, Science Service, will preside. Science youth activities and the school program, Franklin D. Kizer, State Board of Education, Richmond, Va. Intrastate science youth activities, Thomas Hutto, School of the Ozarks. National organizations can interrelate their science youth activities, John H. Marean, retiring president of the National Science Teachers Association.

### **Science Teaching Societies**

**Friday 27 December**

**Films. Session I.** Joint program of the American Nature Study Society, Central Association of Science and Mathematics Teachers, National Association for Research in Science Teaching, National Association of Biology Teachers, and National Science Teachers Association. Arranged by David J. Lockard, University of Maryland.

**Address.** Joint program of all science teaching societies. Phillip Fordyce,

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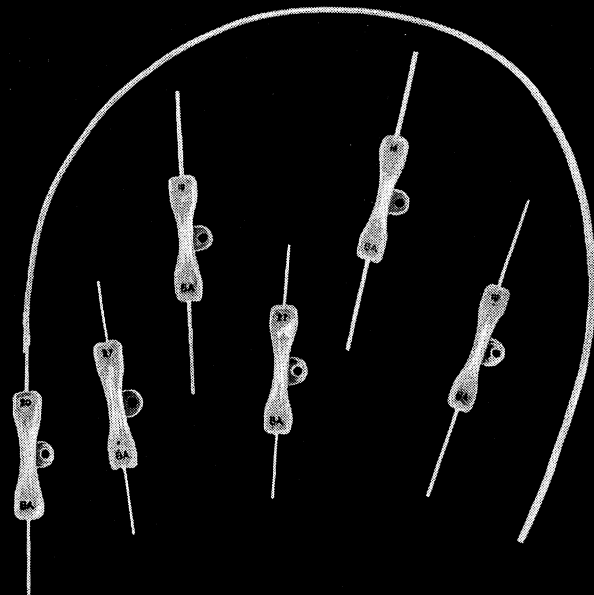
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Florida State University, will preside. The history of science in science education teaching, Genevieve Miller, Howard Dittrick Museum of Historical Medicine of the Cleveland Medical Library.

**Address.** Joint program of all science teaching societies. John Brainerd, Springfield College, will preside. Some early naturalists of the Cleveland area, Ralph W. Dexter, Kent State University.

**Elementary School Science Symposium.** Arranged by Mildred Ballou, Ball State Teachers College, who will also preside. Science and children: partners in discovery, Joseph Zaffaroni, Pennsylvania State University.

**Saturday 28 December**

**Films. Session II.** Joint program of all science teaching societies. Arranged by David J. Lockard.

**Sunday 29 December**

**Films. Session III.** Same sponsors and arranger as for Parts I and II.

**American Nature Study Society**

**Friday 27 December**

**Observing Nature: Basic Technique of Arts and Sciences.** Symposium, program of the American Nature Study Society, cosponsored by the Association of Interpretive Naturalists. Harold E. Wallin, Cleveland Metropolitan Park District, will preside. Speakers include: Dura Dean, Lakewood (Ohio) Board of Education; William Hopkins, Huron-Clinton Metropolitan Authority; Kenneth Hunt, Antioch; Stanley Mulaik, University of Utah; Charles Roth, Massachusetts Audubon Society; and Howard Weaver, University of Illinois.

**Saturday 28 December**

**Recording Nature I. Sketching.** Symposium, program of the American Nature Study Society, cosponsored by the Association of Interpretive Naturalists. William E. Scheele, Cleveland Natural Science Museum, will preside. Panelists will be announced at a later date.

**Presidential Address and Luncheon.** Picture framing by John A. Gustafson.

**Recording Nature II. Photography.** Grant W. Sharpe, University of Michigan, will preside. Panelists include Donald T. Ries, Illinois State Normal University, and Morton Strauss, Photographic Society of America.

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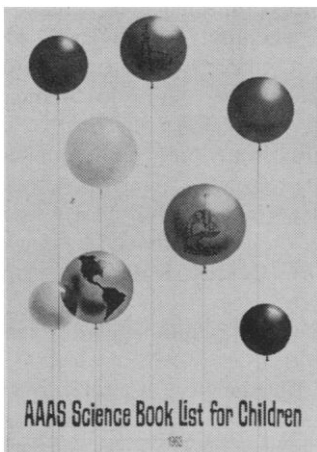
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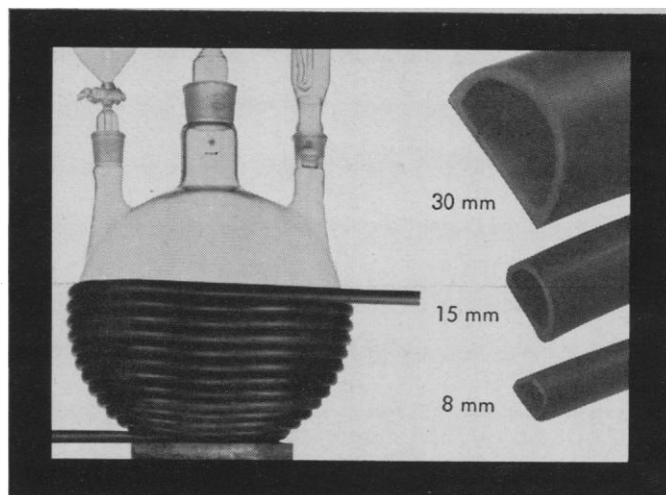
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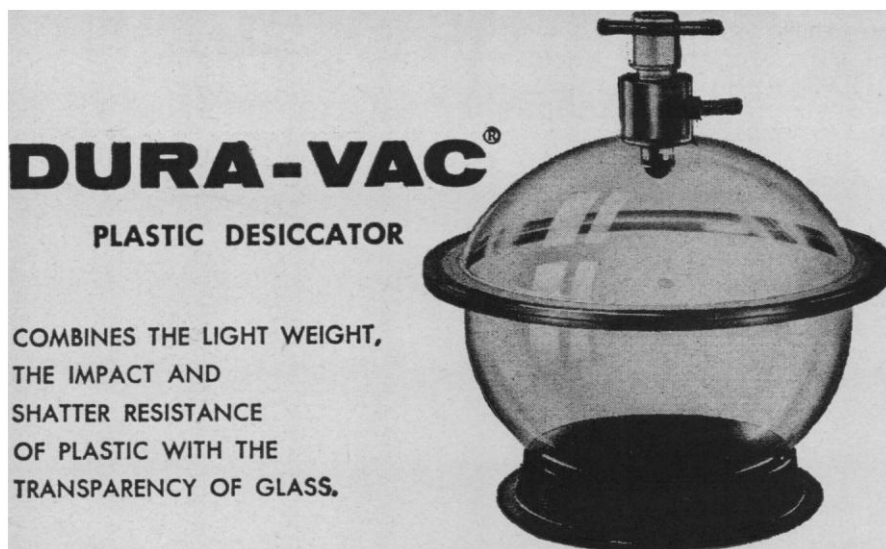


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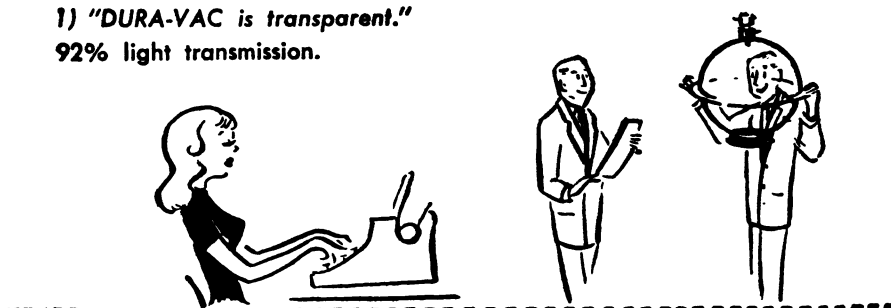
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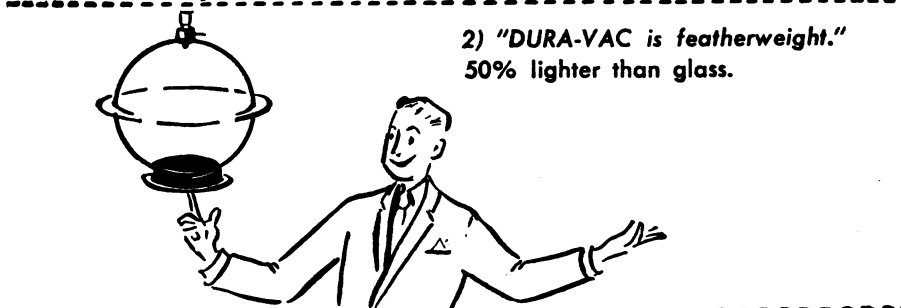


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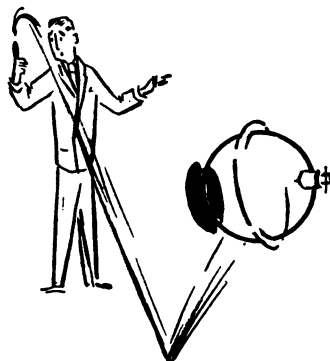
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Sunday 29 December

**Ohio-Michigan Landscapes. Pre-field trip Orientation. Part I.** Symposium, joint program of American Nature Study Society and the National Association of Biology Teachers. George F. Linn, Huron County (Ohio) Department of Education, will preside. Biology of man-altered landscapes, Marston Bates, University of Michigan. Geology's contribution to Ohio's landscapes, Jane Forsyth, Ohio Geological Survey Integrating a conservation program, grades K-12, William Stapp, Ann Arbor Public Schools. Swamp Stompers field trips, Earl Cranston, New London (Ohio) Local Schools.

**Part II.** George F. Linn will preside. Geological setting in north-central Ohio, Jane Forsyth. The role of ecology in high school biology, Marston Bates. The use of school sites as outdoor laboratories, William Stapp. Pre-field-trip orientation, Earl Cranston and George Linn.

#### National Association of Biology Teachers

Friday 27 December

**Recent Developments in Cellular Biology. Session I.** Joseph D. Novak, Purdue, will preside. Molecules, membranes, and molds—studies on cellular function, John W. Greenawalt, Johns Hopkins. Differential lytic reactions of some bacterial species, Ted S. Surdy, Kansas State Teachers College. Plant pectins and their function in food texture, Frank J. McArdle, Pennsylvania State University.

Saturday 28 December

**Recent Developments in Organismal Biology. Session II.** Ann Reynolds, Ball State Teachers College, will preside. Recent advances in the study of social behavior in mammals, J. P. Scott, Jackson Memorial Laboratory. Behavioral studies on reptiles—bobs, nods, and pushups, Charles C. Carpenter, University of Oklahoma. Host-selection behavior in parasitic mites and ticks, Joseph H. Camin, University of Kansas.

**Recent Developments in Ecosystem Biology. Session III.** John Breukelman, Kansas State Teachers College, will preside. Daily energy budgets in environmental fluids, Jacob Verduin, Bowling Green State University. Microcosm approach to ecosystem biology, Robert J.

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**Sunday 29 December**

**Innovations in Teaching Biology. Session IV.** Jerry J. Nisbet, Ball State Teachers College, will preside. Single concept films for college botany, James Wickliff, Iowa State University. Single concept films for high school biology, James Koevenig, University of Colorado. Laboratory blocks for high school biology, Addison Lee, University of Texas. Impact of testing on new curricula, William Mayer, Wayne State University. Impact of new curricula on facilities for biology, James Dawson, Macalaster Scientific Corporation.

**Research Activities in High Schools. Session V** (concurrent with IV). G. E. Caraker, Eastridge High School, Rochester, N.Y., will preside. A multiple integrated response device for use in teaching science, Charles Ostrander, Atwater High School, Atwater, Calif. The apparent relationship between smoking and academic performance among high school students, G. E. Caraker.

**Collegiate Curricula for Biology Teachers. Session VI.** Jack L. Carter, Kansas State Teachers College, will preside. The commission on the undergraduate education in biological sciences, Thomas Hall, Washington University. The commission on the education of teachers of science, Fletcher Watson, Harvard.

**Presidential Address and Silver Jubilee Banquet.** Ted F. Andrews, Kansas State Teachers College, will preside. Missions, money, and men, Phillip For-dyce, president of the National Association of Biology Teachers.

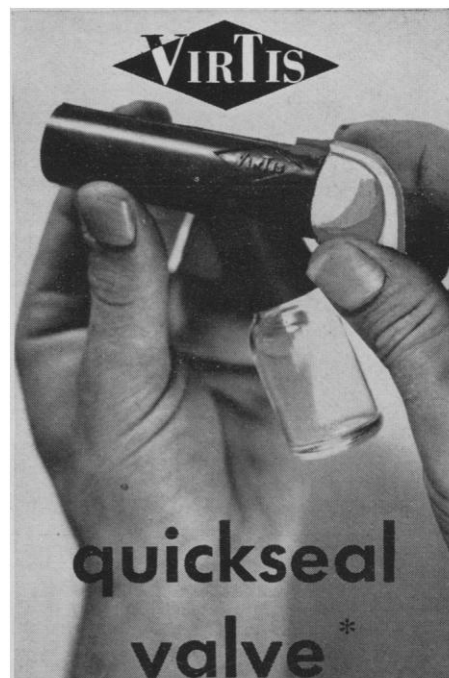
**Monday 30 December**

**Field Trip.** Visit to north-central Ohio with Swamp Stompers. Joint trip of American Nature Study Society and the National Association of Biology Teachers.

## National Association for Research in Science Teaching

**Saturday 28 December**

**The Improvement of Science Teaching.** Research symposium. Arranged by Lloyd K. Johnson, U.S. Office of Education. Cyrus W. Barnes president of the National Association for Research in Science Teaching, will preside. Cur-



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rent research and its meaning for the elementary school, J. Darrell Barnard, New York University. Current research and its meaning for the secondary school, T. Wayne Taylor, Michigan State University. Current research and its meaning for the college, Joseph D. Novak, Purdue.

### National Science Teachers Association

Friday 27 December

**Youth Looks at Science Education.** Arranged by Victor M. Showalter, Ohio State University, who will also act as moderator of this session. Discussants will be high school students.

Saturday 28 December

**Newer Efforts to Improve Science Courses and Curricula.** Robert H. Carleton, executive secretary, National Science Teachers Association, will preside. A general physical science program for senior high school students, Charles W. Woodfield, Dundalk Senior High School, Baltimore County, Md. The junior high school science project, Mrs. Charles Tanaka, Princeton. The earth science curriculum project—its organization, objectives, and philosophy, Robert C. Stephenson, Ohio State University Research Foundation.

### Information and Communication

Friday 27 December

**Communication of Research and Development Information and the Role of the Working Scientist and Engineer.** Panel, joint program of the section on Information and Communication (T) and the Society of Technical Writers and Publishers, cosponsored by the Engineering Section. Arranged by Stello Jordan, Sperry Rand Corporation, who will also preside. Discussion will be based upon the report of the President's Science Advisory Committee, "Science, Government, and Information," prepared by the Panel of Science Information and issued 10 January 1963. Panel members include: Alvin Weinberg, Oak Ridge National Laboratory; Milton O. Lee, American Societies for Experimental Biology; Klaus Liebold, General Electric Company; Vernon Root, Applied Physics Laboratory; and Robert Speers, E. I. du Pont de Nemours and Company.

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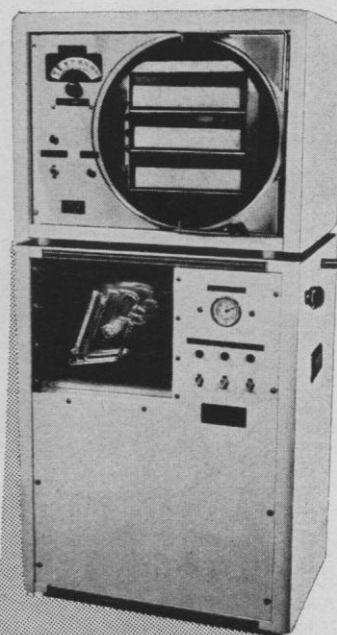
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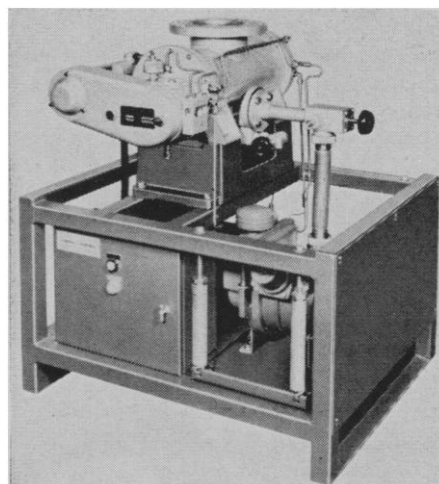
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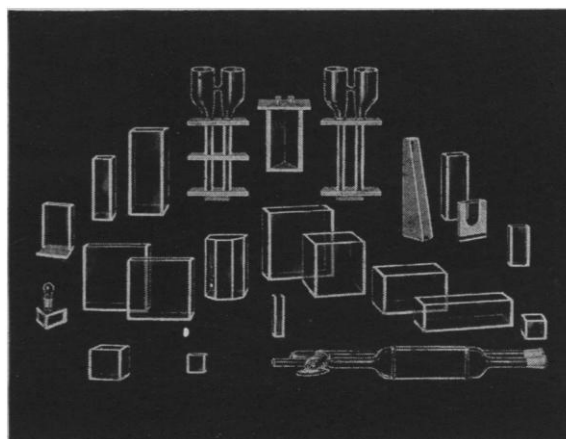
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Sunday 29 December

**Vice-Presidential Address.** Phyllis V. Parkins, *Biological Abstracts*, will preside. Dynamics of documentation: a synthetic science, Foster E. Mohrhardt, National Agricultural Library and vice president for Information and Communication Section.

**Control of Metallurgical Information.** Symposium, joint program of section on Information and Communication and the American Society for Metals, cosponsored by Engineering Section. Arranged by Marjorie R. Hyslop, American Society for Metals. Harry B. Goodwin, Battelle Memorial Institute, will preside. Information problems in metallurgical research, John A. Fellows, Mallinckrodt Chemical Works. Metallurgical information handling by government agencies, Donald A. Shinn, Wright-Patterson Air Force Base. Responsibilities of academic institutions in guiding students in the use of information, Robert S. Taylor, Lehigh University. Inter-society and inter-agency cooperation in metallurgical information: panel discussion by representatives of the American Society for Testing and Materials, Society for Non-destructive Testing, American Institute of Mining (Metallurgical and Petroleum Engineers), Engineers Joint Council, and the American Society for Metals.

**Address.** A new problem in communication: trying to make contact with intelligent life beyond the solar system, Walter Sullivan, *New York Times*. P. C. Fraley, Council for the Advancement of Science Writing, will preside.

**Information Retrieval in the World of Metals—Its Promise and Limitations.** Panel, joint program of section on Information and Communication and the American Society for Metals, cosponsored by Engineering Section. Arranged by Marjorie R. Hyslop, who will also preside. Introduction, Norman E. Cottrell, American Society for Metals. Panel presentation by the documentation service staff of the American Society for Metals: Richard Z. Bedy, Betty A. Bryan, Brice Carter, Thomas J. Fitzgerald, and Barbara Shaffer.

#### National Association of Science Writers

Friday 27 December

**Annual Dinner and Announcement of AAAS-Westinghouse Science Writing Awards.** Donald J. Dunham, *Cleveland Press*, will preside.

6 DECEMBER 1963

## Statistics

The American Statistical Association and the Institute of Mathematical Statistics are general cosponsors of all sessions arranged by the section on Statistics (U).

Friday 27 December

#### Sessions for Teachers of Statistics.

Arranged by Horace W. Norton, University of Illinois, who will also preside. Statistics today, Fred C. Leone, Case Institute of Technology. A look at statistics on the AAAS program, N. L.

Johnson, North Carolina State University.

**Financing Graduate Studies.** Program of the section on Statistics, cosponsored by sections on Social and Economic Sciences and Education. Arranged by Thomas J. Mills, National Science Foundation. Elmer D. West, American Council on Education, will preside. Financial support of graduate students, Thomas J. Mills. The federal government interest in graduate education, Peter P. Muirhead, U.S. Office of Education. University financing of graduate education, John W. Hicks, Purdue.

**Vice-Presidential Address.** S. S. Wilks,

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Princeton, will preside. Statistical teaching in 1974, Harold Hotelling, University of North Carolina and vice president for the Statistics Section.

**Monday 30 December**

**Organization, Search, and Retrieval of Technical and Scientific Information.** Symposium, joint program of sections on Statistics and Information and Communication, cosponsored by the Institute of Management Sciences. Arranged by Ezra Glaser, U.S. Patent Office, who will also preside. The role of search in the Patent Office, Richard Spencer, U.S. Patent Office. On some statistical models of search operations, Edward C. Bryant, Westat Research Analysts, Inc. On some recursive models of large-scale information systems, David Rosenblatt, National Bureau of Standards.

**Reliability of Complex Systems.** Arranged by S. S. Wilks. Landis Gephart, Lockheed Corporation, will preside. Systems reliability and engineering statistical aspects, George Levenbach, Bell Telephone Laboratories. Functional analysis for evaluating systems reliability, William S. Connor, Research Triangle Institute. The concept of monotone hazard rate in systems reliability, Frank Proschan, The Boeing Company.

**Science in General**

The following are the programs of organizations not affiliated with any one section.

**Academy Conference**

**Thursday 26 December**

**National Junior Academy of Science Program.** Charles L. Bickle, Milton Hershey (Pa.) High School, will preside. Titles of papers and lists of participants will be available at the meeting.

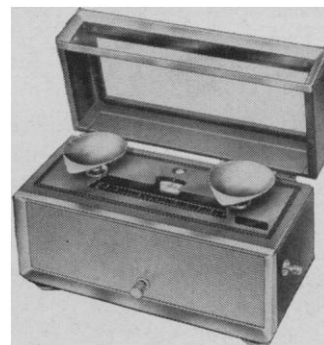
**Friday 27 December**

**Meeting of Directors of Junior Academies of Science.** Charles L. Bickle will preside. Summary of final report on the AAAS Academy Conference survey of junior and collegiate academies supported by the National Science Foundation, John D. Hopperton, Oklahoma Academy of Science. Report on national science seminars, J. Teague Self, Oklahoma Academy of Science.

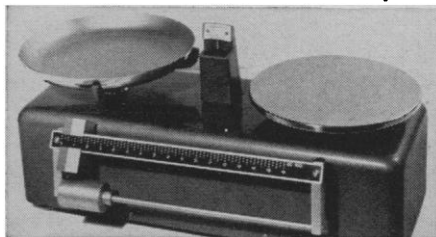
**The Activities of the Academies of Science and the Role of the National Science Foundation.** Symposium. Ger-

**3**

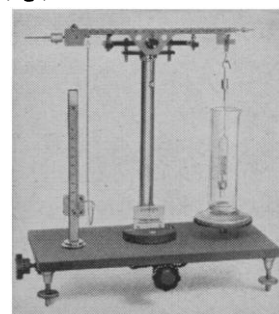
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ald Acker, president of the Academy Conference, will preside. Participants include: John Breukelman, Kansas State Teachers College; J. Teague Self; and John A. Yarbrough, Meredith College. Participants who will discuss the report on national science seminars include: J. Teague Self; Harry J. Bennett, Louisiana State University; Charles L. Bickle; Irving Auerbach, Sandia Corporation; and John D. Hopperton.

**Presidential Address and Dinner.** E. Ruffin Jones, past president of the Academy Conference, will preside. The day of reckoning, Gerald Acker.

### Annual Junior Scientists Assembly

**Friday 27 December**

**Tours.** Places that will be visited include Case Institute of Technology, Natural Science Museum, and Western Reserve University.

**Student Papers.** Sanford Eisler, Cleveland Public Schools, will be master of ceremonies. The keystone address, Antarctica—frontier of international science, will be presented by Laurence M. Gould, president-elect of AAAS. The advanced placement program in science, Ward Ebert, junior at Princeton. Effect of hormones on secondary sexual characteristics of canaries, Larry Spitz, student at Hawken School, South Euclid, Ohio. Journey to a smaller world, Larry Nelson, sophomore at the University of Michigan. An investigation of optimum free convection heat transfer from a finned horizontal cylinder, Richard Karash, a senior at Euclid Senior High School. Opportunities unlimited, Carol Smalheer, a senior at John Marshall High School, Cleveland, Ohio.

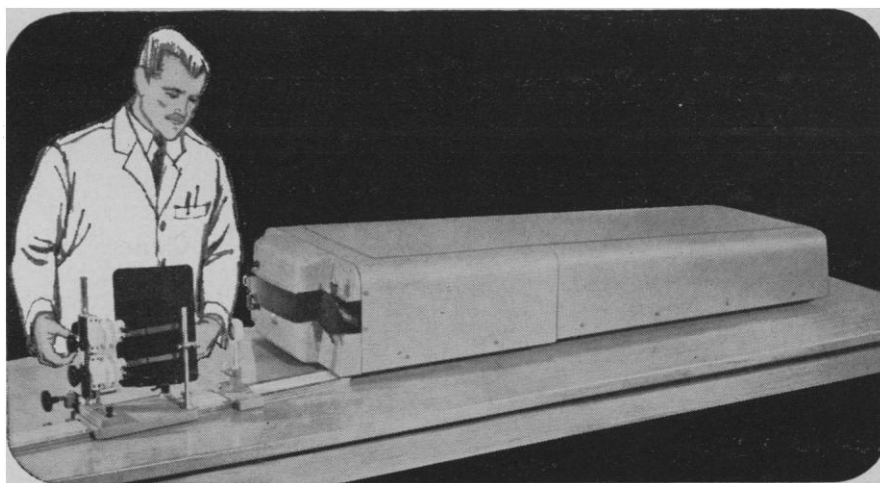
### National Science Foundation

**Monday 30 December**

**The Role of Instruments and Equipment Use in Science Research Program Planning.** Symposium, joint program of the office of Economic and Statistical Studies, National Science Foundation, and the section on Industrial Science. Arranged by Zola Bronson, National Science Foundation. J. Francis Reintjes, M.I.T., will preside. The issues of instrument and equipment expenditures and use in science research organization planning management, Zola Bronson. The role of instruments and equipment in the planning, management, and design of research experiments, John E. Jacobs, Northwestern. The effect of




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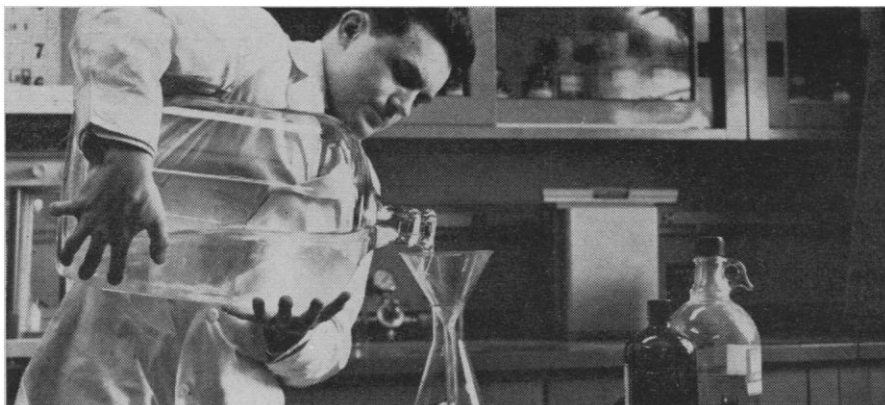
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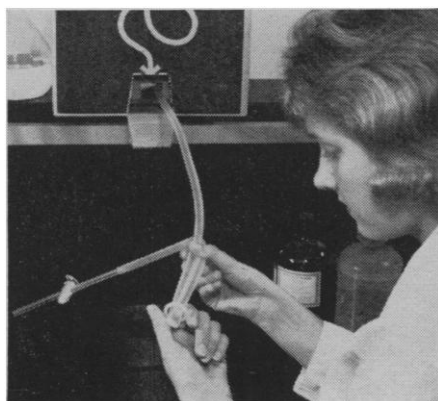
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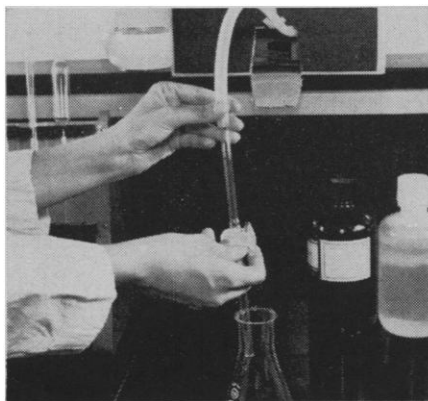
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instrumentation on research, Winston E. Kock, Bendix Corporation. New instrumentation and research management, John J. Grebe, Dow Chemical Company. Policies in the development, acquisition, and utilization of instrumentation in science research, Otto H. Schmitt, University of Minnesota.

**The Planning and Management of Science Research Programs.** Symposium, joint program of the Office of Economic and Statistical Studies, National Science Foundation, and section on Industrial Science. Arranged by Zola Bronson. Jacob Perlman, National Science Foundation, will preside. Productivity in the ivory tower, John R. Dunning, Columbia. The administration of scientific research in universities, Ralph A. Sawyer, University of Michigan. Planning and management of consumer product-oriented industrial research, William B. Reynolds, General Mills, Inc. Research planning and management in an unchanging world, Erwin G. Somogyi, Somogyi Associates. Research planning and management in the federal government, Nicholas E. Golovin, Office of Science and Technology, Executive Office of the President. Quality, relevance, and rate of research productivity with regard to management, Theodore C. Byerly, U.S. Department of Agriculture.

## Scientific Research Society of America

Monday 30 December

**Annual Address for the Scientific Research Society of America and Award of the William Procter Prize.** William E. Hanford will preside. Speaker will be announced later.

## Sigma Delta Epsilon

Friday 27 December

**Luncheon for All Women in Science and Address.** Ernestine Thurman, National Institutes of Health, will preside. A study of the atmospheric pollen of the Minneapolis Area, Agnes Hansen, University of Minnesota.

## Society of Sigma Xi

Friday 27 December

**Joint Annual Address of the Society of the Sigma Xi and the United Chapters of the Phi Beta Kappa.** Wallace R. Brode, past president of AAAS, will preside. Telltale dust, Paul B. Sears, Yale University and past president of AAAS.

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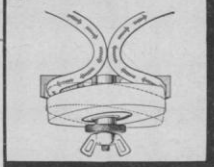
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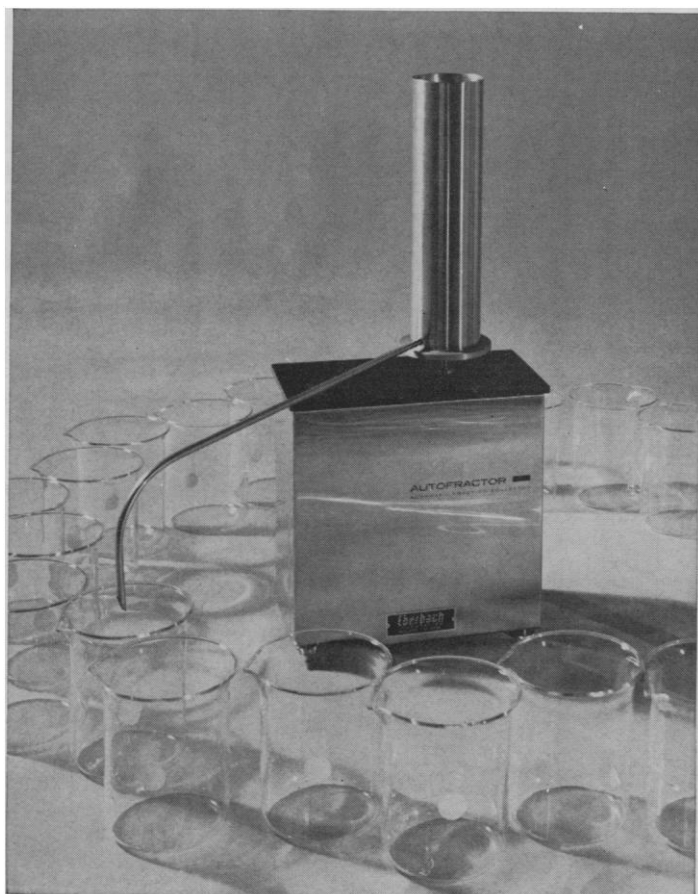
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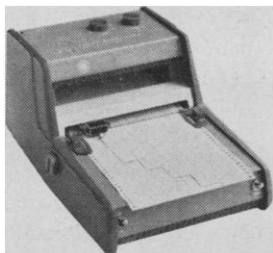
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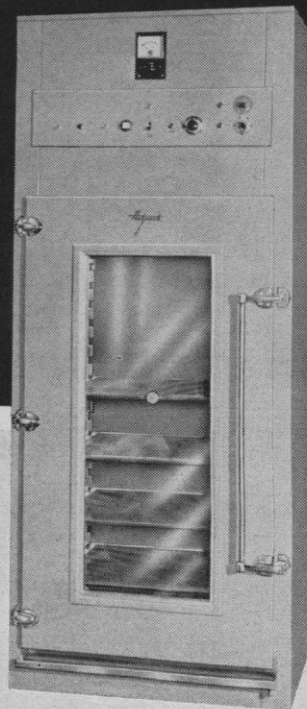


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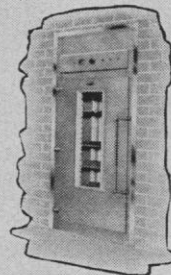
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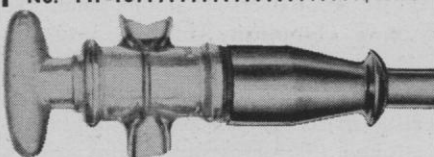
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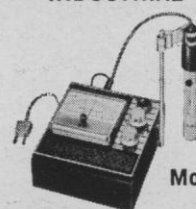
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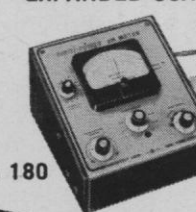
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#### May 1964

6-10. **East German Geographic Soc.**, 7th meeting, Leipzig. (The Society, Georgi Dimitroff Platz 1, Leipzig Cl)

#### May 1964 (no dates)

Mechanism of **Antibody Formation**, intern. symp., Prague, Czechoslovakia. (Inst. of Microbiology, Czechoslovak Acad. of Science, Na cvičišti 2, Prague 6)

**Earth Slides**, all-union conf., Kiev, U.S.S.R. (A. M. Drannikov, bul'var Shevchenko, 78, Kiyevskiy inzhenernostroitel'nyy institut., Kiev)

Czechoslovak National **Geodetic Conf.**, Czechoslovakia. (B. Volfk, Research Inst. of Geodesy, Topography, and Cartography, Prague 1)

**Heat and Mass Transfer conf.**, Minsk, U.S.S.R. (Minsk Inst. for Heat and Mass Transfer, Minsk)

Czechoslovak Medical Soc., **Internal Medicine**, Experiment and Diagnosis. (J. Berman, First Internal Medicine Clinic, U Nemocnice 2, Prague, Czechoslovakia)

#### May-June 1964

**Telecommunications Union**, 3rd assembly of the consultative committee, Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

#### June 1964

3-5. **Ultrasonic Diagnosis in Ophthalmology**, 1st intern. symp., Berlin, East Germany. (W. Buschmann, Augenklinik der Humboldt Universität, Berlin, Ziegelstrasse 5, Berlin N4, East Germany)

15-19. Czechoslovak Microbiological Soc., intern. congr. on **antibiotics**, Prague, Czechoslovakia. (V. Vlček, Antibiotics Research Inst., Roztoky, Czechoslovakia)

22-26. **Material Handling Conf.**, Scientific Soc. for Mechanical Engineering, Hungary. (L. Prockl, Scientific Soc. for Mechanical Engineering, Szabadsag ter 17, Budapest 5, Hungary)

25-27. **Hungarian Radiological Congr.**, Budapest. (Magyar Radiologus, Szakcsoporth, Kongresszbüro, Szabolcs ut., 35, Budapest 13)

#### June 1964 (no date)

Biological Action of **Ionizing Radiations**, all-union conf., Vil'nyus, U.S.S.R. (Inst. of Biophysics, Acad. of Sciences of the U.S.S.R., Moscow, B-133 ul Profsoyuznaya 7)

Balkan Medical Union, 7th **Balkan Medical Week**, Sofia, Bulgaria. (M. Popescu-Buzeu, 10 rue Progresului, Bucharest, Rumania)

#### July 1964

15-19. International Union of **Biological Sciences**, 15th general assembly, Prague, Czechoslovakia. (G. L. Stebbins, Dept. of Genetics, University of California, Davis)



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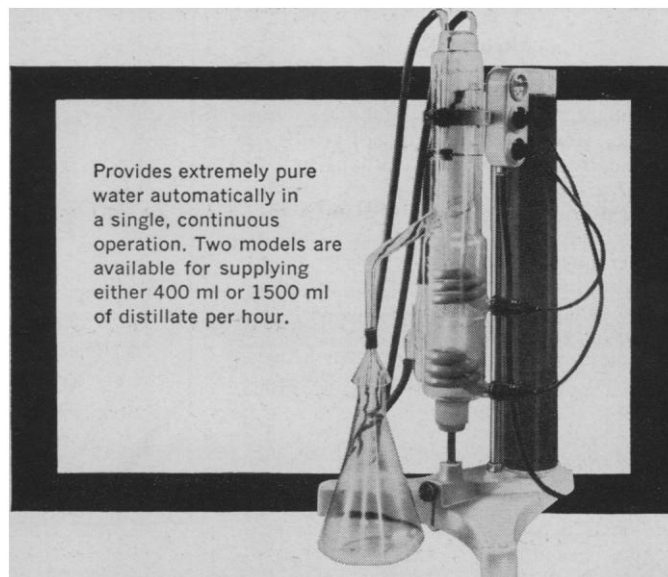
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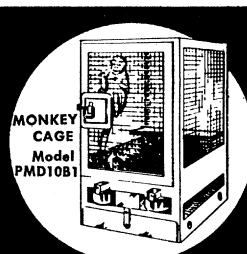
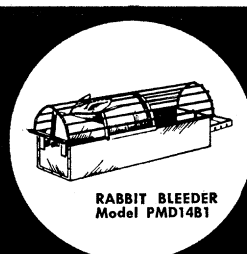
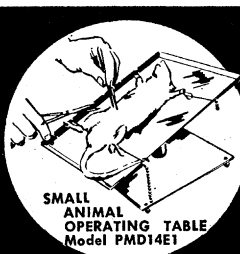
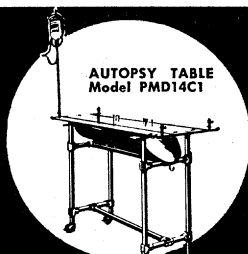
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July 1964 (no date)

**Testing and Research Laboratories** of the International Union of Materials and Structures, 18th annual meeting of the permanent commission, Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

August 1964

2-8. International Assoc. of **Applied Psychology**, 15th congr., Ljubljana, Yugoslavia. (Inst. of Psychology, Faculty of Philosophy, Askerceva 12, Ljubljana)

3-10. International Union of **Anthropological and Ethnological Sciences**, 7th intern. conf., Moscow, U.S.S.R. (Inst. of Ethnography, Acad. of Sciences, Lenin Prospekt 7, Moscow)

9-16. **Sodic Soils**, 9th symp., Budapest, Hungary. (I. Szabolcs, Research Inst. of Soil Sciences and Agricultural Chemistry, Hungarian Acad. of Sciences, Herman-Otto-ut., 15, Budapest)

14-29. **Soil Scientists**, all-union soc., tour of the Soviet Union. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

17-22. **Cardiology**, 4th European congr., Prague, Czechoslovakia. (D. H. Kafka, Karlovy Namesti 32, Prague 2)

26-3. **Electron Microscopy**, 3rd European regional conf., Prague, Czechoslovakia. (Organizing Committee, Intern. Federation of Electron Microscopy Societies, Albertov 4, Prague 2)

31-9. **Soil Scientists**, 8th intern. congr., Bucharest, Rumania. (C. N. Cernescu, Geological Inst., Sosceaua Kiseleff 55, Bucharest)

August 1964 (no date)

**Spectroscopy Conf.**, Scientific Soc. for Mechanical Engineering, Hungary, (L. Prockl, Scientific Soc. for Mechanical Engineering, Szabadsag ter 17, Budapest 5, Hungary)

September 1964

1-5. **Material Testing**, Scientific Soc. for Mechanical Engineering, Hungary. (L. Prockl, Scientific Soc. for Mechanical Engineering, Szabadsag ter 17, Budapest 5, Hungary)

15-20. **Yugoslav Pharmacists**, 4th congr., Opartija. (Yugoslav Acad. of Sciences and Arts, Zrinski trg. 11, Zagreb 1)

18. **Coordination Chemistry**, Hungarian Chemical Soc., Tihany. (M. T. Beck, Szabadsag ter 17, Budapest 5, Hungary)

30-4. **Spectroscopy**, 11th intern. conf., Belgrade, Yugoslavia. (Sekretarijat, Prirodno-matematički fakultet, Fizickohemijski zavod Beograd, Studentski trg., 16, Blok "C," Yugoslavia)

September 1964 (no date)

World Health Organization, European regional committee, 14th session, Prague, Czechoslovakia. (WHO, 8 Scherfigsveg Ø, Denmark)

**Rheumatology**, 11th Czechoslovak congr., Piestamy. (I. J. Charvat, Czechoslovak Medical Soc., Albertov 7, Prague 2)

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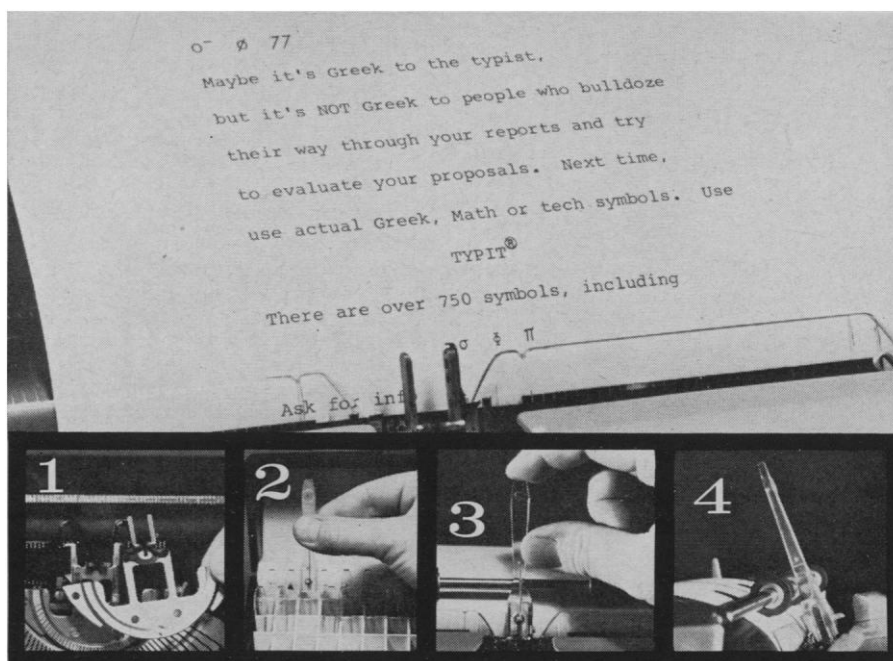


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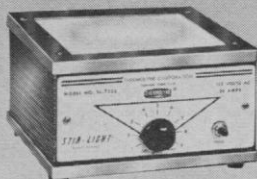
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Czechoslovak Ophthalmological Soc., 28th annual congr., Kosice. (Ophthalmological Diseases Clinic, Medical Faculty, P. J. Safarik University, Bratislavova 41, Kosice)

Prehistoric and Protohistoric Sciences, 7th intern. congr., Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

Polarography in Chemotherapy, Biochemistry, and Biology, 2nd Jena symp., Jena, East Germany. (Inst. for Microbiology and Experimental Therapy, Reuthenbergstrasse 11, Jena)

September-October 1964

Pathophysiology, 1st all-union congr., Tbilisi, U.S.S.R. (I. R. Petrov, All-Union Soc. of Pathophysiology, Moscow, U.S.S.R.)

October 1964

7-9. Czechoslovak Dermatological Soc., symp. on structure and function of epidermal barriers, Brno. (Zd. Vlasin, Dermatological Clinic, Pekarska 53, Brno, Czechoslovakia)

October 1964 (no dates)

Iatrogenic Diseases, meeting, Internal Medicine Section of the Czechoslovak Medical Soc. (J. Berman, First Internal Medicine Clinic, U Nemocnice 2, Prague 2, Czechoslovakia)

Moorland Research, 9th intern. congr., Budapest and Keszthely, Hungary. (Hungarian Acad. of Sciences, Akademia-utca 2, Budapest)

November 1964 (no dates)

Progress in Treatment in Internal Medicine, meeting, Internal Medicine Section of the Czechoslovak Medical Soc. (J. Berman, First Internal Medicine Clinic, U Nemocnice 2, Prague 2, Czechoslovakia)

1964 (no dates)

International Congr. of Aeronautical Sciences, Warsaw, Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

Animal Blood Group, 9th conf., Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

East German Chemical Soc., Processes Div., Freiberg, East Germany. (East German Acad. of Sciences, Mohrenstrasse 39, Berlin W.8)

Economic and Administrative Applications of Digital Computers, colloquium, Hungary. (A. Prekopa, "Bolyai Janos" Mathematical Soc., Szabadsag ter 17, Budapest 5, Hungary)

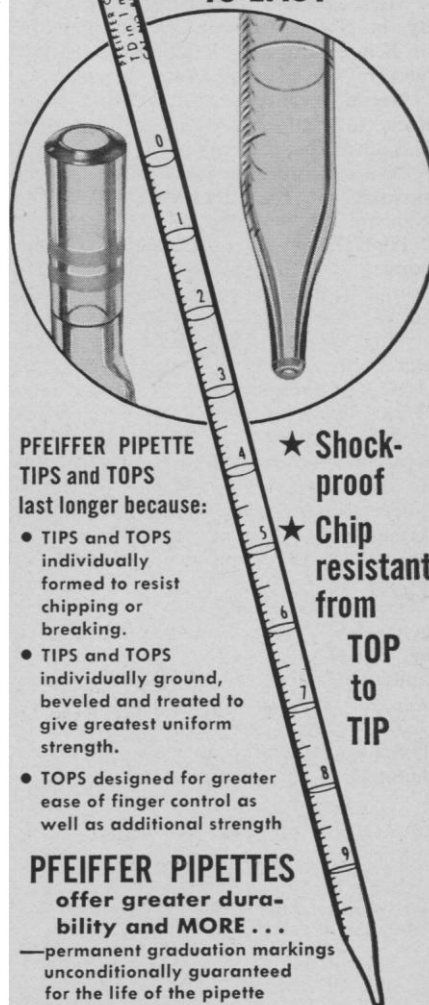
Electrochemistry of Organic Compounds, 5th conf., Moscow, U.S.S.R. (Institute of Chemistry, Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

Electronics, 3rd biennial natl. conf., Prague, Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

Technical and Scientific Films, 3rd intern. festival, Budapest, Hungary. (Scien-

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tific Soc. of Mechanical Engineering, Szabadsag ter 17, Budapest 5)

**Fracture Reservoirs**, 3rd all-union conf., L'vov, U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

**French-Yugoslav Medical Meetings**, Yugoslavia. (Faculte de Medecine de Paris, 12, rue de l'Ecole de Medecine, Paris 6, France)

**Legal Metrology**, intern. committee, meeting, Bucharest, Rumania (closed). (Acad. of the Rumanian People's Republic, Calea Victoriei, 125, Bucharest)

**Microelements and Natural Radioactivity in Soils**, 4th conf., U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

**Neurocybernetics**, 2nd all-union conf., Kiev, U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

**Neurosurgery Conf.**, Prague, Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

**High Speed Photography**, 7th intern. congr., Moscow, U.S.S.R. (Soc. of Motion Picture and Television Engineers, 55 W. 42 St., New York, N.Y. 10036)

**High Energy Nuclear Physics**, 12th intern. conf., Moscow, U.S.S.R. (E. Tamm, Acad. of Sciences of the U.S.S.R., B. Kaluzhskaya 14, Moscow)

**Ophthalmologists**, 29th Polish congr, Krakow. (M. Wilczek, ul. Slawkowska m. 3, Krakow)

**Czechoslovak Soc. of Orthopedics and Traumatology**, congr., Bratislava. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

**European Seismological Commission**, general assembly, Budapest, Hungary. (H. W. Sponheuer, Stellvetr., Inst. fuer Bodendynamik und Erdbebenforschung, Burgweg, 11, Jena, East Germany)

**Zoologists**, 2nd conf., Krasnodarsk, U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

**May 1965 (no date)**

**Czechoslovak Medical Soc., Ophthalmological Congr.**, Brno. (J. Kirzenecky, Mendel Museum, Brno)

**June 1965 (no date)**

**Microwave Communications**, 3rd colloquium, Hungary. (Microwave Research Inst., Hungarian Acad. of Sciences, Technica Haza, Szabadsag ter 17, Budapest 5)

**September 1965**

**3-19. Speleology**, 4th intern. congr., Ljubljana, Postajna, and Opatija, Yugoslavia. (Yugoslav Acad. of Sciences and Arts, Zrinski trg. 11, Zagreb 1)

**September 1965 (no date)**

**History and Philosophy of Science**, 11th intern. congr., Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

**Nematology**, 8th intern. symp., Aschersleben, East Germany. (J. van Brande, Soc. of European Nematologists, Rijsland-bonwhageschool, Coupure links 235, Ghent, Belgium)

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**prices:** Model 103, \$245; rack, \$255  
1031 Power Supply, \$245; rack, \$255



The Keithley Model 102B amplifier combines a 400-megohm input with high gain and low noise. It is an ideal scope preamplifier, especially for high source impedance signals. The 102B provides accurate signal amplification from piezo-electric devices; it is excellent for noise studies in solid state research, and shock and vibration analysis.

Features of the unit include a driven shield input, decade gains from 0.1 to 1000, selectable bandwidths of 2 cps to 150 kc or 2 cps to 1.7 mc, and a 5-volt, 50-ohm output for scopes and recorders.

**input impedance** over 400 megohms at 3  $\mu$ f.

**low noise level**, below 10  $\mu$ v rms from 10 cps to 150 kc at maximum gain, input shorted.

**gain accuracy** of 1% at midband for all gain settings.

**rise time** of 0.3  $\mu$  sec at highest gain.

**two accessory** low capacitance probes available. **price:** \$335

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1965 (no dates)

Invariance in Automatic Control, 3rd all-union conf., U.S.S.R. (Inst. of Automatics and Telemechanics, Dept. of Technical Sciences, Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

International Union of Biological Sciences, theoretical and applied limnology, 16th congr., Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

Diseases and Parasitology, 6th conf., Dushanbe, U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

Fatigue and Restoration Problems, Congr., U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

Geographic Soc. of the U.S.S.R., 4th Congr., U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

Information Theory, Statistical Decisions, Functions, and Random Processes, 4th conf, Czechoslovakia. (Czechoslovak Acad. of Sciences, Nardoni tr. 3, Prague 1)

Ionization Phenomena in Gases, 7th intern. symp., Belgrade, Yugoslavia. (Yugoslav Acad. of Sciences and Arts, Zrinski trg. 11, Zagreb 1)

Physico-Chemical Analysis, 5th all-union conf., Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R., Lenin Prospekt 7, Moscow)

### Forthcoming Events

#### December

11. Radioisotopes in the Life Sciences, Buffalo, N.Y. (R. F. Lumb, Western New York Nuclear Research Center, Inc., Power Dr., Buffalo 14)

11-13. Heterogeneous Combustion Conf., Palm Beach, Fla. (American Inst. of Aeronautics and Astronautics, 500 Fifth Ave., New York, N.Y. 10036)

13-14. Anatomists, Southern Society, 3rd annual meeting, Birmingham, Ala. (E. G. Hamel, Jr., Dept. of Anatomy, University of Alabama Medical Center, Birmingham 3)

16-17. Non-Linear Processes in the Ionosphere, conf., Boulder, Colo. (R. T. Frost, Natl. Bureau of Standards Boulder Laboratories, Boulder)

16-18. Thin Films, Electrical and Magnetic Properties in Relation to Their Structures, London, England. (Administration Assistant, Institute of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1)

19-20. Radiation Emergencies in Medicine, Research and Industry, Chicago, Ill. (R. V. Wheeler, Argonne Natl. Laboratory, 9700 S. Cass Ave., Chicago)

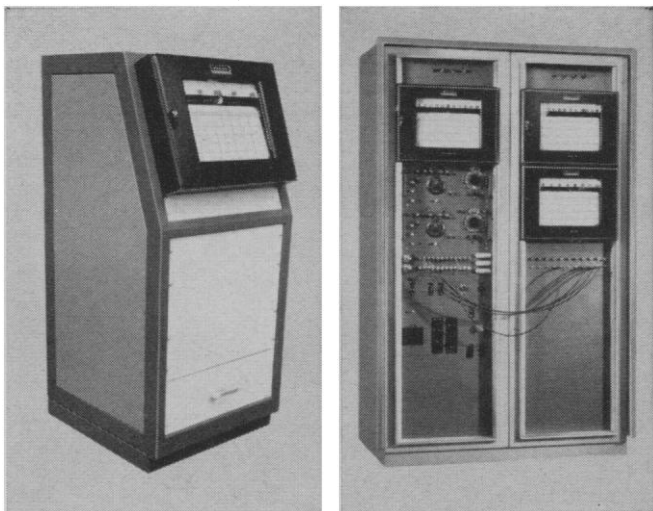
19-21. American Physical Soc., Pasadena, Calif. (APS, Columbia Univ., New York 27)

26-28. National Council of Teachers of Mathematics, San Angelo, Tex. (H. T. Karnes, Dept. of Mathematics, Louisiana State Univ., Baton Rouge 3)

26-28. American Geophysical Union, western natl., Boulder, Colo. (W. W. Kellogg, Rand Corp., 1700 Main St., Santa Monica, Calif.)

26-30. American Assoc. for the Adv.

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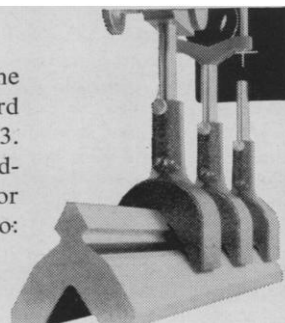
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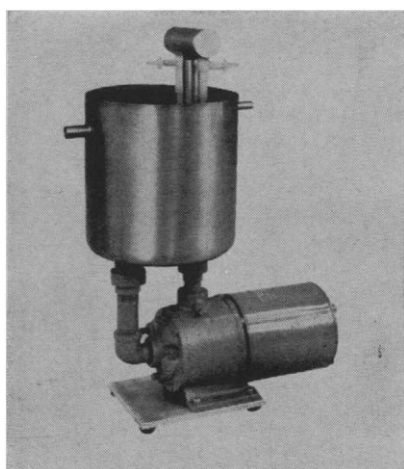
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