

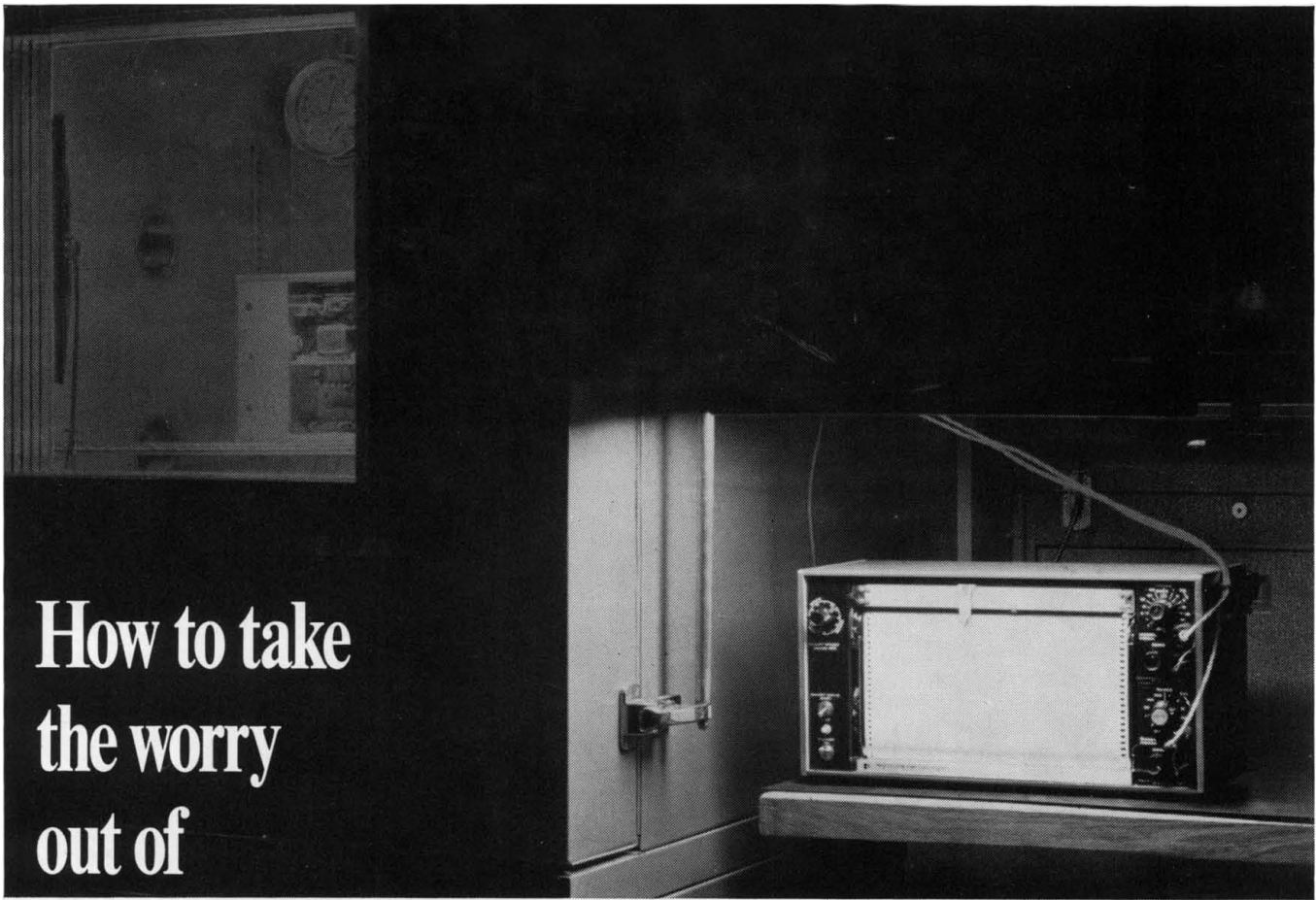
SCIENCE

22 March 1968

Vol. 159, No. 3821

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE





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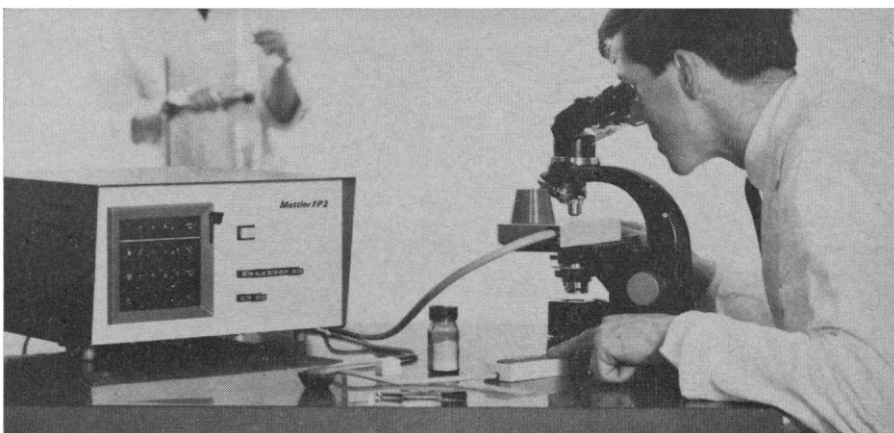
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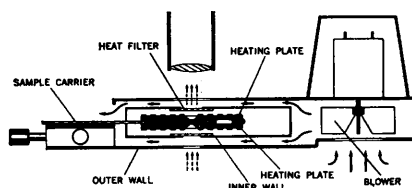
The system makes it easy to carry out studies which were considered difficult, and makes possible many studies which formerly were impossible. It enables the investigator to maintain precise control of sample temperature and to automatically record experimental data without ever looking away from the sample itself.

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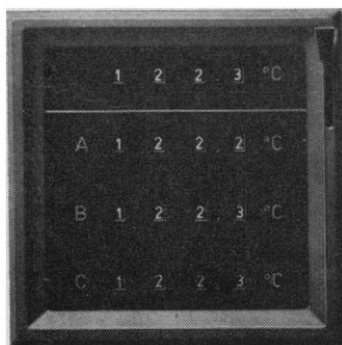
gram, a platinum resistance thermometer, a low-mass sample chamber for mounting on the microscope



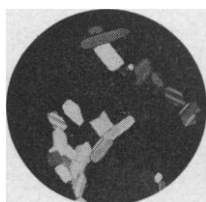
Schematic of sample chamber

and a remote pushbutton controller for increasing, decreasing, or maintaining the sample temperature at a specific value.

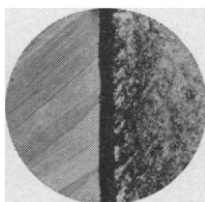
The remote pushbutton controller enables the operator to record the exact temperatures at which any three thermal events occur – beginning of melt, end of melt, phase change, or any of several conditions in the crystallization process. Results are displayed automatically on the digital indicator panel.



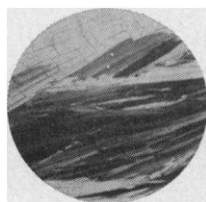
Digital readout of analytical data



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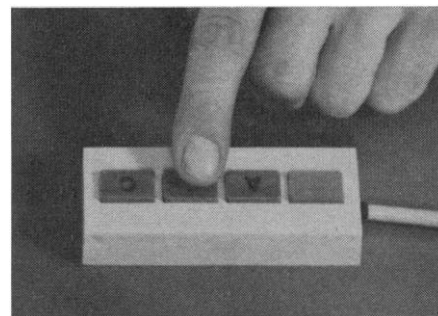


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compounds and most inorganics. The system gives the researcher complete control over his sample temperature – increasing at a linear rate, decreasing, or holding at any single temperature. Three heating rates are provided: $10^{\circ}\text{C}/\text{minute}$ for orientation tests, $1^{\circ}\text{C}/\text{minute}$ for routine tests, and $0.2^{\circ}\text{C}/\text{minute}$ for precision measurements to $\pm 0.1^{\circ}\text{C}$.

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Data recorded by pushbutton controller

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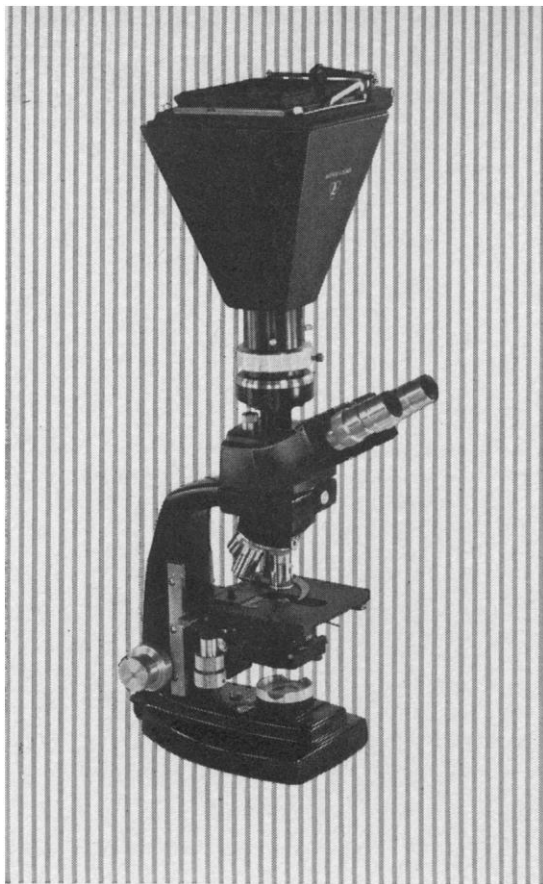
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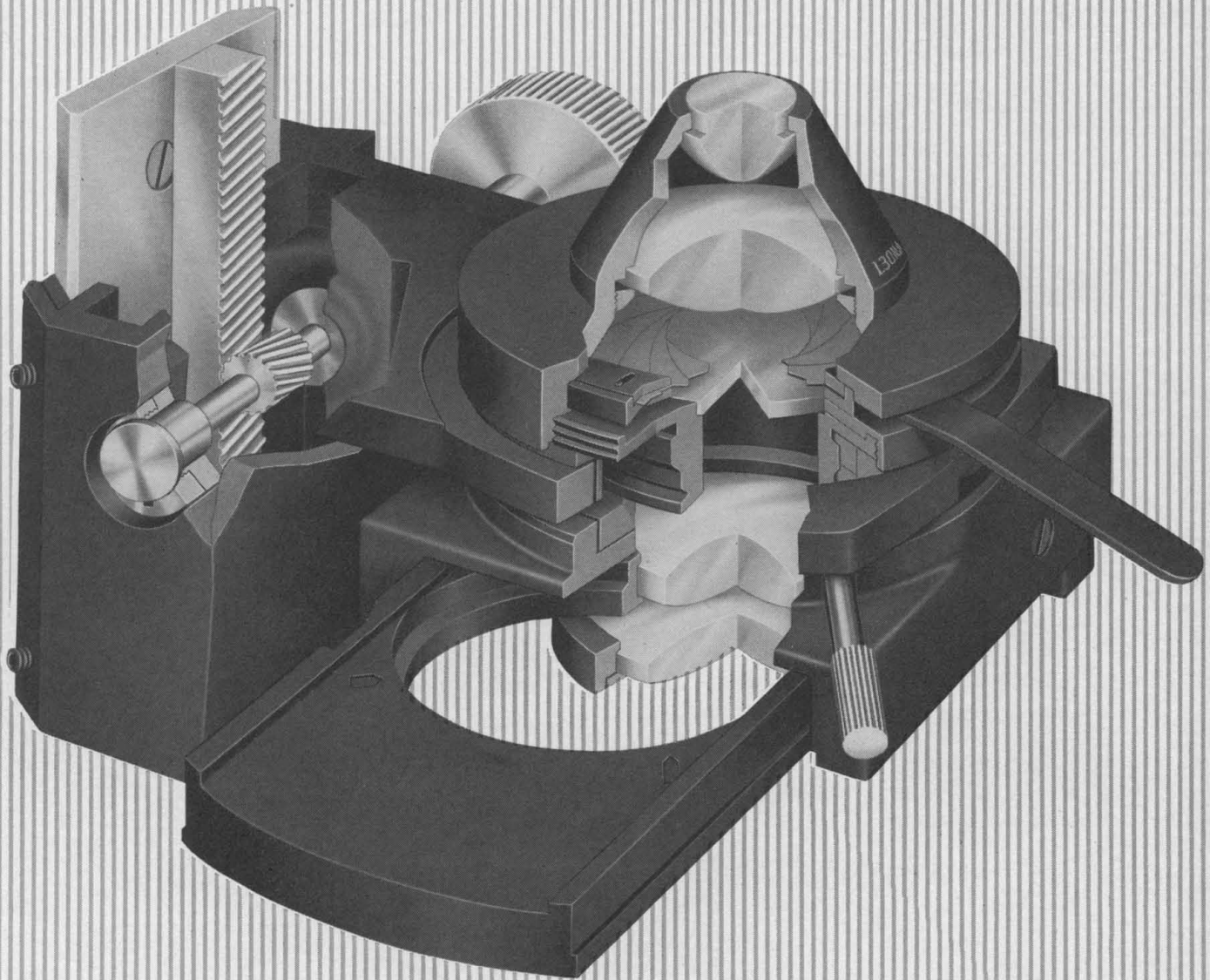


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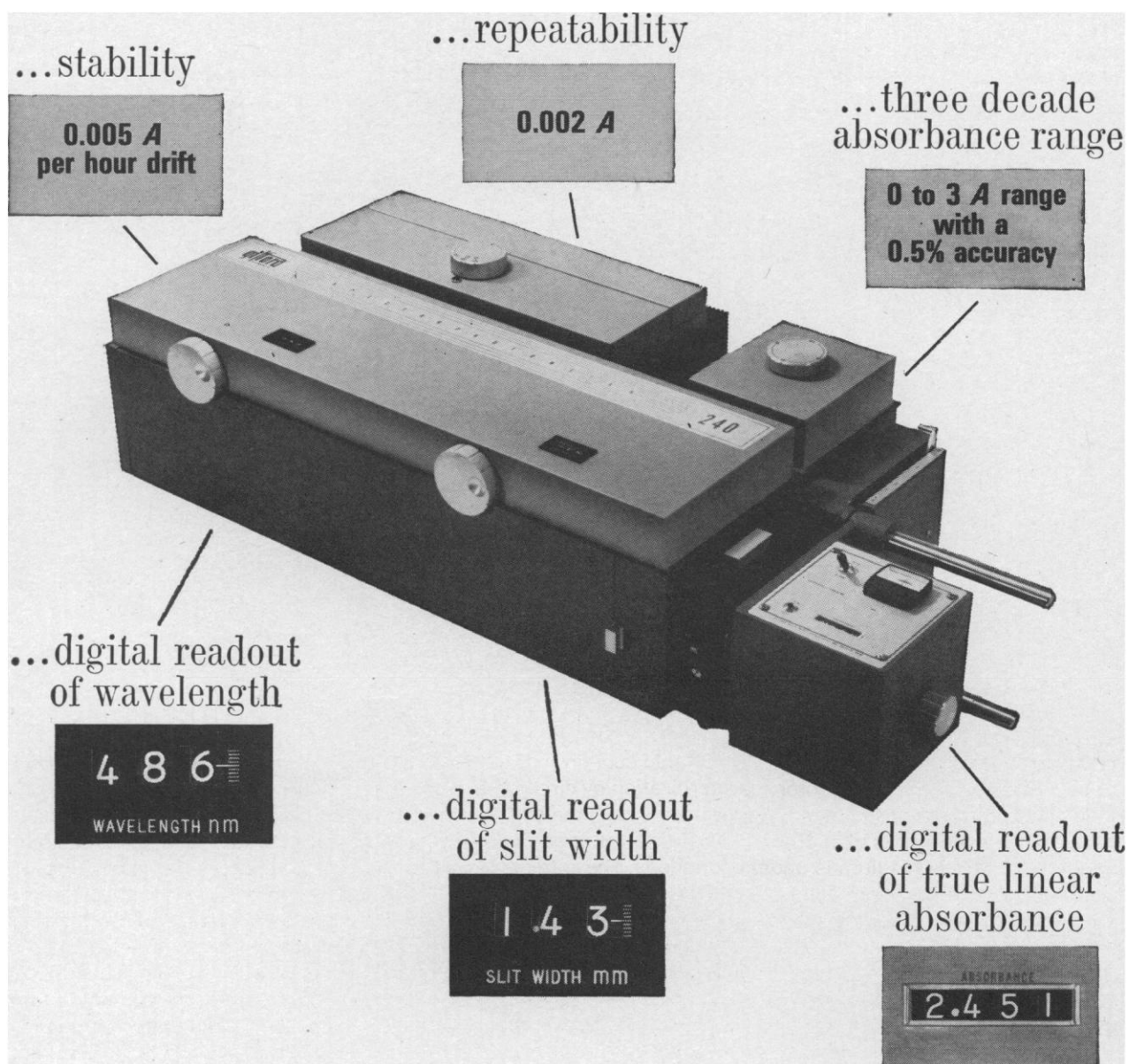
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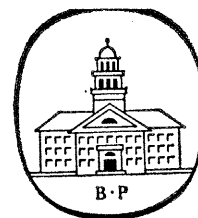
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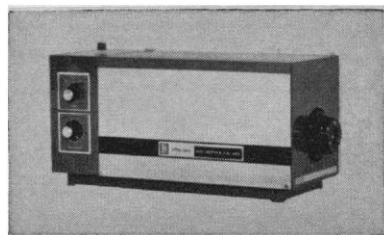
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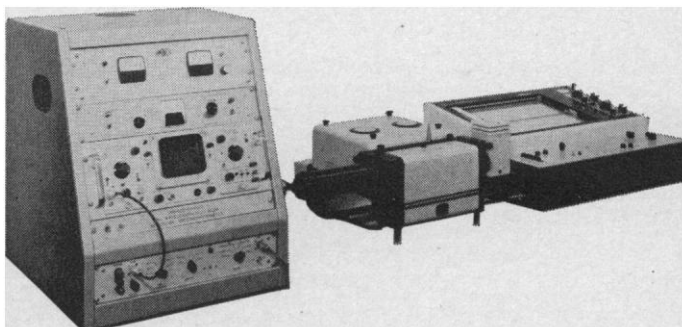
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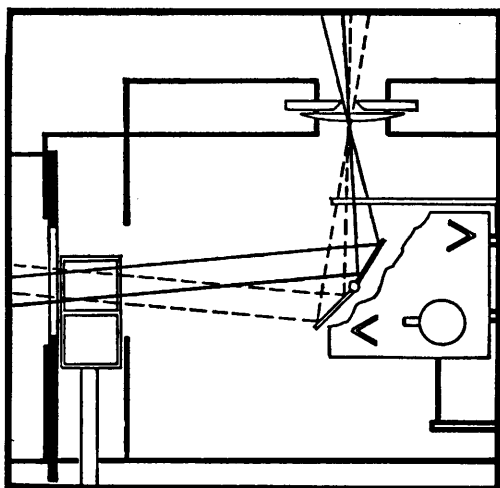
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¹ Commercial adaptation of instrument developed by Dr. Britton Chance, Director, Eldridge Reeves Johnson Foundation for Medical Physics, University of Pennsylvania.

² "The Rapid & Sensitive Recording Spectrophotometer for the Visible & Ultraviolet Region, I. Description & Performance," by Chia-Chih Yang and Victor Legallais, Review of Scientific Instrumentation, Vol. 25, No. 8, August, 1954, pp. 801-813.



Optical path of dual-wavelength mode operation. The two wavelengths, shown as dotted and solid lines, pass through a single sample, reflect off mirrors, pass through lens and grating and impinge on the photomultiplier tube.

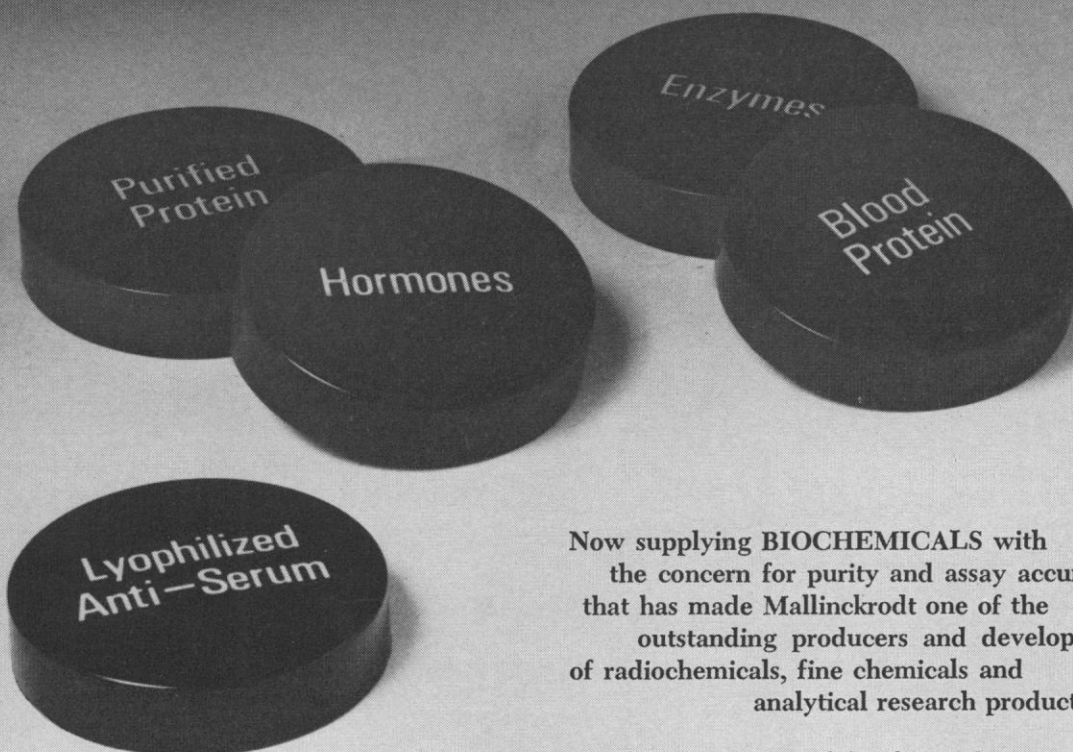


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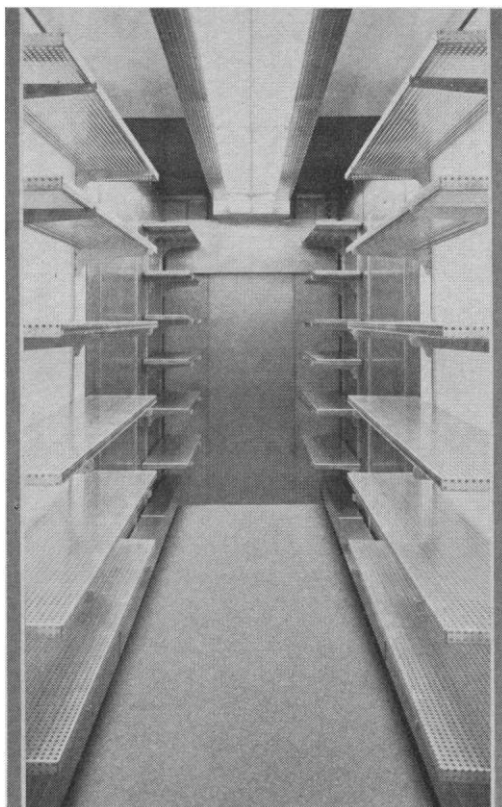
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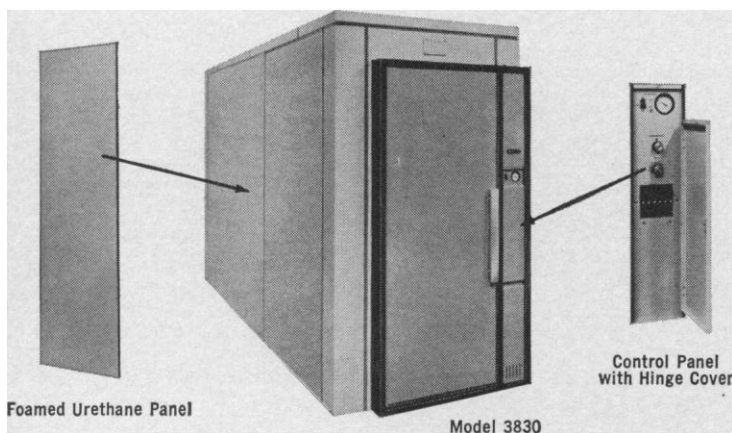
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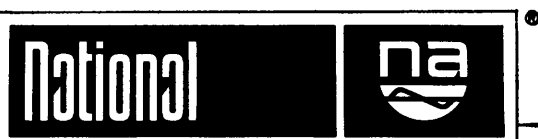
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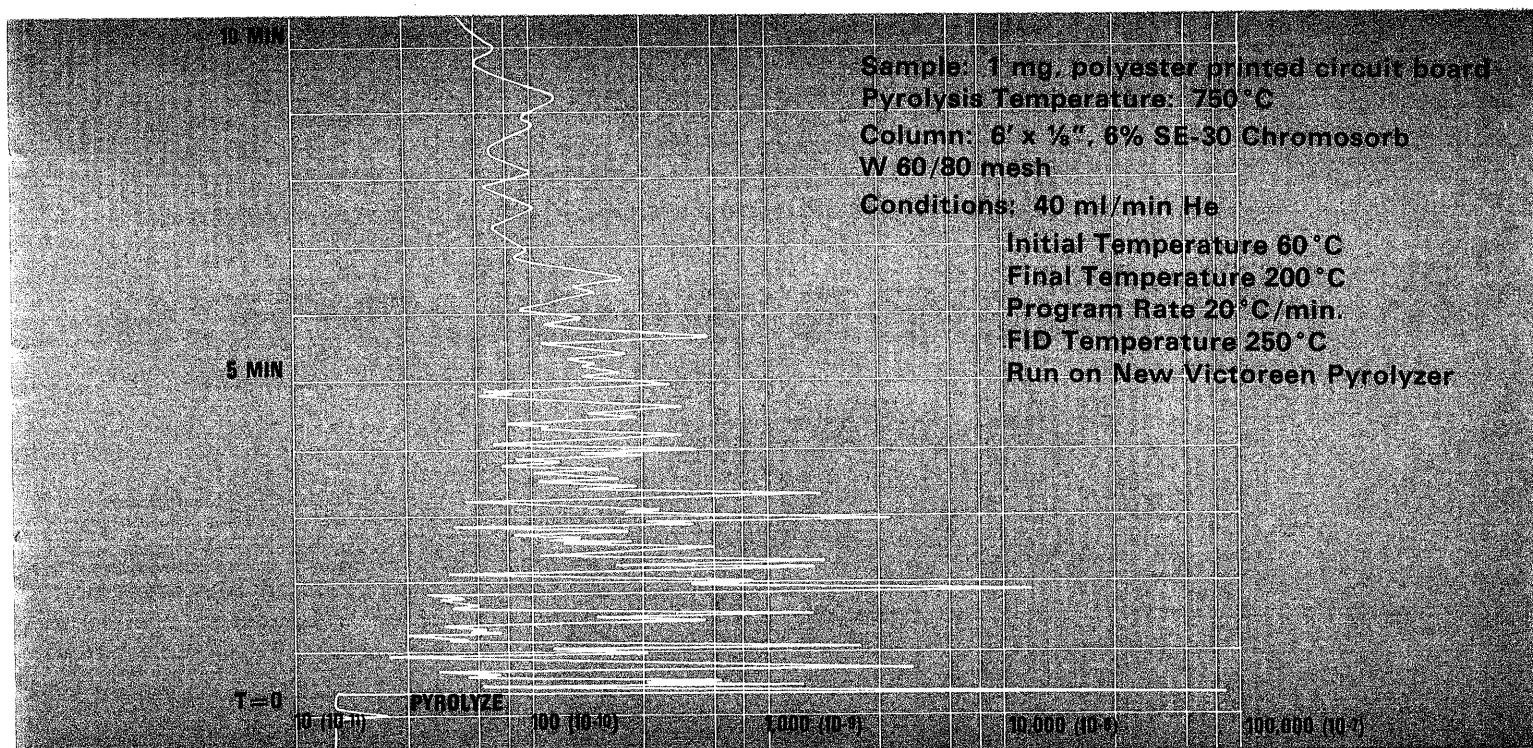
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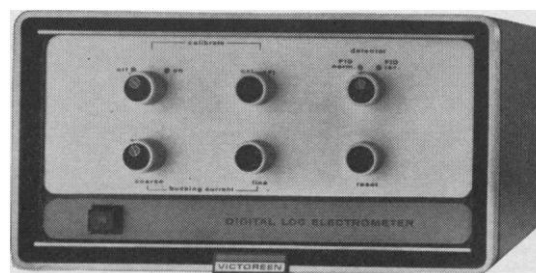
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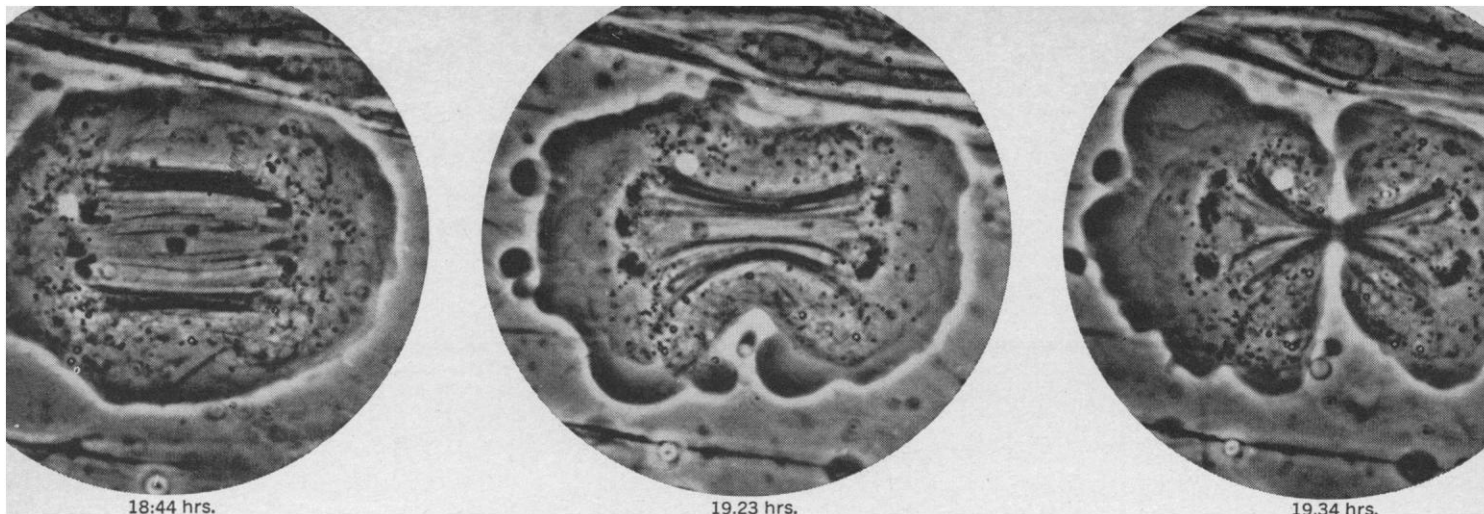
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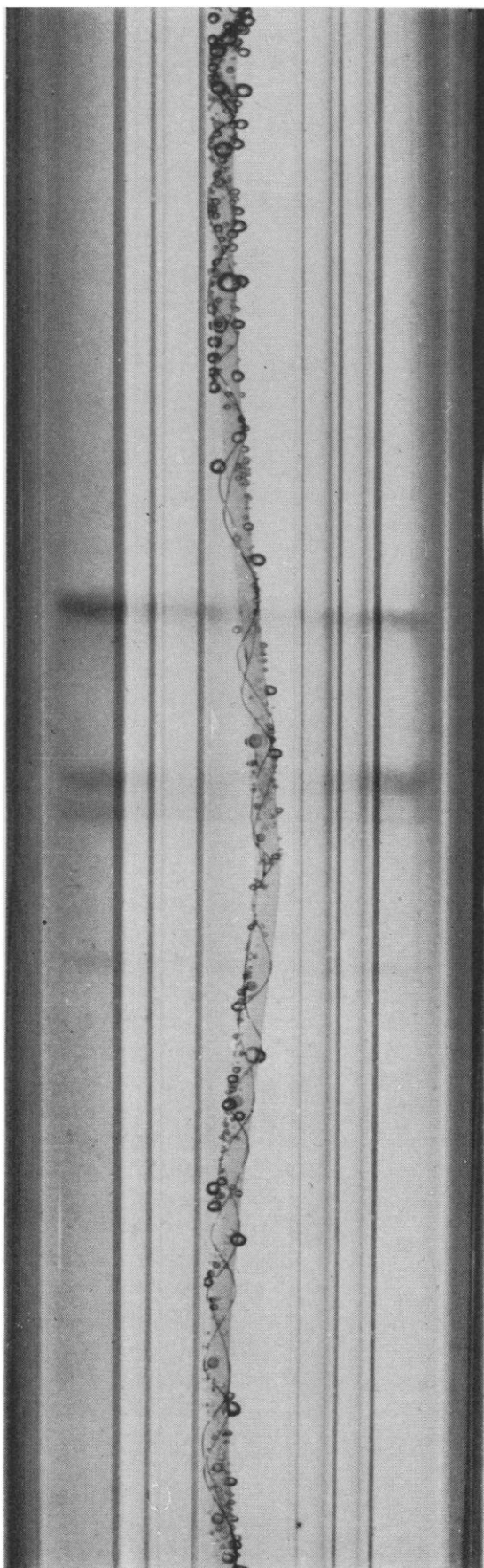
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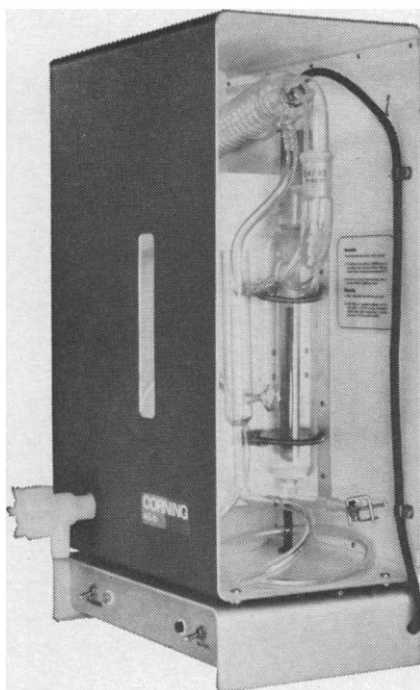
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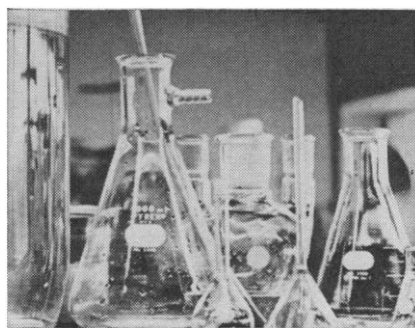
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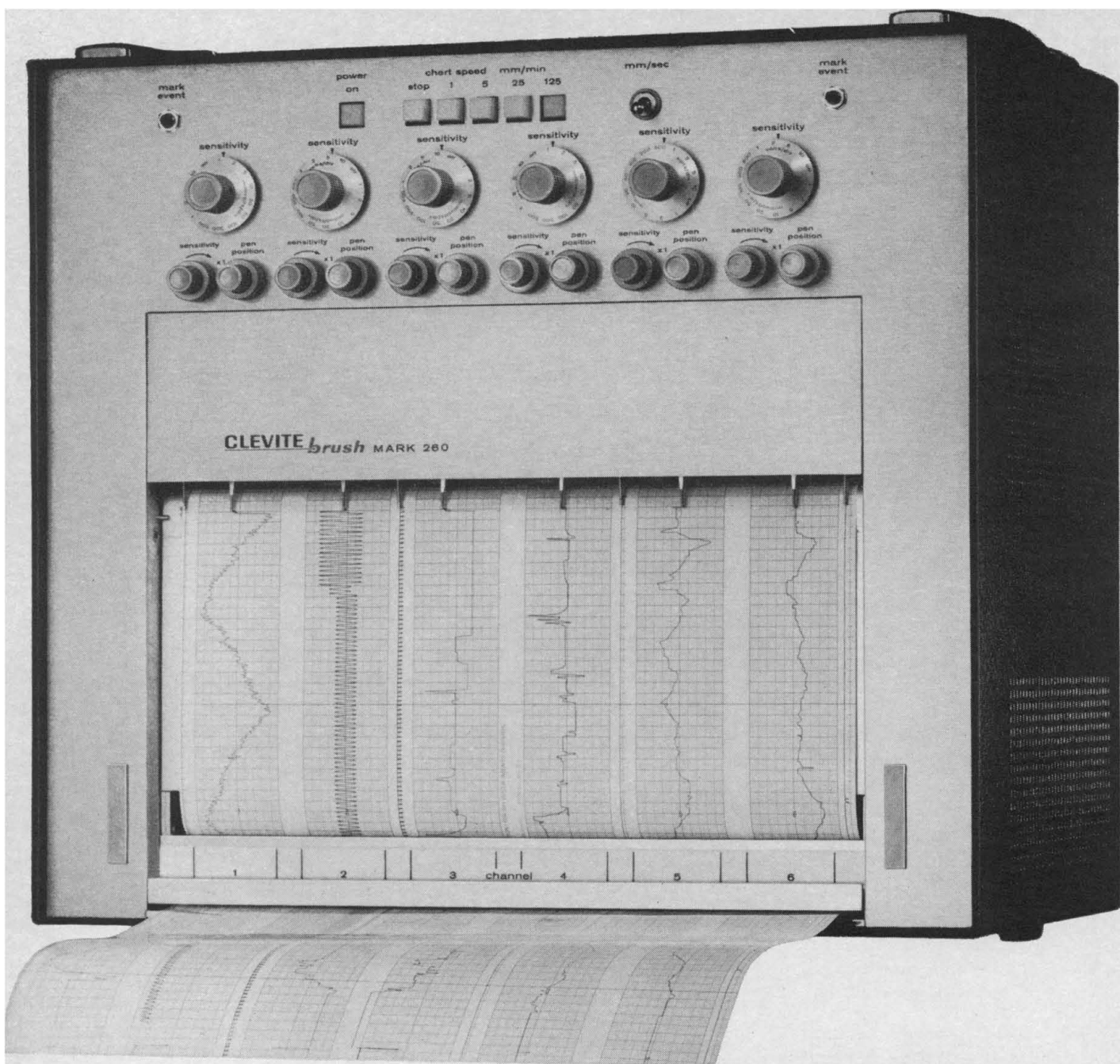
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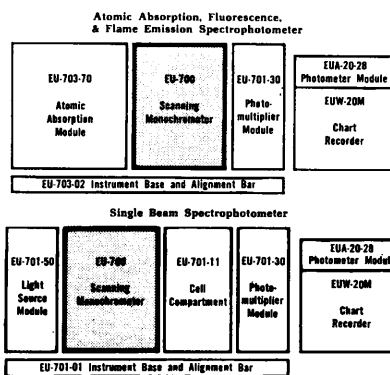
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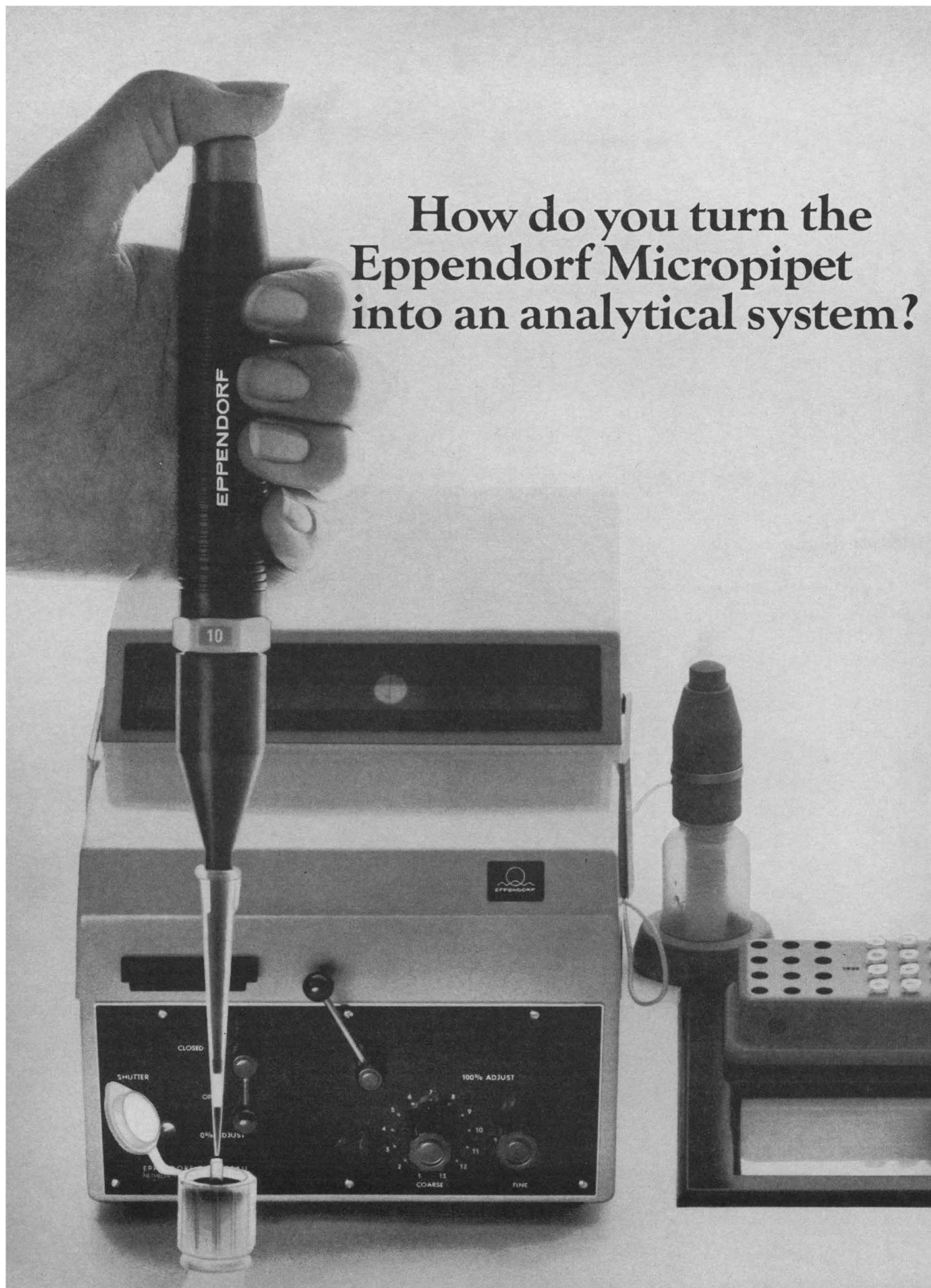
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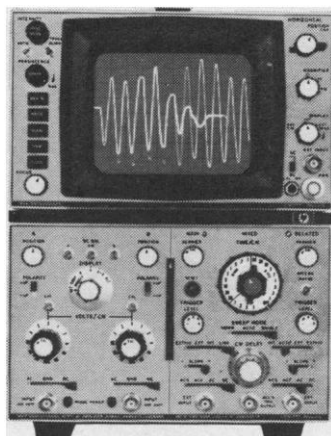


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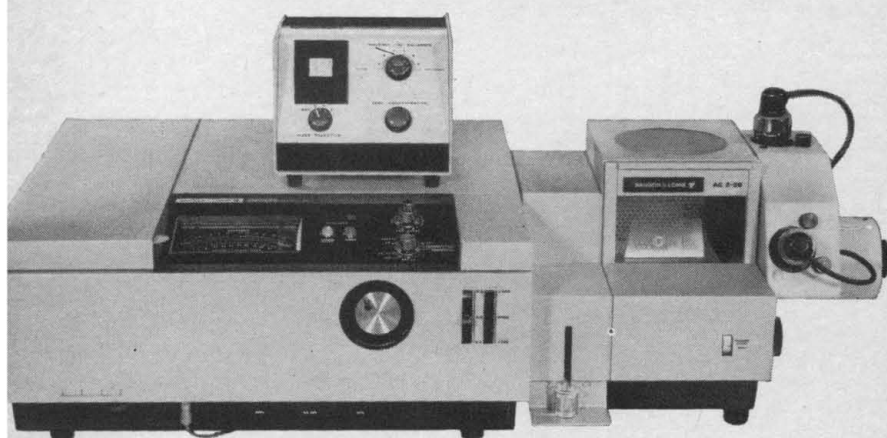
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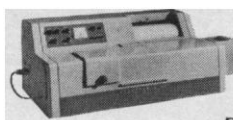


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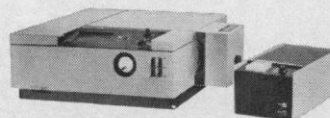
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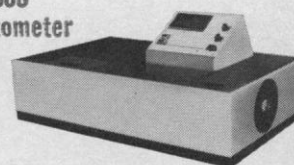
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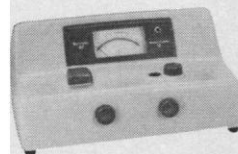
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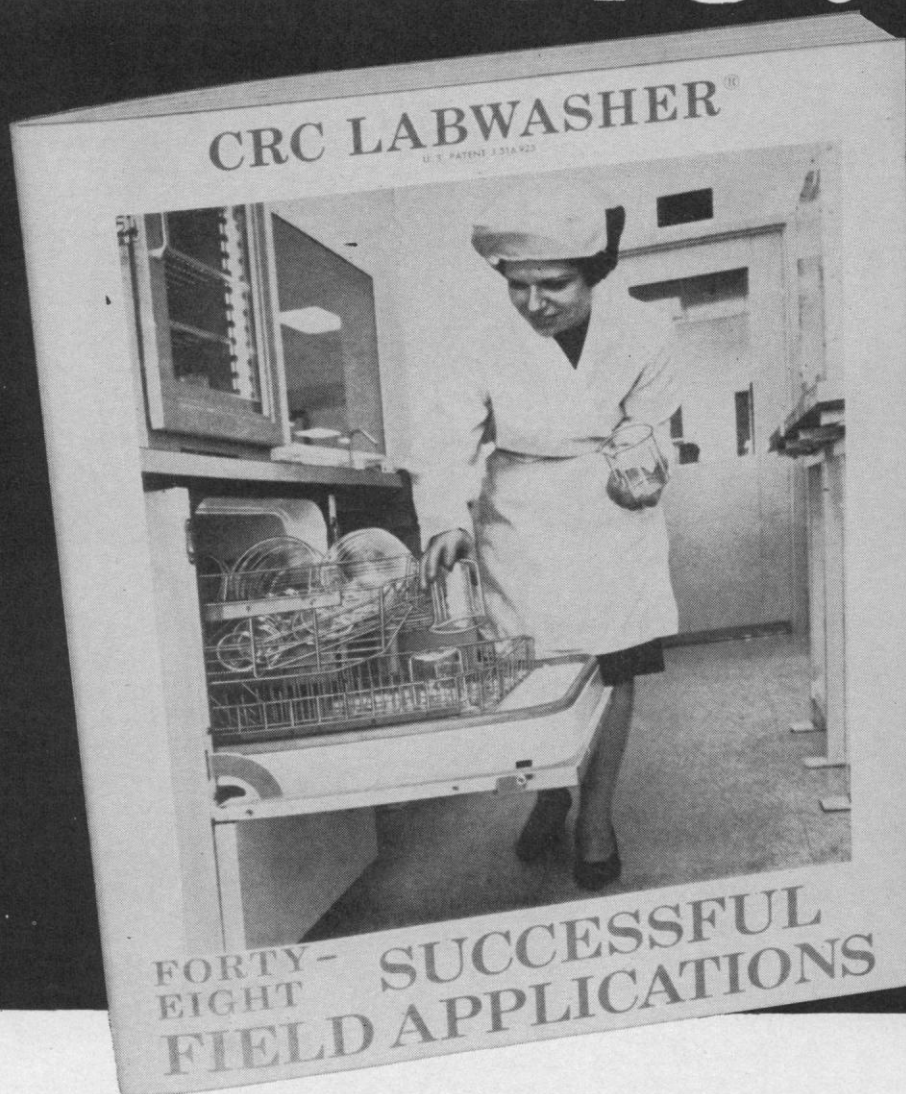
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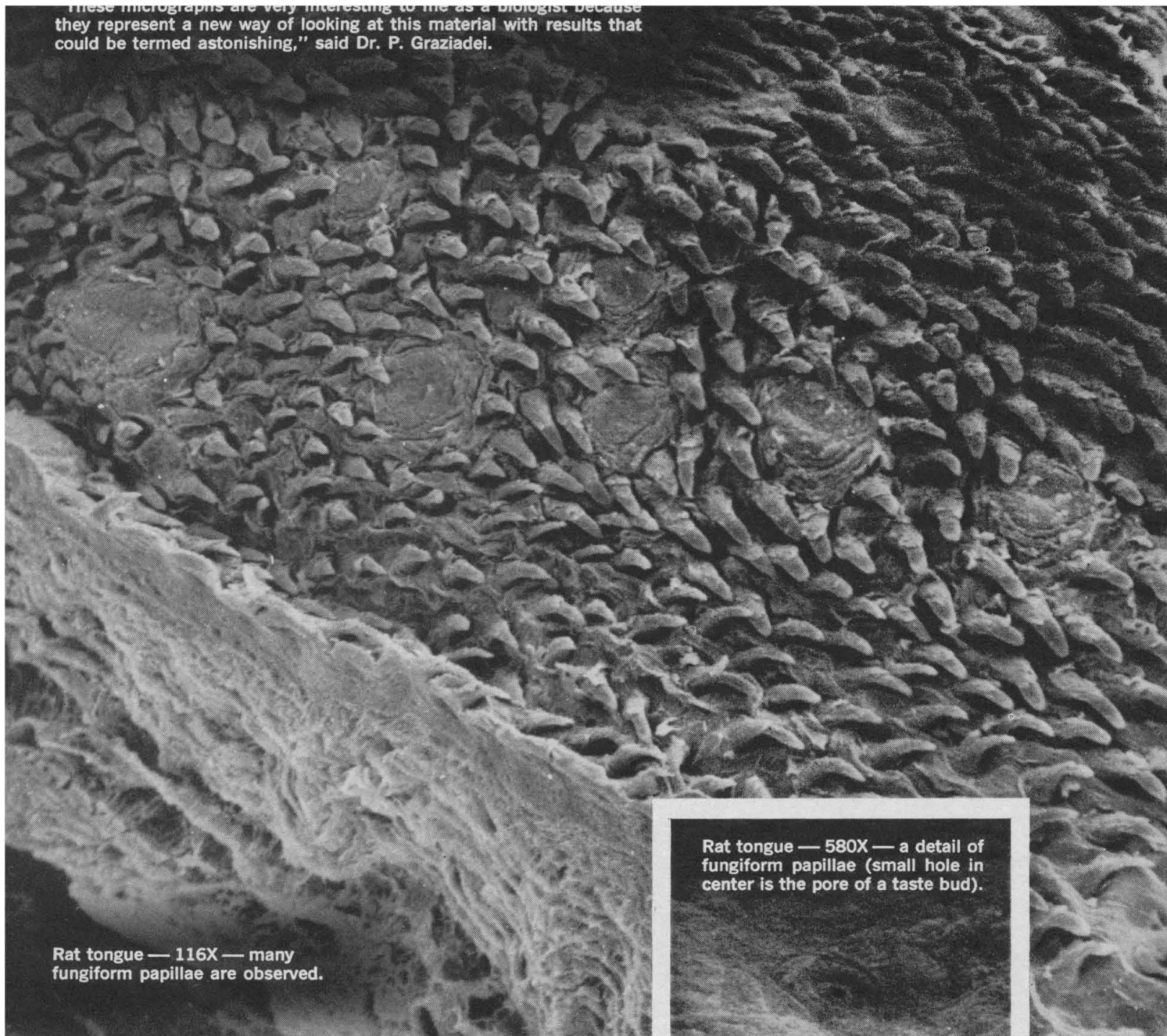
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"These micrographs are very interesting to me as a biologist because they represent a new way of looking at this material with results that could be termed astonishing," said Dr. P. Graziadei.



Rat tongue — 116X — many fungiform papillae are observed.

Rat tongue — 580X — a detail of fungiform papillae (small hole in center is the pore of a taste bud).

We thank Dr. P. Graziadei and Dr. L. M. Beidler of The Florida State University, Department of Biological Science for the use of the micrographs reproduced in this ad.

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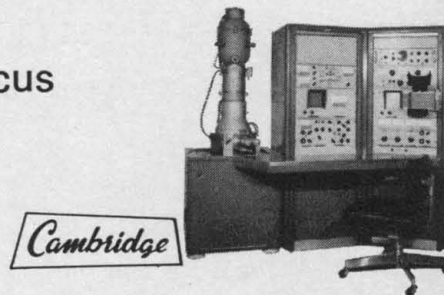
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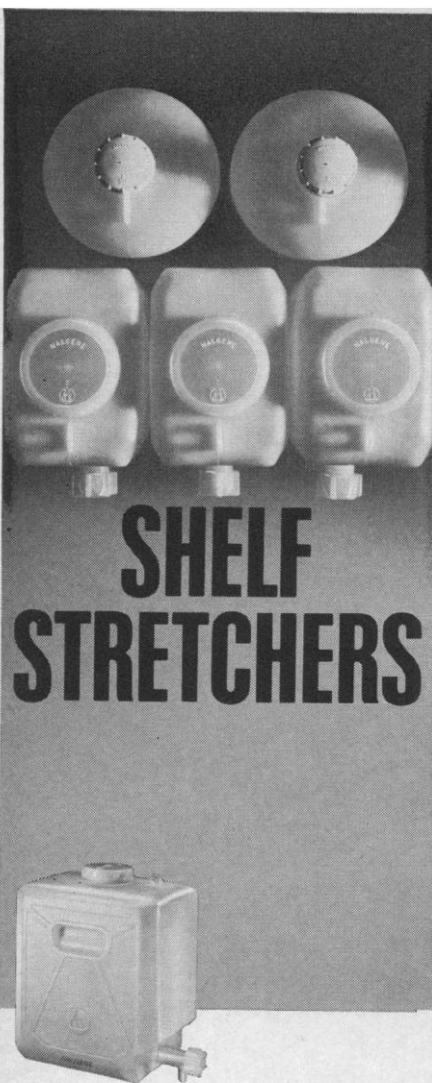
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Reference

1. J. H. Schneider, *Proc. Amer. Doc. Inst.* **4**, 301 (1967).

Contrary to Schneider's contention, the present journal publishing arrangements are beset with problems, and the scientific community is keenly aware of them. As proof, we cite the conferences on this subject which have occurred within and among the professional societies, the experimental systems which are arising with increasing frequency, and the many papers which have appeared in *Science* and elsewhere. However, we agree that any new system should evolve from the present system, and it is for this reason that we base our proposal on the existing journals.

In suggesting that these journals distribute separately bound papers on a selective basis, we do not imply that groups of journals in related fields should not collaborate if they are willing and able to do so. Indeed, the new computerized journal, *Communications in Behavioral Biology*, (Letters, 9 Feb., p. 582) appears to be just such a collaborative undertaking, and the recently announced *Mathematics Offprint Service* (*Notic. Amer. Math. Soc.* **15**, No. 1, p. 44) is another effort in the same direction. Our point is that action should be based on existing journals, and that we should avoid trying to create a universal system to handle everything for everyone.

Schneider believes that a personalized journal based on a small hierarchical vocabulary will provide too little relevance. Fortunately, a scientist's needs for current information are typically rather broad, not highly specific as Schneider implies, and in any event very



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high relevance is not essential. To emphasize this, we quote from a letter from C. W. McCutchen of the National Institutes of Health:

You have convinced me that the scientist of the future will be able to read nearly all relevant literature, and almost nothing else. But this would inherently limit his reading to the scope of his own unaided imagination. Discovery is finding relevance where none appeared before; the raw material of discovery is irrelevance.

While agreeing that irrelevance, in moderation, is desirable, we think the present journals provide too much of it. In our opinion, the journals will be most effective if they provide enough relevance to encourage browsing, but not so much as to prevent it. We believe that the proper balance can be achieved by a simple hierarchical vocabulary tailored to the shared interests of a community of readers and authors.

As to costs, we contend that modern technology *can* produce the personalized journal at a reasonable price, and bound issues as well for those who want them. More generally, we suggest that one of the most important roles of computers in the coming years will be to provide custom-tailored products with mass-production efficiency, and that the personalized journal will be an early example of this phenomenon.

J. R. PIERCE
W. S. BROWN
J. F. TRAUB

*Bell Telephone Laboratories,
Murray Hill, New Jersey 07974*

Afterglows: Eternally Thus

Skin sensory afterglows (26 Jan., p. 445) have been known to the poets and young lovers for centuries. How often have we read—and found out for ourselves—that when you are in love (a strong suggestion), a kiss lingers for hours. A reflection on our early youth can recall numerous occasions when the image of one's girl friend . . .!

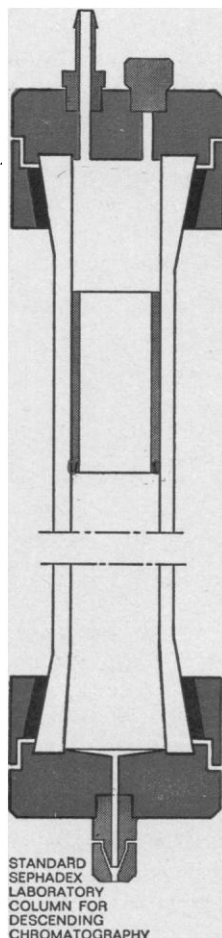
Now, in middle age, after working hard in the garden, or moving furniture, or playing horse to three big kids, a gentle, ever so gentle, stroking of the back (by the spouse, of course) puts one peacefully to sleep. There is no stimulation, no pain sensation, or afterglow. It does not feel like strong suggestion, but boy, what a sleep!

WALTER FLUEGEL

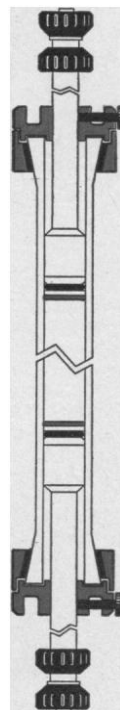
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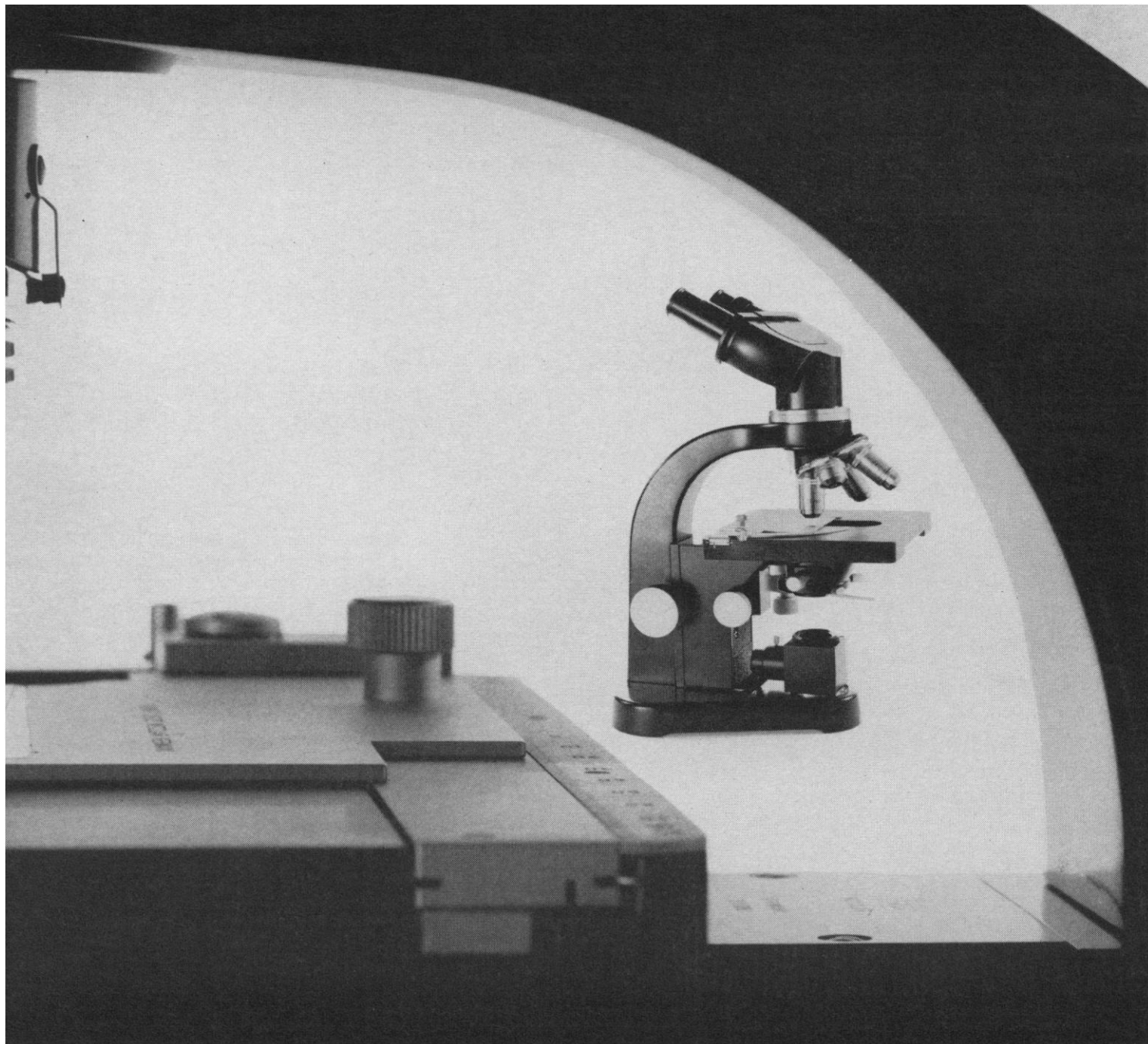


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Beleaguered Presidents

Campus strife, student and faculty tensions, and pressures from outside the campus all come together in the office of the college or university president. His occupational hazards have long included building and equipment shortages, faculty inadequacies, and assorted pressures from professors, parents, and politicians. Now he must cope with new difficulties.

During the fall of 1967, students disrupted activities on 62 campuses. The presidents who called in police to restore order and protect the university knew in advance their decisions would exacerbate student-university relations. Those who did not request police help risked damage to property, possible injury to students, and public criticism. Sometimes police action and the resulting criticism came anyway, as the raid at Stony Brook demonstrated, for the police can make political hay out of campus raids.

Some demonstrations have not been directed against university policies, but have dragged the university into controversy over Selective Service procedures or American participation in Vietnam.

A legal scholar has sued the *Rutgers Law Review* for rejecting an article he submitted. Suits have been instituted, or threatened, to eliminate out-of-state tuition charges, overthrow campus regulations and admissions decisions, and revise faculty hiring and promotion policies.

Recent changes in Selective Service regulations are interfering with orderly planning and are suddenly altering staffing requirements.

In all of this, journalists have been generous in giving publicity to power seekers, police, pot, and protest; professors have sometimes taken leading roles; and many a president must feel he is living in the center of a conspiracy to destroy the institution he is trying to lead.

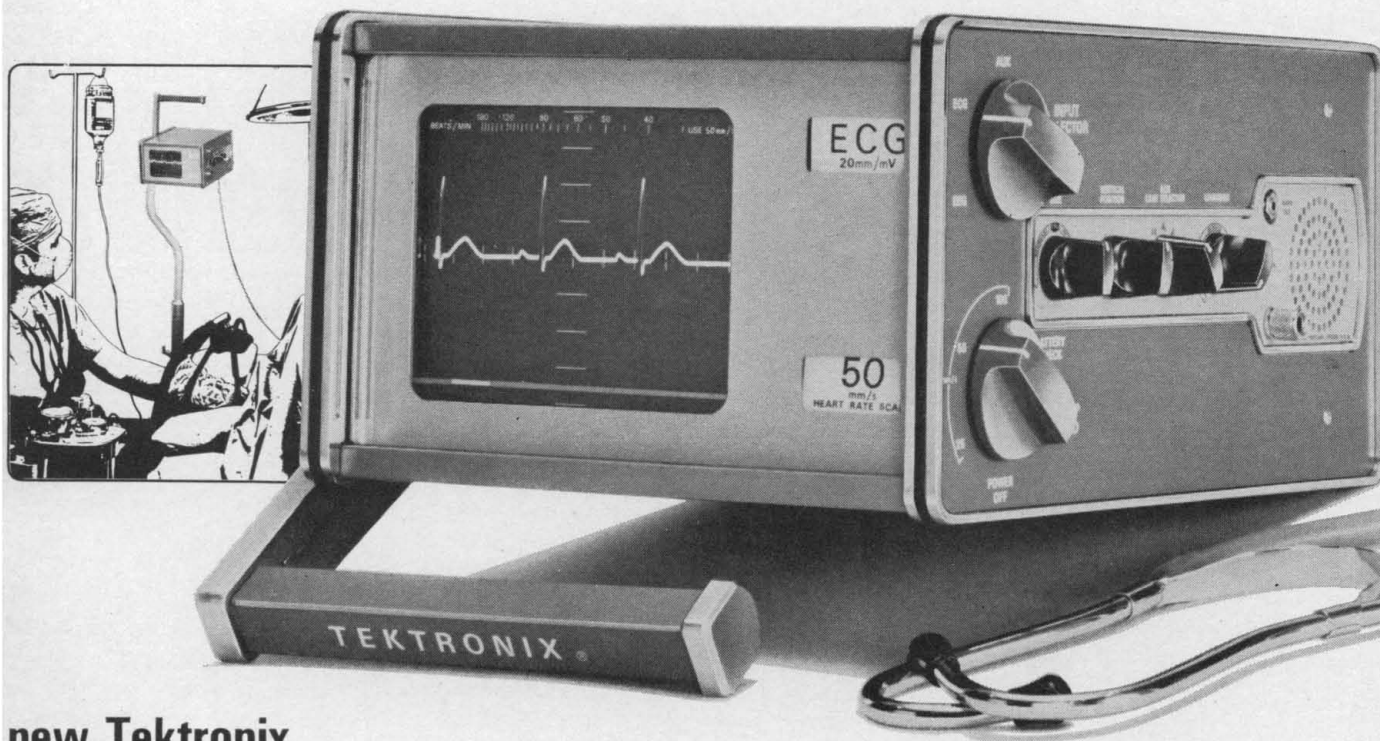
Civil suits and legal actions provide one means of reducing the tumult, but surely a less desirable means than internal agreement and self-government of the university community. Internal control may seem difficult to achieve, for faculty members have sometimes been prominent among the protesters. Nevertheless, the president can take some comfort in the findings of David Brown's nationwide study* of what influences scholars to accept or leave faculty positions. Among the determinants of job choice, the quality of administration ranks high, and among the factors that persuade a faculty member to leave for another post, inadequacies or incompetence of the administration lead the list.

While this finding may solace the presidents, there is more that faculty members can do to protect their universities and their own interests. The kinds of decisions that have traditionally been made within the academic community or within an individual university are more likely to continue to be made there if decisions are supported by a strong sense of corporate responsibility. Strife and divisiveness, however, increase the probability that the power of decision will be taken away from the university to be exercised by the trustees, at government level, or in a court. James Perkins has pointed out that the substitution of police power, civil rule, and court procedures for self-government within the university threatens two values essential to university health and strength: the right to make qualitative distinctions among students and faculty members and among their intellectual products, and the ability of the university to protect the academic freedom of students and faculty.

In selecting their own jobs, faculty members give evidence that they value good administration. It would be prudent policy to make it more obvious to each other, to students, and to the public that they support good administration all of the time.—DAEL WOLFLE

* David G. Brown, *The Mobile Professors* (American Council on Education, Washington, D.C., 1967).

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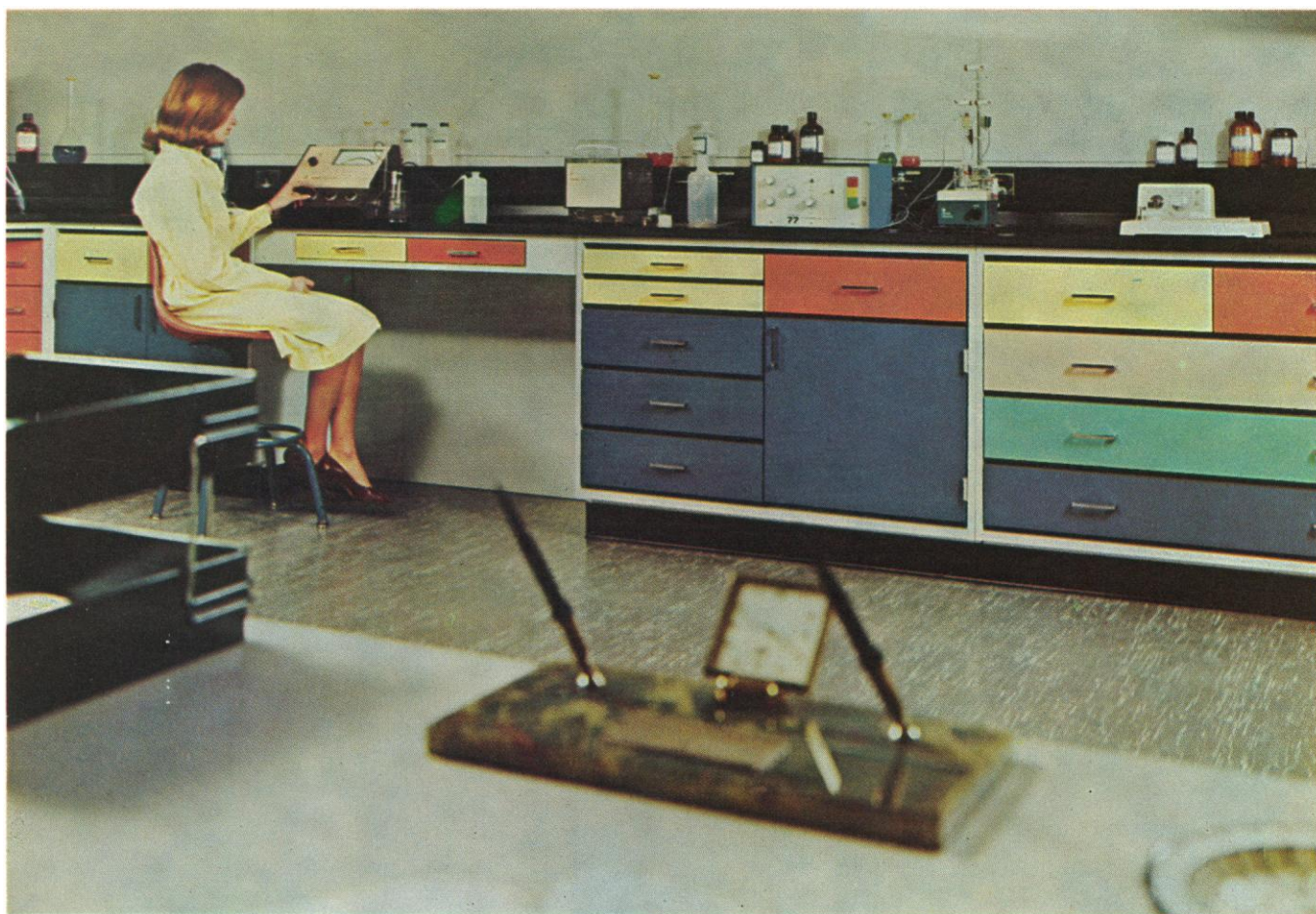
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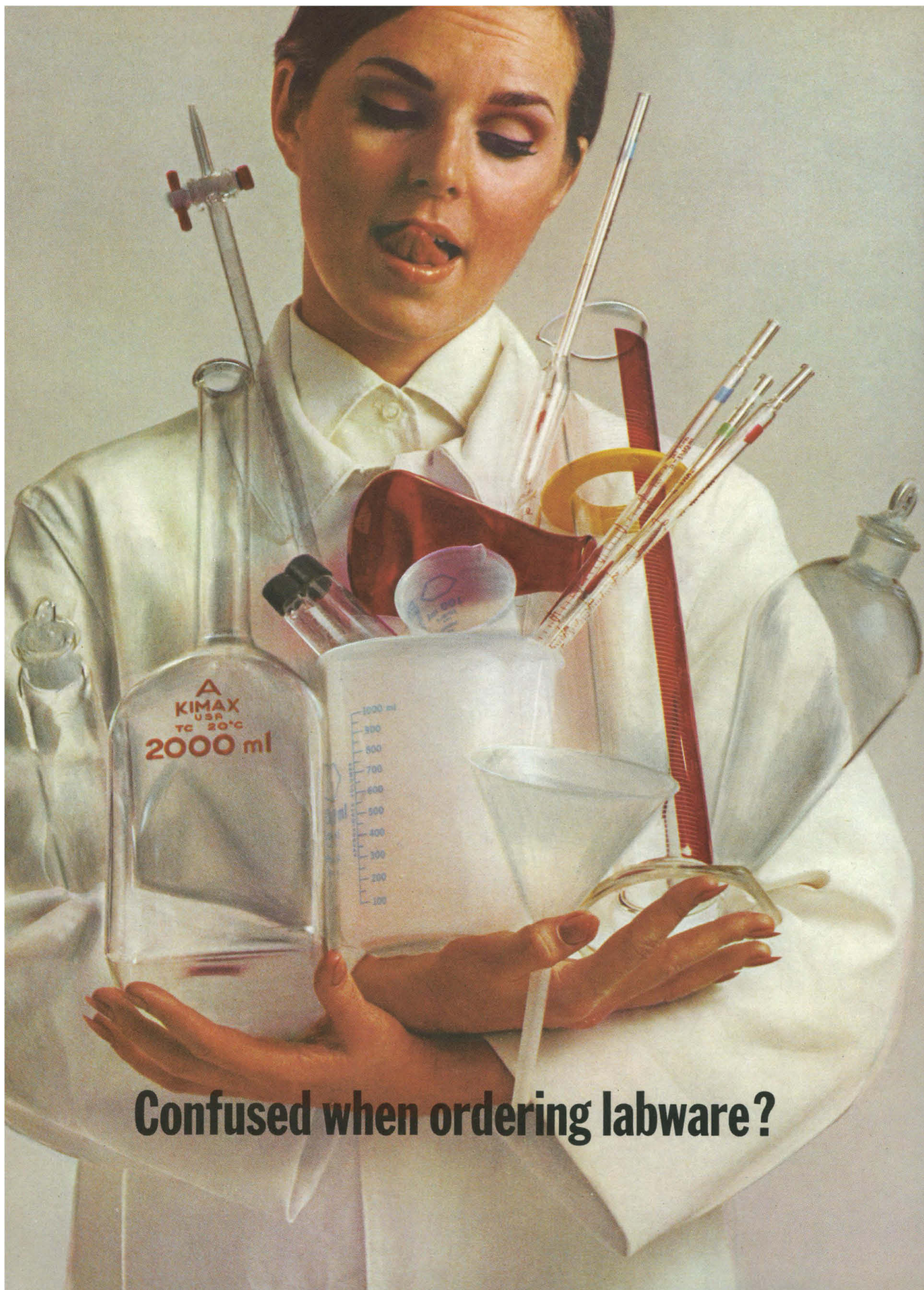
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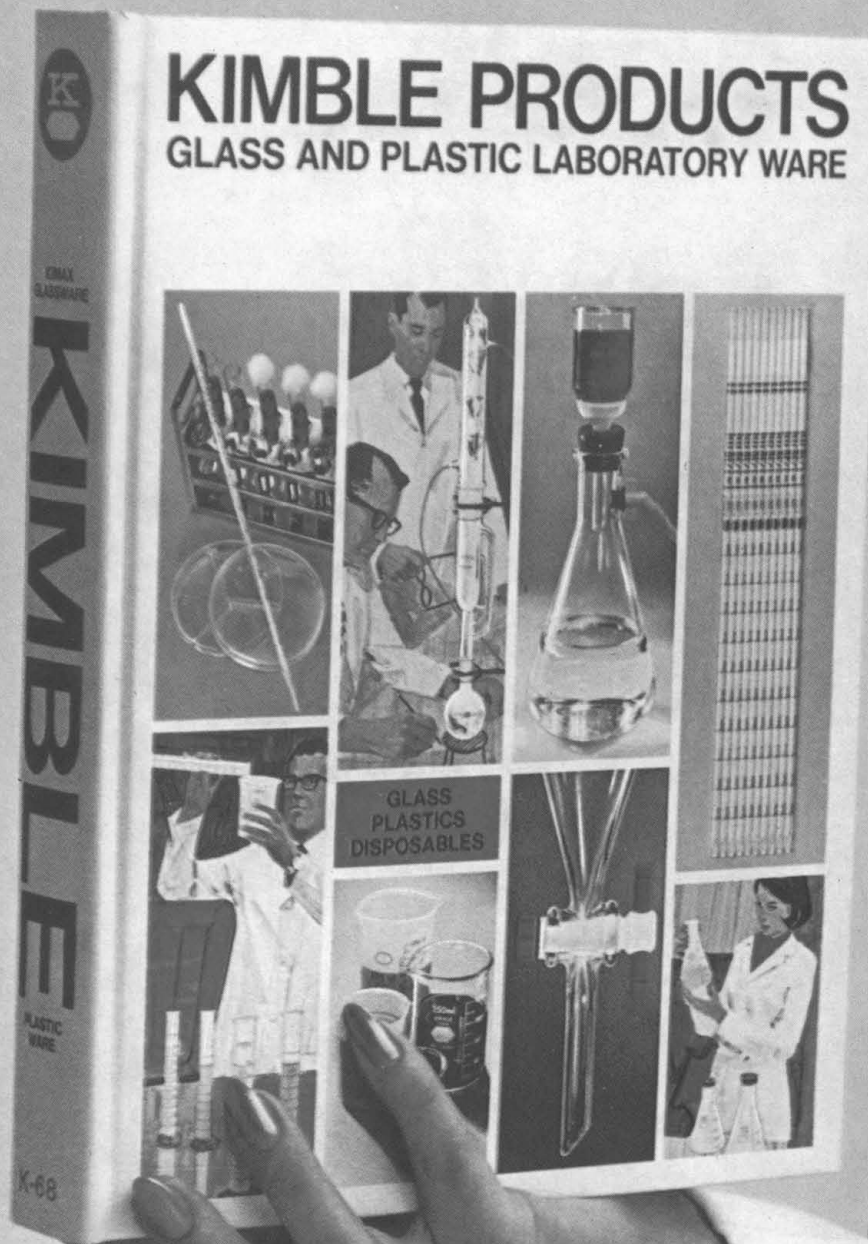


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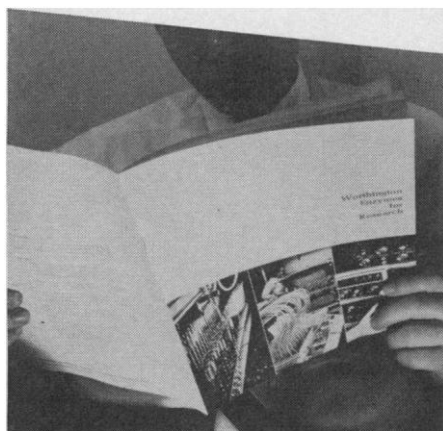


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Calendar of Events

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National Meetings

1-3. Specialized Inst. on **Data Processing**, American Assoc. of Medical Record Librarians, Boston, Mass. (M. C. Beard, Director, Institute Dept., 840 N. Lake Shore Dr., Chicago, Ill. 60611)

1-3. **Open Hearth and Basic Oxygen Steel Conf.**, 51st natl., Atlantic City, N.J. (J. V. Richards, 345 E. 47 St., New York 10017)

1-4. **Materials Engineering/Sciences Exposition and Conf.**, Philadelphia, Pa. (H. F. Grebe, Reber-Friel Co., 117 S. 17 St., Philadelphia 19103)

1-4. **Thermophysical Properties**, 4th symp., College Park, Md. (A. B. Conlin, Jr., Meetings Manager, 345 E. 47 St., New York 10017)

1-5. American College of **Physicians**, 49th annual, Boston, Mass. (E. C. Rose-now, Jr., Executive Director, 4200 Pine St., Philadelphia, Pa. 19104)

1-5. American **Welding Soc.**, Chicago, Ill. (American Welding Soc., 345 E. 47 St., New York 10017)

2-3. **Pharmacy Management** Inst. and Pharmacy Counseling Program, 12th annual, Madison, Wis. (W. L. Blockstein, Chairman, Extension Services in Pharmacy, 190 Pharmacy Building, Univ. of Wisconsin, Madison 53706)

2-4. American **Astronomical Soc.**, Charlottesville, Va. (A. K. Pierce, Kitt Peak National Observatory, P.O. Box 4130, Tucson, Ariz. 85717)

2-4. **Fast Reactor Systems, Materials and Components**, Cincinnati, Ohio. (C. S. Robertson, Jr., General Electric Co., P.O. Box 132, Cincinnati 45215)

2-5. National Council on **Alcoholism**, New York, N.Y. (The Council, 2 E. 103 St., New York 10029)

3-4. Instrumental and Automated Methods for Chemical Analysis for **Water Pollution Control**, symp., San Francisco, Calif. (R. B. Dean, U.S. Dept. of the Interior, Federal Water Pollution Control Administration, Ohio Basin Region, 4676 Columbia Parkway, Cincinnati 45266)

3-4. Institute of **Electrical and Electronics Engineers** and American Soc. of **Mechanical Engineers**, joint railroad conf., Chicago, Ill. (Office of the Technical Activities Board, IEEE, 345 E. 47 St., New York 10017)

3-5. **Engineering Aspects of Magneto-hydrodynamics**, 9th symp., Tullahoma, Tenn. (L. E. Ring, Manager, Research Branch—PWT, ARO, Inc., Arnold Air Force Station, Tenn. 37389)

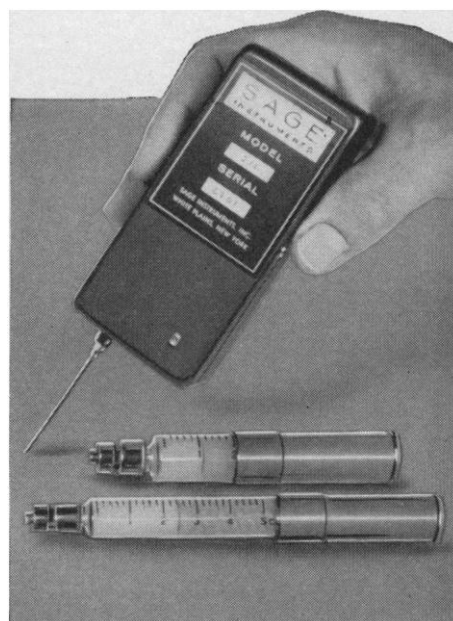
3-5. National Soc. for the **Prevention of Blindness**, New York, N.Y. (V. S. Boyce, Assistant Executive Director, 79 Madison Ave., New York 10016)

3-5. **Numerical Control Soc.**, 5th annual, Philadelphia, Pa. (Miss M. A. De Vries, 44 Nassau St., Princeton, N.J. 08540)

3-5. **Structures. Structural Dynamics, and Materials**, 9th conf., Palm Springs, Calif. (Meetings Manager, American Inst. of Aeronautics and Astronautics, 1290 Sixth Ave., New York 10019)

4-5. **Microphotography**—Fundamentals and Applications, Wakefield, Mass. (K. T.

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4-5. **Numerical Simulation of Reservoir Performance**, symp., Dallas, Tex. (D. L. Riley, 6200 N. Central Expressway, Dallas 75206)

4-6. **American Nuclear Soc. student conf.**, Gainesville, Fla. (J. E. Swander, Dept. of Nuclear Engineering Sciences, Univ. of Florida, Gainesville 32601)

4-6. **Health Education of the Public**, 3rd natl. conf., Chicago, Ill. (Dept. of Health Education, American Medical Assoc., 535 N. Dearborn St., Chicago 60610)

4-6. **South Central Assoc. of Blood Banks**, Dallas, Tex. (J. A. Barney, Executive Secretary, 301 Pasteur Building, Oklahoma City, Okla. 73103)

4-7. **American Assoc. of Endodontists**, 25th annual, New York, N.Y. (J. F. Bucher, Secretary, 6828 Winterberry Lane, Bethesda, Md. 20034)

5-12. **Laboratory Methods in the Diagnosis of Viral Exanthems**, Atlanta, Ga. (U.S. Public Health Service, National Communicable Disease Center, Atlanta 30333)

6. **Problems in Management of Esotropia**, Symp. on Strabismus, Philadelphia, Pa. (A. H. Keeney, Ophthalmologist-in-Chief, Wills Eye Hospital and Research Inst., 1601 Spring Garden St., Philadelphia 19130)

7-9. **Exercise and Heart Disease**, San Francisco, Calif. (W. D. Nelligan, American College of Cardiology, 9650 Rockville Pike, Washington, D.C. 20014)

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7-11. **American Personnel and Guidance Assoc.**, Detroit, Mich. (P. J. McDonough, Convention Liaison, APGA, 1607 New Hampshire Ave., NW, Washington, D.C. 20009)

7-11. **American Radium Soc.**, Miami Beach, Fla. (F. C. Bloedorn, Executive Secretary, Univ. of Maryland Hospital, Baltimore 21201)

7-11. **Oil and Gas Power Conf. and Exhibit**, New Orleans, La. (Meetings Manager, American Soc. of Mechanical Engineers, 345 E. 47 St., New York 10017)

8. **Paleontological Research** Institution, Ithaca, N.Y. (K. V. W. Palmer, 109 Dearborn Pl., Ithaca 14850)

8-9. **Histochemical Soc.**, 19th annual, New Orleans, La. (G. M. Lehrer, Program Chairman, c/o Division of Neurochemistry, Mount Sinai School of Medicine, 11 E. 100 Street, New York 10029)

8-9. **Water and Power**, western symp., Los Angeles, Calif. (R. Banks, 3600 Wilshire Boulevard, Los Angeles 90005)

8-10. **Advanced Propulsion Concepts**, 5th symp., Chicago, Ill. (J. Pearre, Public Information, IIT Research Inst., 10 W. 35 St., Chicago 60616)

8-10. **Aerodynamic Testing**, 3rd conf., San Francisco, Calif. (Meetings Manager, American Inst. of Aeronautics and Astronautics, 1290 Sixth Ave., New York 10019)

8-10. **Communications Satellite**, 2nd mtg., San Francisco, Calif. (Meetings Manager, American Inst. of Aeronautics and Astronautics, 1290 Sixth Ave., New York 10019)

8-10. **Proteins and Nucleic Acids**, symp.,

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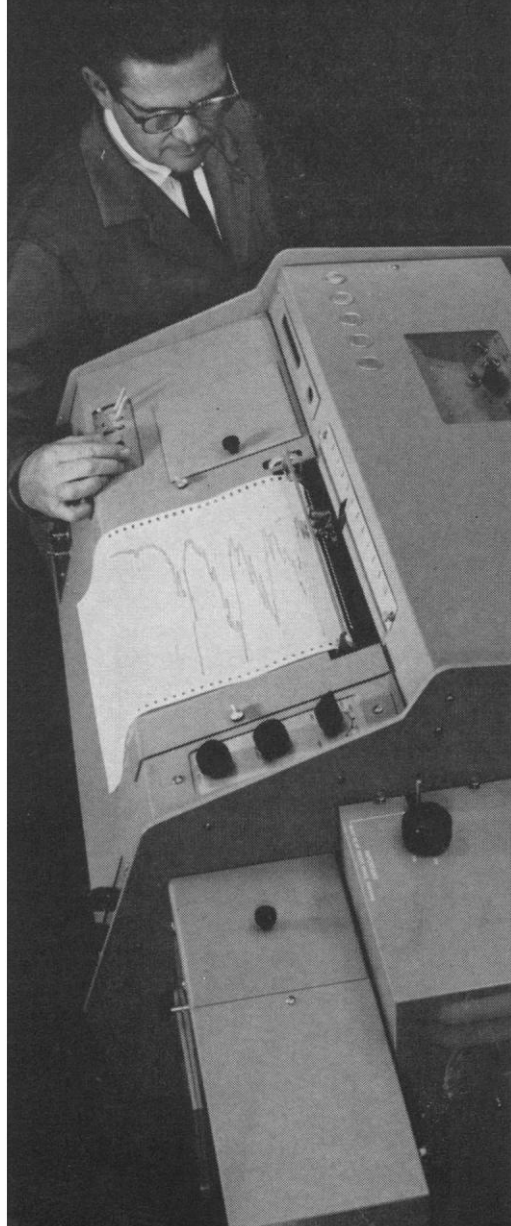
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Houston, Tex. (J. Oro, Dept. of Biophysical Sciences, Univ. of Houston, Cullen Blvd., Houston 77004)

8-11. American Geophysical Union, eastern meeting, Washington, D.C. (F. R. Boyd, Jr., American Geophysical Union, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

8-11. American Meteorological Soc. (with the American Geophysical Union), Washington, D.C. (K. C. Spengler, Executive Director, 45 Beacon St., Boston, Mass. 02108)

8-12. Laboratory Methods in Medical Mycology (refresher), Atlanta, Ga. (U.S. Public Health Service, National Communicable Disease Center, Atlanta 30333)

9-11. Telemetering, natl. conf., Houston, Tex. (R. M. Emberson, 345 E. 47 St., New York 10017)

9-12. American Assoc. of Anatomists, 81st annual, New Orleans, La. (J. C. Finerty, Louisiana State Univ. School of Medicine, 1542 Tulane Ave., New Orleans 70112)

10. American Soc. of Clinical Oncology, Inc., Atlantic City, N.J. (M. Sears, M. D. Anderson Hospital, Texas Medical Center, Houston 77025)

10. American Soc. of Therapeutic Radiologists, Miami Beach, Fla. (J. A. del Regato, Executive Secretary, 2215 N. Cascade St., Colorado Springs, Colo. 80907)

10-12. Latent Inherited Diseases, National Foundation for Neuromuscular Disease Workshop, Harriman, N.Y. (P. S. Gerlad, Children's Hospital Medical Center, 300 Longwood Ave., Boston, Mass. 02115)

10-12. Plastic Surgery Research Council, annual mtg., Chapel Hill, N.C. (E. E. Peacock, Jr., Dept. of Surgery, Univ. of North Carolina, Chapel Hill 27514)

10-12. Water Resources of the Inner Planets, Las Vegas, Nev. (J. Green, Douglas Advanced Research Labs., 5251 Bolsa Ave., Huntington Beach, Calif. 92646)

11-12. Seismological Soc. of America, annual meeting, Tucson, Ariz. (D. Tocher, The Society, P.O. Box 826, Berkeley, Calif. 94701)

11-13. American Assoc. for Cancer Research, 59th annual, Atlantic City, N.J. (H. J. Creech, 7701 Burholme Ave., Philadelphia, Pa. 19111)

11-13. Society for Philosophy and Psychology, 60th annual, Louisville, Ky. (D. Browning, Dept. of Philosophy, Univ. of Miami, Coral Gables, Fla. 33124)

15-18. American Acad. of Oral Pathology, Scottsdale, Ariz. (S. M. Standish, Indiana Univ. School of Dentistry, 1121 W. Michigan St., Indianapolis 46202)

15-19. Laboratory Methods in Medical Mycology (advanced), Atlanta, Ga. (U.S. Public Health Service, National Communicable Disease Center, Atlanta 30333)

15-20. Federation of American Societies for Experimental Biology, annual, Atlantic City, N.J. (H. B. Lemp, Convention Manager, 9650 Rockville Pike, Bethesda, Md.)

16-17. American Assoc. of Planned Parenthood Physicians, 6th annual, San Antonio, Tex. (G. J. Langmyhr, Planned Parenthood Federation, 515 Madison Ave., New York 10022)

16-17. Seminar on Standardization, Philadelphia, Pa. (American Soc. for Testing and Materials, 1916 Race St., Philadelphia 19103)

16-18. **Law Enforcement Science and Technology**, 2nd symp., Chicago, Ill. (S. A. Yefsky, Law Enforcement Science and Technology Center, IIT Research Inst., Chicago)

16-18. **National Conf. on Instrumentation for the Iron and Steel Industry**, Pittsburgh, Pa. (T. Cauley, Crucible Steel Co., P.O. Box 998, Pittsburgh 15230)

16-18. **William Hunt Eisenman Conference on Heat Treating**, Cleveland, Ohio (American Soc. for Metals, Metals Park, Ohio 44073)

16-18. **Remote Sensing of Environment**, 5th symp., Ann Arbor, Mich. [C. E. Molineux, AFCRL (CRJT), L. G. Hanscom Field, Bedford, Mass. 01730]

16-18. **Southern Water Resources and Pollution Control**, 17th conf., Chapel Hill, N.C. (C. M. Weiss, Chairman, Operating Committee, 17th SWRPC Conf., Dept. of Environmental Sciences and Engineering, P.O. Box 630, Chapel Hill 27514)

16-20. **American Assoc. of Immunologists**, Atlantic City, N.J. (Convention Manager, 9650 Wisconsin Ave., Bethesda, Md. 20014)

16-20. **American Inst. of Nutrition**, Atlantic City, N.J. (Convention Manager, 9650 Wisconsin Ave., Bethesda, Md.)

16-20. **American Physiological Soc.**, Atlantic City, N.J. (Convention Manager, The Society, 9650 Wisconsin Ave., Bethesda, Md. 20014)

16-20. **American Soc. of Biological Chemists, Inc.**, Atlantic City, N.J. (Convention Manager, The Society, 9650 Wisconsin Ave., Bethesda, Md. 20014)

16-20. **American Soc. of Experimental Pathology**, Atlantic City, N.J. (Convention Manager, The Society, 9650 Wisconsin Ave., Bethesda, Md. 20014)

16-20. **American Soc. for Pharmacology and Experimental Therapeutics, Inc.**, Atlantic City, N.J. (Convention Manager, The Society, 9650 Wisconsin Ave., Bethesda, Md. 20014)

17. **Association for the Advancement of Psychoanalysis**, New York, N.Y. (E. Schattner, Secretary, 147 E. 50 St., New York 10022)

17-19. **American Surgical Assoc.**, Boston, Mass. (H. B. Schumacker, Jr., Indiana Univ. Medical Center, 1100 W. Michigan, Indianapolis, Ind. 46207)

17-19. **Southwestern Inst. of Electrical and Electronics Engineers**, 20th annual, Houston, Tex. (J. V. Leeds, ML 106—SWIEECO, Rice Univ., Houston 77001)

17-20. **American Assoc. for the History of Medicine**, St. Louis, Mo. (J. B. Blake, National Library of Medicine, Bethesda, Md. 20014)

17-21. **Atomic Physics Conf.**, New York, N.Y. (C. C. Butler, Secretary General, Intern. Union of Pure and Applied Physics, Imperial College of Science and Technology, Prince Consort Rd., South Kensington, London, S.W.1, England)

18-19. **American Assoc. of Railway Surgeons**, Houston, Tex. (C. Y. Werelius, 5800 Stony Island Ave., Chicago, Ill.)

18-19. **Fiber Soc.**, New Orleans, La. (L. Rebenfeld, Box 625, Princeton, N.J.)

18-19. **Production Automation Symp.**, Hobbs, N.M. (American Inst. of Mining, Metallurgical and Petroleum Engineers, 345 E. 47 St., New York 10017)

18-20. **Great Lakes Research**, 11th conf., Milwaukee, Wis. (A. M. Beeton,

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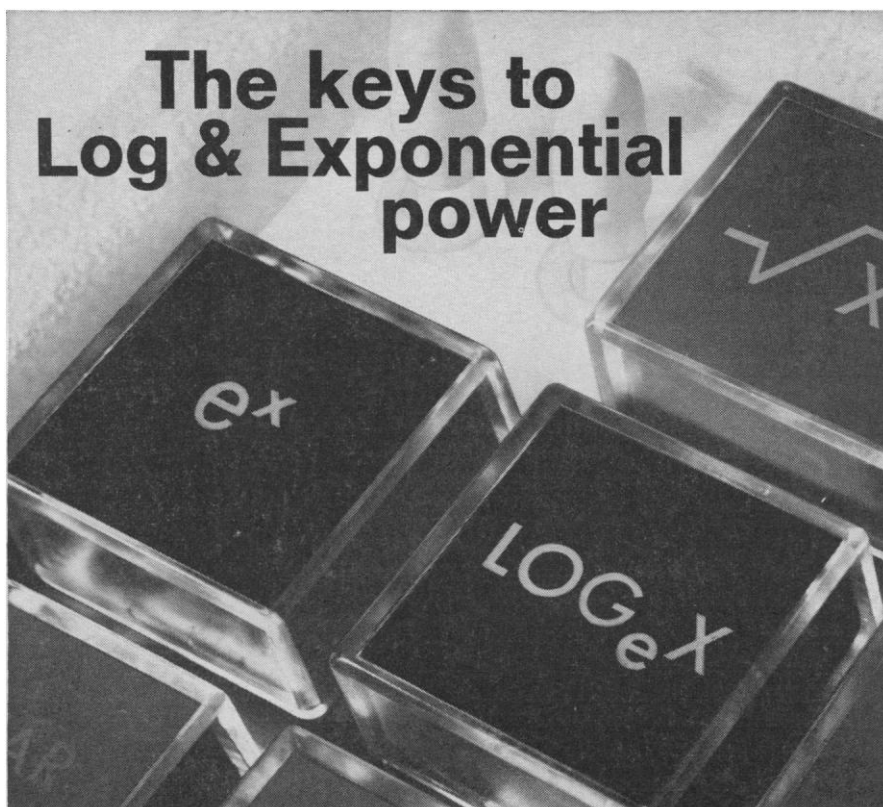
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Program Chairman, Center for Great Lakes Studies, Univ. of Wisconsin, Milwaukee, Milwaukee 53201)

18-20. American Otolological Soc., Hollywood Beach, Fla. (W. H. Bradley, 1100 E. Genesee St., Syracuse, N.Y.)

18-20. Eastern Psychological Assoc., 39th annual, Washington, D.C. (W. W. Cumming, Dept. of Psychology, Columbia Univ., New York 10027)

18-24. American Leprosy Missions, Carville, La. (O. W. Hallelblad, 297 Park Ave. S., New York 10010)

19-20. Environmental Engineering Conf., Rolla, Mo. (S. G. Grigoropoulos, Dept. of Civil Engineering, Univ. of Missouri-Rolla, Rolla 65401)

19-20. Iowa Acad. of Science, Waverly. (G. W. Peglar, Dept. of Mathematics, Iowa State Univ., Ames 50010)

19-20. Ohio Acad. of Science, 77th annual, Bowling Green, Ohio. (J. H. Melvin, 505 King Ave., Columbus, Ohio)

19-20. Population Assoc. of America, Boston, Mass. (D. M. Heer, Harvard School of Public Health, 665 Huntington Ave., Boston 02115)

19-21. Cooper Ornithological Soc., Salt Lake City, Utah. (W. H. Behle, 203 Biology Building, Univ. of Utah, Salt Lake City 84112)

20-25. American Ceramic Soc., 70th annual, Chicago, Ill. (R. S. Sheldon, 4055 N. High St., Columbus, Ohio 43214)

21-22. American Broncho-Esophagological Assoc., Hollywood, Fla. (J. R. Ausband, Bowman Gray School of Medicine, Winston-Salem, N.C. 27103)

21-22. American Soc. for Artificial Internal Organs, Philadelphia, Pa. (P. M. Galletti, Div. of Biological Medical Science, Brown Univ., Providence, R.I. 02912)

21-24. American Oil Chemists Soc., Memphis, Tenn. (Administrative Assistant, The Society, 35 E. Wacker Drive, Chicago, Ill. 60600)

21-24. American Orthopaedic Assoc., Boca Raton, Fla. (S. W. Banks, Executive Secretary, 29 E. Madison St., Chicago, Ill. 60602)

21-24. Radiation Research Soc., 16th annual, Houston, Tex. (F. Smith, Biology Dept., American Univ., Washington, D.C. 20016)

21-24. Society of Head and Neck Surgeons, Los Angeles, Calif. (H. W. Baker, 2250 NW Flanders St., Portland, Ore. 97210)

21-25. American Assoc. of Cereal Chemists, 53rd annual, Cincinnati, Ohio. (Executive Secretary, The Association, 1955 University Ave., St. Paul, Minn. 55104)

21-25. Paper Coating Conf., Miami Beach, Fla. (K. G. Chesley, Technical Assoc. of Pulp and Paper Industries, 360 Lexington Ave., New York 10017)

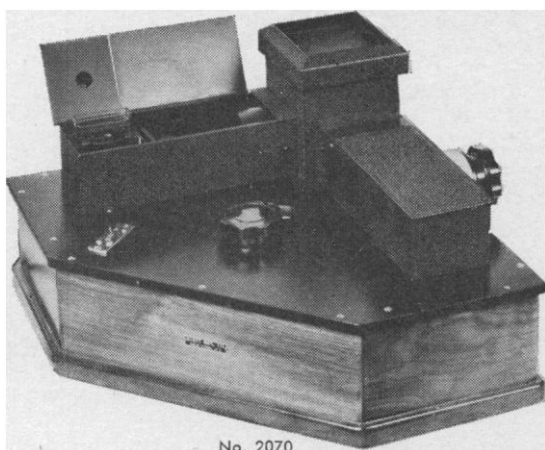
21-26. American Laryngological, Rhinological and Otolological Soc., Hollywood Beach, Fla. (V. R. Alfaro, 916 19th St., NW, Washington, D.C. 20006)

22-23. Chemical and Petroleum Instrumentation Symp., 9th natl., Wilmington, Del. (E. M. Brandle, Leeds and Northrup, 2625 Concord Pike, Wilmington 19803)

22-24. American Assoc. of Thoracic Surgery, Pittsburgh, Pa. (A. Hanvey, 311 Carondelet Building, St. Louis, Mo. 63105)

22-24. Association of Iron and Steel Engineers, spring conf., St. Louis, Mo.

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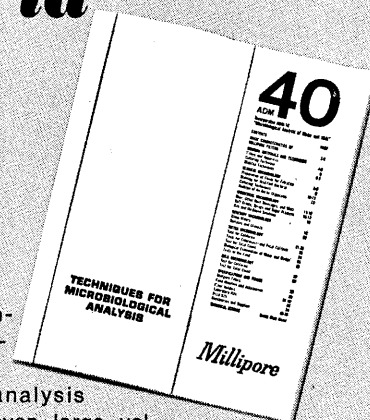
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22-25. American Assoc. of **Petroleum Geologists**, Oklahoma City, Okla. (E. P. Kerr, Jr., Mobil Oil Co., Box 1828, Oklahoma City 73101)

22-25. American College of **Obstetricians and Gynecologists**, 16th annual clinical mtg., Chicago, Ill. (D. C. Sommers, 79 W. Monroe St., Chicago 60603)

22-25. American **Industrial Health Conf.**, San Francisco, Calif. (C. D. Bridges, Industrial Medical Assoc., 55 E. Washington, Chicago, Ill. 60602)

22-25. American **Physical Soc.**, Washington, D.C. (W. W. Havens, Jr., Columbia Univ., New York 10027)

22-26. American Soc. of **Tool and Manufacturing Engineers**, Detroit, Mich. (General Manager, The Society, 10700 Puritan Ave., Detroit, Mich.)

22-27. American Acad. of **Neurology**, 20th annual, Chicago, Ill. (S. A. Nelson, 4005 W. 65 St., S, Minneapolis, Minn. 55435)

22-10. **Laboratory Methods in Medical Parasitology**, Atlanta, Ga. (U.S. Public Health Service, National Communicable Disease Center, Atlanta 30333)

23-24. **Relay Conference**, 16th annual, Stillwater, Okla. (D. R. Wilson, School of Electrical Engineering, Stillwater, 74074)

23-25. American Assoc. of **Physical Anthropologists**, Detroit, Mich. (F. G. Johnston, Dept. of Anthropology, Univ. of Pennsylvania, Philadelphia 19104)

23-25. American **Power Conf.**, 30th annual, Chicago, Ill. (Director, American Power Conf., Illinois Inst. of Technology, Chicago 60616)

23-25. Institute of **Electrical and Electronics Engineers**, New Orleans, La. (R. M. Emberson, 345 E. 47 St., New York 10017)

24-26. **Space Age Facilities**, 2nd conf., Los Angeles, Calif. (W. H. Wisley, American Soc. of Civil Engineers, United Nations Plaza, 345 E. 47 St., New York 10017)

25. American Soc. for **Head and Neck Surgery**, Hollywood, Fla. (E. W. Cocke, Jr., 899 Madison Ave., Memphis, Tenn. 38103)

25-26. American **Geriatrics Soc.**, New Orleans, La. (E. Henderson, Executive Director, 10 Columbus Circle, New York 10019)

25-27. American **Cleft Palate Assoc.**, Miami Beach, Fla. (D. R. Bzoch, Dept. of Communicative Disorders, College of Health Related Professions, Univ. of Florida, Gainesville 32603)

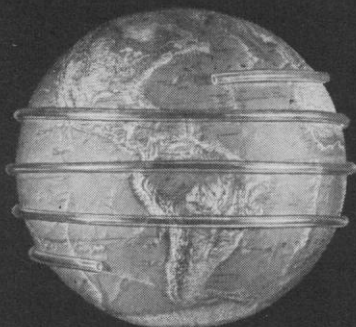
25-27. **Cineradiology**, 6th symp., Rochester, N.Y. (R. Gramiak, Diagnostic Radiology, Univ. of Rochester Medical Center, Rochester 14620)

25-27. **Molecular Basis of Odor**, San Francisco, Calif. (Letters and Science Extension, Univ. of California, 2223 Fulton St., Berkeley 94720)

25-27. American Acad. of **Physical Medicine and Rehabilitation**, Chicago, Ill. (C. C. Herold, 30 N. Michigan Ave., Chicago 60602)

25-27. American Assoc. of **University Professors**, Washington, D.C. (B. H. Davis, AAUP, 1785 Massachusetts Ave., NW, Washington, D.C. 20036)

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25-27. **Wildflower Pilgrimage**, 18th annual, Gatlinburg, Tenn. (Dept. of Botany, Univ. of Tennessee, Knoxville 37916)

26-27. **Applications of Lasers to Photography and Information Handling**, New York, N.Y. (K. T. Lassiter, Eastman Kodak Co., Dept. 942, Rochester, N.Y. 14650)

26-27. **Biochemical Co-evolution**, 29th annual biology colloquium, Corvallis, Ore. (W. C. Denison, Box 689, Corvallis 97330)

26-27. **Comparative Endocrinology**, northeast regional mtg., Boston, Mass. (N. B. Clark, Biological Sciences, Univ. of Connecticut, College of Liberal Arts and Sciences, Storrs 06268)

26-27. **Indiana Acad. of Science**, Wabash. (J. R. Gammon, Dept. of Zoology, DePauw Univ., Greencastle, Ind. 46135)

26-28. **Wisconsin Acad. of Sciences, Arts and Letters**, Eau Claire. (A. Suppan, School of Fine Arts, Univ. of Wisconsin-Milwaukee, Milwaukee)

26-30. **Industrial Gas Cleaning Inst.**, 9th annual meeting, Point Clear, Ala. (H. R. Herington, Executive Secretary, Industrial Gas Cleaning Inst. Inc., Box 448, Rye, N.Y. 10580)

27. **American Medical Electroencephalographic Assoc.**, Chicago, Ill. (M. L. Towler, Secretary-Treasurer, 200 University Boulevard, Galveston, Tex. 77550)

27-28. **Ceramic Engineers**, Chicago, Ill. (F. Reid, American Ceramic Soc., 4055 N. High St., Columbus, Ohio)

27-1. **American Acad. of Facial Plastic and Reconstructive Surgery**, Hollywood Beach, Fla. (J. R. Anderson, 1111 Tulane Ave., New Orleans, La. 70112)

28. **American Assoc. of Electromyography and Electrodiagnosis**, 15th annual, Chicago, Ill. (E. W. Johnson, Secretary-Treasurer, 410 W. 10, Columbus, Ohio 43210)

28-29. **American Laryngological Assoc.**, Hollywood, Calif. (L. G. Richards, 12 Clovelly Road, Wellesley Hills, Mass.)

28-1. **American Assoc. of Plastic Surgeons**, Houston, Tex. (C. W. Monroe, 715 Lake St., Oak Park, Ill. 60301)

28-1. **Fluid Controls Inst., Inc.**, spring meeting, Hot Springs, Va. (The Institute, P.O. Box 1485, Pompano Beach, Fla. 33061)

29-30. **Combustion Inst.**, western states section spring mtg., Pasadena, Calif. (G. S. Bahn, 16902 Bollinger Drive, Pacific Palisades, Calif. 90272)

29-30. **Environmental Health Problems**, 5th congr., Chicago, Ill. (AMA Dept. of Environmental Health, 535 N. Dearborn St., Chicago 60610)

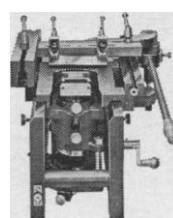
29-30. **Fiber Optics Seminar**, Baltimore, Md. (Society of Photo-optical Instrumentation Engineers, 1716 S. Catalina Ave., P.O. Box 288, Redondo Beach, Calif. 90277)

29-1. **Association for Research Ophthalmology**, Tampa, Fla. (H. E. Kaufman, Dept. of Ophthalmology, Univ. of Florida College of Medicine, Gainesville 32601)

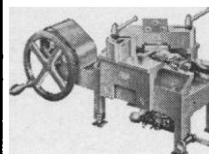
29-1. **Dose Rate in Mammalian Radiation Biology**, symp., Oak Ridge, Tenn. (D. G. Brown, UT-AEC Agricultural Research Lab., 1299 Bethel Valley Rd., Oak Ridge 37830)

29-1. **Institute of Environmental**

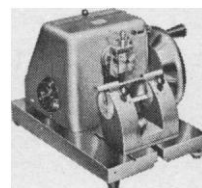
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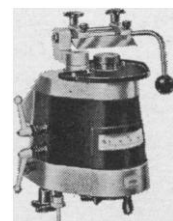
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29-1. **Plant Engineering and Maintenance Conf.**, Kansas City, Mo. (A. B. Conlin, Jr., Meetings Manager, 345 E. 47 St., New York, 10017)

29-2. **American Acad. of Pediatrics**, New Orleans, La. (E. H. Christopherson, Executive Secretary, 1801 Hinman Ave., Evanston, Ill. 60204)

29-2. **Audio Engineering Soc., Inc.**, 34th conv., Los Angeles, Calif. (D. B. Davis, Altec Lansing, 1515 S. Manchester Ave., Anaheim, Calif. 92803)

29-3. **Aeronautic Mtg. and Production Forum**, New York, N.Y. (W. I. Marble, Manager, Meetings Division, 485 Lexington Ave., New York 10017)

29-3. **Casting Congr. and Exposition**, Cleveland, Ohio. (American Foundrymen's Soc., Golf and Wolf Rds., Des Plaines, Ill. 60016)

30-2. **Institute of Management Sciences**, American mtg., San Francisco, Calif. (R. Van Horn, RAND Corp., 1700 Main St., Santa Monica, Calif.)

30-2. **Spring Joint Computer Conf.**, Atlantic City, N.J. (H. G. Asmus, Executive Secretary, 345 E. 47 St., New York 10017)

30-3. **American College Health Assoc.**, Minneapolis, Minn. (L. D. Stauffer, Executive Secretary, Box 9117, Univ. of Miami Branch, Coral Gables, Fla. 33124)

30-4. **American Assoc. on Mental Deficiency**, Boston, Mass. (J. J. Noone, Executive Director, 5201 Connecticut Ave., NW, Washington, D.C. 20015)

May

5-8. **American Inst. of Chemical Engineers**, 64th natl., Tampa, Fla. (R. W. Fahien, Univ. of Florida, Gainesville)

5-8. **Industrial Research Inst.**, Boca Raton, Fla. (G. W. McBride, Secretary-Treasurer, The Institute, 100 Park Ave., New York, 10017)

9-11. **American Inst. of Industrial Engineers**, Tampa, Fla. (R. C. Hutchinson, IMC, Box 867, Bartow, Fla.)

12-16. **American Assoc. of Orthodontists**, San Francisco, Calif. (J. E. Brophy, Executive Secretary, 7477 Delmar Blvd., St. Louis, Mo. 63130)

International and Foreign Meetings

April

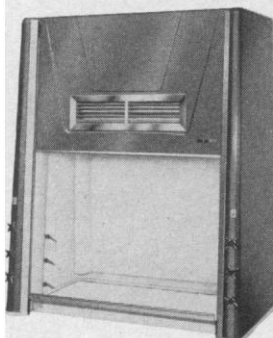
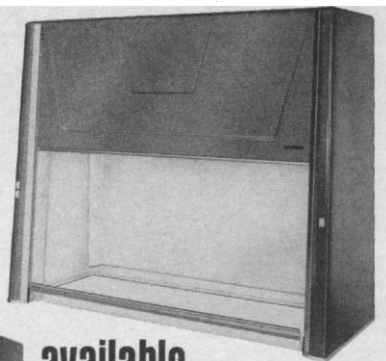
1-3. **British Biophysical Soc.**, spring mtg., Nottingham, England. (J. B. Finean, Dept. of Medical Biochemistry and Pharmacology, The University, P.O. Box 363, Birmingham, 15, England)

1-3. **Endodontics**, 4th intern. conf., Philadelphia, Pa. (L. I. Grossman, Chairman, School of Dental Medicine, Univ. of Pennsylvania, Philadelphia 19104)

1-3. **Physical and Chemical Causes of Creep and Shrinkage of Concrete**, Munich, Germany. (Materialprüfungsamt für des Bauwesen, Technische Hochschule München, Arcisstr. 21, 8 Munich 2, Germany)

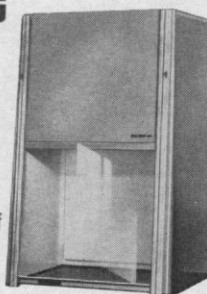
1-3. **Society for General Microbiology**, 52nd general mtg., London, England. (Inst. of Biology, 41 Queen's Gate, London, S.W.7)

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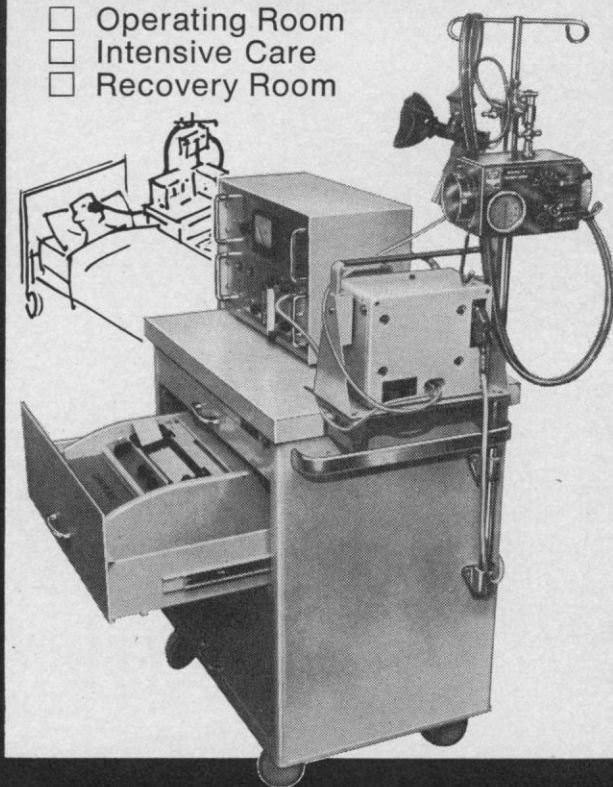
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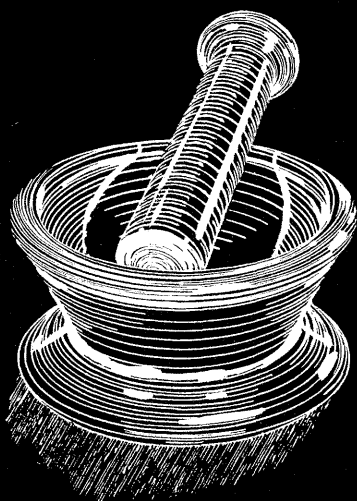
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SCIENCE, VOL. 159

1-5. Effect of **Radiation of Cellular Proliferation and Differentiation**, symp., Monaco, Monaco. (Intern. Atomic Energy Agency, Kartner Ring 11, Vienna 1, Austria)

1-5. **Chemical Soc.**, Inst. of Chemistry of Ireland, Royal Inst. of Chemistry, annual joint mtg., Dublin, Ireland. (General Secretary, Chemical Soc., Burlington House, London, W.1, England)

1-5. Interactions between **Ocean and Atmosphere**, conf., Hamburg, Germany. (Deutsche Geophysikalische Gesellschaft, Binderstrasse 22, 2000 Hamburg 13, Germany)

1-5. International Workshop in **Teratology**, 2nd, Kyoto, Japan. (H. Nishimura, Dept. of Anatomy, Faculty of Medicine, Kyoto Univ., Sakyo-Ku, Kyoto)

1-5. **Properties and Metrology of Surfaces**, intern. conf., Oxford, England. (Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster, London, S.W.1, England)

1-5. **Rheology of Disperse Systems**, Postgraduate School, London, England. (G. M. Sweet, Secretary to the Director, Dept. of Pharmaceutical Sciences, Pharmaceutical Soc. of Great Britain, 17 Bloomsbury Sq., London, W.C.1)

1-6. European Federation of **Chemical Engineering**, 3rd European symp., Bristol, England. (Dr. Fritsche, Gesellschaft Deutscher Chemiker, P.O.B. 9075, 9 Frankfurt am Main 9, Germany)

1-6. International Commission of **Agricultural Engineering**, technical section 4 (rural electrification) mtg., Silsoe, England. (15, Avenue du Maine, 75 Paris 15, France)

1-6. **Nuclear Physics**, German-Netherlands Conf., Bad Neuenahr, Germany. (U. Schmidt-Rohr, P.O.B. 1248, D-69 Heidelberg, Germany)

1-6. **Paleogeophysics**, NATO Advanced Study Inst., Newcastle-upon-Tyne, England. (S. K. Runcorn, Dept. of Geophysics and Planetary Physics, School of Physics, Univ. of Newcastle-upon-Tyne, Newcastle-upon-Tyne)

2-4. **Advanced Control Systems**, Leicester, England. (Soc. of Instrument Technology, 20 Peel St., London, W.8, England)

2-4. Latest Technique in **Pig-Iron Production and Processing**, 9th conf., Unterwellenborn, Germany. (Dem.) (Forschungsinstitut für Roheisenerzeugung, 6806 Unterwellenborn)

2-4. Society for **Applied Mathematics and Mechanics**, annual scientific mtg., Prague, Czechoslovakia. (Sekretariat, Gamm Jahrestagung 1968, Utam-Csav, Vysehradská 49, Nove Mesto, Prague 2)

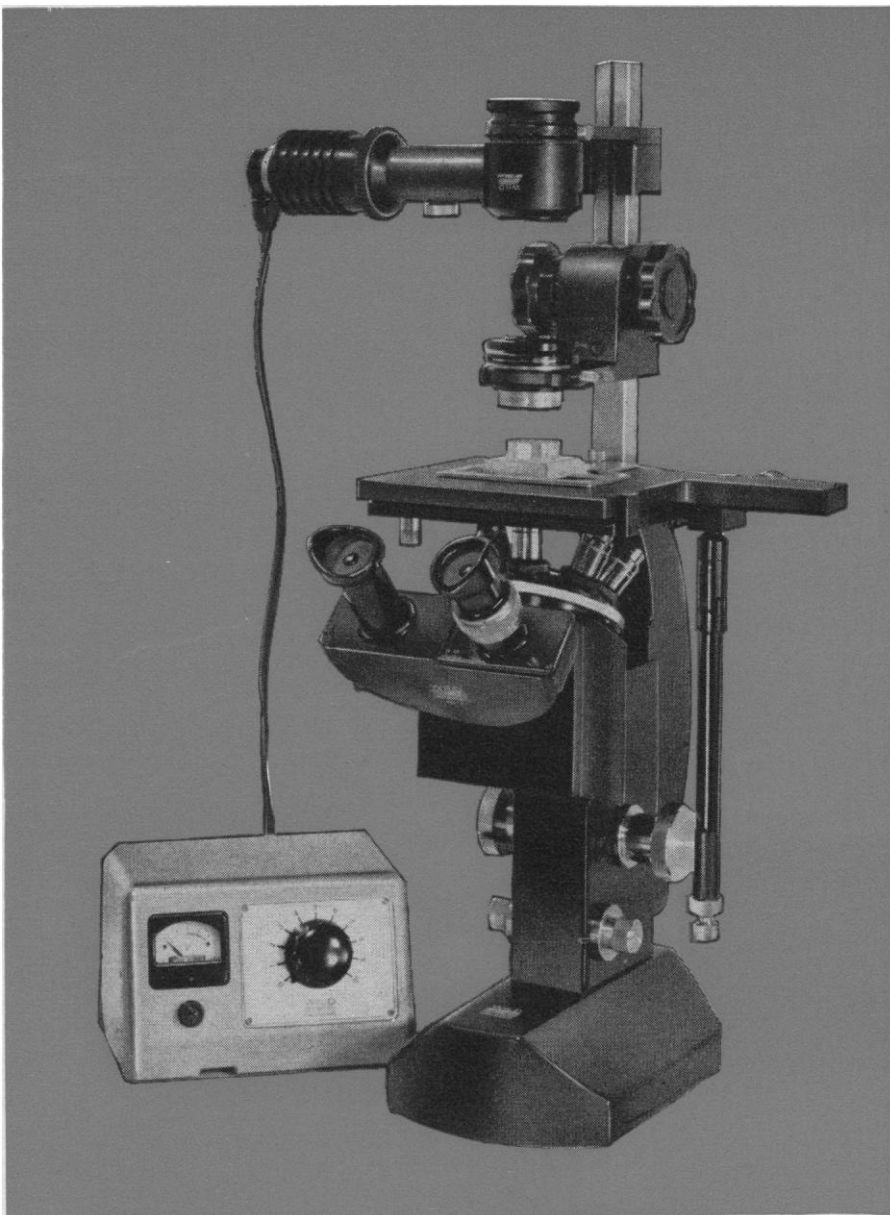
2-4. Third United Kingdom **Automation Council Control Conv.**, Control Systems in Steel Industry, Leicester, England. (Soc. of Instrument Technology, 20 Peel St., London, W.8, England)

2-4. **Visual Science**, 1st Intern. Conf., Bloomington, Ind. (American Optometric Assoc., Executive Offices, 7000 Chippewa St., St. Louis, Mo. 63119)

3-5. International **Magnetics** Conf., Washington, D.C. (E. Pugh, IBM, Poughkeepsie, N.Y.)

3-6. **Electronics**, 15th intern. scientific congr., Rome, Italy. (Ressegna Internazionale Elettronica Nucleare e Teleradiocinematografica, via Crescenzo 9, Rome)

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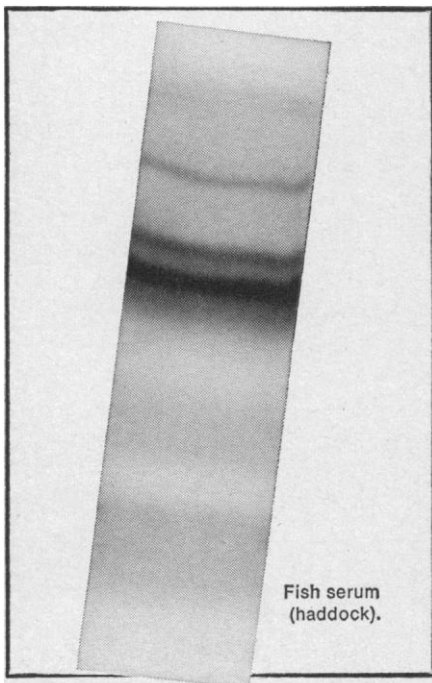
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4-5. British Society for Cell Biology, annual mtg., London, England. (L. M. Franks, Secretary, Imperial Cancer Research Fund, Lincoln's Inn Fields, London, W.C.1)

4-5. Hovercraft, 1st intern. conf., Southampton, England. (W. F. S. Woodford, Secretary, Institution of Production Engineers, 10 Chesterfield St., London, W.1, England)

4-5. Textiles Produced from Film, intern. conf., Manchester, England. (Plastics Inst., 6 Mandeville Place, London, W.1, England)

4-5. Transmission Dynamics, Counterbalance and Oscillation, Dusseldorf, Germany. (VDI/AWS-Fachgruppe Getriebe-technik, Postfach 1139, 4 Dusseldorf 1)

4-6. Parenteral Nutrition, intern. symp., Nashville, Tenn. (O. T. Ball, Vanderbilt Univ. School of Medicine, Station 17, Nashville 37203)

4-6. Symposium Ossium, London, England. (J. S. MacDonald, % Conference Office, 156 Lambeth Road, London, S.E.1)

4-9. American Dermatological Assoc., San Juan, Puerto Rico. (R. R. Kierland, Mayo Clinic, Rochester, Minn. 55901)

4-10. International Biological Program, 3rd general assembly, Varna, Bulgaria. (I. B. P. Central Office, 7 Marylebone Road, London, N.W.1, England)

6. North Pacific Fur Seal Commission, 11th annual mtg., Moscow, U.S.S.R. (% Bureau of Commercial Fisheries, Dept. of Interior, Washington, D.C. 20240)

7-11. N₂, O₂, and Hydrogen as Ligands for Metals, Leeds, England. (B. L. Shaw, School of Chemistry, The University, Leeds 2)

8-10. Thermodynamics, 3rd conf., Manchester, England. (H. A. Skinner, Univ. of Manchester, Oxford Road, Manchester 13)

8-11. Liquefied Natural Gas, 1st intern. conf., Chicago, Ill. (M. V. Burlingame, Chairman, Program Committee, Inst. of Gas Technology, 3424 S. State St., Chicago 60616)

8-13. European Arachnologist, 4th conf., Paris, France. (M. Vachon, Secrétaire General, Centre International de Documentation Arachnologique, 61 rue de Buffon, Paris 5)

8-19. Helium, spring conf., Beirut, Lebanon. (Secretary, Beirut Spring Conf. on Helium, Physics Dept., American Univ. of Beirut, Beirut)

9-10. Textile Inst., annual physics group conf., Coventry, England. (D. B. Moore, General Secretary, 10 Blackfriars St., Manchester 3, England)

9-11. Pulse-Rate and Pulse-Number Signals in Automatic Control, intern. symp., Budapest, Hungary. (Symposium Organizing Committee, Hungarian Acad. of Sciences, P.O.B. 63, Budapest 112)

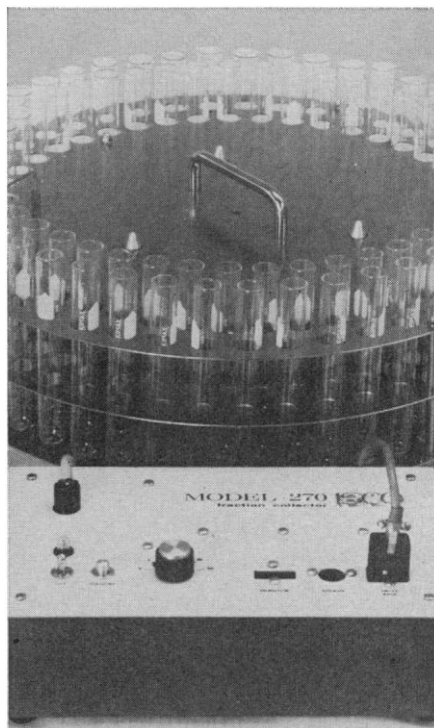
9-11. Society for the Study of Fertility, symp., Nairobi, Kenya. (W. I. Gay, Program Director, Comparative Medicine, National Inst. of General Medical Sciences, Bethesda, Md. 20014)

14-16. Israel Physical Soc., Jerusalem. (R. Rahman, Faculty of Medicine, Hebrew Univ. of Jerusalem, Jerusalem)

16-18. Pulp and Paper Instrumentation Symp., 9th intern., Charlotte, N.C. (J. J. Garey, British Columbia Forest Products Ltd., Crofton, B.C., Canada)

16-18. Turbulence of Fluids and Plas-

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SCIENCE, VOL. 159

mas, intern. symp., New York, N.Y. (J. Fox, 333 Jay St., Brooklyn, N.Y. 11201)

17-19. International Organization for Vacuum Science, Technique and Applications, 4th general mtg. and congr., Manchester, England. (Technical Secretary, The Organization, 47 Belgrave Sq., London, S.W.1, England)

17-19. Molecular Spectroscopy, 4th conf., Brighton, England. (Hydrocarbon Research Group, Inst. of Petroleum, 61 New Cavendish St., London, W.1, England)

18-19. Society for Analytical Chemistry, Enschede, Netherlands. (R. Goulder, Woodstock Agricultural Research Co., Shell Research Ltd., Sittingbourne, Kent, England)

18-20. Geochemical Exploration, intern. symp., Golden, Colo. (Geochemical Exploration Symp., Colorado School of Mines, Golden 80401)

21-24. European Soc. of Experimental Surgery, 3rd congr., Munich, Germany. (W. Brendel, Nussbaumstr. 20, 8 Munich 15)

21-24. Geological Assoc. of Canada, Canada Inst. of Mining and Metallurgy, Mineralogical Assoc. of Canada, joint mtg., Vancouver, Canada. (J. M. Carr, British Columbia Dept. of Mines, Victoria, Canada)

21-25. International College of Surgeons (North American Federation), Boston, Mass. (Executive Director, The College, 1516 Lake Shore Drive, Chicago, Ill. 60610)

21-27. Cardiology, 8th inter-American congr., Lima, Peru. (Secretary-General, Pablo Bermudez 274, Offices 705/706, Lima)

22-24. Canadian Inst. of Mining and Metallurgy, 70th annual, Vancouver, B.C., Canada (Secretary-Treasurer, The Institute, 906 Drummond Bldg., Montreal, P.Q., Canada)

22-24. Interference Problems Associated with the Operation of Microwave Communication Systems, conf., London, England. (Joint Conf. Secretariat, Institution of Electrical Engineers, Savoy Place London, W.C.2)

22-26. World Meteorological Organization, Advisory Committee, 4th session, Geneva, Switzerland. (41, Ave. Guiseppe Motta, Geneva)

22-11. International Civil Aviation Organization, Airworthiness Committee, 8th mtg., Amsterdam, Netherlands. (H. S. Marzusch, 3BIS, Villa Emile-Bergerat, Neuilly-sur-Seine, France)

23-24. Physical-Chemical Methods of Corrosion Testing, Frankfurt am Main, Germany. (Study Group on Corrosion, European Federation of Corrosion, Theodore-Huess-Allee 25, Frankfurt am Main, Germany)

23-25. Stereochemical Nomenclature, symp., London, England. (Ciba Foundation, 41 Portland Pl., London, W.1)

24-28. Biochemical Mtg., 9th Latin, Monte Carlo, Monaco. (J. E. Curtois, 4 avenue de l'Observatoire, Paris 6, France)

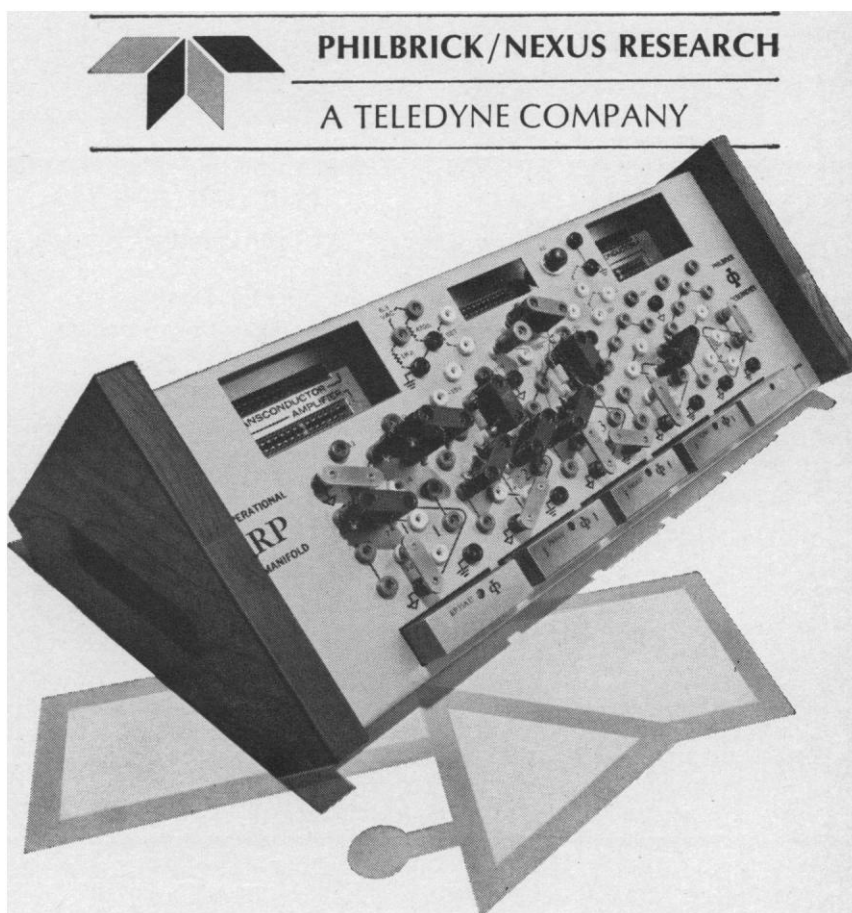
28-4. Inter-American Congr. of Atherosclerosis, 3rd, Buenos Aires, Argentina. (J. J. Lijo Pavia, Avda. Quintana 104, Buenos Aires)

29-2. Biochemical Analysis Conf., Munich, Germany. (H. Schievelbein, Secretary, Nussbaumstr. 20, 8 Munich 15)

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BOOKS RECEIVED

(Continued from page 1347)

Paul Tarrant, Ed. Dekker, New York, 1967. vi + 424 pp., illus. \$18.50.

The Foundation of Physics. With a Proposal for a Fundamental Theory of Physics. Pieter J. van Heerden. Wistik, Wassenaar, Netherlands, 1967. x + 104 pp., illus. Cloth, \$7; paper, \$5.

Gas Chromatographic Analysis of Drugs and Pesticides. Benjamin J. Gudzinowicz. Arnold, London; Dekker, New York, 1967. x + 605 pp., illus. \$28.50. Chromatographic Science, vol. 2.

Gems, Minerals and Rocks in Southern Africa. J. R. McIver. Elsevier, New York, 1967. xii + 268 pp., illus. \$27.50.

Genetics: Basic and Applied. A Survey of Methods and Main Results. Arne Muntzing. LTs Forlag, Stockholm, ed. 2, 1967. 472 pp., illus. \$9.75.

A Guide to Science and Index to the Life Science Library. The editors of *Life*. Time, New York, 1968. 208 pp., illus. \$3.95. Life Science Library.

Guts. The Form and Function of the Digestive System. John Morton. St. Martin's, New York, 1967. iv + 58 pp., illus. Paper, \$1.50. Institute of Biology: Studies in Biology, No. 7.

The Haua Fteah (Cyrenaica) and the Stone Age of the South-East Mediterranean. C. B. M. McBurney. Cambridge University Press, New York, 1967. xvi + 387 pp., illus. \$37.50.

Heat Exchange in Shaft Furnaces. B. I. Kitaev, Yu. G. Yaroshenko, and V. D. Suchkov. Translated from the Russian by M. M. Page and H. Simons. P. A. Young, Ed. Pergamon, New York, 1967. xviii + 301 pp., illus.

L'Homme, rien que l'Homme. De l'Anthropogenèse à l'Hominisation. Henri Piéron. Presses Universitaires de France, Paris, 1967. viii + 172 pp. Paper, 8 F.

Identity. Youth and Crisis. Erik H. Erikson. Norton, New York, 1968. 336 pp. \$6.95.

The Inhibition of Fat Oxidation Processes. N. M. Emanuel and Yu. N. Lyaskovskaya. Translated from the Russian edition (1961) by K. A. Allen. Pergamon, New York, 1967. xii + 389 pp., illus. \$19.50.

Initiation aux Techniques de l'Histologie Animale. R. Martoja and M. Martoja-Pierson. Masson, Paris, 1967. 345 pp., illus. Paper, 56 F.

Introduction to Geology. Physical and Historical. William Lee Stokes and Sheldon Judson. Prentice-Hall, Englewood Cliffs, N.J., 1968. xiv + 530 pp., illus. \$9.50.

An Introduction to Non-Electrolyte Solutions. A. G. Williamson. Wiley, New York, 1967. x + 188 pp., illus. Paper, \$3.75. University Chemical Texts, No. 3.

Investigation of the Physicochemical Mechanics of Clay-Mineral Dispersions. P. A. Rebinder, Ed. F. D. Ovcharenko, S. P. Nichiporenko, N. N. Kruglitskii, and V. Yu. Tretinnik. Translated from the Russian edition (Kiev, 1965) by Z. Lerman. R. Amols, Translation Ed. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1967. x + 146 pp., illus. \$7.50.

Kirk-Othmer Encyclopedia of Chemical Technology. Herman F. Mark, John J.

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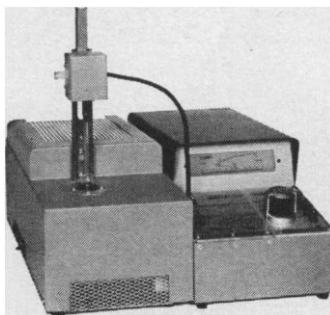
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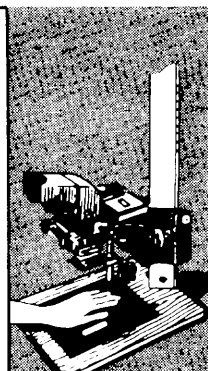
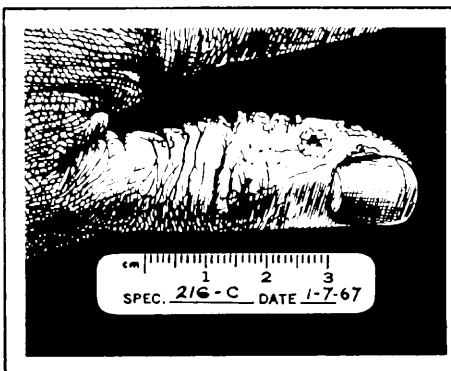
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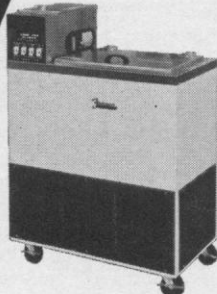
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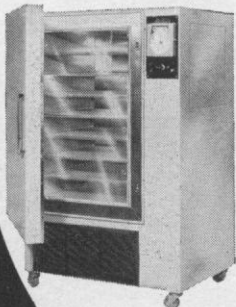


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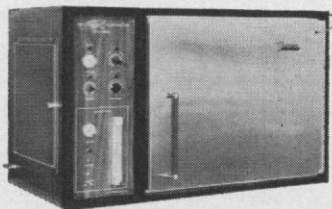
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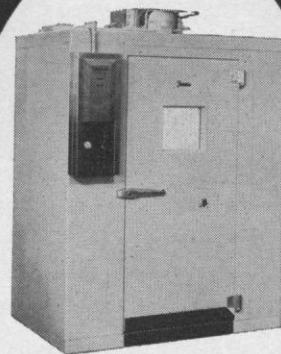
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Laboratory Embryology of the Frog. Lloyd E. Downs. Brown, Dubuque, Iowa, 1968. x + 42 pp., illus. Paper, \$2.25.

Lectures on Modern Algebra. P. Dubreil and M. L. Dubreil-Jacotin. Translated from the second French edition (Paris, 1961) by A. Geddes. Hafner, New York, 1967. xii + 364 pp., illus. \$16.80. University Mathematical Monographs, No. 5.

Management and Growth. Management's Creative Task in a World of Increasing Complexity and Accelerated Growth. Proceedings of the 14th International Management Congress of Conseil International pour l'Organisation Scientifique, Rotterdam, September 1967. Nederlands Instituut voor Efficiency. Rotterdam University Press, Rotterdam, 1967. xii + 463 pp., illus. Paper, \$18.10.

The Many-Body Problem in Quantum Mechanics. N. H. March, W. H. Young, and S. Sampanthar. Cambridge University Press, New York, 1967. x + 459 pp., illus. \$14.50.

Materials. Freeman, San Francisco, 1967. xii + 210 pp., illus. Cloth, \$5; paper, \$2.50. Articles from *Scientific American*, September 1967.

Metabolic Pathways. Vol. 1, Energetics, Tricarboxylic Acid Cycle, and Carbohydrates. David M. Greenberg, Ed. Academic Press, New York, ed. 3, 1967. xvi + 460 pp., illus. \$22.50.

Methods in Cancer Research. Vol. 3. Harris Busch, Ed. Academic Press, New York, 1967. xviii + 755 pp., illus. \$33.

Modern Electromagnetic Fields. P. Silvester. Prentice-Hall, Englewood Cliffs, N.J., 1968. xvi + 332 pp., illus. \$12. Prentice-Hall Electrical Engineering Series.

Molluscs. J. E. Morton. Hillary House, New York, ed. 4, 1967. 244 pp., illus. Paper, \$2.25. Biological Sciences Series.

The Movement of Molecules Across Cell Membranes. W. D. Stein. Academic Press, New York, 1967. xviii + 369 pp., illus. \$17.50. Theoretical and Experimental Biology, vol. 6.

NASA Thesaurus. Subject Terms for Indexing Scientific and Technical Information. National Aeronautics and Space Administration, Washington, D.C., 1967 (order from Superintendent of Documents, Washington, D.C.). Vols. 1 and 2, Alphabetical Listing (xiv + 859 pp.); vol. 3, Appendixes (vi + 535 pp.). Paper, \$8.50. Preliminary Edition, December 1967. NASA SP-7030.

The Natural Regulation of Animal Numbers. David Lack. Oxford University Press, New York, 1967. viii + 343 pp., illus. \$7.20. Reprint of the 1954 edition.

The Nature of Time. Report of a meeting, Ithaca, N.Y., May-June 1963. T. Gold and D. L. Schumacher, Eds. Cornell University Press, Ithaca, N.Y., 1967. xvi + 248 pp., illus. \$8.75.

The Neuron. Holger Hydén. Elsevier, New York, 1967. viii + 393 pp., illus. \$19.

Neurophysiology and Emotion. Proceedings of a conference, New York, December 1965, under the auspices of the Russell