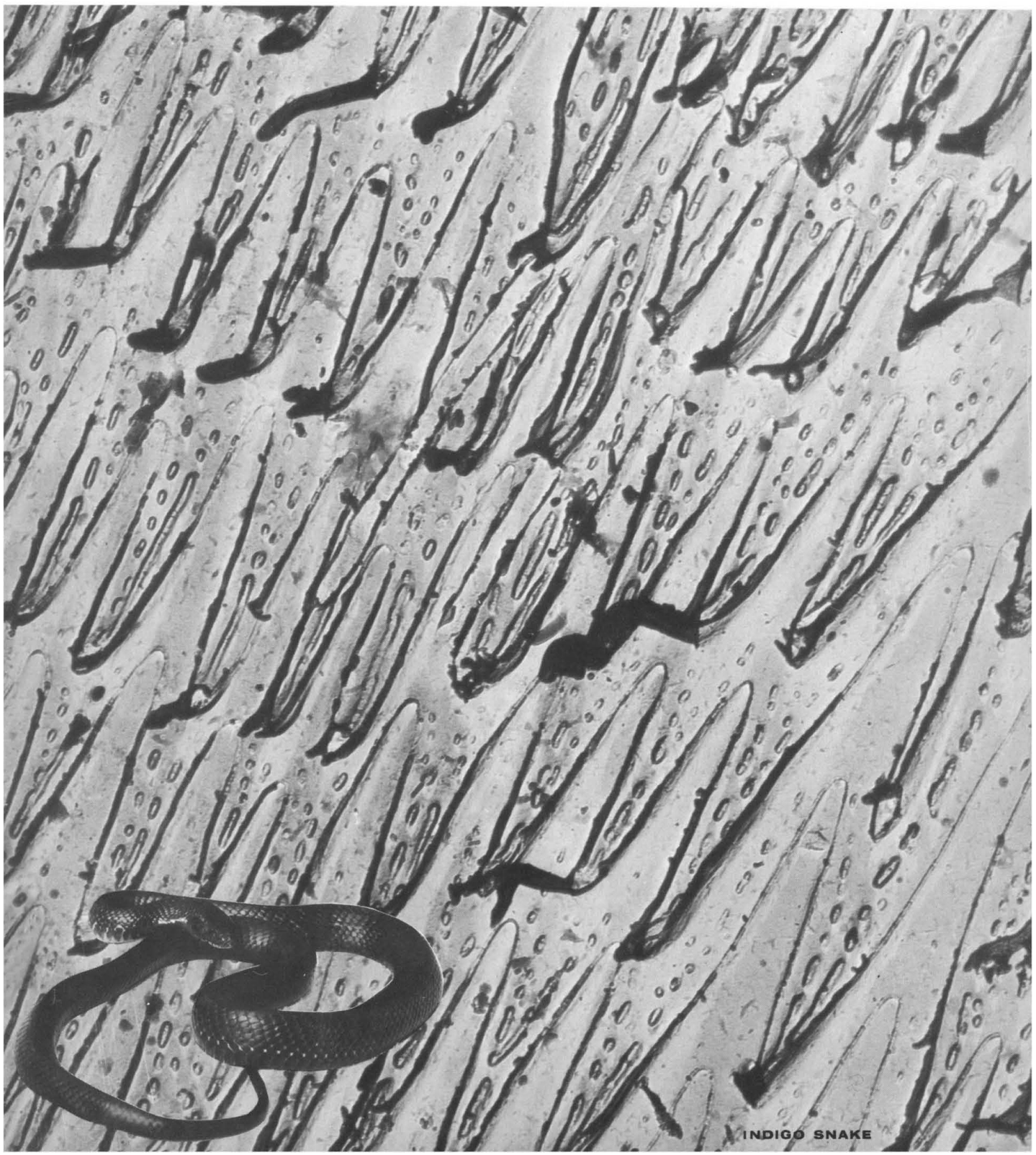
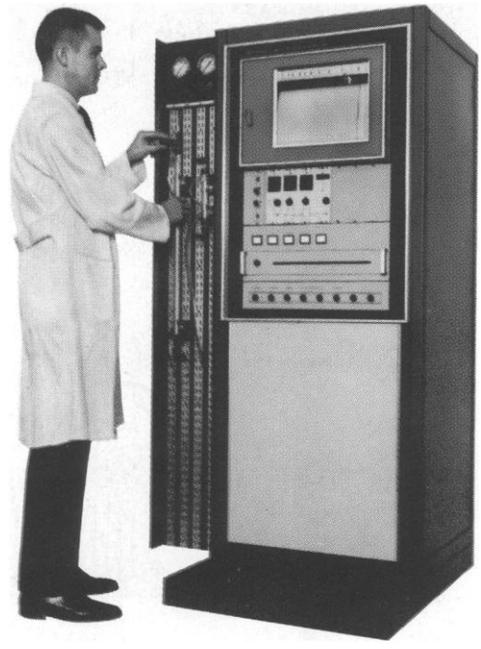
SCIENCE

5 January 1968

Vol. 159, No. 3810

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE





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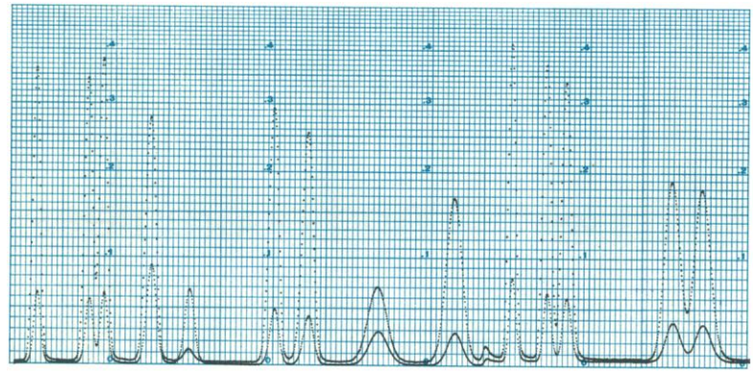

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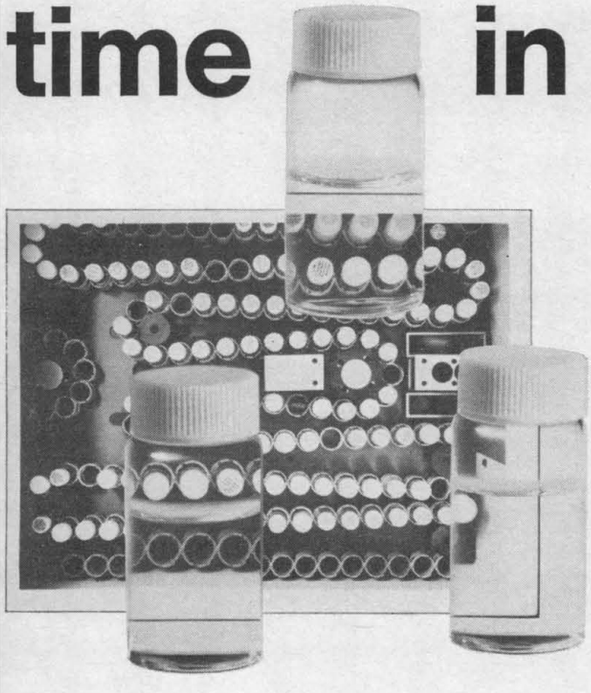

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SCIENCE

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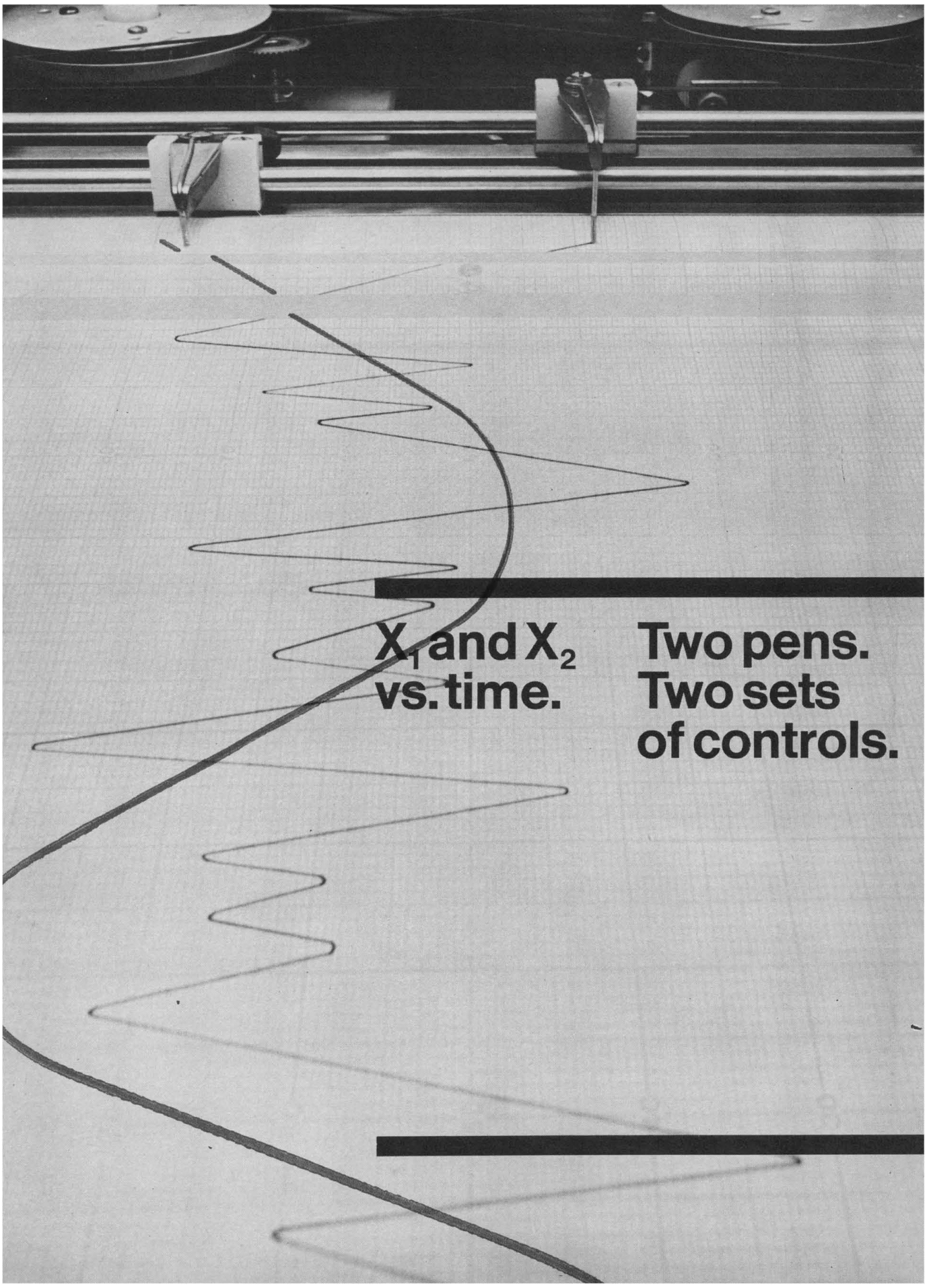
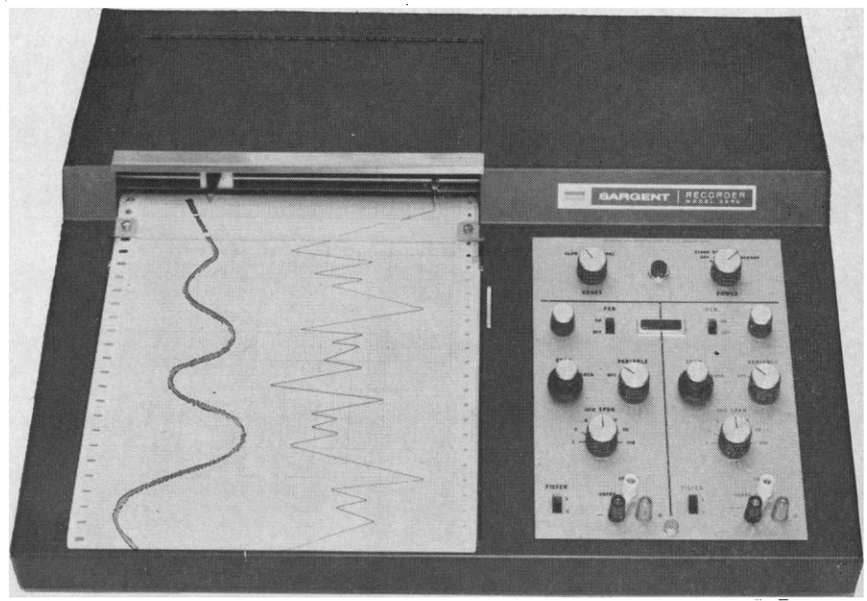
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

External surface of a lateral scale from an indigo snake, *Drymarchon corais,* variety *couperi* (Holbrook). The textural pattern acts as an optical diffraction grating which produces iridescent colors (Replication electron microscopy, about × 16,000). See page 97. [E. A. Monroe, State University of New York at Alfred University, and S. E. Monroe, Alfred Almond School, Alfred, New York]


X_1 and X_2 vs. time.
Two pens. Two sets of controls.



In a single, sensitive recorder: Sargent's new Model DSRG.

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The DSRG has two pens, two independent recording channels, and two sets of controls. You can operate the channels singly or simultaneously, with related or independent inputs. And select a different span for each channel, for full or half-scale, with or without a marginal integrator for each trace.

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Price? With pens, paper, and connecting cables, the DSRG Dual-Pen Recorder costs $1575.00. With one integrator installed, $2160.00. (Dual integrators are available—ask for details.)

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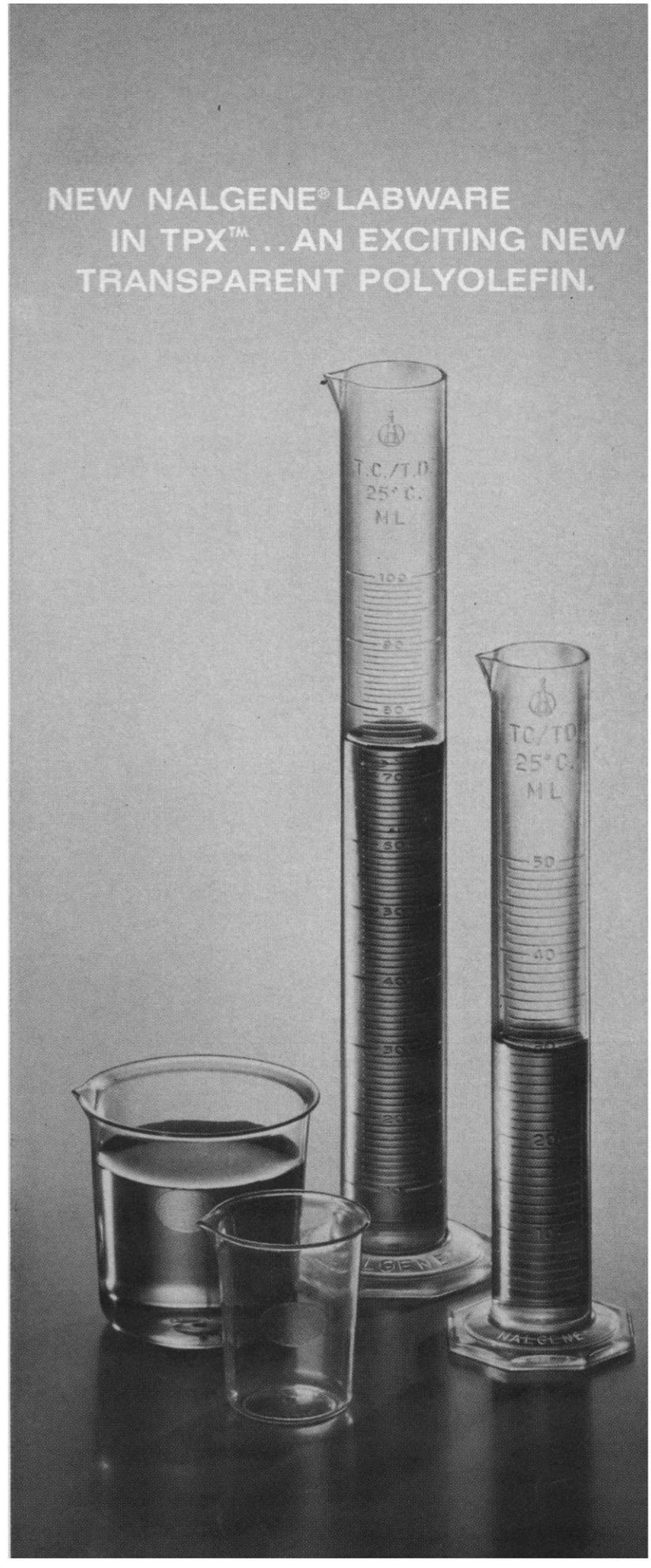

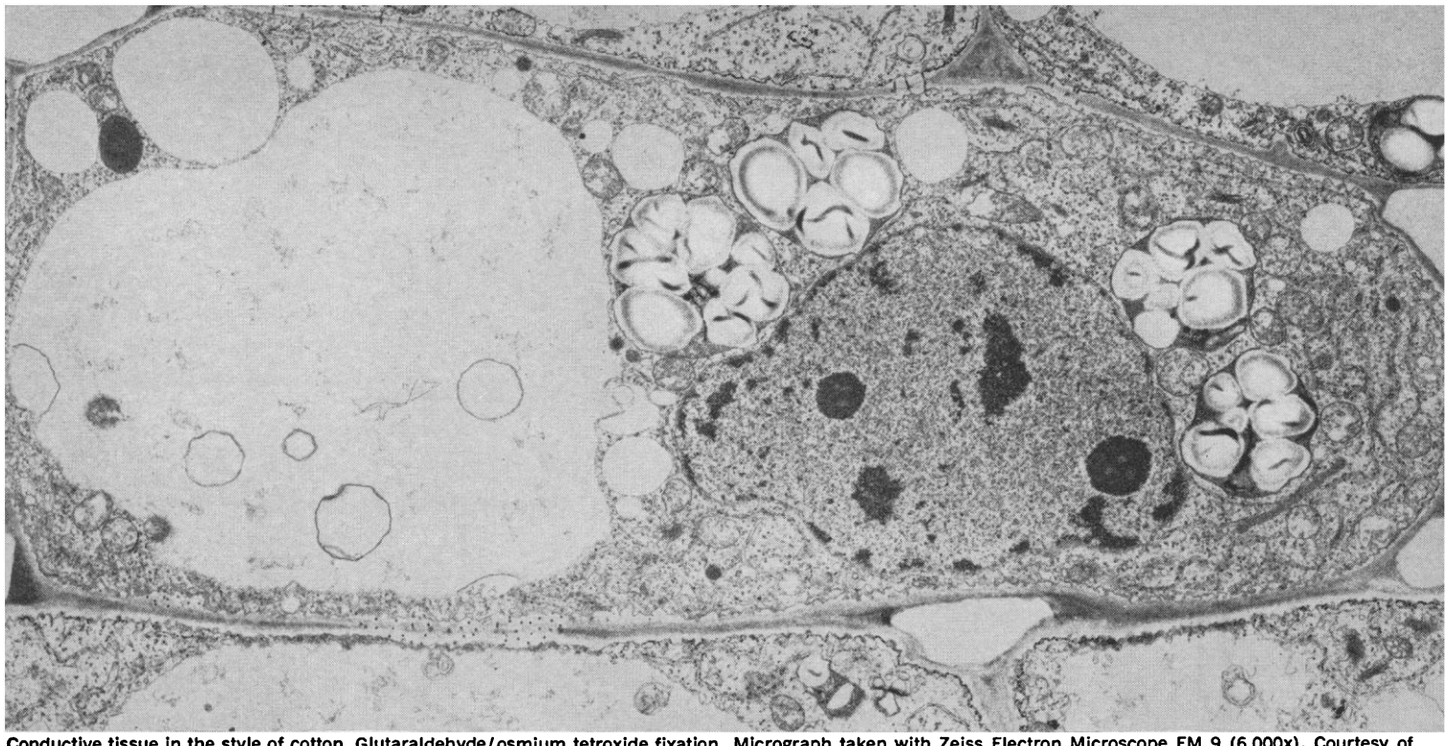

Conductive tissue in the style of cotton. Glutaraldehyde/osmium tetroxide fixation. Micrograph taken with Zeiss Electron Microscope EM 9 (6,000x). Courtesy of Professor William A. Jensen, Botany Department, University of California, Berkeley.

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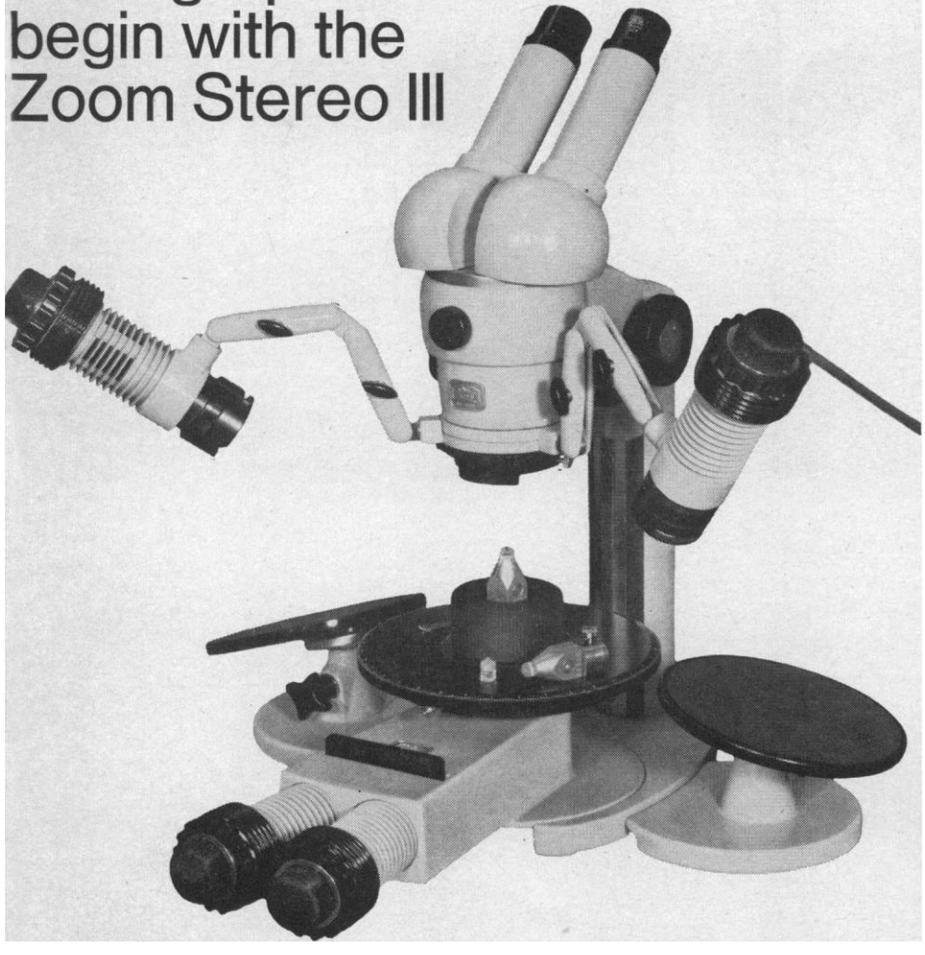

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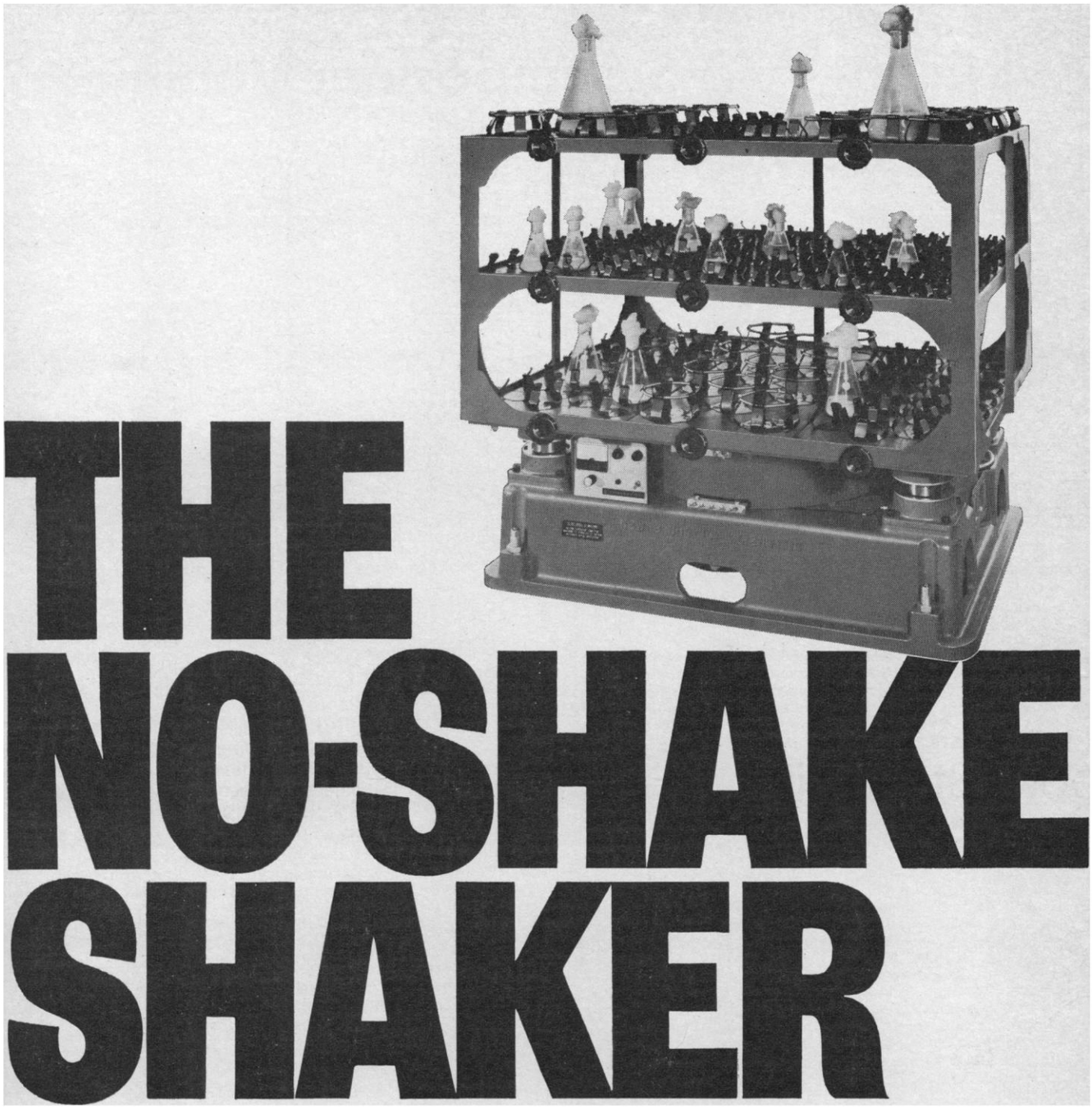

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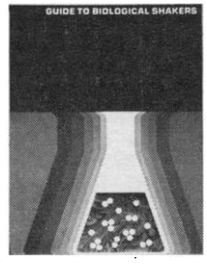

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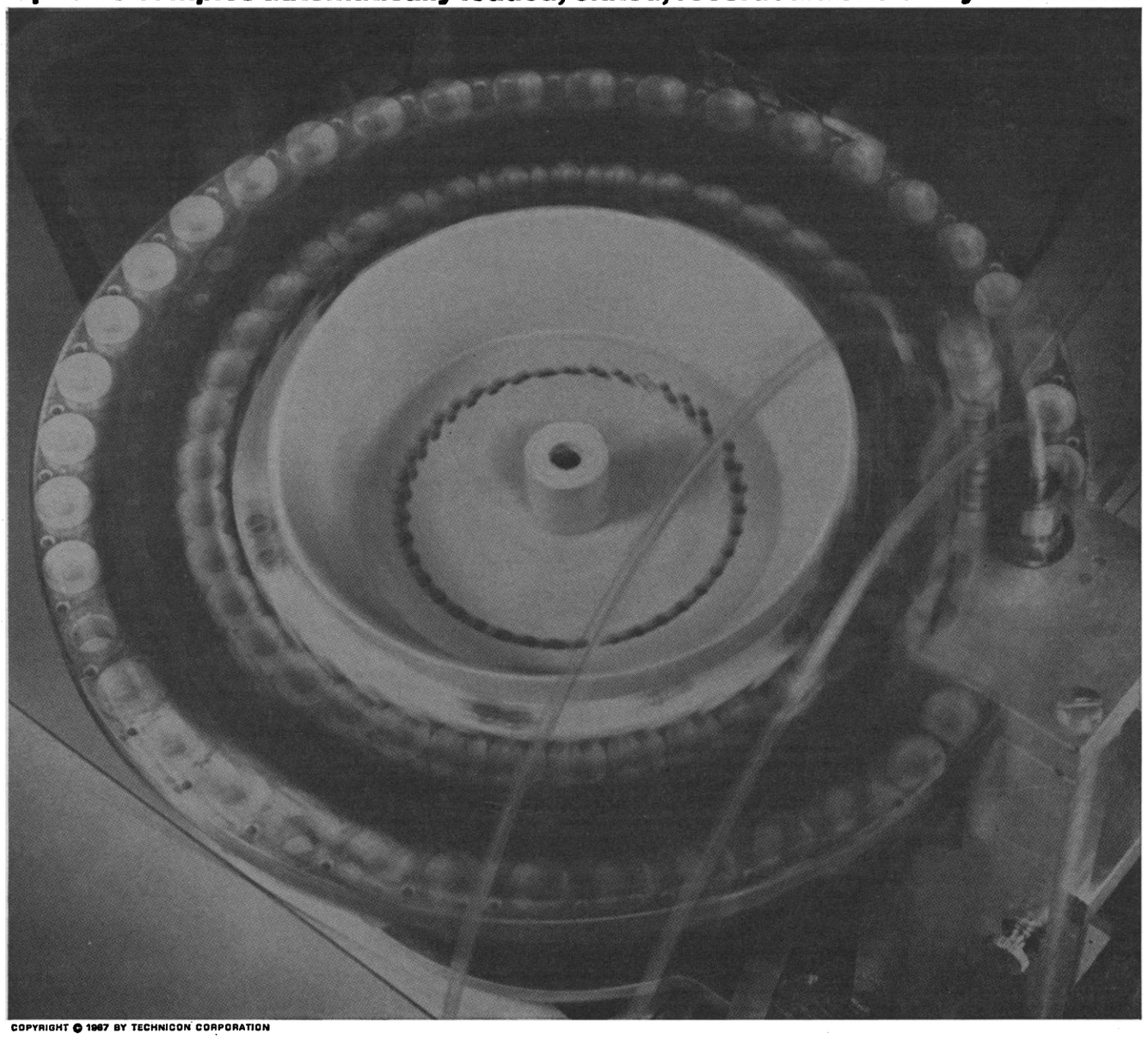

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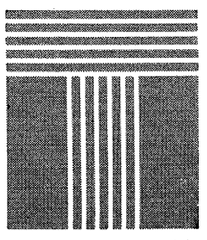

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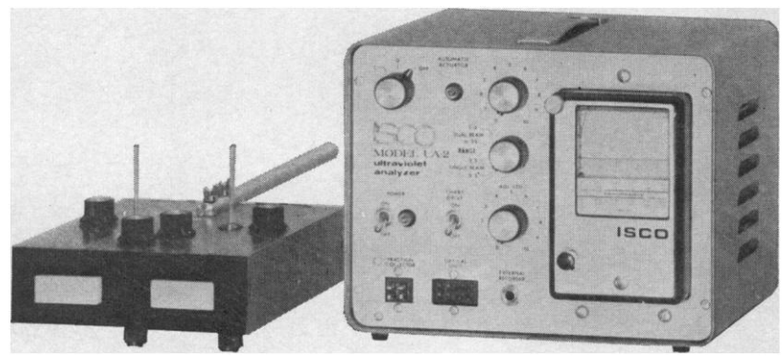

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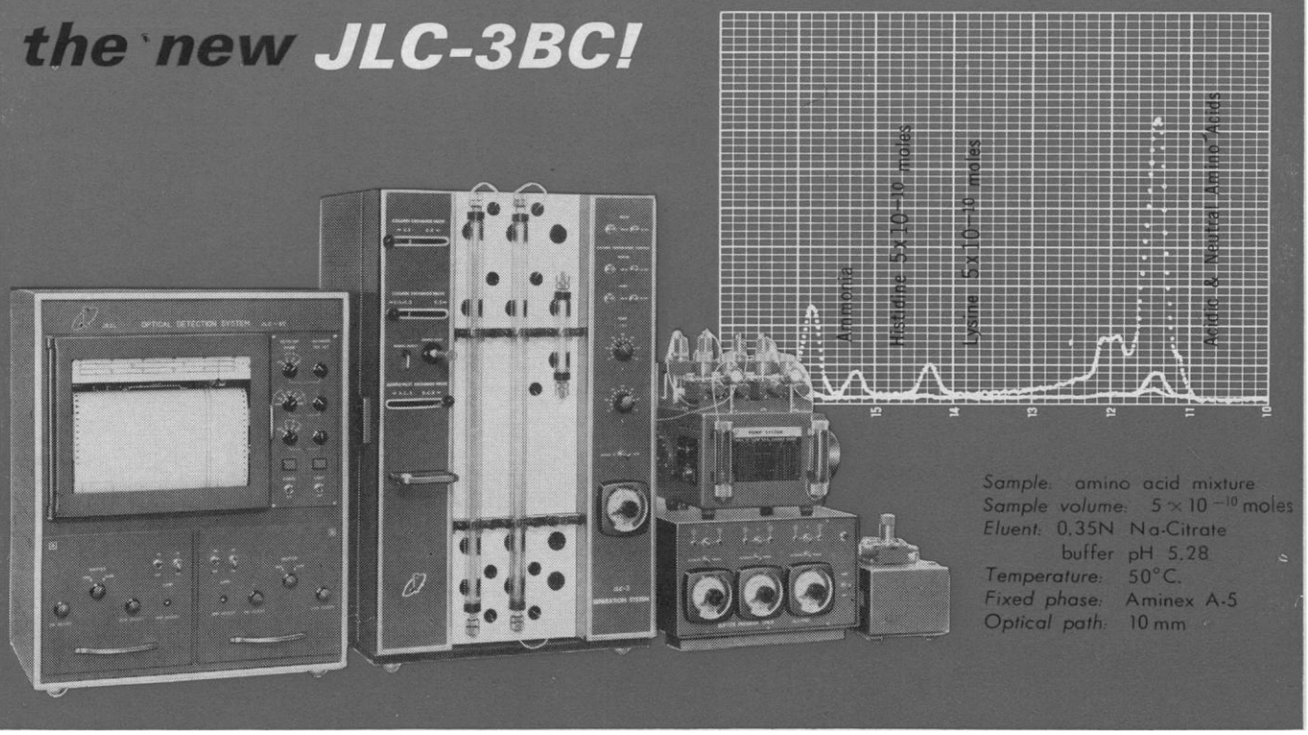

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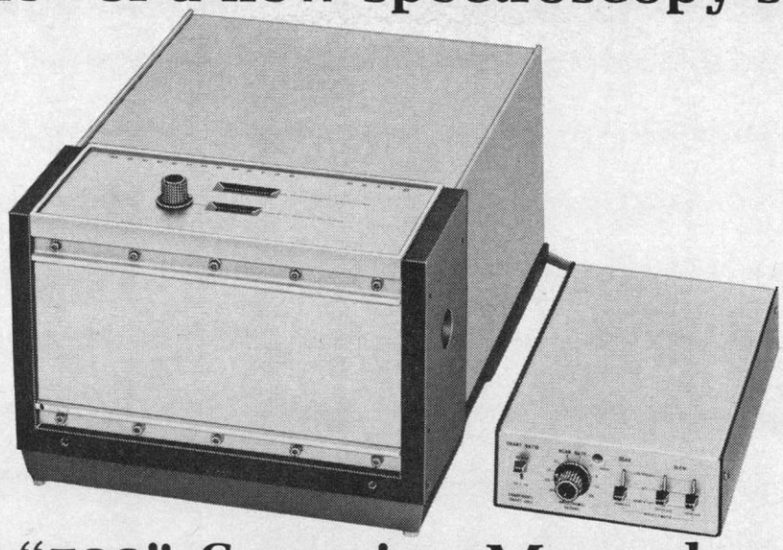

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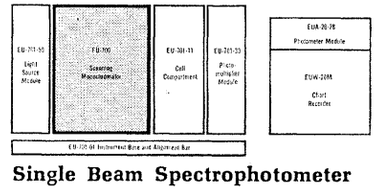

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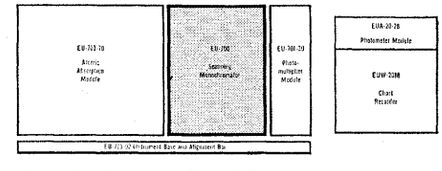

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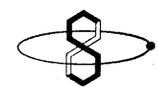

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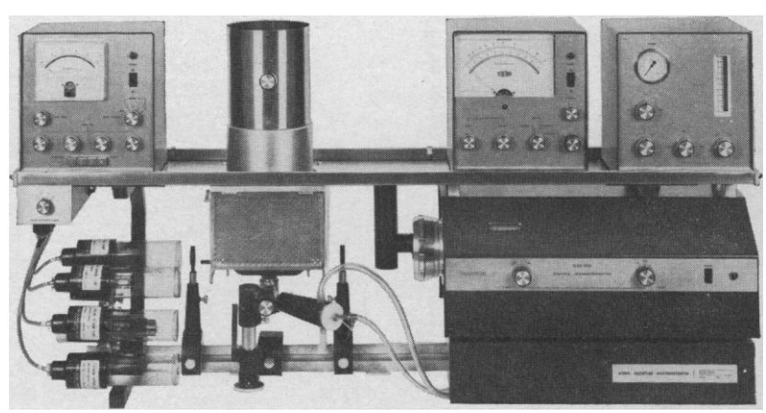

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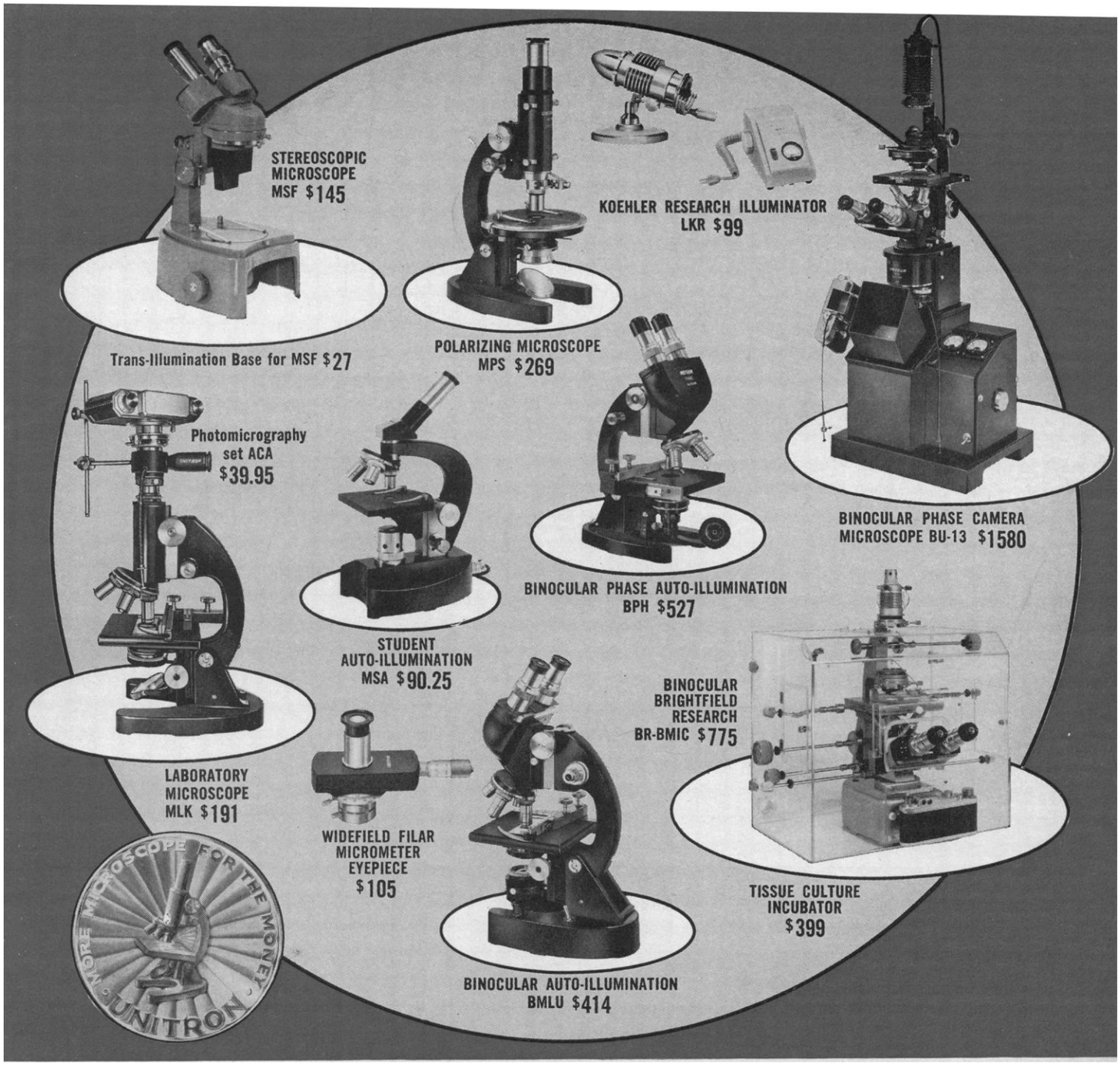

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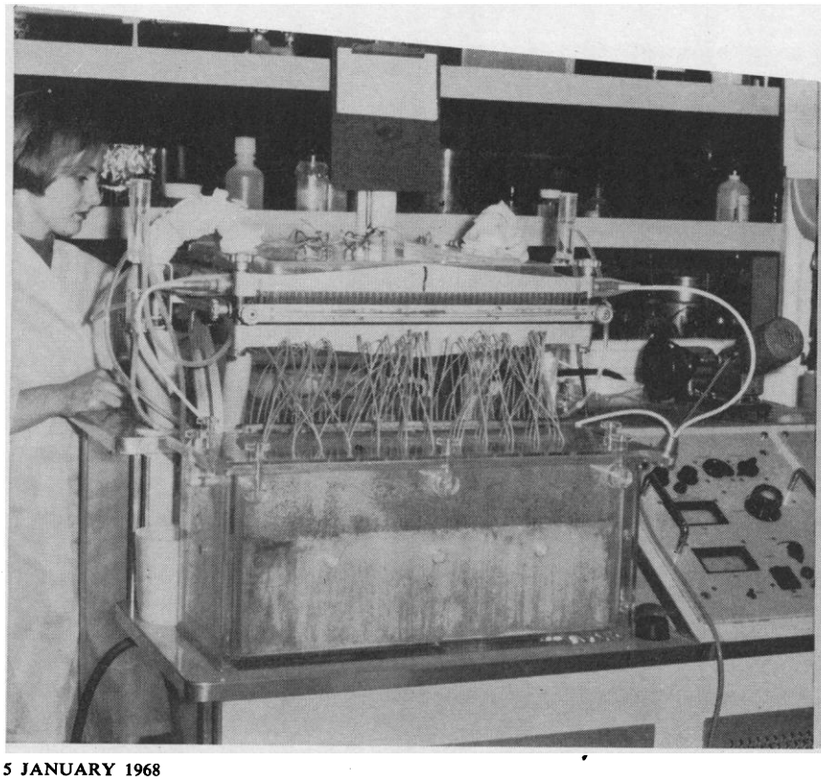

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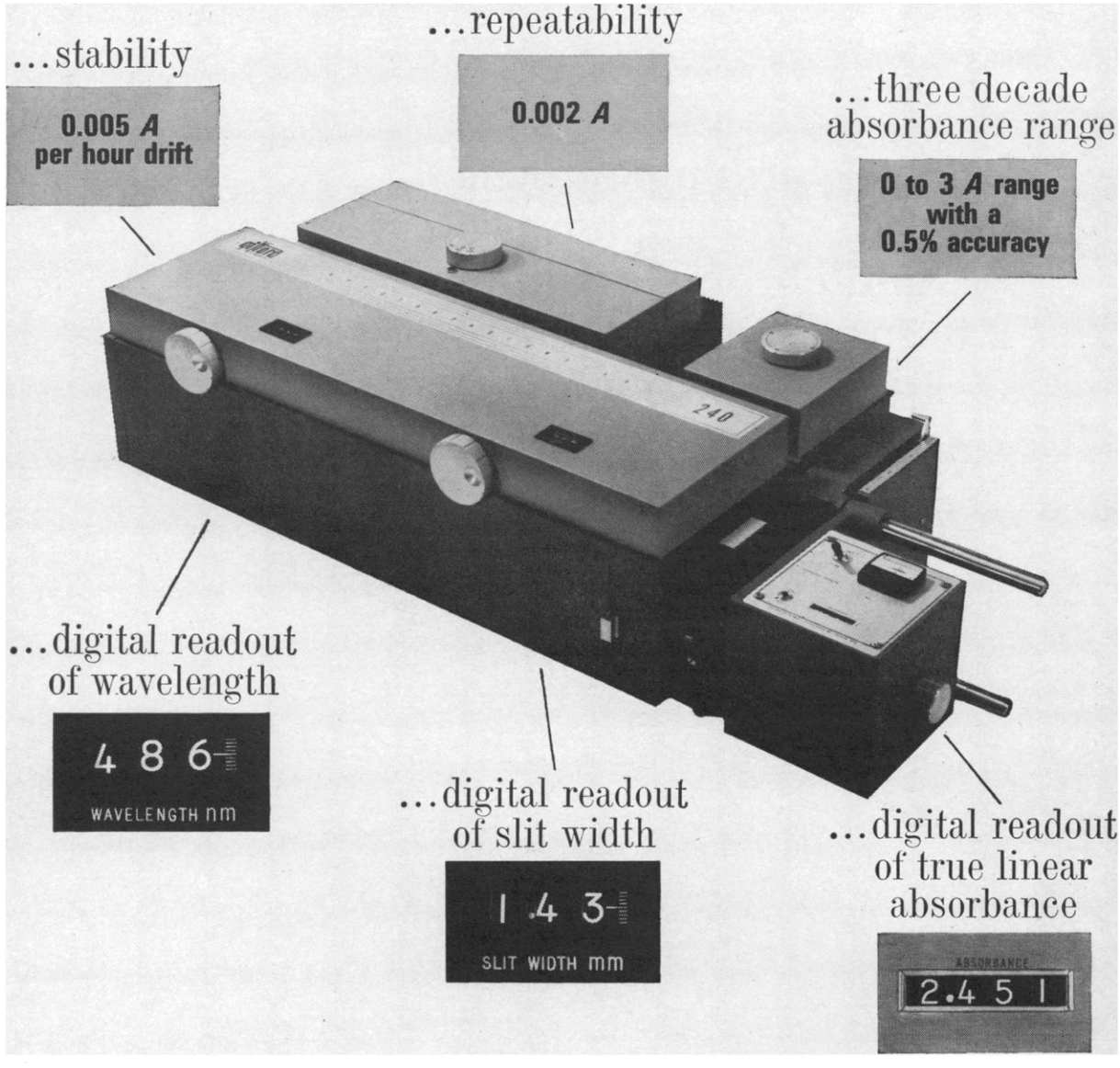

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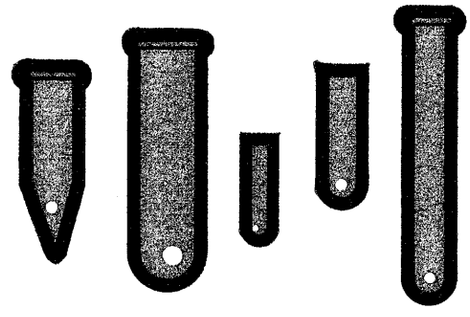

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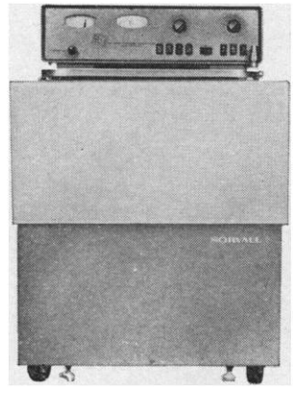

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noise and dust from continued movement of trucks on the mining road and from blasting at the site for the next 20 years. The road would be cut through the virgin rain forest of the Suiattle River valley at the foot of the Glacier Peak itself. A conservative estimate of the area which will be affected by the sights and sounds of this operation for another generation is at least 22,000 acres. Our estimate is that this operation, with all its appurtenances, will upset and damage at least 26,000 acres of the wilderness during the course of the operation. When it is over, the scars will remain for centuries. The allegation has been made that nature will soon reclaim this area. Yet the Holden copper mine, 10 miles away, was abandoned 10 years ago, and the huge tailing piles are still there. Nothing is growing on them. And it seems likely that it will be hundreds of years before anything can. How long is long?

Peugnet implies that the area could be made accessible to the public by virtue of the mining road. Last year, over 10,000 people spent 45,000 man days visiting the Glacier Peak Wilderness, doubling its use in the last 4 years. It is already accessible and it is used to view an unmatched panorama of incredible beauty unmarred by any works of man. It is true that the nation needs minerals. But we are someday going to run short whether we mine every available site or not. The copper ore produced at this particular site would supply about 2 days' worth of U.S. consumption. This operation will tear out the heart of a great wilderness area forever. I think the most appropriate question to ask is whether we want to permit such an operation in such a place. Indeed, it might be said, "Never would so little be gained by so few at the expense of so many."

M. BROCK EVANS
North Cascades Conservation Council, 4534–½ University Way, Seattle, Washington 98105

Peugnet displays no understanding of the wilderness concept or of the relevant acts of Congress. According to federal law, the National Wilderness Areas are intended to remain in their original state, so as to perpetuate the "values of solitude, physical and mental challenge, scientific study, inspiration, and primitive recreation" (Wilderness Act, Title 36, Chapter II, Part 251—Land Uses). On mining claims validly established prior to inclusion of the land within the National Wilderness Preservation System, claimants are required by law to remove any "improvements" no longer needed for mining purposes, restore the original contour of the surface of the land, and promote its revegetation by natural means.

Peugnet's suggestion that Kennecott should leave a road open to the public and a "potentially beautiful lake" is not only incompatible with the wilderness concept but also against the law. . . . The suggestion that an artificial lake would improve Miner's Ridge is certain to outrage anyone who has visited the area. Equally outrageous is the suggestion that a road would be desirable. Tiny Image Lake, although it is 14 miles from the nearest road, is already so heavily used that the vegetation and terrain are in danger. The appearance of a public road, with parking lot, gasoline pumps, and other "improvements" would provide the *coup de grace* for another of our fragile wilderness areas.

RONALD W. ANGEL
Division of Neurology, Stanford University School of Medicine, Palo Alto, California 94304

The 450-acre open pit that Kennecott proposes to gouge out of the top of Plummer Mountain may be "a mere flyspeck in the 458,000-acre Glacier Peak Wilderness Area," but it would be a festering eyesore visible from the entire Suiattle valley, an area a hundred times as large as the pit itself. The blasting could be heard over the rest of the wilderness area and clouds of dust would settle on a lake two miles away which is not just "potentially beautiful," but is already the most beautiful mountain lake in the United States.

Image Lake is a morning-glory pool with gently shelving white sand bottom around the edge and indigo-blue depths in the middle. It is set in a basin of alpine meadows spotted with clumps of fir trees and over the low side of the basin, 6 or 7 miles away and 4000 feet above, the white mass of Glacier Peak looms against the sky, the only one of the Cascade volcanoes which cannot be seen from a paved highway.

Apart from esthetic considerations, there are compelling practical objections to this "development." The possibility of water pollution is not just a matter of speculation; we can be guided by recent, nearby experience. Tailings from the Holden Mine on the

other side of Cloudy Pass did pollute streams and destroy fish. Even now, years after the operation was abandoned, a vast mound of inert, lifeless, brown dirt, loaded with sulfuric acid, fills half the valley of Railroad Creek, waiting for the spring floods from rain and melting snow to carry more of it down to Lake Chelan.

It may be "obvious that the excavation from which both ore and waste are derived could ultimately contain the tailings"; nevertheless, the concentration plant will be 1500 feet below the pit and it is unlikely that Kennecott will hoist the tailings back to their original level as a public service. They are likely to remain precariously perched on a steep mountainside where the spring runoff will have a much greater erosive effect than in the relatively level valley of Railroad Creek.

There are many other undeveloped ore deposits in the United States. One in the Twin Buttes area of Arizona between Tucson and Nogales is being prepared for mining by Anaconda Copper and they are currently running full-page advertisements (see the inside back cover of *Saturday Review*, 28 Oct.) to show how their strip operation is being camouflaged by plantings of indigenous shrubbery. In a flat cactus desert of Arizona this is hardly necessary; the pit is not an offensive contrast to the dry, bare landscape. I would like to invite Kennecott to publish a similar color photograph of Miner's Ridge and show by photomontage what their pit would look like.

ROBERT F. JACKSON
Department of Mathematics, University of Toledo, Toledo, Ohio

Liberties with Language

Richards' analysis (Letters, 20 Oct.) has enabled me to identify, retrospectively, an oddity I encountered some years ago in a manuscript. The text announced that, to allow for some variable or other, values in a table had been "adjustmented." This clearly represents the third term in the series: "to adjust; to make an adjustment; to adjustment." One hopes that no additional terms will make an appearance to be classificationed.

PHILIP S. CORBET
Canada Department of Agriculture, Belleville, Ontario

Masquerade of Undirected Research

For almost a year Project Hindsight has been under discussion (18 Nov. 1966, p. 872; 2 Dec. 1966, p. 1123; 23 June, p. 1571; 29 Sept., p. 1512), and in all that time a point of fundamental importance has been ignored. "Undirected" research is *not* equivalent to pure or basic research.

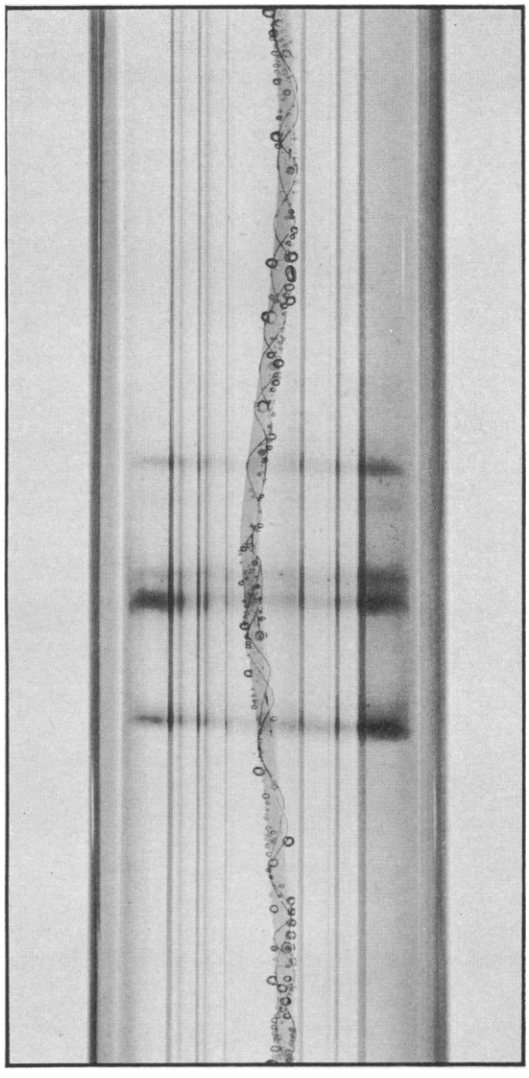
Basic scientific research is concerned with new ideas, new concepts, new principles. It is not concerned with practical applications or development of things, but with the development of ideas fundamental to nature. For this reason it requires a very special scientific competence, even genius, as well as a highly developed sense of purpose and direction.

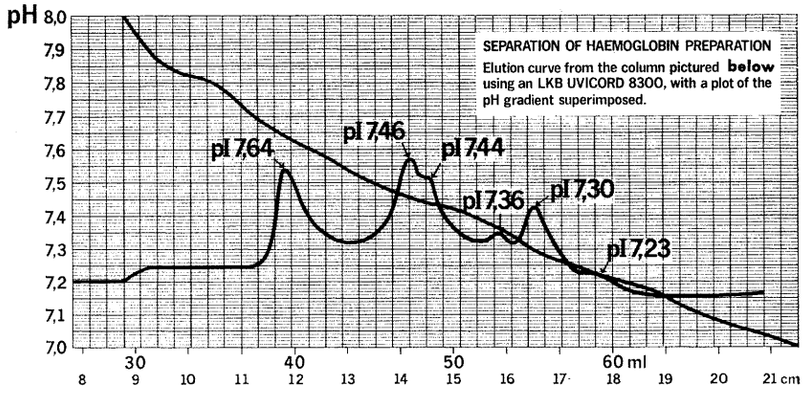
The hard fact is that the overwhelming majority of scientists are not capable of performing basic research to any significant extent, just as there are many well-trained musical arrangers but there are very few really good composers.

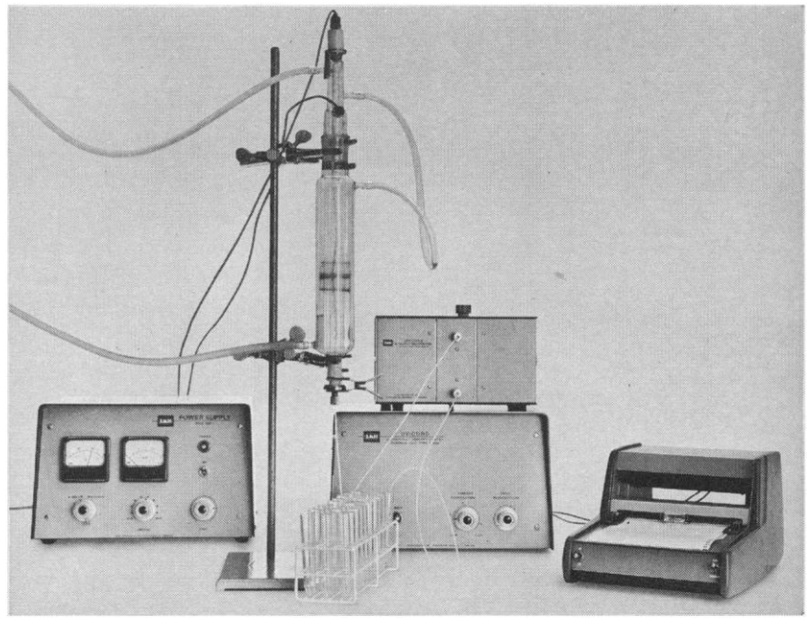
Unfortunately, few scientists are willing to admit to an incapability of accomplishing basic and fundamental research, particularly if they are in academic life. Hence there has arisen that form of self-deception in which the scientist reasons that if his work is "undirected"—not directed toward a specific goal—then it must be basic research. This may be one of the greatest *non sequiturs* of all time, but that does not prevent one afflicted with the delusion from fighting with astounding ferocity for funds for "undirected research." In a sense he is fighting to maintain status, face, and self-respect.

The main conclusion of Project Hindsight (and I support it) is that the usual scientist is more productive when he is given specific goals. To equate this to an attack on the value of basic research is ridiculous. The conclusion may be unpalatable to some, but still the evidence is there that a great deal of undirected research is mere timeserving and scientific busywork masquerading as basic research. The large body of scientists supported by public and corporate funds and allegedly engaged in basic research had best recognize this unhealthy situation and come to grips with it, rather than denounce those who have uncovered it.

ROBERT M. LUKES
223 Bramton Road, Louisville, Kentucky 40207







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5 January 1968, Volume 159, Number 3810

SCIENCE

Meeting Needs for Heavy Elements

Advancing technology and a higher standard of living are creating demands for every chemical element. The special properties of many of the metals are being exploited. For instance, gold is used for spinnerets in forming synthetic fibers, for electrical contacts in switches, and for new brazing alloys used in joining semiconductor devices to metals or in joining glass and other insulating materials to metals. Nonmonetary use of gold in the United States has more than tripled in the past 10 years, and the expansion continues. Use of other metals, such as the platinum group, silver, tin, and antimony, also has been growing. The quantities involved are substantial, and in none of these is the United States self-sufficient. To meet present needs, the United States must expend annually more than a billion dollars for imports of these elements. Our industrial growth in the future could be limited by inability to pay for expanded requirements of heavy metals.

For nearly 60 years following the discovery of gold in California in 1848, the United States was the world's leading producer of gold. Today, our production is only about 4 percent of the free world's total. The rich placer deposits are exhausted, and once-profitable mines have been closed. Recently, however, because of expanded activities by the Geological Survey and the Bureau of Mines, the outlook for gold has improved. The Geological Survey is providing a better assessment of the occurrence of gold, and the Bureau of Mines is devising better and cheaper means of recovering it.

The Survey has devised a sensitive field procedure to assess the occurrence of gold in rocks. Following sample preparation, the gold is extracted and measured by spectrophotometry. Using this method, the Survey has been examining a large number of samples. Average rocks contain 5×10^{-9} part of gold, or an amount worth about a half cent per ton of rock at the current price of $35 per ounce. When rock undergoes weathering or other geochemical processes, concentration of the gold can occur. The Geological Survey estimates that between 10^9 and 10^{10} ounces of gold are present in about 50 cubic miles of rock located in northwest Wyoming. This corresponds to a concentration of about 100×10^{-9} and an average value of about 10 cents per cubic yard. However, local concentrations higher than the average exist, and mining in some of these localities might prove to be economical.

In Nevada the Survey method has pinpointed two ore bodies, one at Carlin (already being exploited) and another at Cortez. Both ores average about 10 parts per million, or 0.3 ounce per ton, and can be mined by open pit methods.

Among other projects, the Bureau of Mines has been seeking better ways of extracting gold from ores and has been investigating the possibility of leaching in place. In the established leaching procedure cyanide solutions are used. The poisonous character of the cyanide and its ineffectiveness in the case of some ores are undesirable features. The Bureau of Mines has discovered that malononitrile is an effective, nontoxic substitute for HCN.

The new government-sponsored heavy metals program has been in operation for a year and a half. It promises some amelioration of our balance of payments problem and a better assessment of our natural resources. However, the gap between prospective needs and proven reserves is great, and the problem deserves the attention of many competent scientists and engineers.—PHILIP H. ABELSON

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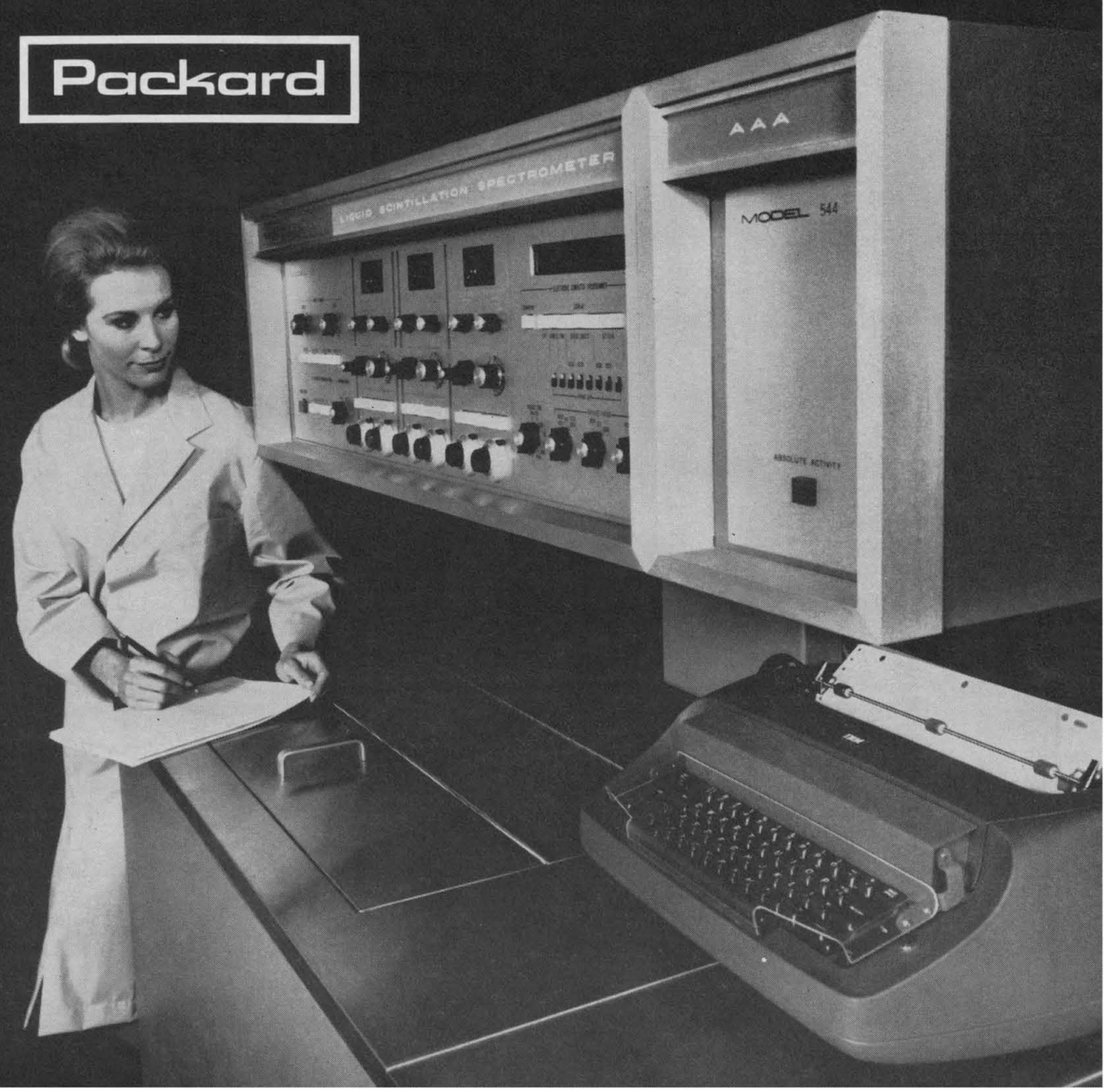

22–27. **Air Conditioning** Principles and Practices, Austin, Tex. (D. E. Griffith, Program Director, Taylor Hall 153, College of Engineering, University of Texas, Austin 78712)

23. **Industrial Associates** Research Review, Houston, Tex. (D. E. Griffith, Program Director, Taylor Hall 153, College of Engineering, University of Texas, Austin 78712)

23. Preventive and Therapeutic Aspects of **Coronary Heart Disease**, conf., New York, N.Y. (Conference Planning Committee, New York Heart Association, 10 Columbus Circle, New York 10019)

23–26. Council on **Social Work Education**, Minneapolis, Minn. (P. Stickney, Council on Social Work Education, 345 E. 46 St., New York 10017)

23–26. **Water**, Technical Committee mtg., West Palm Beach, Fla. (American Soc. for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103)

23–27. American Mathematical Soc., 74th annual, San Francisco, Calif. (G. L. Walker, American Mathematical Soc., Box 6248, Providence, R.I. 02904)

24–25. **Health Physics**, 2nd mid-year symp., Augusta, Ga. (C. M. Patterson, E. I. duPont, Savannah River Lab., Aiken, S.C. 29801)

25–27. **Mathematical** Assoc. of America, 51st annual, San Francisco, Calif. (H. M. Gehman, MAA, Executive Director, c/o SUNY at Buffalo, N.Y. 14214)

25–27. **Symmetry Principles** at High Energy, 4th conf., Coral Gables, Fla. (Conf. on Symmetry Principles at High Energy, Center for Theoretical Studies, University of Miami, Coral Gables)

27–1. American Group **Psychotherapy** Assoc., conf., Chicago, Ill. (M. Schiff, AGPA, Room 702, 1790 Broadway, New York 10019)

28. Fourth **Mössbauer** Symp., Chicago, Ill. (P. A. McNulty, New England Nuclear Corp., 575 Albany St., Boston, Mass. 02118)

28–2. Institute of **Electrical and Electronics Engineers**, winter power mtg., New York, N.Y. (J. W. Bean, American Electric Power, 2 Broadway, New York 10008)

28–2. **Testing and Materials**, winter mtg., Atlantic City, N.J. (T. A. Marshall, Jr., American Soc. for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103)

29–31. National Assoc. of **Private Psychiatric Hospitals**, 35th annual mtg., Miami Beach, Fla. (The Association, 353 Broad Ave., Leonia, N.J.)

29–31. Society of **Thoracic Surgeons**, annual mtg., New Orleans, La. (F. X. Byron, Executive Secretary, Society for Thoracic Surgeons, City of Hope Medical Center, 1500 E. Duarte Rd., Duarte, Calif. 91010)

29–1. American Assoc. of **Physics Teachers**, annual mtg., Chicago, Ill. (S. S. Ballard, Univ. of Florida, Gainesville 32603)

29–1. American **Meteorological** Soc., 48th annual, San Francisco, Calif. (K. C. Spengler, AMS, 45 Beacon St., Boston, Mass. 02108)

29–1. American **Physical** Soc., annual mtg., Chicago, Ill. (R. G. Sachs, Box 344, Argonne, Ill. 60440)

29–3. **Bio-Physical Techniques**, Hopatcong, N.J. (Center for Professional Advancement, P.O. Box 66, Hopatcong 07843)

February

1–2. American **Chemical** Soc., 3rd Middle Atlantic regional mtg., Philadelphia, Pa. (H. Reiff, Smith, Kline and French Labs., 15th and Spring Garden St., Philadelphia 19130)

1–3. **Solar Astronomy**, Tucson, Ariz. (N. Sheeley, Kitt Peak National Observatory, 950 North Cherry Ave., P.O. Box 4130, Tucson 85717)

3–7. American Acad. of **Allergy**, annual mtg., Boston, Mass. (J. O. Kelley, Executive Secretary, 756 N. Milwaukee St., Milwuakee, Wis. 53202)

3–9. National **Asphalt Pavement** Assoc., annual, Los Angeles, Calif. (The Association, 6715 Kenilworth Ave., Riverdale, Md.)

4–7. American **Crystallographic** Assoc., Tucson, Ariz. (W. L. Kehl, % Gulf R&D Co., P.O. Drawer 2038, Pittsburgh, Pa. 15230)

5–6. **Underwater Photo-Optical Instrumentation** Applications, San Diego, Calif., (Society of Photo-Optical Instrumentation Engineers, P.O. Box 288, Redondo Beach, Calif. 90277)

5–8. American Soc. of Heating, Refrigerating and Air-Conditioning Engineers, semiannual mtg., Columbus, Ohio. (J. I. Szabo, 345 E. 47 St., New York, New York 10017)

5–9. **Applied Transducers** Workshop for Scientists and Engineers, Hopatcong, N.J. (Saul Gordon Associates Center for Professional Advancement, P.O. Box 66, Hopatcong 07843)

6–7. **Sanitary Engineering**, 10th conf., Urbana, Ill. (Div. of University Extension, Room 116e, Illini Hall, Champaign, Ill. 61820)

6–8. American College of **Radiology**, annual mtg., Chicago, Ill. (W. C. Stronach, American College of Radiology, 20 N. Wacker Dr., Chicago, Ill. 60606)

6–9. **Reinforced Plastics**, 23rd annual div. conf., Washington, D.C. (L. P. Williams, Soc. of the Plastics Industry, 250 Park Ave., New York 10017)

7. **Medical Library** Group of Southern California, Los Angeles, Calif. (Medical Library Assoc., Inc., 919 N. Michigan Ave., Chicago, Ill.)

7–9. American Acad. of **Occupational Medicine**, Washington, D.C. (B. D. Dinman, Dept. of Industrial Health, University of Michigan, Ann Arbor 48104)

7–9. American Assoc. of **Petroleum Geologists**, Southwestern Section, Wichita Falls, Tex. (E. A. Baldon, % Tom B. Medders, 414 City National Bldg., Wichita Falls 76301)

7–9. Methods of **Air Pollution and Industrial Hygiene** Studies, 9th conf., Pasadena, Calif. (P. K. Mueller, Air and Industrial Hygiene Laboratory, California State Dept. of Public Health, 2151 Berkeley 94704)

7–10. American **Educational Research** Assoc., Chicago, Ill. (The Association, 1126 16th St., NW, Washington, D.C. 20036)

8–10. Pacific Northwest **Oceanographers**, 17th annual mtg., Seattle, Wash. (L. H.

Larsen, Dept. of Oceanography, Univ. of Washington, Seattle 98105)

8–10. Society of **University Surgeons**, annual mtg., Lexington, Ky. (W. G. Austen, The Society, Massachusetts General Hospital, Boston)

10. **History of Science**, Columbus, Ohio. (R. L. Stuckey, Ohio Acad. of Science, 1735 Neil Ave., Columbus 43210)

12–14. **Aircraft Design** for 1980, Washington, D.C. (Meetings Manager, 1290 Sixth Ave., New York 10019)

13–15. **Aerospace and Electronic Systems**, Los Angeles, Calif. (R. M. Emberson, 345 E. 47 St., New York 10017)

13–15. **Military Aircraft Systems**, Washington, D.C. (Meetings Manager, 1290 Sixth Ave., New York 10019)

13–16. American **Public Power** Assoc., Sacramento, Calif. (A. Radin, General Manager, Suite 830. 919 18th St., NW, Washington, D.C. 20006)

14–16. **Offshore Exploration** Conf., New Orleans, La. (M. F. Oberacker, Manager, Administration, OECON, P.O. Box 88, Palos Verdes Estates, Calif.)

15. **Commercial Application of Ultrasonics**, New York, N.Y. (J. N. Antonevich, Blackstone Corp., 1111 Allen St., Jamestown, N.Y. 14701)

16–17. **Neurobiological Aspects of Psychopathology**, New York, N.Y. (J. Zubin, 722 W. 168 St., New York 10032)

16. **Reliability Symp.**, 9th annual West Coast, Beverly Hills, Calif. (R. J. Green, TRW Systems, Building E2/6043, One Space Park, Redondo Beach, Calif. 90278)

16–18. **Repair and Regeneration**, Symp., San Francisco, Calif. (Continuing Education in Health Sciences, University of California, San Francisco Medical Center, Parnassus and Third Ave., San Francisco 94122)

18–21. American Inst. of **Chemical Engineers**, 63rd natl. mtg., St. Louis, Mo. (L. L. Fellinger, Monsanto Co., 800 N. Lindbergh, St. Louis)

18–22. Society of **Economic Geologists**, New York, N.Y. (R. A. Laurence, P.O. Box 1549, Knoxville, Tenn. 37901)

18–22. Technical Assoc. of the **Pulp and Paper Industry**, 53rd annual mtg., New York, N.Y. (K. G. Chesley, TAPPI, 360 Lexington Ave., New York 10017)

19–20. **Engineering Project Investment Analysis**, Austin, Tex. (D. E. Griffith, Program Director, Taylor Hall 153, College of Engineering, Univ. of Texas, Austin 78712)

19–21. **Biophysical Soc.**, 12th annual mtg., Pittsburgh, Pa. (Local Arrangements Chairman, I. Bendet. Biophysics Dept., Univ. of Pittsburgh, Pittsburgh 15213)

19–23. **Transportation Engineering** Conf., San Diego, Calif. (W. H. Wisely, 345 E. 47 St., New York, N.Y. 10017)

19–25. American Soc. of **Civil Engineers**, San Diego, Calif. (W. H. Wisely, ASCE, 345 E. 47th St., New York 10017)

21–22. **Industrial Pharmacy**, Austin, Tex. (W. L. Guess, Dept. of Pharmacy, College of Pharmacy, University of Texas, Austin 78712)

22–24. Central **Surgical** Assoc., Cleveland, Ohio. (B. L. Willman, 1402 S. Grand Blvd., St. Louis, Mo. 63104)

25. **Psychoanalysis**, 6th annual scientific conf., New York, N.Y. (A. Blatt, Chairman Program Committee, 7 W. 96 St., New York 10025)

25–29. American Inst. of **Mining, Metallurgical, and Petroleum Engineers,** 97th annual mtg., New York, N.Y. (C. Hopkins, 345 E. 47 St., New York 10017)

26–28. American **Physical Soc.,** Boston, Mass. (W. W. Havens, Jr., Columbia Univ., New York 10027)

26–28. Association of **Asphalt Paving Technologists,** Atlanta, Ga. (L. L. Kole, Box 619, Ann Arbor, Mich. 48107)

26–28. Association of **Iron and Steel Engineers,** Western mtg., San Francisco, Calif. (T. J. Ess, 1010 Empire Bldg., Pittsburgh, Pa. 15222)

26–1. American Assoc. of **Junior Colleges,** 48th annual conv., Boston, Mass. (The Association, 1315 16th St., NW, Washington, D.C. 20036)

27. National **Multiple Sclerosis** Soc., New York, N.Y. (S. Lawry, Executive Director, 257 Park Ave., South, New York 10010)

27–28. National **Dairy Engineering** Conf., 16th annual, East Lansing, Mich. (D. R. Heldman, Dept. of Agricultural Engineering, Michigan State Univ., East Lansing 28823)

27–3. **Scintillation and Semiconductor Counter,** 11th symp., Washington, D.C. (R. M. Emberson, 345 E. 47 St., New York, N.Y. 10017)

28–3. American College of **Cardiology,** annual mtg., San Francisco, Calif. (W. D. Nelligan, 9650 Rockville Pike, Bethesda, Md. 20014)

28–3. **Biology Teachers,** Anaheim, Calif. (J. P. Lightner, Secretary, 1420 N St., NW, Washington, D.C.)

International and Foreign Meetings

January

19–21. **Diseases of Colon, Rectum, and Anus,** intern. seminar, Bombay, India. (R. K. Menda, Chairman, P.O Box 677, Bombay)

23–26. Canadian **Pulp and Paper** Assoc., 54th annual mtg., Montreal, P.Q., Canada. (The Association, 2280 Sun Life Building, Montreal 2, Quebec)

24–31. Australian and New Zealand Assoc. for the **Advancement of Science,** 40th Congr., Christchurch, New Zealand. (B. R. Penfold, Univ. of Canterbury, Private Bag, Christchurch 1)

29–30. Canadian Soc. of **Chemotherapy,** 4th annual mtg., Montreal, Quebec. (L. Tétreault, Service de Recherche, Hôpital Saint-Jean-de-Dieu, Montréal-Gamelin, Québec, Canada)

29–31. **Photosensitization in Solids,** 2nd intern. conf., Tucson, Ariz. (G. Tollin, Dept. of Chemistry, Univ. of Arizona, Tucson 85721)

February

1–25 Mar. United Nations Conf. on **Trade and Development,** 2nd session, New Delhi, India. (United Nations, New York, N.Y.)

4–17. **Cohesion and Conflict** within the East and within the West, conf., Steyning, England. (H. Koeppler, Warden, Wilton Park, Wiston House, Steyning, Sussex)

6–8. **Weed Control,** Inter-American conf., New Orleans, La. (J. B. Baker, Dept. of Botany and Plant Pathology, Louisiana State Univ., Baton Rouge)

BOOKS RECEIVED

(Continued from page 75)

Basic Fluid Power. Dudley A. Pease. Prentice-Hall, Englewood Cliffs, N.J., 1967. xiv + 333 pp., illus. $13.50.

Basic Physical Chemistry for the Life Sciences. Virginia R. Williams and Hulen B. Williams. Mathematical appendix by Bill B. Townsend. Freeman, San Francisco, 1967. xii + 382 pp., illus. $11.50.

Being, Becoming and Behavior. The Psychological Sciences. Edited with introductions by Floyd W. Matson. Braziller, New York, 1967. xvi + 288 pp. $7.50.

Beyond the Frontier. Social Process and Cultural Change. Paul Bonannan and Fred Plog, Eds. Published for the American Museum of Natural History by Natural History Press, Garden City, N.Y., 1967. xviii + 413 pp. Cloth, $6.95; paper, $2.50. American Museum Sourcebooks in Anthropology.

The Biochemistry and Physiology of Infectious Plant Disease. Robert N. Goodman, Zoltán Király, and Milton Zaitlin. Van Nostrand, Princeton, N.J., 1967. x + 354 pp., illus. $12.50.

Birth Control. Ernest Havemann and the Editors of Time-Life Books. Time, New York, 1967. 118 pp., illus. Cloth, $3.95; paper, $1.95.

Bronchial Asthma. A Genetic, Population and Psychiatric Study. Denis Leigh and Edward Marley, with the assistance of Dorothy Braithwaite. Pergamon, New York, 1967. viii + 192 pp. $10.

Characters of Finite Groups. Walter Feit. Benjamin, New York, 1967. x + 186 pp. Cloth, $9.50; paper, $4.95. Mathematics Lecture Notes.

Chemistry. A First Course in Modern Chemistry. Alfred B. Garrett, John S. Richardson, and Earl J. Montague. Ginn, Boston (rev. ed.), 1966. viii + 765 pp., illus. $6.60. Laboratory manual, xvi + 355 pp., illus. Paper, $2.88; teacher's ed., paper, $2.88.

Comprehensive Biochemistry. Vol. 27, Photobiology, Ionizing Radiations. Marcel Florkin and Elmer H. Stotz, Eds. Elsevier, New York, 1967. xvi + 384 pp., illus. $20.

Computers in Medicine. A Primer for the Practicing Physician. Sidney O. Krasnoff. Thomas, Springfield, Ill., 1967. xiv + 126 pp., illus. $6.75.

Cowles Encyclopedia of Science, Industry and Technology. Benedict A. Leerburger, Jr., Ed. James T. Andrews, Art Director. Cowles Education Corp., New York, 1967. viii + 510 pp., illus. $9.95.

Culture and Consciousness. Perspectives in the Social Sciences. Edited with introductions by Gloria B. Levitas. Braziller, New York, 1967. xii + 340 pp. $7.50.

Debate the Antiballistic Missile. Eugene Rabinowitch and Ruth Adams, Eds. Published for the *Bulletin of the Atomic Scientists* by the Educational Foundation for Nuclear Science, Chicago, 1967. vi + 172 pp., illus. Cloth, $5; paper, $1.50.

Development of Fishes of the Chesapeake Bay Region. An Atlas of Egg, Larval, and Juvenile Stages. Part 1. Alice J. Mansueti and Jerry D. Hardy, Jr. Earl E. Deubler, Jr., Ed. Natural Resources Institute, University of Maryland, College Park, 1967. vi + 202 pp., illus. $9.50.

Disease in Forest Plantations: Thief of Time. Successes and Failures in Forest Plantations as Guides to Disease Prevention. Dow V. Baxter. Cranbrook Institute of Science, Bloomfield Hills, Mich., 1967. xviii + 251 pp., illus. $8.50. Cranbrook Institute of Science Bulletin 51.

Dynamic Aspects of Biochemistry. Ernest Baldwin. Cambridge University Press, New York, ed. 5, 1967. xiv + 466 pp., illus. $9.50.

Economic Evaluation of Urban Renewal. Conceptual Foundation of Benefit-Cost Analysis. Jerome Rothenberg. Brookings Institution, Washington, D.C., 1967. xiv + 277 pp., illus. $6.75.

The Economic Life of the Ancient World. Jean-Philippe Lévy. Translated from the French edition (Paris, 1964) by John G. Biram. University of Chicago Press, Chicago, 1967. x + 147 pp. $5.

Edward Wilson's Birds of the Antarctic. Brian Roberts, Ed. Humanities Press, New York, 1967. 191 pp., illus. $17.50.

Electromagnetic Depth Soundings. Papers by L. L. Vanyan and others, selected and translated from the Russian by George V. Keller. Consultants Bureau, New York, 1967. viii + 312 pp., illus. Paper, $27.50. Special Research Report.

Electromagnetic Scattering. Proceedings of the 2nd Interdisciplinary conference, Amherst, Mass., June 1965. Robert L. Rowell and Richard S. Stein, Eds. Gordon and Breach, New York, 1967. xx + 842 pp., illus. Reference ed., $48.; professional ed., $19.50.

Electrosorption. Eliezer Gileadi, Ed. Plenum, New York, 1967. xiv + 221 pp., illus. $12.50.

Eléments de Physique Nucléaire. Daniel Blanc and Georges Ambrosino. Masson, Paris, ed. 2, 1967. viii + 285 pp., illus. Paper, 50 F.

Engström-Finean Biological Ultrastructure. J. B. Finean. Academic Press, New York, ed. 2, 1967. viii + 384 pp., illus. $15.

L'Environnement de la Terre. Francis Delobeau. Presses Universitaires de France, Paris, 1967. viii + 163 pp., illus. Paper, 15 F. La Science Vivante.

Eskimos of the Nushagak River. An Ethnographic History. James W. VanStone. University of Washington Press, Seattle, 1967. xxiv + 192 pp. $6.95.

The Evolution of Society. Selections from Herbert Spencer's *Principles of Sociology*. Edited and with an introduction by Robert L. Carneiro. University of Chicago Press, Chicago, 1967 lviii + 241 pp. $10.95. Classics in Anthropology.

Experiments in Persuasion. Ralph L. Rosnow and Edward J. Robinson, Eds. Academic Press, New York, 1967. xx + 519 pp., illus. $8.95. Social Psychology Series.

Eye Movements and Vision. Alfred L. Yarbus. Translated from the Russian edition (Moscow, 1965) by Basil Haigh. Lorrin A. Riggs, Translation Ed. Plenum, New York, 1967. xiv + 222 pp., illus. $17.50.

The First Four Georges. J. H. Plumb. Science Editions (Wiley), New York, 1967. 188 pp., illus. Paper, $1.95. Reprint of the 1956 edition.

The Fishes. Url Lanham. Columbia

University Press, New York, 1967. viii + 116 pp., illus. Paper, $2.25. Reprint of the 1962 edition.

Flora of Turkey and the East Aegean Islands. Vol. 2. P. H. Davis, J. Cullen, and M. J. E. Coode, Eds. Edinburgh University Press, Edinburgh; Aldine, Chicago, 1967. xii + 581 pp., illus. $33.50.

Fluorescence. Based on an American Chemical Society symposium, Miami Beach, Fla., April 1967. Theory, Instrumentation, and Practice. George G. Guilbault, Ed. Dekker, New York, 1967. xxviii + 697 pp., illus. $15.75.

Fluorescence and Phosphorescence of Proteins and Nucleic Acids. Sergei V. Konev. Translated from the Russian edition (Minsk, 1965). Sidney Udenfriend, Translation Ed. Plenum, New York, 1967. x + 204 pp., illus. $9.50.

Focusing of Charged Particles. Vol. 1. Albert Septier, Ed. Academic Press, New York, 1967. xiv + 509 pp., illus. $21.

Formulaire pour le Calcul Opérationnel. V. A. Ditkin and A. P. Prudnikov. Translated into French from the Russian edition (Moscow, 1965) by G. Carvallo. Mason, Paris, 1967. 472 pp. 65 F.

Foundations of Projective Geometry. Robin Hartshorne. Benjamin, New York, 1967. viii + 167 pp., illus. Cloth, $8.50; paper, $2.95.

Fundamentals of Gas-Surface Interactions. Proceedings of a symposium, San Diego, Calif., Dec. 1966. Howard Saltsburg, Joe N. Smith, Jr., and Milton Rogers, Eds. Academic Press, New York, 1967. x + 557 pp., illus. $14.50.

Ganglion-Blocking and Ganglion-Stimulating Agents. D. A. Kharkevich. Translated from the Russian edition (Moscow, 1962) by R. Crawford. W. D. M. Paton, Ed. Pergamon, New York, 1967. xii + 367 pp., illus. $14.

Gear Design and Application. Nicholas P. Chironis, Ed. McGraw-Hill, New York, 1967. viii + 375 pp., illus. $10.

Gene Theory. Elof Axel Carlson, Ed. Dickenson, Belmont, Calif., 1967. xiv + 158 pp., illus. Text ed., $2.25; trade ed., $3. Dickenson Series on Contemporary Thought in Biological Science.

The Generation of High Magnetic Fields. David H. Parkinson and Brian E. Mulhall. Plenum, New York, 1967. xiv + 165 pp., illus. $11.50. International Cryogenics Monographs, vol. 5.

Government in Science. The U.S. Geological Survey, 1867–1894, Thomas G. Manning. University of Kentucky Press, Lexington, 1967. xiv + 257 pp., illus. $7.

Hanover to Windsor. Roger Fulford. Science Editions (Wiley), New York, 1967. 208 pp., illus. Paper, $1.95. Reprint of the 1960 edition.

The Harper Encyclopedia of Science. James R. Newman, Jerome Wyckoff, Roger G. Menges, and Edmund H. Harvey, Jr., Eds. Harper and Row, New York; Sigma, Washington, D.C., ed. 2, 1967. x + 1379 pp., illus. $35.

The Heart of the Atom. The Structure of the Atomic Nucleus. Bernard L. Cohen. Doubleday, Garden City, N.Y., 1967. xii + 107 pp., illus. $3.95.

Heterocyclic Compounds. Vol. 9. Pteridines, Alloxazines and Compounds with 7-Membered or Larger Rings. Robert C. Elderfield, Ed. Wiley, New York, 1967. x + 377 pp., illus. $25.

High Energy Collisions of Elementary Particles. R. J. Eden. Cambridge University Press, New York, 1967. xii + 298 pp., illus. $9.50.

A History of the Weimar Republic. Vol. 1, From the Collapse of the Empire to Hindenburg's Election. Erich Eyck. Translated from the second German edition (1957) by Harlan P. Hanson and Robert G. L. Waite. Science Editions (Wiley), New York, 1967. xiv + 373 pp. Paper, $3.45. Reprint of the 1962 edition.

Hummingbirds. Walter Scheithauer. Translated from the German edition (1966) by Gwynne Vevers. Photographs by the author. Crowell, New York, 1967. 176 pp. $10.

Hunting for Fossils. A Guide to Finding and Collecting Fossils in all Fifty States. Marian Murray. Drawings by Madge Perry. Macmillan, New York, 1967. xxvii + 348 pp. $7.95.

Inequalities. Proceedings of a symposium, Wright-Patterson Air Force Base, Ohio, August 1965. Oved Shisha, Ed. Academic Press, New York, 1967. xiv + 360 pp., illus. $18.

The Insects. Url Lanham. Columbia University Press, New York, 1967. viii + 292 pp., illus. Paper, $2.95. Reprint of the 1964 edition.

Internal Friction in Metals and Alloys. V. S. Postnikov, F. N. Tavadze, and L. K. Gordienko, Eds. Translated from the Russian edition (Moscow, 1966) by Albin Tybulewicz. Consultants Bureau, New York, 1967. x + 266 pp., illus. $27.50. Special Research Report.

International Relations Research. Problems of Evaluation and Advancement. E. Raymond Platig. Published for Carnegie Endowment for International Peace by Clio Press, Santa Barbara, Calif., 1967. xiv + 211 pp. Cloth, $6.50; paper, $3.50. Twentieth Century Series, No. 3.

International Review of Cytology. Vol. 22. G. H. Bourne, J. F. Danielli, and Kwang Jeon, Eds. Academic Press, New York, 1967. xviii + 420 pp., illus. $19.

The Intrapsychic Self. Feeling, Cognition, and Creativity in Health and Mental Illness. Silvano Arieti. Basic Books, New York, 1967. xvi + 487 pp., illus. $12.50.

Introduction to Stellar Statistics. Rudolf Kurth. Pergamon, New York, 1967. viii + 175 pp., illus. $8. International Series of Monographs in Natural Philosophy, vol. 10.

An Introduction to the Chemistry of Heterocyclic Compounds. R. M. Acheson. Interscience (Wiley), ed. 2, 1967. xviii + 408 pp., illus. $8.95.

Introductory Physical Science. IPS Group, Educational Services Incorporated. Prentice-Hall, Englewood Cliffs, N.J., 1967. xii + 227 pp., illus. Cloth, $3.72; paper, $2.64.

Jahrbuch der Deutschen Akademie der Wissenschaften zu Berlin, 1966. Akademie-Verlag, Berlin, 1967. viii + 866 pp. DM 48.

Kirk-Othmer Encyclopedia of Chemical Technology. Vol. 13, Manganese Compounds to Nitrophenols. Eva Parolla Dukes, Christopher Coleman, Gloria Joyce, Anna Klingsberg, and Paul van Reyen, Eds. Interscience (Wiley), New York, ed. 2, 1967. xiv + 894 pp., illus. $50; by subscription, $40.

Landform Studies from Australia and

New Guinea. J. N. Jennings and J. A. Mabbutt, Eds. Cambridge University Press, New York, 1967. xxiv + 434 pp., illus. $19.50.

Lecture Notes on Elementary Topology and Geometry. I. M. Singer and John A. Thorpe. Scott, Foresman, Glenview, Ill., 1967. vi + 214 pp., illus. Paper, $6.25.

Long-Range Forecasting and Planning. A symposium sponsored by the Office of Aerospace Research, U.S. Air Force Academy, Colorado, August 1966. Air Force Office of Scientific Research, Arlington, Va., 1967 (available from Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.). x + 200 pp., illus. $3.

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