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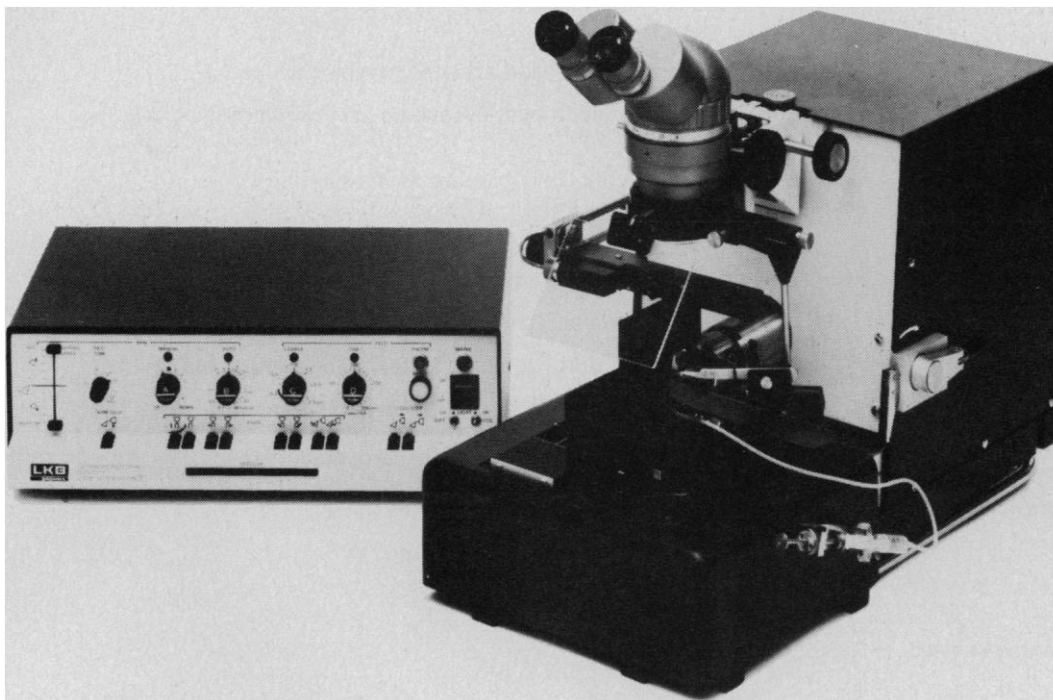
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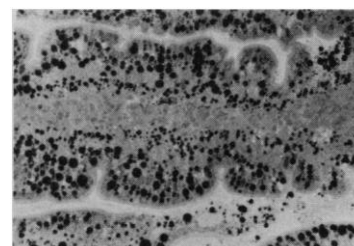
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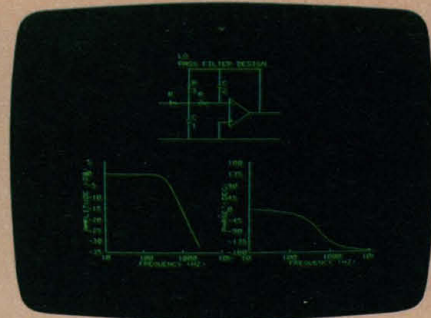


(Cover) Herring gull chick (*Larus argentatus*). [A. Gilman, Canadian Wildlife Service] (Above) Light micrograph of intestinal tissue from gull dosed with crude oil. Presence of lipid droplets in the epithelium may be related to observed impairment of intestinal nutrient transport. Epon section stained with Sudan Black (About $\times 100$). See page 315. [H. Church, Mount Desert Island Biological Laboratory, Salsbury Cove, Maine]

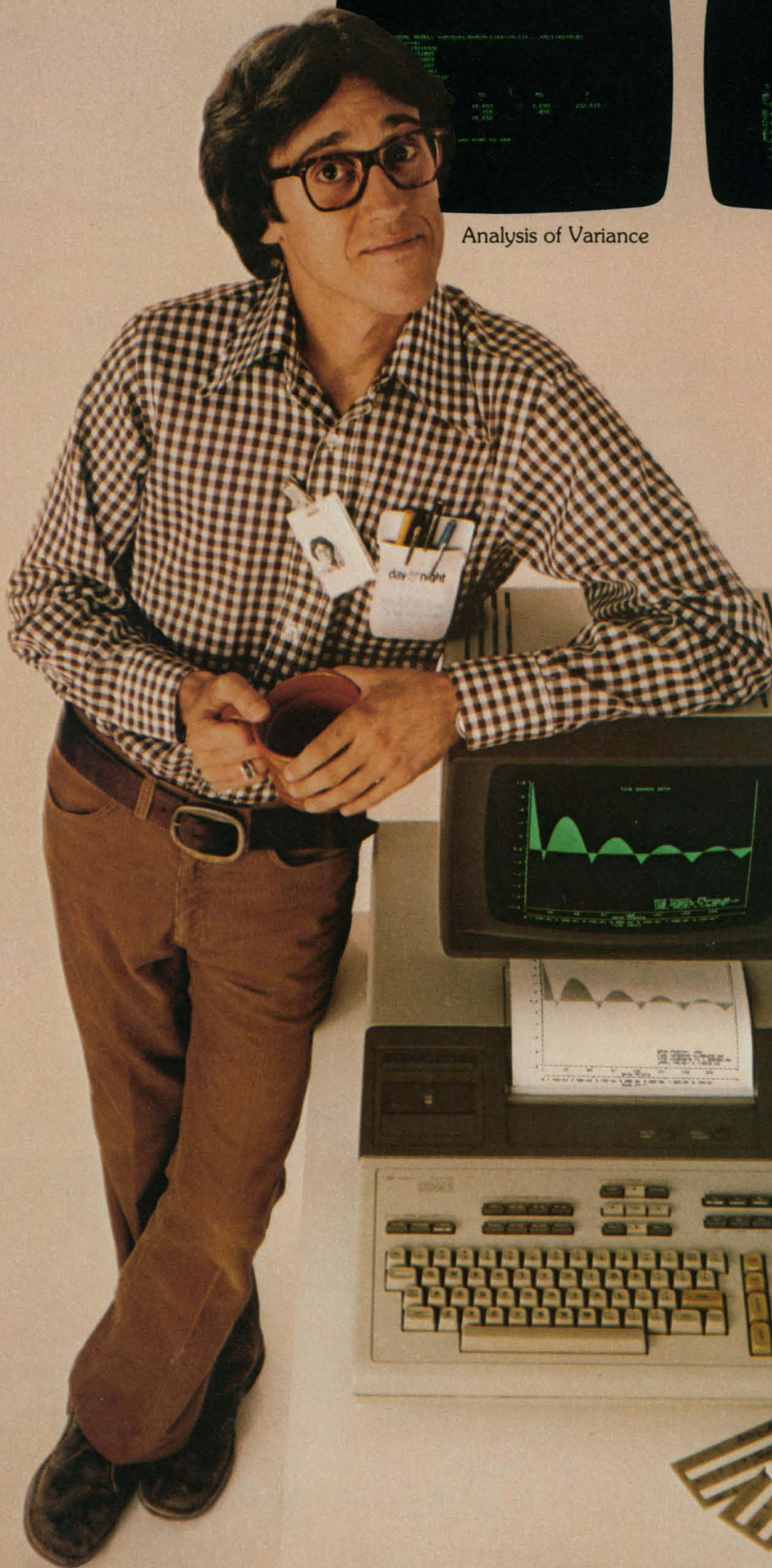
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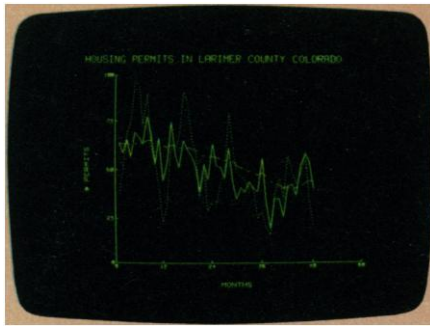


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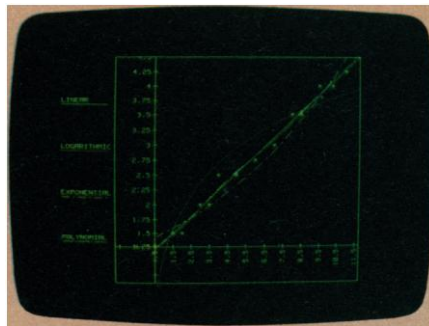


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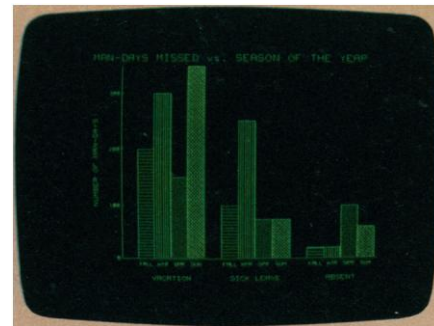




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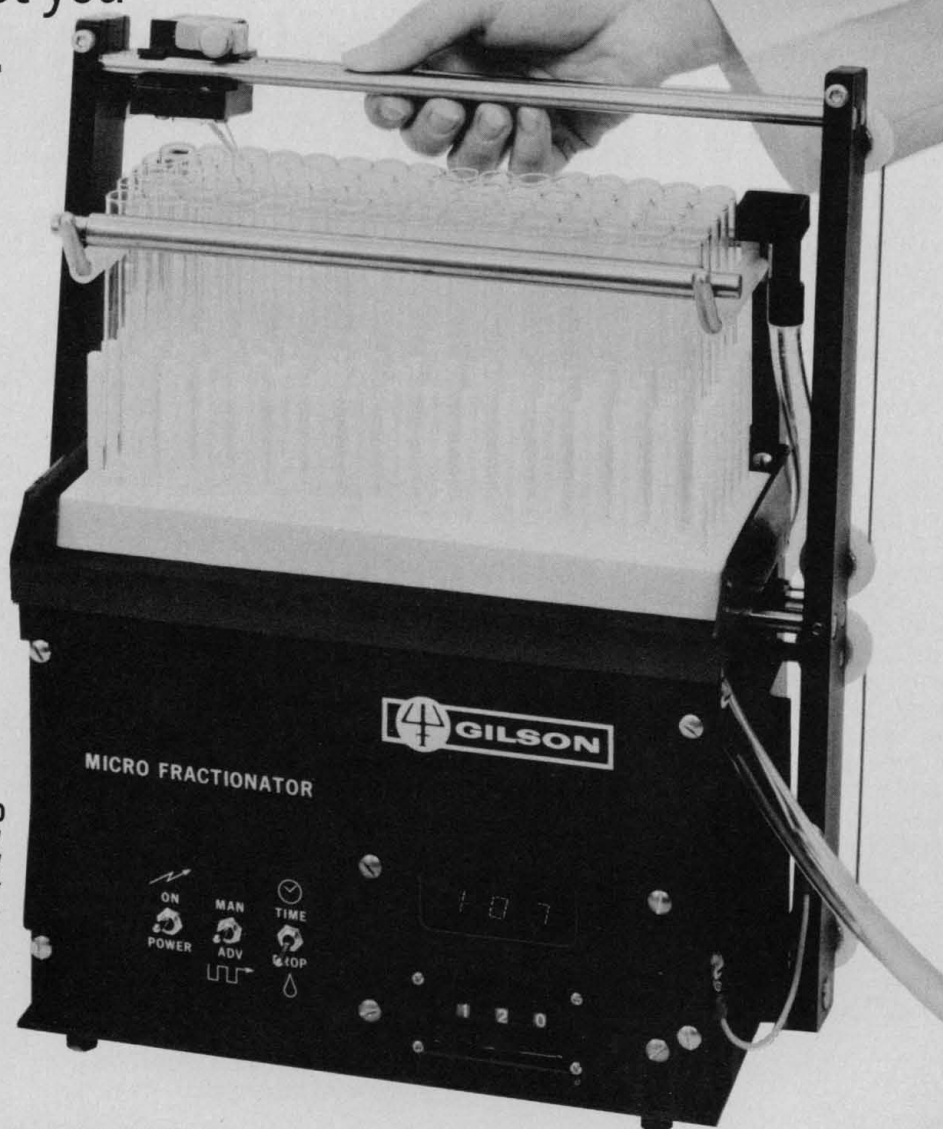
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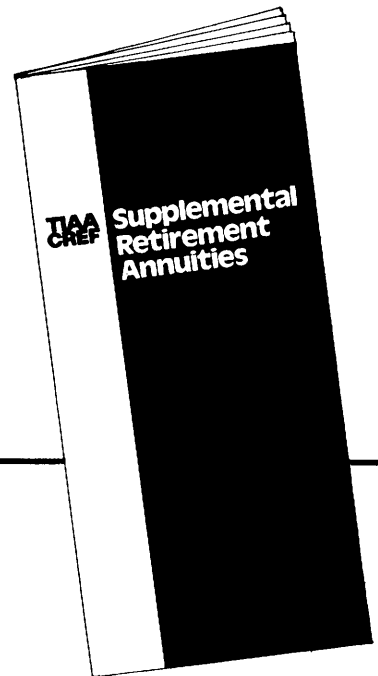


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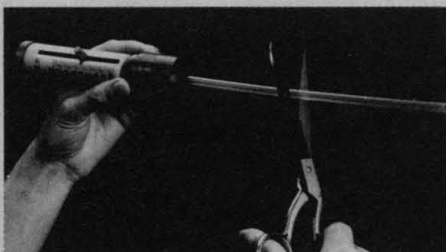


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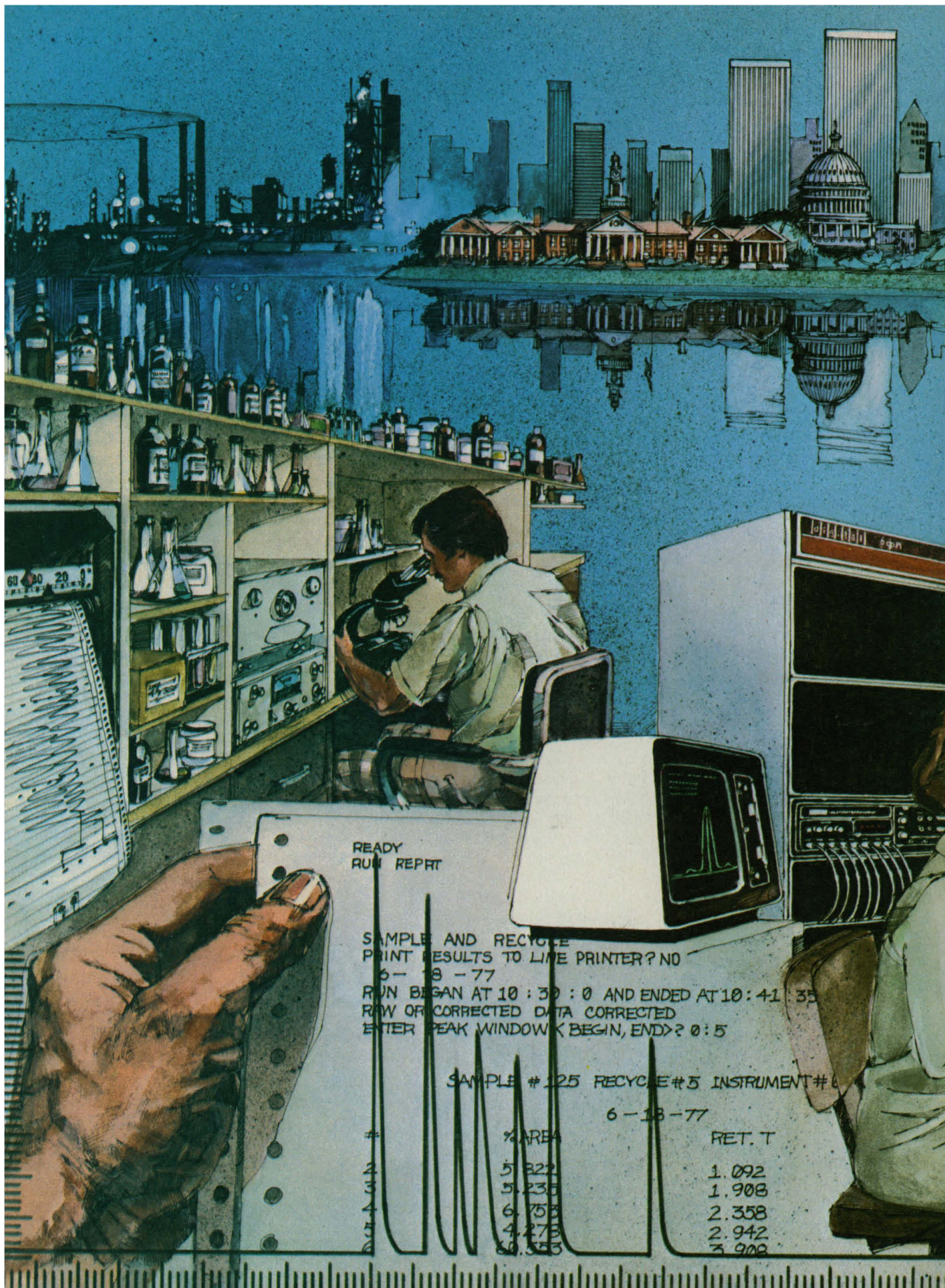
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6-18-77

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3	5.235	1.908
4	6.753	2.358
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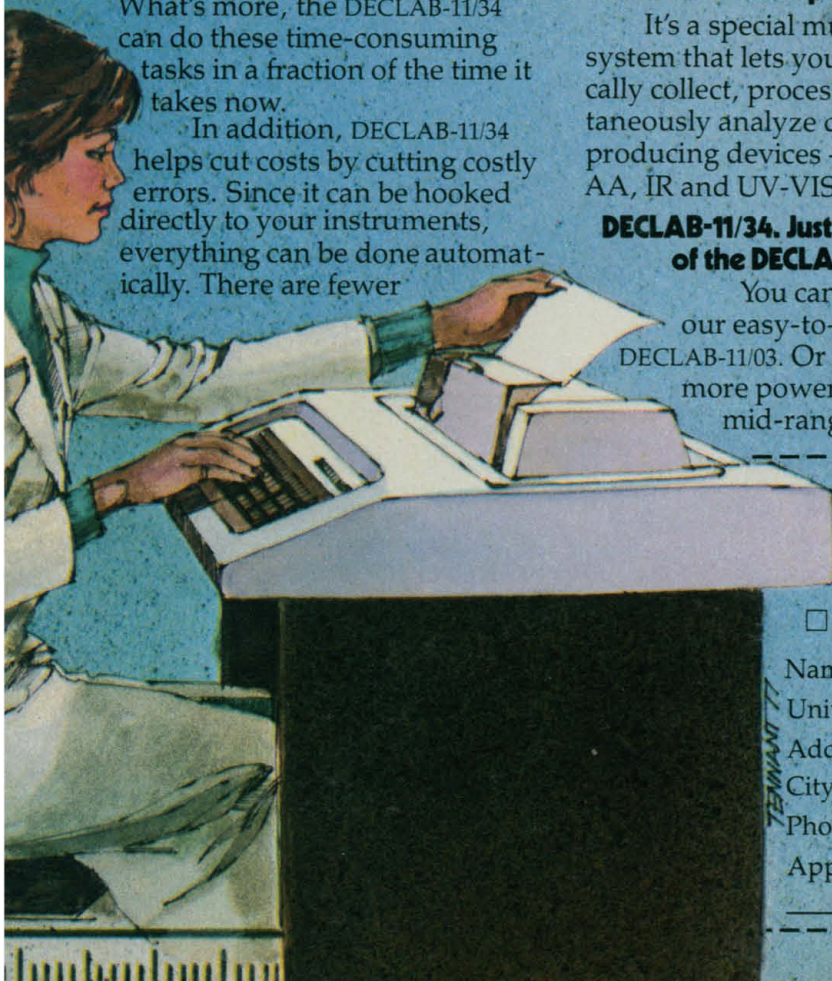
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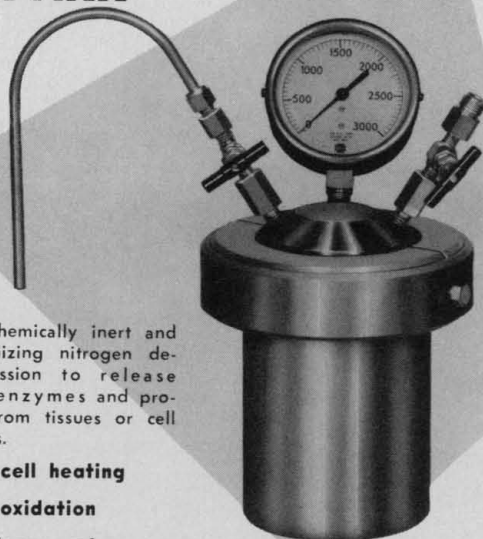
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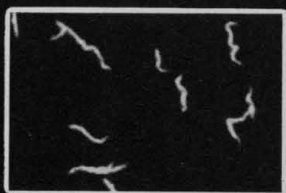
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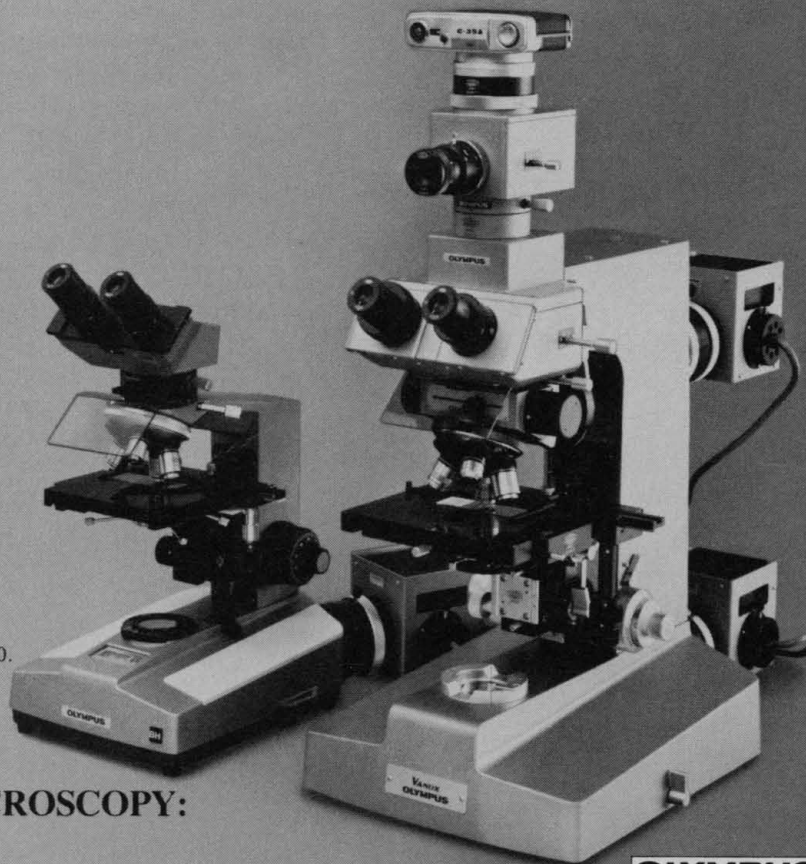
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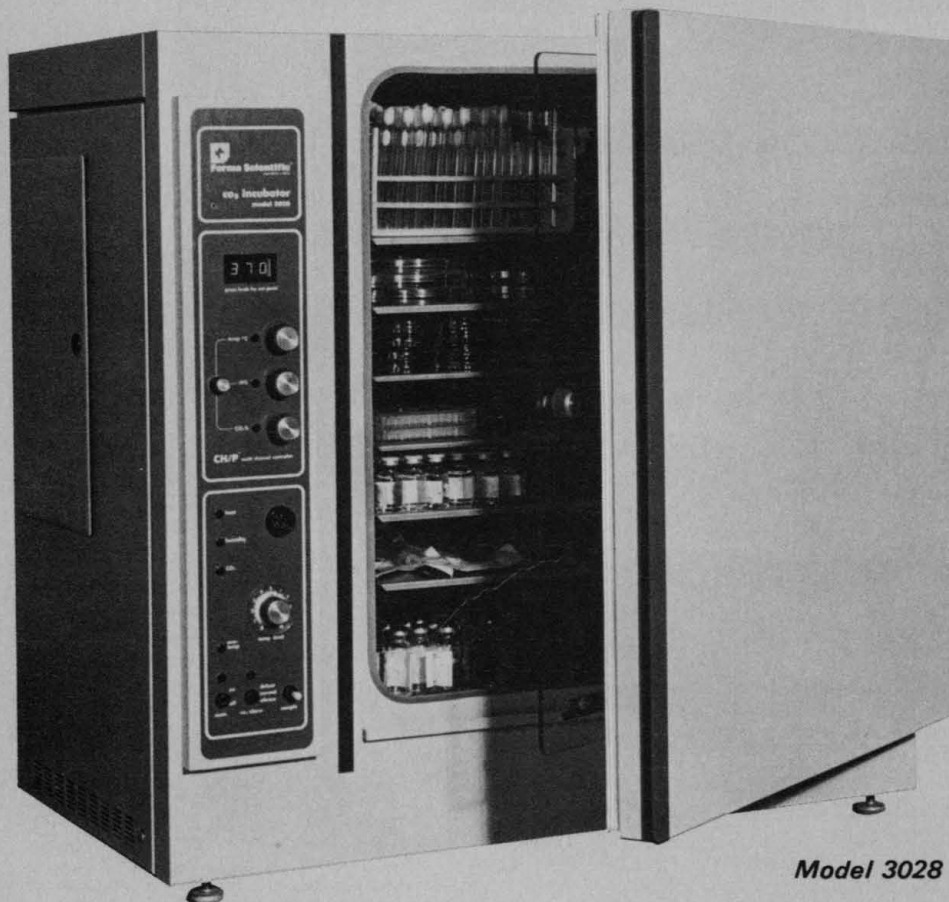
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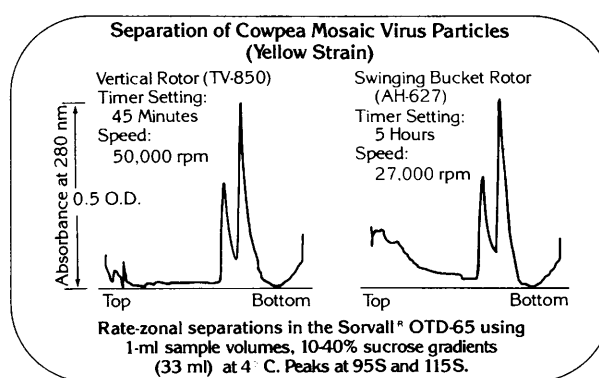
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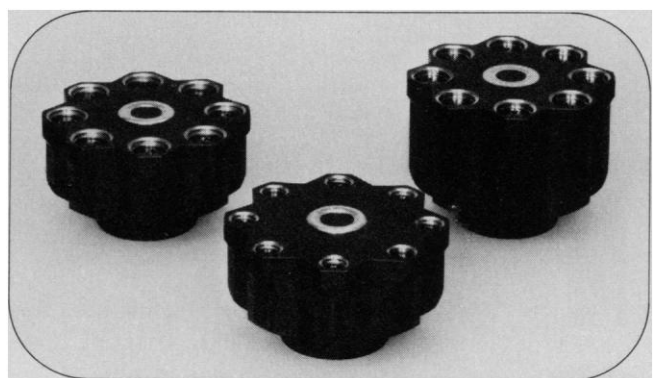
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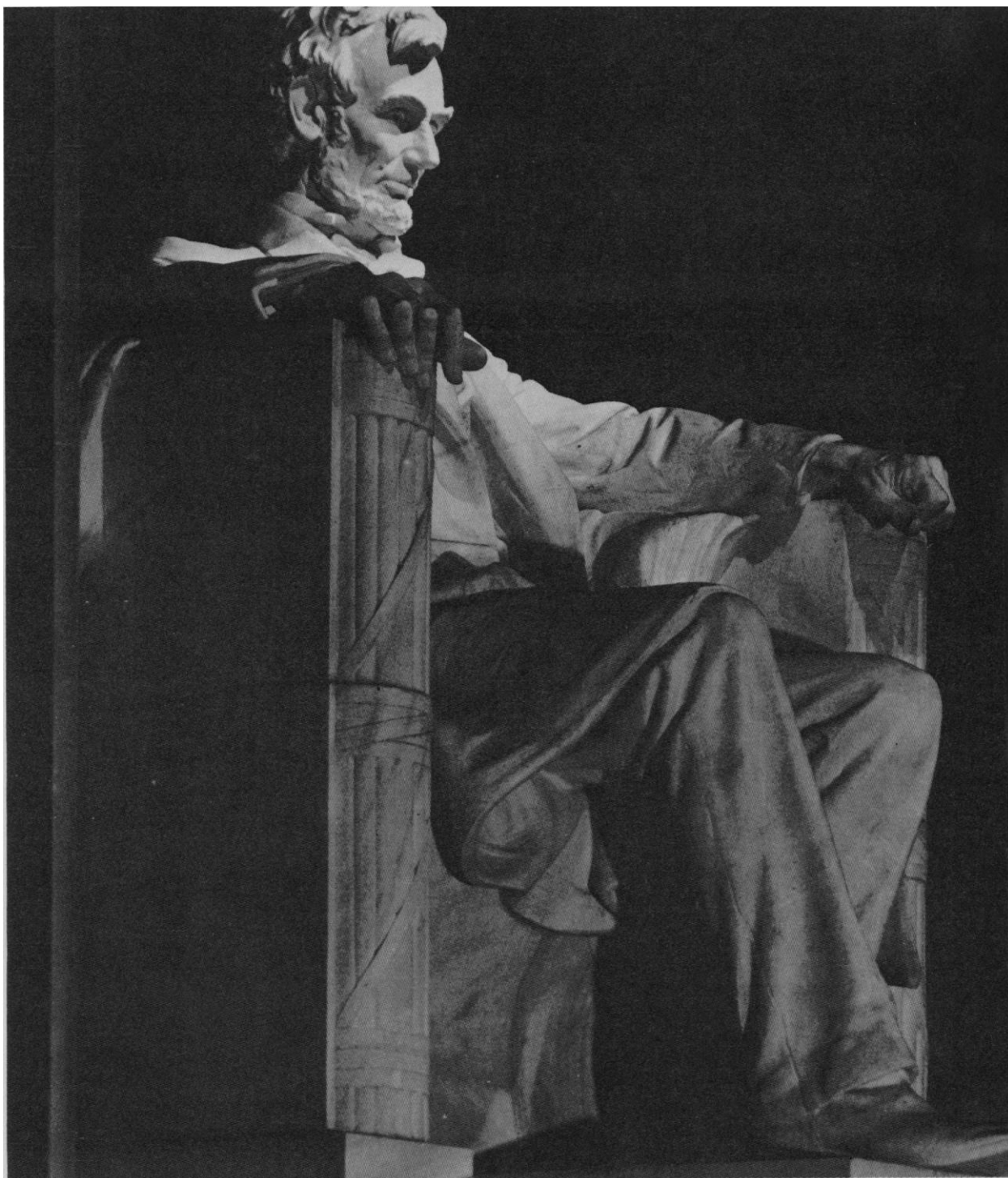
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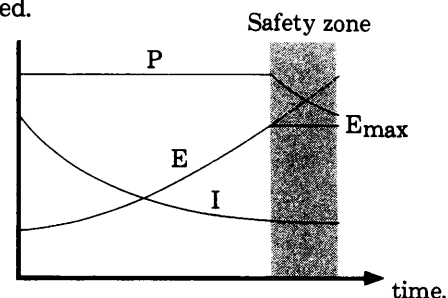
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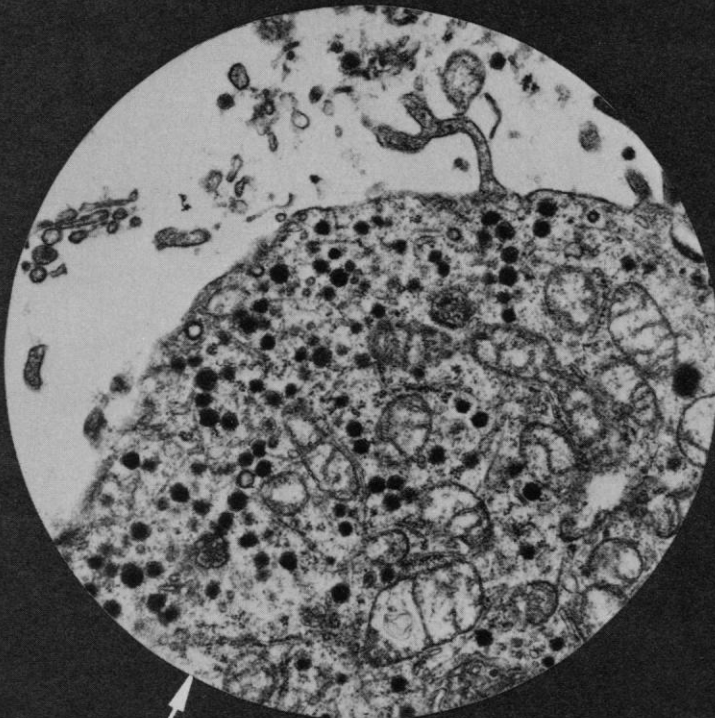
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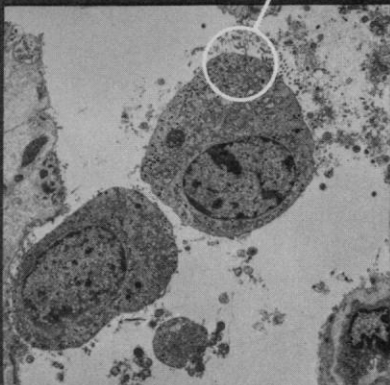
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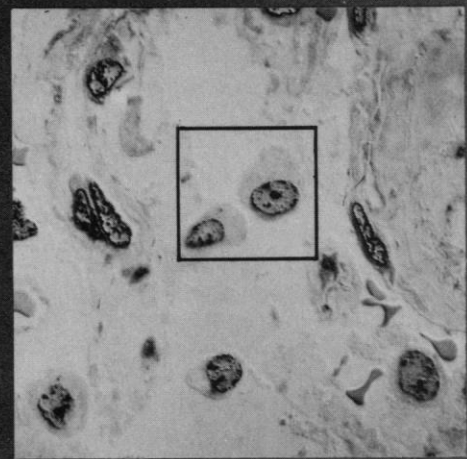
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Science and Technology for Development

As the year turns, we are a step closer to the 1979 U.N. Conference on Science and Technology for Development. That Conference promises to be more than a general exchange of scientific courtesies. It will be a face-off between advanced and deprived societies, with science and technology as hard currencies in the new diplomacy. This is the outcome of postwar Western achievement in discovery and use of knowledge, and the lessons have not escaped notice.

The issues now being raised go to the rate, the terms, and the scale on which this productive knowledge will be shared by the have-not majority. As it happens, these questions are entangled with troubling dilemmas of our own national economy, our markets, and our institutional structures. Science and technology may be the new high cards in foreign policy, but how they are dealt in that arena cannot be separated from considerations of U.S. economic growth and stability. This double image has to be respected in preparing for the Conference, and it defines implicit constraints on our diplomatic posture.

Stimulation of development through science and technology will not come about through an instant and massive transfusion of Western know-how. It will take time, measured in decades. It follows that any significant U.S. response to the ideas of the "new international economic order," and especially to industrialization demands, will require a strong and lasting U.S. political consensus.

That kind of consensus is unlikely if we cannot count on an expanding U.S. economy with lively growth and innovation. A struggling economy, lagging in productivity, averse to industrial risk investment, shying off from long-term research and development, beaten repeatedly by foreign competitors, and unable to keep its own work force employed, is not likely to sustain the political consensus needed to underwrite decades of scientific and technical support for development—especially when the aim of the Group of 77 is to reduce and erase the *relative* economic differentials between North and South. But the alternative prospect of an expanding economy capable of absorbing the near- and midrange economic and social costs of industrialization assistance would enhance the chances for political consensus and open up the diplomatic options. The work of our beleaguered economic strategists thus assumes an important external dimension.

The benefits of science and technology to developing countries can be substantial, but so can the costs. If the goal is to make a difference, the quality of the difference needs to be considered. Just as Congress had good reasons for providing itself with an Office of Technology Assessment, we should be equally thoughtful of the risks of handing off technology. We can hardly tell the developing countries what is good for them, but we can try to shape priorities to meet basic human needs and to promote industrialization which is not simply imitative but builds on whatever natural advantage is present and awaiting development. Much of the developing world is organized around rural-based societies and village systems, while industrialization has a centralizing drive. Unchecked, it can wreak violent changes on unprepared cultures and value systems with all the familiar downside effects of rampant urban migration, poverty, and political instability. This is the dark side of unthinking modernization, and it is a poor trade-off for present dissatisfactions. If decentralization can be built into industrialization objectives, so much the better.

Although much is said about the limitations of U.S. diplomacy where science and technology are concerned, the preparatory homework in the State Department is very good indeed. Uncertain as may be the outcomes of the 1979 meeting, we are likely to emerge from it with stronger and better foreign policy management.—WILLIAM D. CAREY

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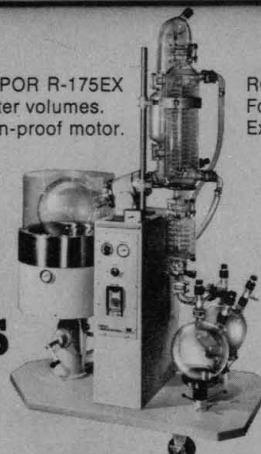
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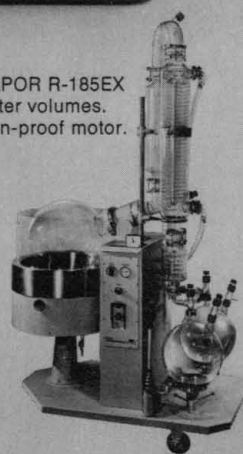
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For the Annual Meeting Program, please see the Preconvention Program in the 6 January issue of *Science*, pages 48–55). Tours are limited to Meeting Registrants only.

Scientific Tours

The following tours of scientific facilities in the greater Washington area are available to registrants who reserve early; use the advance reservation form provided; capacities are limited. Tickets should be picked up at the AAAS Ticket Desk in the Meeting Registration Area (Upper Concourse of the Sheraton-Park Hotel) at least 24 hours before the tour; a minimal charge will be made to defray bus transportation costs. Lunch will not be provided; however, all facilities to be visited except for the Patuxent Wildlife Center, have adequate cafeteria accommodations. The times listed show when the bus leaves the Sheraton-Park and leaves the visited facility for the Sheraton-Park, respectively (travel time is about 1 hour).

1a. National Bureau of Standards—Energy; Monday, 13 February, 8:30 a.m.–noon.

NBS solar townhouse, consumer appliance testing laboratory, and a magnetohydrodynamics and coal gasification laboratory.

1b. National Bureau of Standards—Tools of Science; Monday, 13 February, 1:15 p.m.–4:30 p.m.

Computer-controlled device (robot), on-line data acquisition in the laboratory, the 3-D Moore measuring machine, and air pollution measuring equipment.

NOTE: Those electing both tours **1a** and **1b** may remain at NBS, have lunch at one of the cafeterias, and return with the second tour.

2. Beltsville Agricultural Research Center; Tuesday, 14 February, 8:30 a.m.–3:30 p.m.

Virology, Nematology, Florist and Nursery Crops, and Instrumentation Research Laboratories; Windshield Areas; Biological Waste Management and Soil Nitrogen Laboratory; and the Human Nutrition and Medicinal Plants Laboratories.

3a. National Institutes of Health Tour; Wednesday, 15 February, 8:30 a.m.–12:30 p.m.

NIH Clinical Center, including nuclear medicine department, blood bank, computer-created movie for diagnosis of heart problems. NIH National Library of Medicine, including automated retrieval, computer-assisted publishing, and use of satellites.

3b. National Institutes of Health Demonstration; Wednesday, 15 February, 1:00 p.m.–4:30 p.m.

Selected applications which demonstrate the use of the computer as a tool of science.

NOTE: Those electing both tours **3a** and **3b** may remain at NIH, have lunch in one of the cafeterias, and return with the second tour.

4. NASA Goddard Space Flight Center; Thursday, 16 February, 9:00 a.m.–noon

Goddard Tracking Control Center, Communications Center, and Computer Facility. Displays of satellites, weather satellite receiving station, lunar sample, and solar telescope.

5. University of Maryland, College Park Campus; Thursday, 16 February, 1:00 p.m.–4:30 p.m.

Solar research facilities, energy conservation in agriculture, volcanoes and the atmospheric chemistry in Antarctica, experimental studies in origin of life, microbiological research in the Chesapeake Bay, the 140-MeV cyclotron, and plasma research for fusion applications.

6. U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center (limit 12 persons; bring your own lunch); Friday, 17 February, 8:30 a.m.–2:30 p.m.

Laboratories, experimental colonies, and other experimental facilities at this 4000-acre center. (Because of ongoing research, certain areas may not be accessible.)

Guided Cultural Tours

The following tours have been arranged by the National Fine Arts Associates, which will supply a tour guide with each bus. The price of each tour is **\$10.50** (which does not include lunch but does include all fees). Tickets should be picked up (and paid for) 24 hours before the tour at the National Fine Arts Associates Ticket Desk in the Meeting Registration Area (Upper Concourse of the Sheraton-Park Hotel). *A minimum of 25 persons is required for each tour*; refunds will be made if the minimum is not met or if substitutions are not feasible. Reserve now by completing and returning the appropriate reservation form.

7a, b, c. Hillwood. Former estate of Marjorie Merriweather Post: Russian paintings and sculptures, Fabergé Easter eggs, and French furniture and tapestries.

a. Mon., 13 Feb., 2:30 p.m.–5:00 p.m.

b. Wed., 15 Feb., 12:30 p.m.–3:00 p.m.

c. Wed., 15 Feb., 2:30 p.m.–5:00 p.m.

8. Hirshhorn Museum and Sculpture Garden. 19th- and 20th-century European and American painting and sculpture.

Tues., 14 Feb., 9:30 a.m.–noon

9. Phillips Collection and Anderson House. 19th- and 20th-century European (largely French) and American paintings. Headquarters of the Society of the Cincinnati: eclectic collection of Far-Eastern art, British paintings, tapestries, and Revolutionary War relics.

Tues., 14 Feb., 9:30 a.m.–noon

10. American Art in Washington. Stephen Decatur House, historic Lafayette Square, the Renwick Gallery, and the Corcoran Gallery of Art.

Tues., 14 Feb., 9:30 a.m.–noon

11a, b. Historic Georgetown and Dumbarton Oaks Museum. Colonial and Federal buildings, the Chesapeake and Ohio Canal, and a collection of Byzantine and Pre-Columbian art.

- a. Tues., 14 Feb., 1:30 p.m.–4:00 p.m.
- b. Thurs., 16 Feb., 1:30 p.m.–4:00 p.m.

12. Museum of African Art. Collection of sculpture, jewelry, wall hangings, and masks; a visit to the African Boutique.

Tues., 14 Feb., 1:30 p.m.–4:00 p.m.

13a, b. Department of State, Embassy Row, and Washington Cathedral. Diplomatic reception rooms with American Chippendale and Federal furniture and other decorative arts. Various embassy locations and the imposing structure of the Cathedral.

- a. Wed., 15 Feb., 9:00 a.m.–11:30 a.m.
- b. Fri., 17 Feb., 9:00 a.m.–11:30 a.m.

14. Historic Alexandria. Robert E. Lee's boyhood home, Carlyle House, Christ Church, Ramsay House, and other 18th-century buildings.

Thurs., 16 Feb., 9:00 a.m.–11:30 a.m.

Reservation Form for Guided Cultural Tours

AAAS Meeting registrants who wish to reserve tickets for these tours should fill out the coupon below and mail it in as soon as possible, since capacities are limited. Tickets should be picked up and **fee of \$10.50** paid at the National Fine Arts Associates Ticket Desk in the Meeting Registration Area (Upper Concourse of the Sheraton-Park Hotel) during the Annual Meeting, about 24 hours before the scheduled tour. *Do not send any remittance with this coupon; this is a reservation form only.*

Tour	No. of tickets
7a. Hillwood [Mon., 13 Feb., 2:30–5:00 p.m.]	_____
7b. Hillwood [Wed., 15 Feb., 12:30–3:00 p.m.]	_____
7c. Hillwood [Wed., 15 Feb., 2:30–5:00 p.m.]	_____
8. Hirshhorn [Tue., 14 Feb., 9:30 a.m.–noon]	_____
9. Phillips [Tue., 14 Feb., 9:30 a.m.–noon]	_____
10. American Art [Tue., 14 Feb., 9:30 a.m.–noon]	_____
11a. Georgetown [Tue., 14 Feb., 1:30–4:00 p.m.]	_____
11b. Georgetown [Thu., 16 Feb., 1:30–4:00 p.m.]	_____
12. African Art [Tue., 14 Feb., 1:30–4:00 p.m.]	_____
13a. State Dept. [Wed., 15 Feb., 9:00–11:30 a.m.]	_____
13b. State Dept. [Fri., 17 Feb., 9:00–11:30 a.m.]	_____
14. Alexandria [Thu., 16 Feb., 9:00–11:30 a.m.]	_____

Total No. of Tickets Reserved _____

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Reservation Form for Scientific Tours

AAAS Meeting registrants who wish to reserve tickets for these tours should fill out the coupon below and mail it in as soon as possible, since capacities are limited. Tickets should be picked up (and minimal bus fare paid) at the AAAS Ticket Desk in the Meeting Registration Area (Upper Concourse of the Sheraton-Park Hotel) during the Annual Meeting, about 24 hours before the scheduled tour. *Do not send any remittance with this coupon; it is a reservation form only.*

Tour	No. of tickets
1a. NBS—Energy [Mon., 13 Feb., 8:30 a.m.–noon]	_____
1b. NBS—Tools of Science [Mon. 13 Feb., 1:15 p.m.– 4:30 p.m.]	_____
2. Agr. Research Ctr. [Tues., 14 Feb., 8:30 a.m.–3:30 p.m.]	_____
3a. NIH—Tour [Wed., 15 Feb., 8:30 a.m.–12:30 p.m.]	_____
3b. NIH—Demonstration [Wed., 15 Feb., 1:00 p.m.– 4:30 p.m.]	_____
4. NASA Goddard SFC [Thur., 16 Feb., 9:00 a.m.– noon]	_____
5. Univ. of Maryland [Thur., 16 Feb., 1:00 p.m.–4:30 p.m.]	_____
6. Patuxent Wildlife Res. Ctr. [Fri., 17 Feb., 8:30 a.m.– 2:30 p.m.]	_____

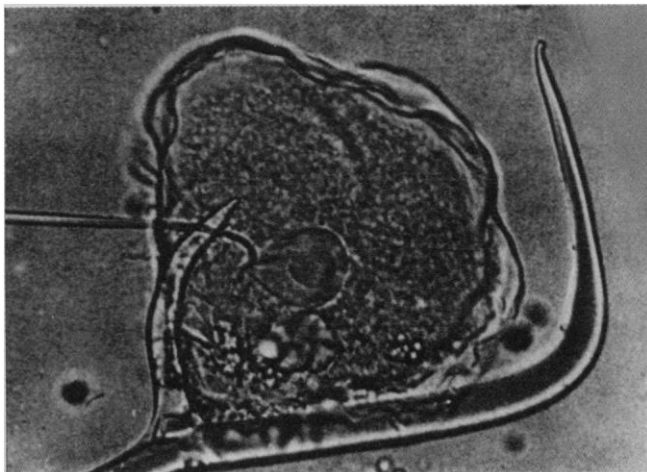
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Research Microscope

The Series 120 Microstar microscope offers continuously variable intensity of illumination. Three filter turrets are equipped with eight filters. Controls on the base operate a 0.1 percent neutral density filter, focusable condensing lens system, and field diaphragm. Requirements for Koehler illumination are satisfied. The high color temperature 12-volt, 100-watt tungsten halogen lamp operates in an outboard lamphouse for efficient heat dissipation. Image quality is maintained by the infinity-corrected optical system and planachromatic objectives which correct for lateral color, astigma-

tism, and curvature of field. Wide field eyepieces offer a full 20-millimeter field of view. Only the gravity-loaded focusable nosepiece moves to focus objective to specimen. American Optical. Circle 666.

Nephelometer

The model 40-100 reads directly in nephelometric turbidity units. Two ranges are available: 0 to 9.99 in steps of 0.01 NTU and 0 to 99.9 in steps of 0.1 NTU. Capped cells protect samples from contamination. There is a recorder output and the unit is designed for field operation. It may be equipped with a continuous-flow attachment. Turner Designs. Circle 669.

Intracellular and Microelectrodes

The MI-331 and MI-332 intracellular probes are used for measurements in single cells. They utilize an ion-selective sensing fluid in the tip and possess a linear response to chloride or potassium activities to about 0.01 millimole. The MI-331 potassium probe has a potassium to sodium selectivity of 80 and the MI-332 chloride probe is highly selective to chloride in the presence of other anions. The probes are 7.62 centimeters long and the diameter of the tips is less than 1 micron. Microelectrodes. Circle 670.

Pocket Calculators

The LC-78 is a horizontal unit that weighs 1.4 ounces. It measures 3.5 by 2.125 by 0.125 inches (approximately the

size of a business card and the thickness of two quarters). It features a large eight-digit liquid-crystal display, four basic mathematical functions, seven-function percent key, and an independent three-key memory. The display area also shows the function that is being computed. Two batteries allow up to 800 hours of operation. Casio. Circle 668.

Quadrupole Mass Spectrometer

The IQ 200 features a range of 0 to 200 atomic mass units and three video display modes. The tabular mode allows independent monitoring and precise calibration of up to ten masses; the bargraph display mode permits display of spectra with Peak-Lock identification of mass number; and the analog mode is used for display of peak shape. The IQ 200 is available with Faraday cup for partial pressure to 1×10^{-11} torr or with electron multiplier for partial pressures to 1×10^{-13} torr. The unit is programmable and may be interfaced with a computer for remote operation. Inficon Leybold Heraeus. Circle 671.

Literature

Liquid Chromatography Product Guide includes columns and media, products for adsorption chromatography, products for reversed-phase chromatography, and other techniques. Whatman. Circle 672.

Portable Oscilloscopes is a 24-page brochure that features two dozen models for laboratory use. Tektronix. Circle 673.

Liquid Scintillation, radiation monitoring, isotope-labeled compounds, antisera, enzyme substrates, and research biochemicals are listed in a 136-page catalog. Research Products International. Circle 674.

Gas-Chrom Newsletter for November features an article on packed gas chromatography columns. Applied Science Laboratories. Circle 675.

The Recorder Book is a selection guide to strip-chart, multipoint, and circular-chart instruments. Honeywell, Process Control Division. Circle 676.

Molecular Models is a brochure devoted to six Dreiding system stereomodel sets designed to facilitate studies in chemistry. Brinkmann Instruments. Circle 677.

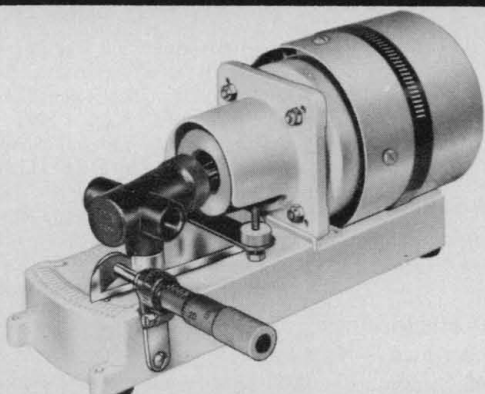
Immunoelectrophoresis Profile Kit describes the technique, its components and antisera, and lists references. Kaltestad Laboratories. Circle 678.

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card (on pages 242A and 330A) and placing it in the mailbox. Postage is free.

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RESEARCH NEWS

(Continued from page 285)

nosphere, a relatively plastic layer. Chapman and Pollack's map generally agrees with more direct but limited measurements and seems to indicate that the lithosphere thickens with age, older crust being thicker than younger crust. As the lithosphere thickens, the athenosphere becomes thinner and more viscous; that is, Chapman and Pollack suggest that the plate transporting machinery is slowly grinding to a halt.

Many geologists regard peridotitic komatiite, a unique type of lava which is always found to be at least 2.5 billion years old, as evidence of increased thermal effects early in the history of the earth. O'Nions notes that the tectonic implications of this high temperature, mantle-like rock are not unequivocal. He believes, however, that its very existence tends to support the idea of shallower high temperature regions, thinner plates, and rapid transport of mantle melting products to the surface. Burke, on the other hand, infers that while mantle convection was indeed faster, continental plate thickness and rigidity were essentially the same as now. He cites the apparent occurrence of deep, but relatively low-temperature, 2.5 billion-year-old metamorphism in the Superior Province of Canada.

Recent theoretical studies have emphasized the possible relation between the thermal structure of the crust and oceanic plate subduction. For example, A. J. Baer of the University of Ottawa has suggested that the warmer plates of the Precambrian might actually have been incapable of sinking into the mantle because of their higher buoyancy. If the buoyancy of a plate plays a role in determining its ability to be subducted, then its temperature could set its size. Baer argues that early plates were always too hot to allow a mineralogical phase transition to a denser form, thus preventing any subduction.

The final word concerning the behavior of the earth's crust during most of geologic time is not in. There does seem to be an apparent openness among a large number of researchers to the possibility of another tectonic mechanism, perhaps operating simultaneously with plate tectonics. This mechanism may have been a significant or even the dominant one very early in the Precambrian, only to be supplanted by plate tectonics. Confirmation of this possibility must, in all likelihood, await the accumulation of conclusive paleomagnetic and isotopic data.—**RICHARD A. KERR**

BOOKS RECEIVED AND

BOOK ORDER SERVICE

(Continued from page 290)

Ancient Mesopotamia. Portrait of a Dead Civilization. A. Leo Oppenheim. Revised edition completed by Erica Reiner. University of Chicago Press, Chicago, 1977. xvi, 446 pp. + plates. Cloth, \$20; paper, \$6.95.

Asbestos. Review of Uses, Health Effects, Measurement and Control. R. E. N. Bradfield. Atkins Research and Development, Epsom, Surrey, England, 1977. vi, 102 pp. Paper, \$20.

Bankson Language Screening Test. Nicholas W. Bankson. University Park Press, Baltimore, 1977. iv, 74 pp., illus. Spiral bound, \$14.95.

Behavioral Treatments of Obesity. John Paul Foreyt, Ed. Pergamon, New York, 1977. xvi, 516 pp. \$15. Pergamon General Psychology Series, vol. 61. Pergamon International Library. To order this book circle No. 350 on Readers' Service Card

Bibliography of the Nude Mouse 1966–1976. Jørgen Rygaard and Carl O. Povlsen, Eds. Gustav Fischer, Stuttgart, 1977. 48 pp. Paper, DM 16.

Dynamical Systems. Proceedings of a symposium, Gainesville, Fla., Mar. 1976. A. R. Bednarek and L. Cesari, Eds. Academic Press, New York, 1977. xviii, 516 pp. \$19.50.

Ecological Lab Experiences. An Ideas Forum. Larry B. Crowder, Ed. Michigan State University Department of Zoology, East Lansing, 1977. iv, 200 pp., illus. Paper, \$4.

Elements of Software Science. Maurice H. Halstead. Elsevier, New York, 1977. xiv, 128 pp. \$14.95. Operating and Programming Systems Series.

Environmental Assessments and Statements. John E. Heer, Jr. and D. Joseph Hagerty. Van Nostrand Reinhold, New York, 1977. xiv, 368 pp., illus. \$17.95. To order this book circle No. 357 on Readers' Service Card

Essays on Analytical Chemistry. In Memory of Professor Anders Ringbom. Erkki Wänninen, Ed. Pergamon, New York, 1977. xiv, 608 pp., illus. \$50. To order this book circle No. 358 on Readers' Service Card

Global Chemical Cycles and Their Alterations by Man. Papers from a workshop, Berlin, Nov. 1976. Werner Stumm, Ed. Dahlem Konferenzen, Berlin, 1977 (U.S. distributor, Koehn and Schneider, Old Greenwich, Conn.). 350 pp., illus. Paper, \$24. Physical and Chemical Sciences Research Reports, 2. To order this book circle No. 351 on Readers' Service Card

Goals in a Global Community. The Original Background Papers for *Goals for Mankind*, a Report to the Club of Rome. Vol. 1, Studies on the Conceptual Foundations. Ervin Laszlo and Judah Bierman, Eds. Pergamon, New York, 1977. xiv, 336 pp. \$20. To order this book circle No. 359 Readers' Service Card

Handbook of the Biology of Aging. Caleb E. Finch and Leonard Hayflick, Eds., with the assistance of Harold Brody, Isadore Rossman, and F. Marott Sinex. Van Nostrand Reinhold, New York, 1977. xvi, 772 pp., illus. \$32.50. To order this book circle No. 360 on Readers' Service Card

Low Molecular Weight Sulphur Containing Natural Products. Proceedings of a symposium, Warsaw, July, 1976. J. Wróbel, Ed. Pergamon, New York, 1977. 74 pp., illus. \$15. To order this book circle No. 361 on Readers' Service Card

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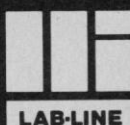
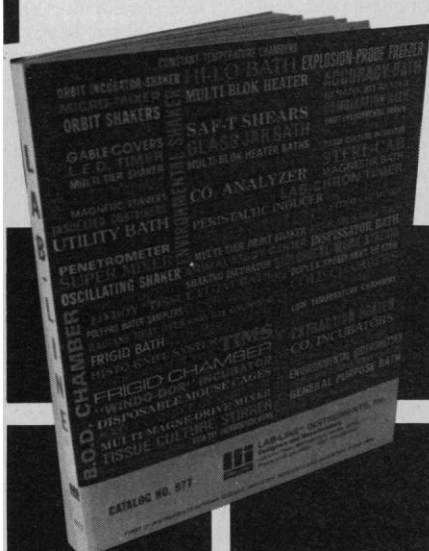
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Mathematical Magic Show. Martin Gardner. Knopf, New York, 1977. 284 pp., illus. \$8.95.

Meaning and Void. Inner Experience and the Incentives in People's Lives. Eric Klingner. University of Minnesota Press, Minneapolis, 1977. xiv, 412 pp. \$16.50.

Medical Abbreviations and Acronyms. Peter Roody, Robert E. Forman, and Howard B. Schweitzer. McGraw-Hill, New York, 1977. viii, 256 pp. Paper, \$5.95. A Blakiston Publication.

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Noise, Buildings and People. Derek J. Croome. Pergamon, New York, 1977. xx, 614 pp., illus. Cloth, \$50; paper, \$30. International Series in Heating, Ventilation and Refrigeration, vol. 11. *To order this book circle No. 354 on Readers' Service Card*

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Polymerization of Heterocycles (Ring Opening). Papers from a symposium, Warsaw-Jobłonna, Poland, June 1975. S. Penczek, Ed. Pergamon, New York, 1977. vi + pp. 247-372, illus. \$18. Reprinted from *Pure and Applied Chemistry*, vol. 48, No. 3. *To order this book circle No. 356 on Readers' Service Card*

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Prevention of Mental Retardation. John B. Fotheringham and Mary Morrison. National Institute on Mental Retardation, Downsview, Ontario, Canada, 1976. vi, 144 pp. Paper, \$3.50.

Proceedings, Conference on University Education for Technology and Public Policy. St. Louis, Dec. 1976. Eric B. Hartman and Robert P. Morgan, Eds. Department of Technology and Human Affairs, Washington University, St. Louis, 1977. iv, 146 pp., illus. Paper, \$6.95.

Program Behavior. Models and Measurements. Jeffrey R. Spirn. Elsevier, New York, 1977. x, 278 pp., illus. Paper, \$17.95. Operating and Programming Systems Series.