

SCIENCE

17 May 1974

Vol. 184, No. 4138

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



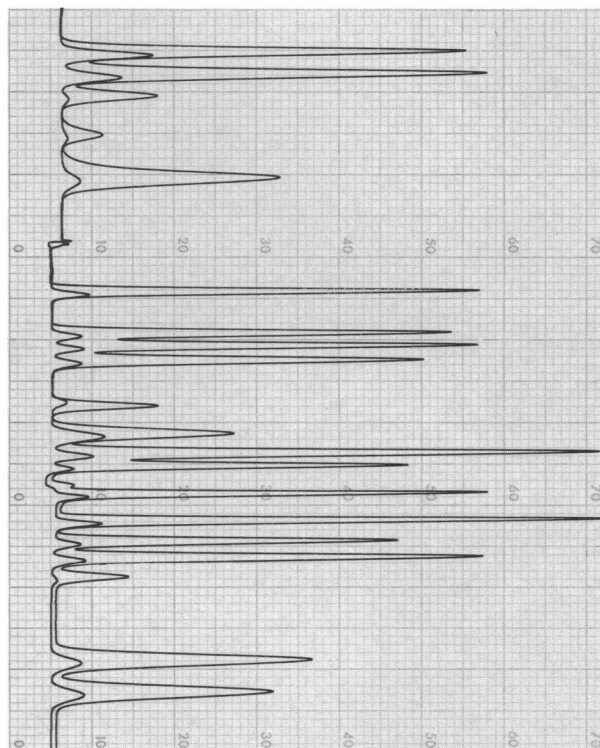
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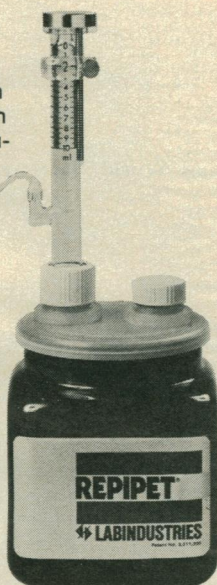
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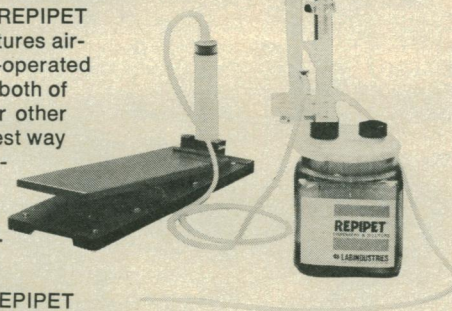
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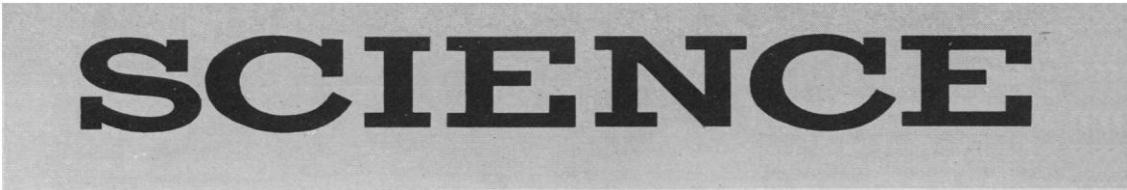
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Volume 184, No. 4138



LETTERS	Management Techniques: <i>T. S. Storvick; J. L. Bower; M. O. Burke</i> ; Safety of Cosmetics: <i>M. Berdick</i> ; Radioactive Waste Disposal: <i>B. L. Cohen</i> ; Inter-American Relations: <i>C. Widmer; S. M. Linowitz</i> ; Schistosomiasis Research Projects: <i>D. B. Hoffman, Jr.</i>	746
EDITORIAL	Genetic Counseling: <i>M. W. Shaw</i>	751
ARTICLES	A Perspective on Climatic Change: <i>R. A. Bryson</i>	753
	Biosynthesis of Natural Products: <i>A. I. Scott</i>	760
	Traditional Maize Processing Techniques in the New World: <i>S. H. Katz, M. L. Hediger, L. A. Valleroy</i>	765
NEWS AND COMMENT	Arms Control: U.S., Soviets Revive Threshold Test Ban Talks	774
	Antarctica: World Hunger for Oil Spurs Security Council Review	776
	CEQ Weighs Oil Exploration in the Atlantic, off Alaska	778
	Kissinger on Science: Making the Linkage with Diplomacy	780
RESEARCH NEWS	Particle Physics: Is the Electron Really a Hadron at Heart?	782
	Energy Storage (I): Using Electricity More Efficiently	785

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BOOK REVIEWS	Representative Government and Environmental Management, <i>reviewed by R. H. Salisbury</i> ; Nutritive Value of Triticale Protein; <i>D. M. Hegsted</i> ; Neurochemistry of Cerebral Electroshock, <i>M. Fink</i> ; Theoretical Solid State Physics, <i>J. A. Krumhansl</i> ; Pyrethrum, <i>R. D. O'Brien</i>	788
REPORTS	New Evidence for the Antiquity of Man in North America Deduced from Aspartic Acid Racemization: <i>J. L. Bada, R. A. Schroeder, G. F. Carter</i>	791
	Radioreceptor Assay of Human Chorionic Gonadotropin: Detection of Early Pregnancy: <i>B. B. Saxena et al.</i>	793
	Serum Induced Lymphoid Cell Mediated Cytotoxicity to Human Transitional Cell Carcinomas of the Genitourinary Tract: <i>T. R. Hakala and P. H. Lange</i>	795
	Partition of Tissue Functions in Epithelia: Localization of Enzymes in "Mitochondria-Rich" Cells of Toad Urinary Bladder: <i>W. N. Scott, V. S. Sapirstein, M. J. Yoder</i> . .	797
	Genetic Regulation of Chlorophyll Synthesis Analyzed with Mutants in Barley: <i>D. von Wettstein et al.</i>	800
	Colonization of Exploded Volcanic Islands by Birds: The Supertramp Strategy: <i>J. M. Diamond</i>	803
	Factors of Human Chronic Pain: An Analysis of Personality and Pain Reaction Variables: <i>G. Timmermans and R. A. Sternbach</i>	806
	<i>Technical Comments:</i> Gravity Anomalies in the Galápagos Islands Area: <i>A. B. Watts and J. R. Cochran</i> ; <i>J. E. Case et al.</i> ; Conceptual Deficits in Women: <i>T. Perper and J. Chase</i> ; <i>H. Thomas, W. Jamison, D. D. Hummel</i>	808
MEETINGS	Susceptibility of the Fetus and Child to Chemical Pollutants: <i>R. W. Miller</i> ; Forthcoming Events	812

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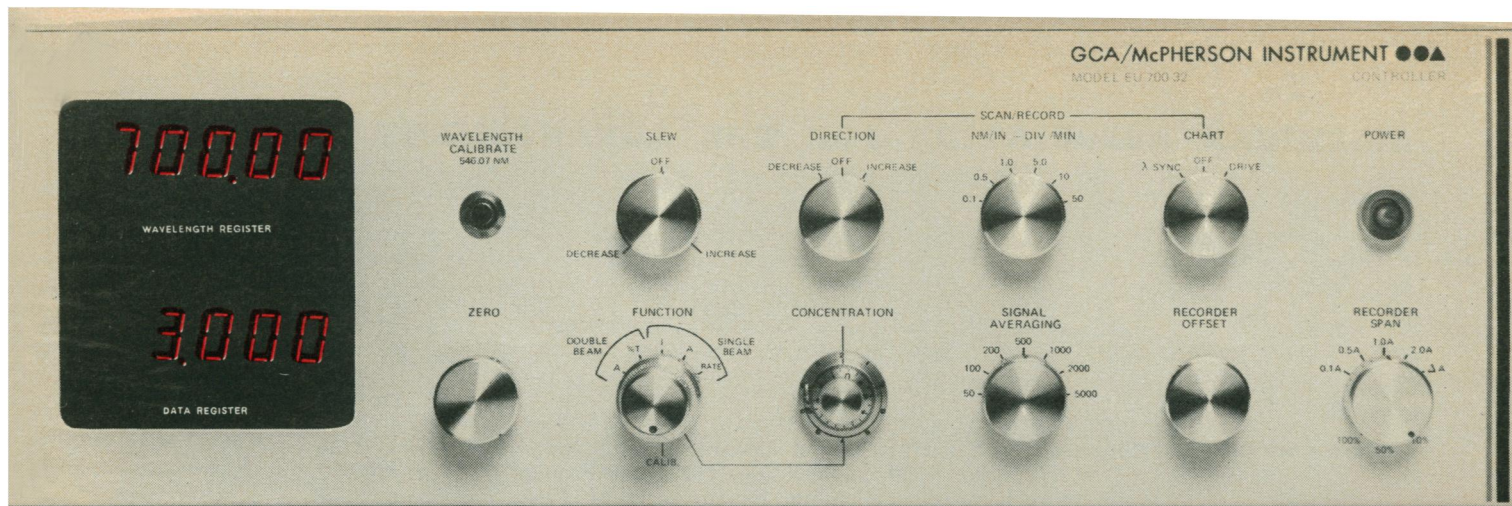
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COVER

Wet, dim lit, moss-hung cloud forest on summit of Long Island (near New Guinea), two centuries after devastation by a volcanic explosion. Although the summit forest has already regained mature structure under these perpetually moist conditions, montane birds have recolonized much more slowly than lowland birds. See page 803 [Jared Diamond, University of California Medical Center, Los Angeles]

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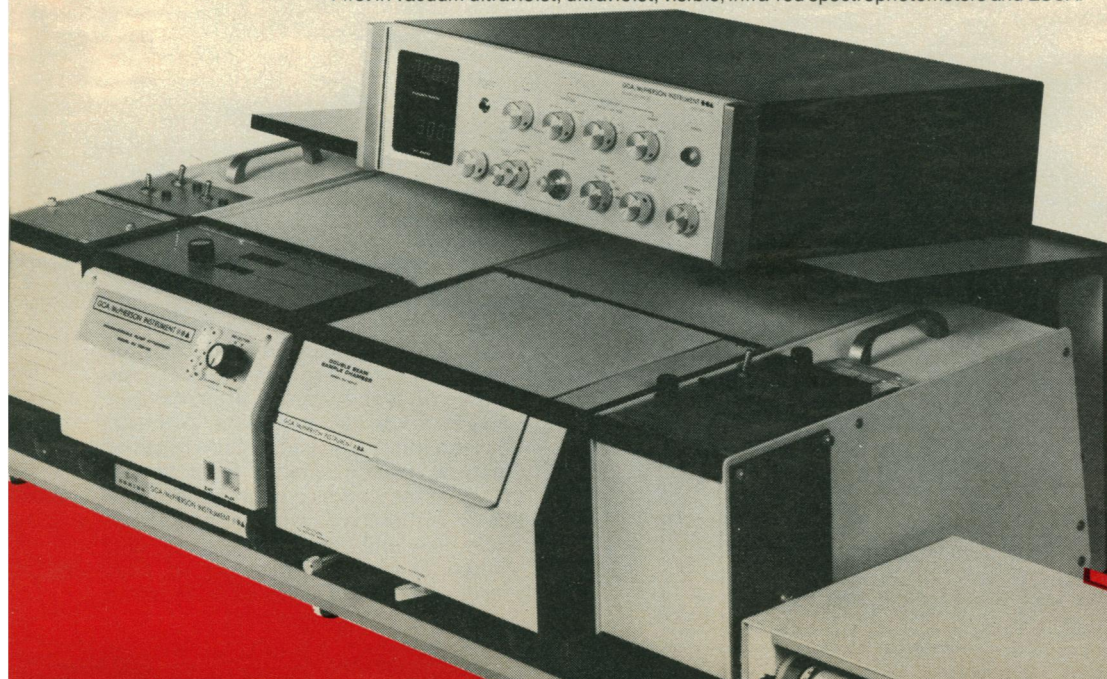
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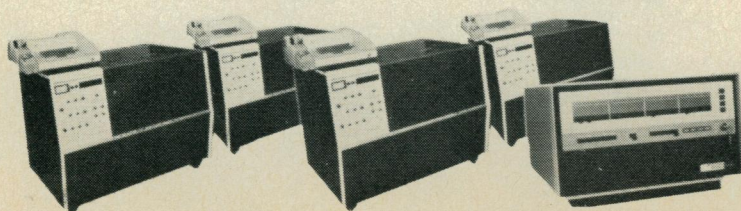
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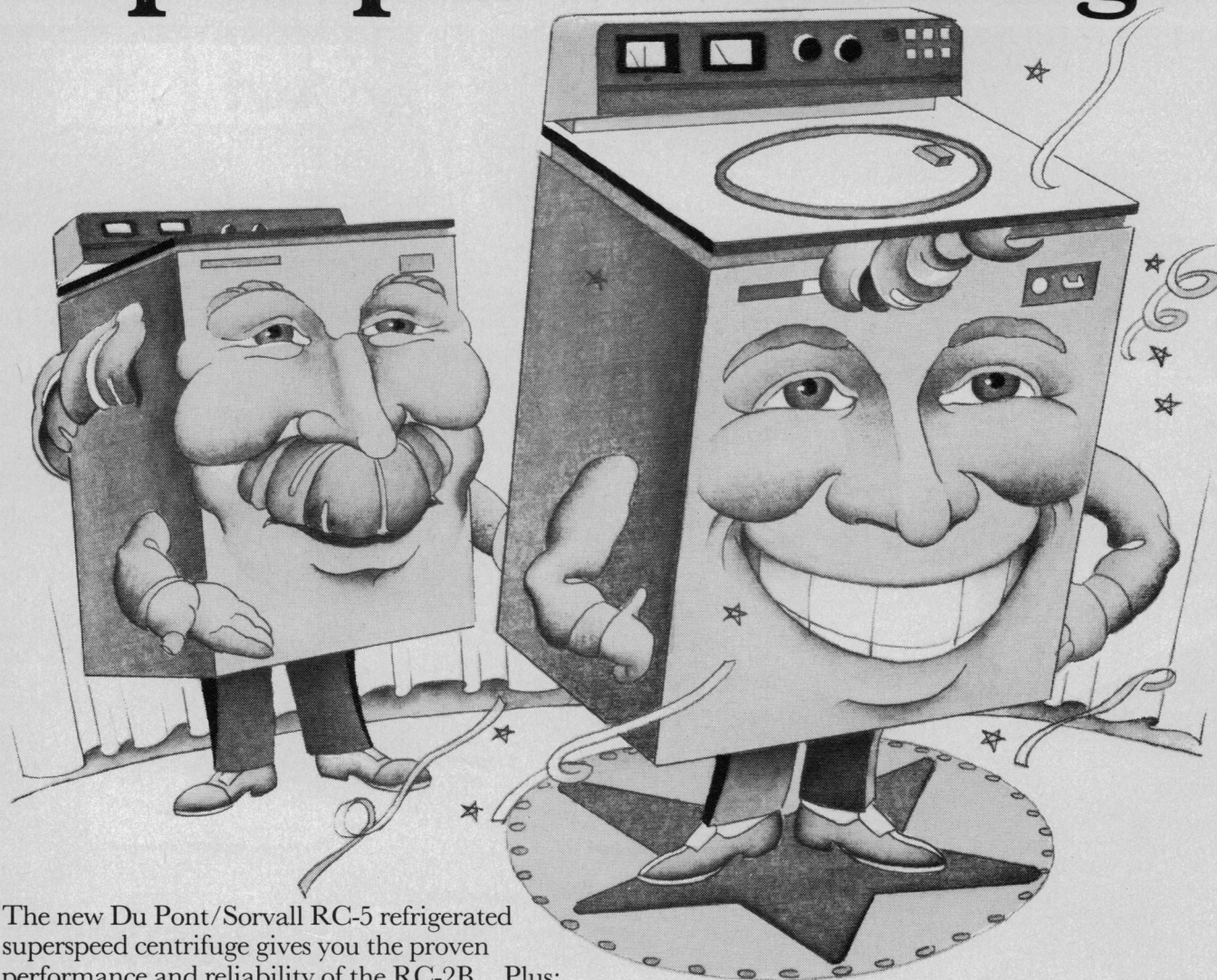
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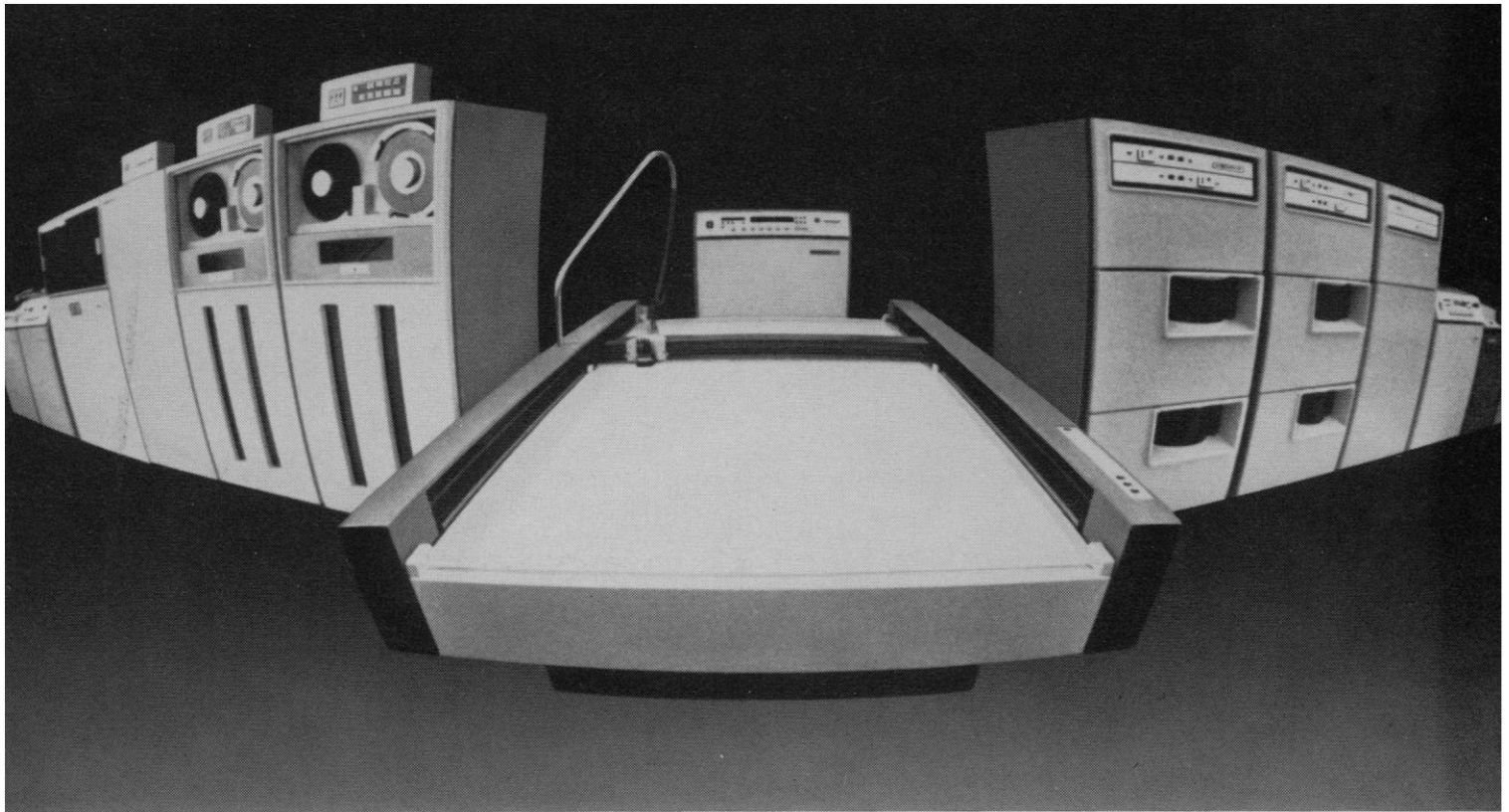
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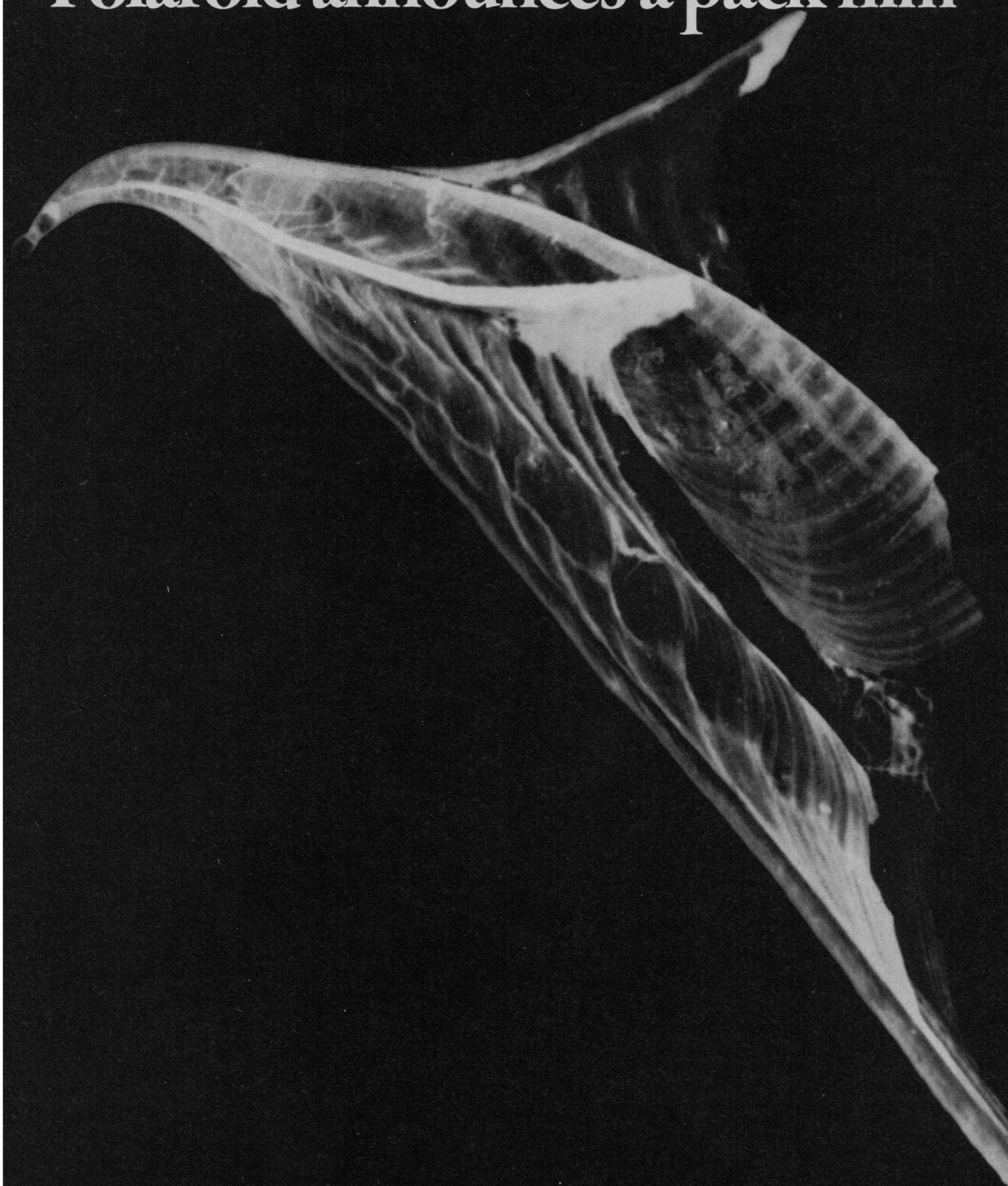
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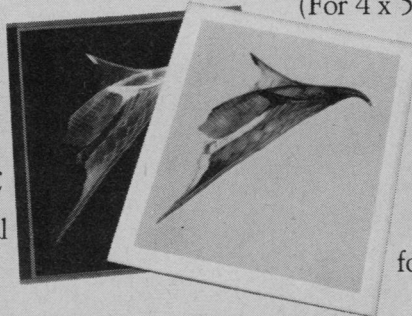
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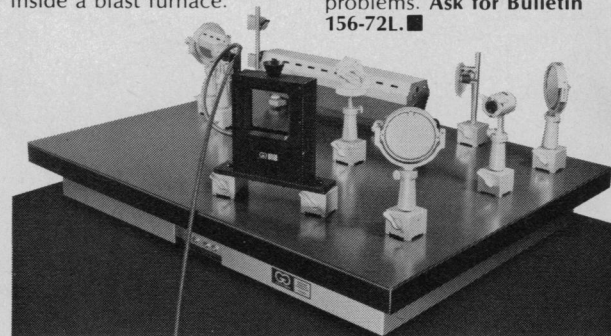
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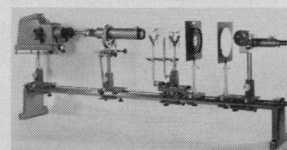
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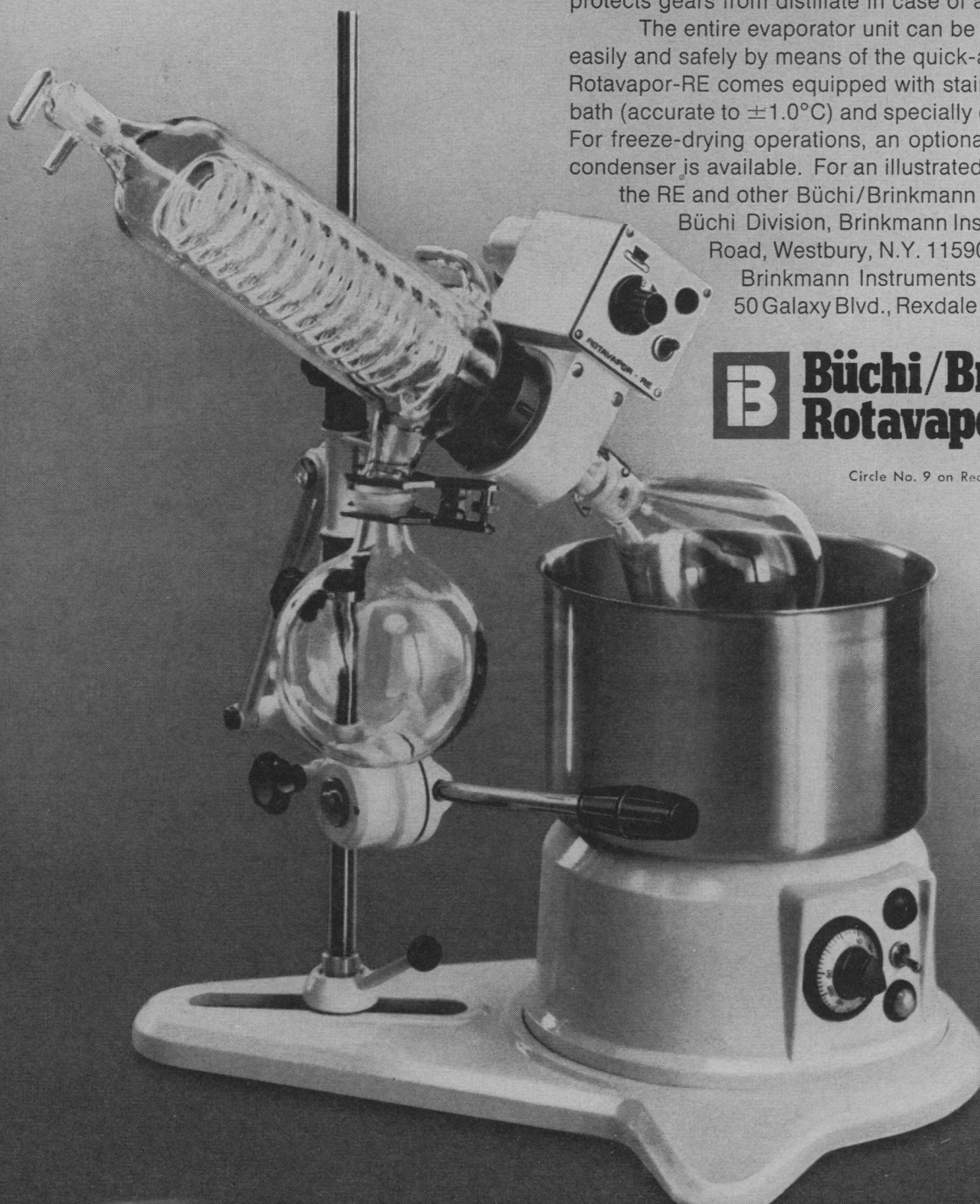
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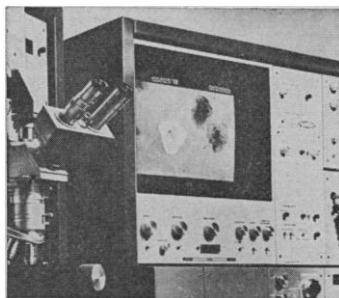
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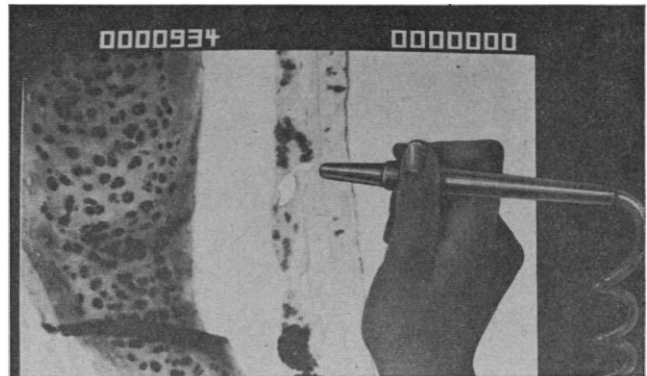


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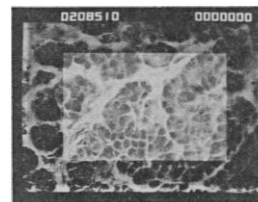
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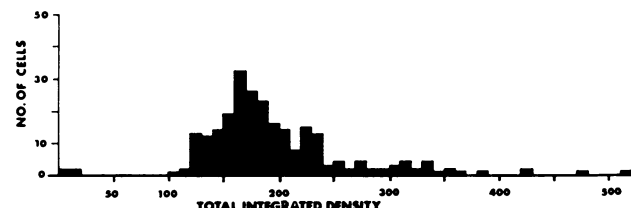
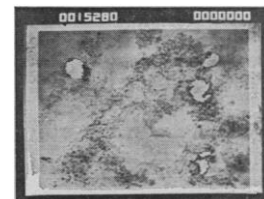
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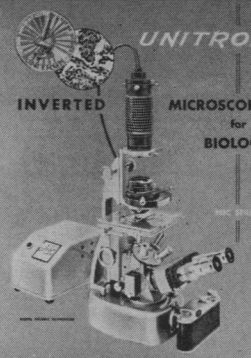
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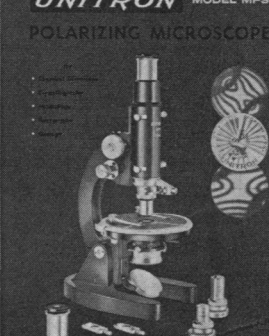
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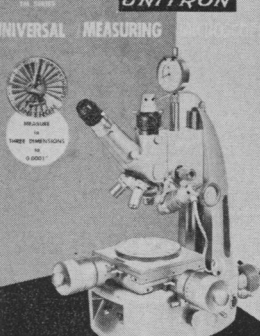
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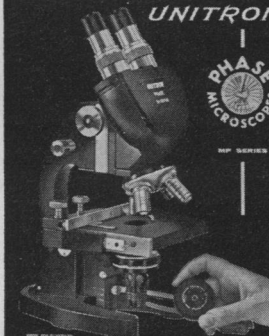
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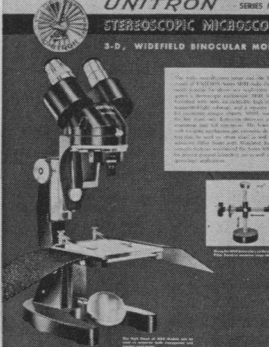
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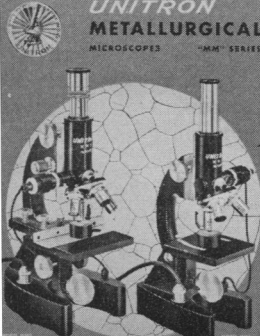
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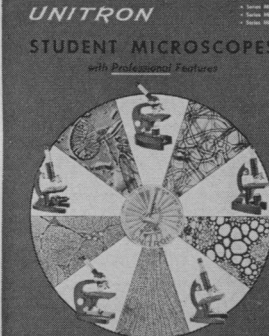
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BERNARD L. COHEN

*Department of Physics,
University of Pittsburgh,
Pittsburgh, Pennsylvania 15260*

Inter-American Relations

In his article "The future of the Americas" (7 Sept. 1973, p. 916) Sol M. Linowitz looks at the problems of the Americas. He expects a better life for all Americans through international cooperation and investment on the part of the developed nations. For the last 15 years I have been considering the problems of a small region of "underdeveloped" rural Latin America. I come to conclusions which are in complete opposition to those of Linowitz. Development aid given by the United States has done little to bring a better life to the Latin American urban worker or unemployed person or to the peasant. It has simply made possible the survival of considerably more people at the same mean level of existence. Moreover, antagonisms toward the United States have been constantly increasing.

During the mid-1950's, crop failures and livestock deaths in the Titicaca Altiplano [highland] in Peru brought the people of this region close to famine. The United States sent food, and catastrophe was averted. No one that I know has acknowledged that U.S. aid saved many lives. Meanwhile, the continuing high birth rate and disbursement of food donated by the United States ensure that the next drought cycle will require even more prodigious efforts on the part of the United States to avoid catastrophe in the Titicaca Altiplano.

The United States should follow a laissez-faire policy with regard to development in Latin America. The U.S. tax dollar should not be frittered away on development schemes, many of which appear to border on fraud. Technical and scientific advice should be available to those countries who ask for it and who are prepared to make reasonable payment for it. Cooperative research efforts involving scientists from various countries should be facilitated. Latin America should stand on its own feet. Latin Americans should work out their own future.

CARL WIDMER

*Lake Titicaca Ecological Studies,
Casilla 23, Puno, Peru*

Widmer's experience in his "small region of 'underdeveloped' rural Latin America" has led him to some very broad generalizations. I can only say that his own recipe for a "laissez-faire policy" on the part of the United States has been tried during the past several years and found to be dismally wanting, as Secretary of State Kissinger's new approach clearly indicates.

SOL M. LINOWITZ

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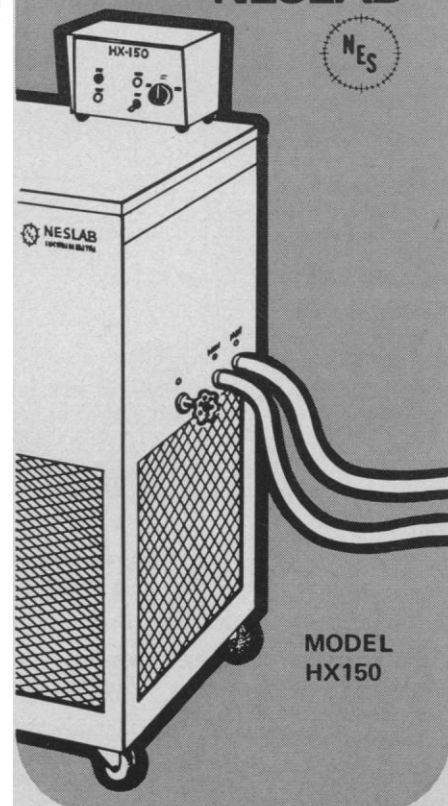
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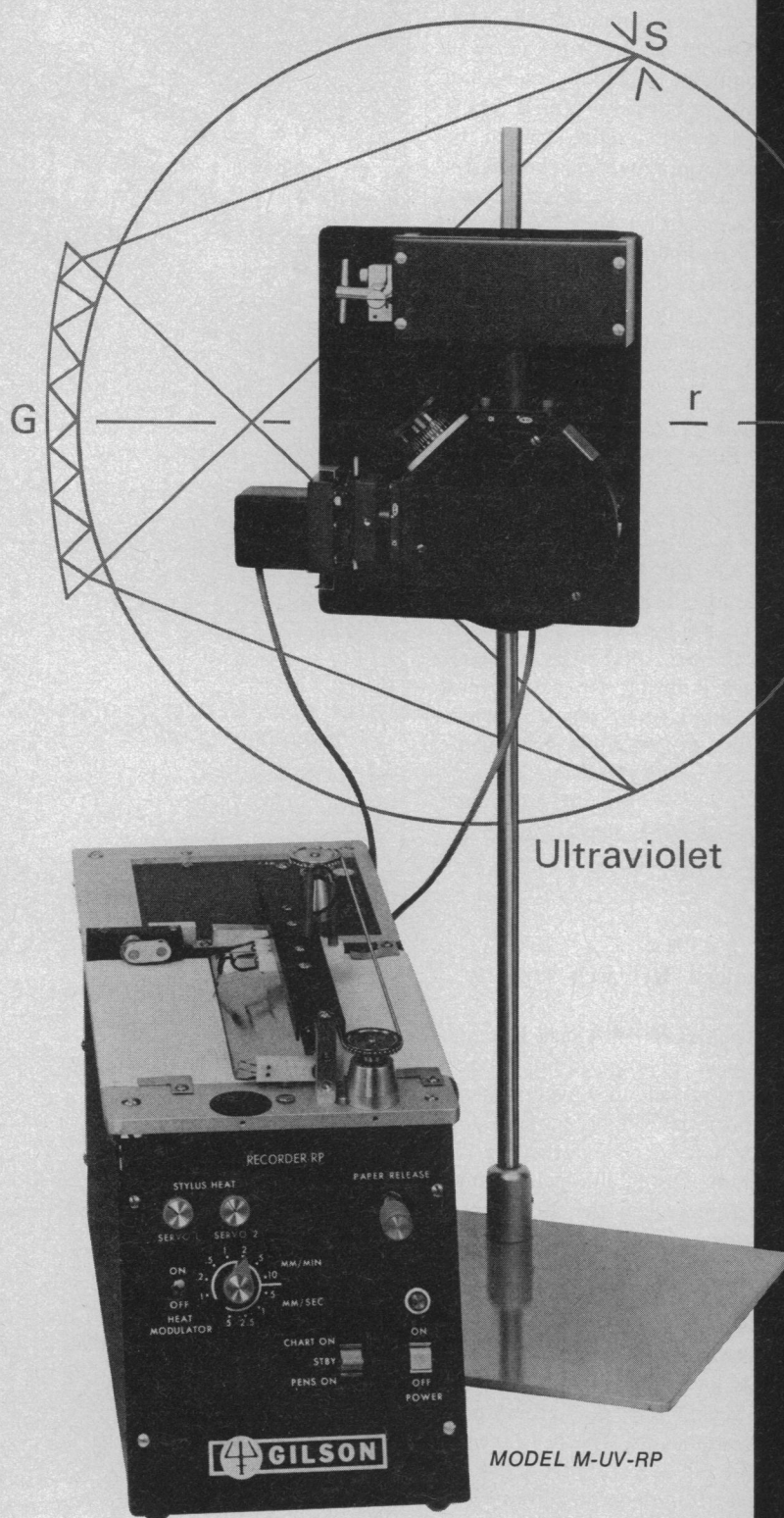
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Genetic Counseling

The avalanche of new genetic discoveries and revolutionary techniques (such as amniocentesis, fetoscopy, and fetal biopsy) has introduced into our social consciousness an awareness of moral, ethical, and philosophical concepts at the grass-roots level that were formerly left to the ivory-tower scholars. Suddenly we are faced with choices previously left to fate: Should a genetically defective child be aborted? Should parents be allowed to select the sex of their offspring? Do parents have an inalienable right to knowingly produce defective children?

These and related questions are receiving increasing attention in professional journals and in articles for the layman. The bioethicists promulgate heated arguments, convincing me that there are no right or wrong answers to the questions posed. Most of the recent articles on genetic counseling have pointed out the complex issues involved, the difficulties in communication, and the ethical dilemmas posed. Many authors have taken a stand on the "best" way to counsel. Each reflects a different point of view.

My point of view is that we need to preserve these different points of view. As a geneticist, I cherish human variability. Our collective strength lies in our pluralistic attitudes. Freedom of speech preserves our right to shout our convictions and to try to persuade others. But the power to make rational decisions preserves our ability to resist coercion from others. There is no opportunity for rational choice, however, when a counselor does not disclose this variety of viewpoints which enables the counselee to arrive at an independent, autonomous decision.

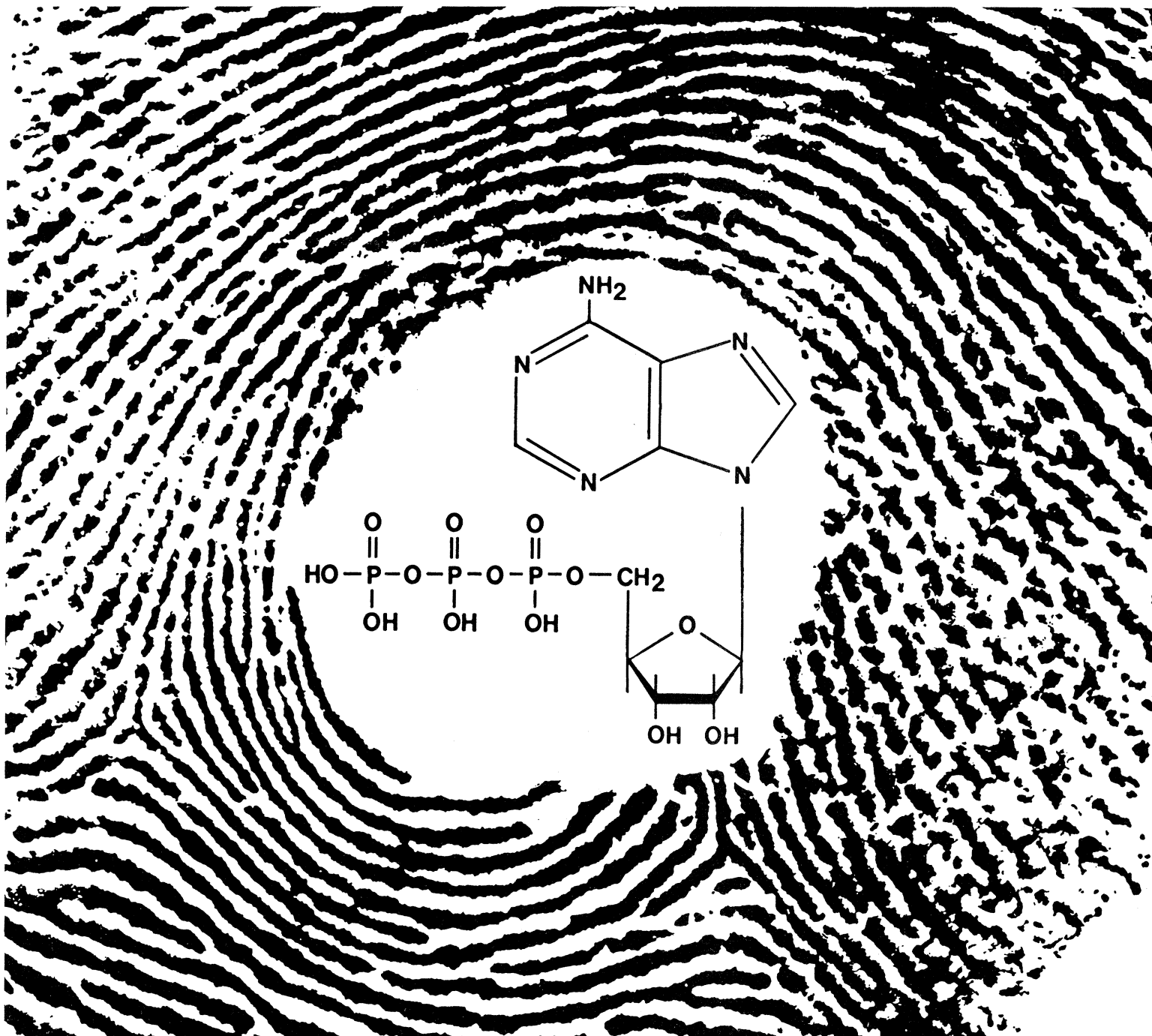
I am not afraid that genetic screening will lead to genocide, nor that abortion will lead to infanticide, as many have warned. If we need checks on our behavior the law will provide them.

The relationship of the genetic counselor to the counselee is a very personal one. It involves a discussion of procreation decisions. Should the counselor describe only the genetic risks, inform the counselee of the range of decisions available, or advise the counselee on the action to be taken? Different counselors do different things. The counselor has freedom to persuade, according to his personal convictions, but he does not have freedom to coerce, based upon his inherent power in the counseling milieu. He must accept the counselee as the ultimate decision-maker. Different parents have a variety of motives for their ultimate decisions. Thus, the outcome of their deliberations will vary. And we will preserve our genetic heterogeneity!

Professionals in general, and physicians in particular, tend to adopt a paternalistic attitude in dealing with patients or experimental subjects or relatives. But only those who desire "parenting" will blindly follow another's advice. The rest will be influenced to a greater or lesser degree by the prescriptions of the counselor who is directive rather than permissive. Those who would argue that the counselee needs protection from directive counseling are themselves being paternalistic.

As our life-styles have become more individualized, so have our ethical codes. The Supreme Court has recognized this trend in the *Roe v. Wade* decision on elective abortion. The proposed amendment to the Constitution to reverse this decision would narrow our options to make individual choices. I see no immediate need to arrive at a consensus or to make policy decisions. Let us keep our options open and preserve our diversity of opinion. By so doing, we preserve our diversity of people.

—MARGERY W. SHAW, *Director, Medical Genetics Center, Health Sciences Center at Houston, University of Texas, Houston 77025*



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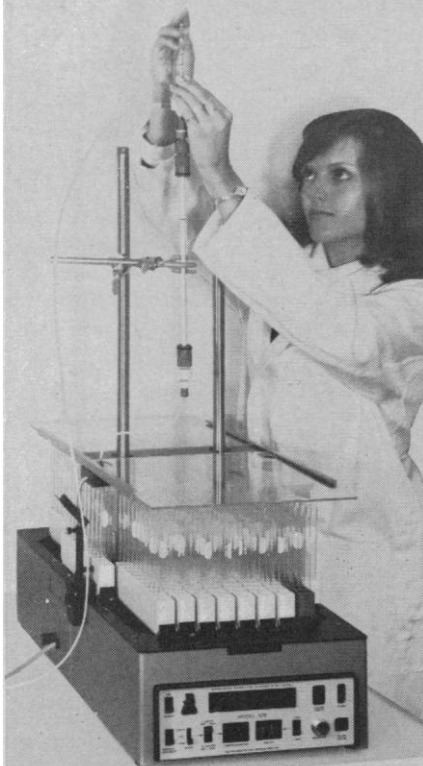
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MEETINGS

Susceptibility of the Fetus and Child to Chemical Pollutants

As chemicals increasingly permeate our environment, there is a need to consider the special vulnerability of the fetus and child. As a first step, a meeting was held on this subject at Browns Lake, Wisconsin, 11 to 13 June 1973, under the sponsorship of the Committee on Environmental Hazards of the American Academy of Pediatrics, the National Institute of Environmental Health Sciences (NIEHS), and the National Institute of Child Health and Human Development (NICHD). Fresh thinking was sought by bringing together scientists who know about environmental effects but not about child health, and pediatricians, who know about child health, but have not given much thought to environmental effects.

Children may be harmed in special ways by pollutants, as illustrated by two epidemics in Japan: the well-known occurrence of congenital cerebral palsy among infants whose mothers, during pregnancy, ingested fish contaminated with methylmercury from industrial waste, and the less well known occurrence of undersized newborn infants with brown discoloration of the skin caused by maternal ingestion of polychlorinated biphenyls which leaked into cooking oil as it was manufactured.

The history of medicine reveals that environmental causes of malformations and other diseases in man have usually been first recognized by alert practitioners. With this in mind, the participants repeatedly urged implementation of an Alert Practitioner Program, in which physicians would report suspicions of new environmental effects for evaluation by a panel of experts. A feasibility study concerning childhood diseases is being made by the American Academy of Pediatrics under contract with NIEHS.

When population studies are contemplated, Sullivan (Guy's Hospital, London) noted that if the usual frequency of an anomaly is 1 in 1,000 newborn infants, the offspring of 23,000 mothers who had taken a suspect drug must be studied to detect a doubling in the incidence of the defect. Other participants stressed the desirability of monitoring populations for the earliest possible detection of malformations due to chemicals newly introduced into the environment.

In screening for transplacental haz-

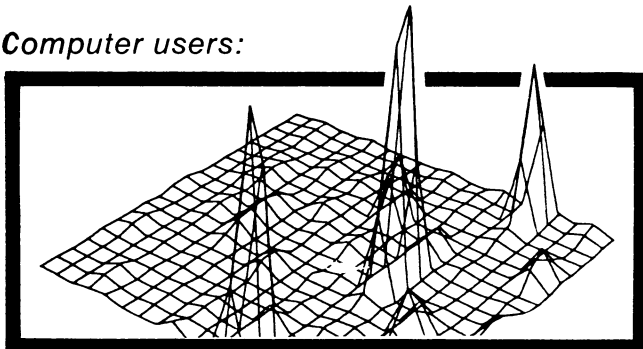
ards, Fraumeni (National Cancer Institute, Bethesda), stated that the entire range of fetal response should be covered, including miscarriage in the early stages, malformations during organ development, and neoplasia when exposure occurs later in pregnancy. Battaglia (University of Colorado) stated that chemical pollutants might also affect the rates for premature births. The onset of labor is in part triggered by the pituitary-adrenal axis of the fetus and by enzyme systems affecting the synthesis of prostaglandins in the uterine mucosa. Chemicals might affect prematurity rates by blocking enzymes that channel certain fatty acids to prostaglandins. An increase in the prematurity rates of California sea lions has since been attributed to organochlorine pesticides and polychlorinated biphenyl residues.

The effects of interacting environmental chemicals was illustrated by the increased frequency and severity of cretinism on Idjwi Island in the Congo. The increase, as described by Gardner (State University of New York Upstate Medical Center), was due to a deficiency of iodine in the diet, the adverse effects of which were worsened by eating cassava. Linamarin, a glucoside in this food, produces cyanide, which, when metabolized to thiocyanate, depresses iodine uptake by the thyroid.

The brain may be particularly susceptible to environmental exposures, but minimal dysfunction is difficult to demonstrate. Weiss (University of Rochester) stated that techniques must be developed to evaluate the relative contribution of various components of the brain, as well as the relationship among all of the structural, functional, and chemical constituents of the central nervous system.

Important concepts about general principles of teratogenesis have come from animal experimentation, but such studies have not been satisfactory in predicting the effects of drugs in man. As an example of new understanding which can be derived from molecular biology, Dorfman (University of Chicago) described the importance of timing in cell differentiation. When 5-bromodeoxyuridine (BrdU) is substituted for thymidine in DNA early in the development of cells in culture, the cells will not differentiate. If BrdU is introduced after differentiation, the cells will not perform certain functions: muscle cells will not make myosin, and cartilage cells will not make chondroitin sulfate. By such studies a basis may be

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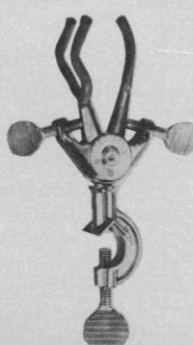
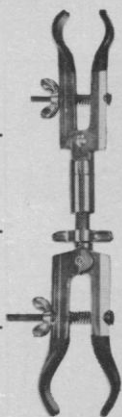
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established for the different actions of teratogens at different stages of development.

In turning from the fetus to the child, Brown (University of Georgia) said that recent research into bilirubin metabolism gives added importance to the effects of light soon after birth. In the newborn infant, bilirubin absorbs light, which may then react to form singlet oxygen and be degraded into water-soluble dipyrroles. Infants should be observed for the effects of actions consciously sought from a drug and un-

consciously produced from sunlight or fluorescent bulbs.

More is known about air pollution. Holland (St. Thomas' Hospital, London) presented evidence that the origins of respiratory diseases with onset late in life can be traced to childhood: persons who migrate from one country to another, even before 10 years of age, carry with them the higher disease rate of the old country. The next generation, born in the new country, does not have its parents' higher rate of respiratory diseases.

Other potential hazards in the environment of the infant or child include skin preparations (such as hexachlorophene), dyes or other materials on the surfaces of toys, pesticides and herbicides, and, as always, lead poisoning from ingesting paint from the walls of deteriorated old houses.

The teen-ager, because of unusual social and environmental subcultures, may experience special environmental difficulties. Cohen (Montefiore Hospital, New York) noted that food faddism and drug abuse, so common among adolescents, pose a variety of problems which may be intensified by the active growth of members of this age group. Adolescents are also more prone than older persons to enter occupations which subject them to chemical hazards.

In reviewing the genetic aspects of chemical pollution, Sutton (University of Texas, Austin) noted that environmentally induced mutations in somatic cells may threaten the survival of the individual, whereas mutations in germ cells may threaten the survival of a population. Mass screening for human mutagenesis will not be feasible until technology is further developed. It is theoretically possible, Sutton said, to examine 100 million somatic cells to detect very low mutation rates—on the order of 1×10^{-7} . This is an enormous advantage over the currently employed approaches to the study of germinal mutations.

The discussion made clear the fact that the Environmental Protection Agency is responsible for regulatory actions pertaining to chemical pollutants for the population in general, but no federal health organization is responsible for research concerning the special susceptibility of the fetus and child. The participants concluded that there is an urgent need for a national agency to assume responsibility for research in this area.

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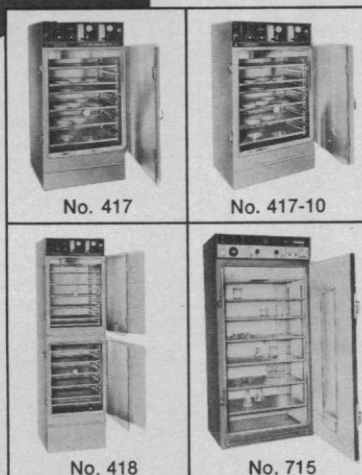
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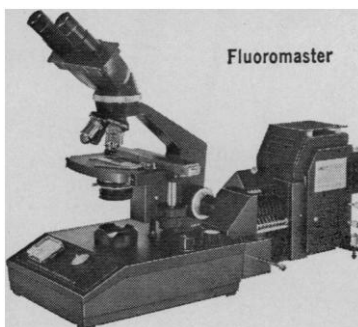
June

3-4. **Intestinal Microecology**, 3rd intern. symp., Columbia, Mo. (Conference Section, Continuing Medical Education, M-175 Medical Center, Columbia 65201)

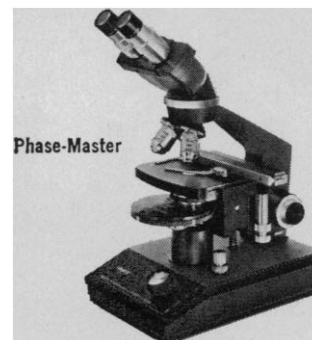
3-6. **Tissue Culture Assoc.**, 25th annual, Miami, Fla. (M. Siegel, Univ. of Miami, P.O. Box 520875, Biscayne Annex, Miami 33152)

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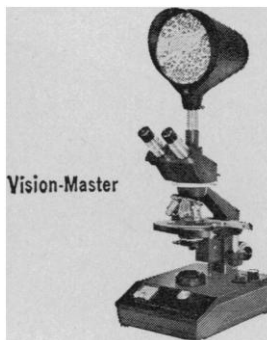
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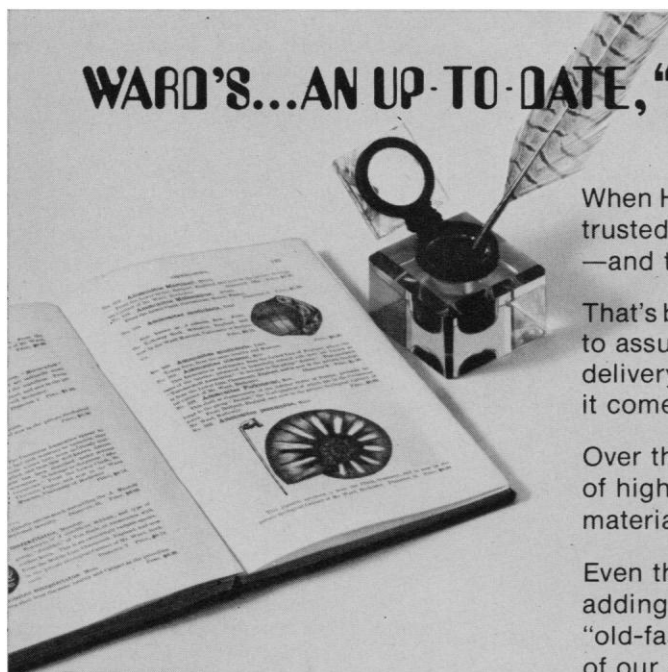
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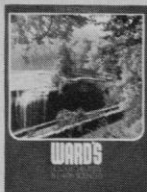


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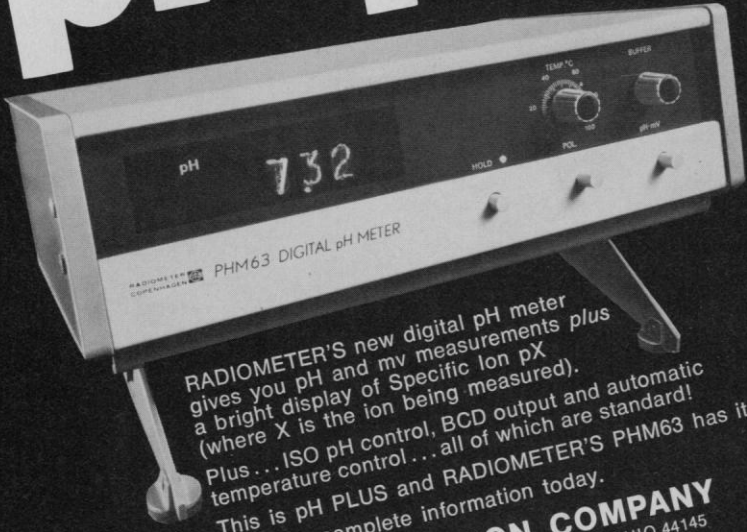
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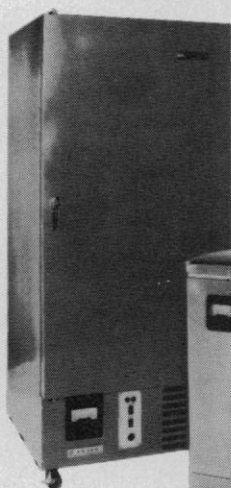


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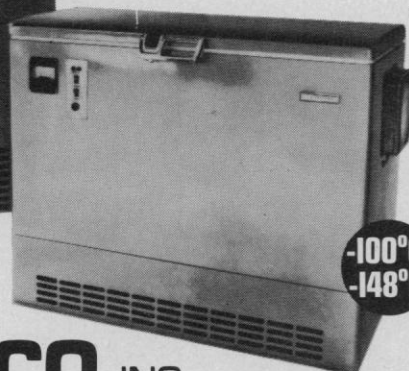
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6-7. **Geodesy/Solid-Earth and Ocean Physics**, 7th conf., American Geophysical Union, Defense Mapping Agency, Natl. Aeronautics and Space Administration, Natl. Oceanic and Atmospheric Administration, Ohio State Univ. Dept. of Geodetic Science, and U.S. Geological Survey, Columbus, Ohio. (AGU, 1707 L St., NW, Washington, D.C. 20036)

6-7. **Symposium on Nutrition and Public Policy**, New York State Nutrition Inst., Ithaca, N.Y. (M. T. Knipe, NYSNI, Savage Hall, Cornell Univ., Ithaca 14850)

6-7. **Role of Immunological Factors, Infectious, Allergic and Autoimmune Processes**, 8th Miles intern symp., Miles Labs., Inc., Baltimore, Md. (E. G. Bassett, Miles Labs., Inc., Elkhart, Ind. 46514)

6-9. **Association for the Psychophysiological Study of Sleep**, 14th annual, Jackson Hole, Wyo. (D. Foulkes, Univ. of Wyoming, Box 3291, University Station 82071)

7-10. **Society of Biological Psychiatry**, Boston, Mass. (I. F. Small, Larue D. Carter Memorial Hospital., 1315 W. 10 St., Indianapolis 46202)

8-12. **Nuclear Energy Conf.**, European Federation of Chemical Engineers, Paris, France. (Société de Chimie Industrielle, 80, Ave. du 18-juin-1940, 95000 Rueil-Malmaison, France)

9-11. **American Assoc. of Petroleum Geologists**, Rocky Mountain Section, Casper, Wyo. (W. H. Curry III, P.O. Box 3001, Casper 82601)

9-12. **Society for Developmental Biology**, 33rd annual, Athens, Ga. (W. S. Badman, SDB, P.O. Box 502, Kalamazoo, Mich. 49005)

9-12. **Nuclear Reactors**, 14th intern. conf., Canadian Nuclear Assoc., Montreal, Canada. (J. A. Weller, CNA, Suite 65 Queen St. W, Toronto, M5H 2M5, Can.)

9-12. **Public Health Hazards of Viruses in Water**, American Public Health Assoc., Mexico City, D.F. (N. R. Bernstein, APHA, 1015 18th St., NW, Washington, D.C. 20036)

9-14. **Geothermal Energy Conf.**, Engineering Foundation, Pacific Grove, Calif. (EF, 345 E. 47 St., New York 10017)

10-11. **Microanalysis with the Scanning Electron Microscope Conf.**, EMventions Microanalysis Lab., Rockville, Md. (J. M. Wehrung, EML, 2351 Shady Grove Rd., Rockville 20850)

10-12. **Conference on Laboratory Instruction in Chemistry**, Intern. Union of Pure and Applied Chemistry, Troy, N.Y. (R. L. Strong, Dept. of Chemistry, Rensselaer Polytechnic Inst., Troy 12181)

10-12. **American Neurological Assoc.**, 99th annual, jointly with Assoc. of British Neurologists, Boston, Mass. (S. A. Trufant, Cincinnati General Hospital, Cincinnati, Ohio 45229)

10-12. **Conference on Thermodynamics and National Energy Problems**, Numerical Data Advisory Board and the Natl. Acad. of Sciences, Warrenton, Va. (C. Holley, Los Alamos Scientific Lab., Los Alamos, N.M. 87544)

10-13. **Quantum Electronics**, 8th intern. conf., American Inst. of Physics and the Inst. of Electrical and Electronics Engineers, San Francisco, Calif. (D. Edgar, Courtesy Associates, Suite 700, 1629 K St., NW, Washington, D.C. 20006)

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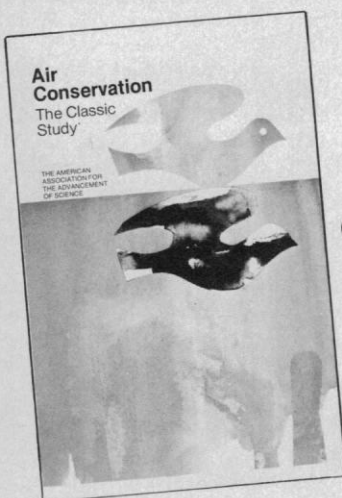
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tion, Blacksburg, Va. (J. A. Cochran, Dept. of Mathematics, Virginia Polytechnic Inst. and Virginia Univ., Blacksburg 24061)

11-13. **Astronomical Soc. of the Pacific**, Bishop, Calif. (L. E. Salanave, ASP, 75 Southgate Ave., Daly City, Calif. 94015)

11-13. **Trace Substances in Environmental Health**, 8th annual conf., Columbia, Mo. (D. Hemphill, 426 Clark Hall, Univ. of Missouri, Columbia 65201)

11-14. **Electrodynamics of Substorms and Magnetic Storms**, American Geophysical Union, Bayse, Va. (AGU, 1707 L St., NW, Washington, D.C. 20036)

11-14. **Endangered and Threatened Species of North America**, Wild Canid Survival and Research Center, Washington, D.C. (WCSRC, Wolf Sanctuary, P.O. Box 16204, St. Louis, Mo. 63105)

11-14. American Soc. of **Mechanical Engineers**, New Orleans, La. (R. B. Finch, ASME, 345 E. 47 St., New York 10017)

11-14. Society of **Nuclear Medicine**, San Diego, Calif. (M. Glos, SNM, 305 E. 45 St., New York 10017)

12-14. **Endocrine Soc.**, Atlanta, Ga. (M. M. Branch, Suite 319, 1411 Classen Blvd., Oklahoma City, Okla. 73106)

12-14. International **Microwave Symp.**, Inst. of Electrical and Electronics Engineers, Atlanta, Ga. (E. B. Joy, School of Electrical Engineering, Georgia Inst. of Technology, Atlanta 30332)

12-14. Canadian **Psychological Assoc.**, 35th annual, Windsor, Ont. (M. Bunt, Univ. of Windsor, Windsor II, Ont.)

12-14. Society of **Research Administrators**, Northeastern section, New York, N.Y. (L. Lasker, New York Medical College, Fifth Ave. at 106 St., New York 10029)

12-15. **Analysis of Lipids and Lipoproteins**, American Oil Chemists' Soc., Washington, D.C. (E. G. Perkins, Dept. of Food Science, Burnsides Research Lab., Univ. of Illinois, Urbana)

13-15. Midwest Conf. of **Parasitologists**, annual, Ann Arbor, Mich. (J. H. Greve, Dept. of Veterinary Pathology, Iowa State Univ., 50010)

13-16. Society of **Biological Psychiatry**, Boston, Mass. (I. F. Small, 1315 W. 10 St., Indianapolis, Ind. 46202)

16-19. International **Communications Conf.**, Inst. of Electrical and Electronics Engineers, Minneapolis, Minn. (A. Cohen, Inst. of Technology, Univ. of Minnesota, Minneapolis 55455)

16-20. Canadian **Anesthetists Soc.**, St. John's, Newfoundland. (CAS, 178 St. George St., Toronto, Ont., M5R 2M7)

16-20. **Medicinal Chemistry**, 14th symp., American Chemical Soc., Durham, N.H. (R. E. Lyle, Dept. of Chemistry, Parson Hall, Univ. of New Hampshire, Durham 03824)

16-20. **Photochemistry Conf. Honoring Prof. Francis E. Blacet**, Nashville, Tenn. (T. W. Martin, Box 1506/B, Vanderbilt Univ., Nashville 37235)

16-21. American Inst. of **Biological Sciences**, Tempe, Ariz. (A. Kulback, AIBS, 1401 Wilson Blvd., Arlington, Va. 22209)

16-21. **Botanical Soc. of America**, Tempe, Ariz. (B. F. Palser, Dept. of Botany, Rutgers Univ., New Brunswick, N.J. 08903)

16-21. American **Fern Soc.**, Tempe, Ariz. (T. R. Webster, Biological Sciences

Group, Univ. of Connecticut, Storrs 06268)

16-21. Society for **Invertebrate Pathology**, 7th annual, Tempe, Ariz. (A. C. Smith, Hawaii BioMarine, No. A102, 4300 Waialae Ave., Honolulu, Hawaii 96816)

16-21. International Conf. on **Microscopy**, McCrone Research Inst., Chicago, Ill. (W. C. McCrone, 2820 S. Michigan Ave., Chicago 60616)

16-21. **Mycological Soc. of America**, Tempe, Ariz. (C. T. Rogerson, New York Botanical Garden, Bronx, N.Y. 10458)

16-21. American Soc. of **Plant Taxonomists**, Tempe, Ariz. (D. E. Stone, Dept. of Botany, Duke Univ., Durham, N.C. 27706)

16-21. American **Rheumatism Assoc.**, Toronto, Ont., Canada (L. Bonfiglio, ARA, 1212 Ave. of the Americas, New York 10036)

16-22. World Confederation for **Physical Therapy**, 7th intern. congr., Montreal, P.Q., Canada. (WCPT, Brigray House 20/22, Mortimer St., London W.1, England)

17-19. **Recent Advances in the Analytical Chemistry of Pollutants**, 4th symp., American Chemical Soc. and U.S. Environmental Protection Agency, Basle, Switzerland. (D. M. Hercules, Dept. of Chemistry, Univ. of Georgia, Athens 30602)

17-19. **Velikovsky and the Recent History of the Solar System**, Student Academic Freedom Forum, Hamilton, Ont., Canada. (S. L. Talbott, *Pensee Magazine*, Post Office Box 414, Portland, Ore. 97207)

17-20. American Soc. for **Engineering Education**, Troy, N.Y. (L. B. Williams, ASEE, Suite 400, 1 Dupont Circle, NW, Washington, D.C. 20036)

17-20. American Soc. of **Plant Physiologists**, Ithaca, N.Y. (W. H. Klein, Smithsonian Radiation Biology Lab., 12441 Parklawn Dr., Rockville, Md. 20852)

17-20. Canadian **Public Health Assoc.**, 65th annual, St. John's, Newfoundland. (C. D. Noble, CPHA, 1255 Yonge St., Toronto, Ont., M4T 1W6)

17-21. American Assoc. for the **Advancement of Science** (Pacific Div.), Irvine, Calif. (R. T. Orr, California Acad. of Sciences, Golden Gate Park, San Francisco 94118)

17-22. American Soc. of **Ichthyologists and Herpetologists**, Ottawa, Ont., Canada. (R. Highton, Dept. of Zoology, Univ. of Maryland, College Park 20742)

17-22. **Phycological Soc. of America**, Tempe, Ariz. (M. J. Wynne, Dept. of Botany, Univ. of Texas, Austin 78712)

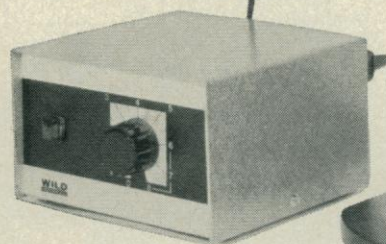
19-20. **Problem Solving Through Information Management**, Univ. of Pittsburgh, Pittsburgh, Pa. (Director of Continuing Education, 418 Cathedral of Learning, Univ. of Pittsburgh, Pittsburgh 15260)

19-21. **Biological Motivated Automata Theory Conf.**, McLean, Va. (M. A. Arbib, Dept. of Computer and Information Science, Univ. of Massachusetts, Amherst 01002)

19-22. Idaho **Medical Assoc.**, Sun Valley. (A. L. Bird, 407 W. Bannock St., Boise, Idaho 83702)

20. Symposium on the **Systems Approach: Key to Successful Computer Applications**, Assoc. for Computing Machin-

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