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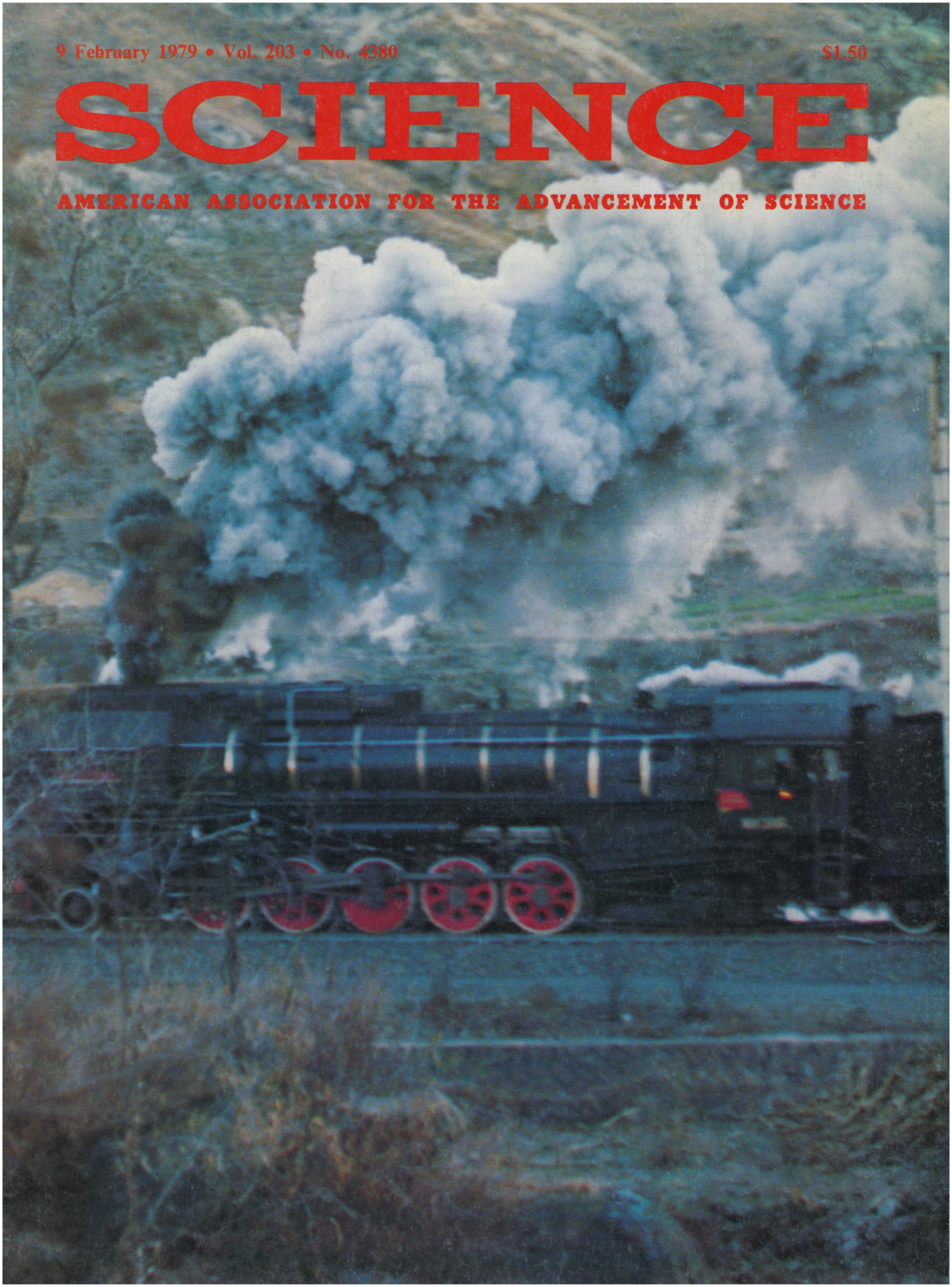

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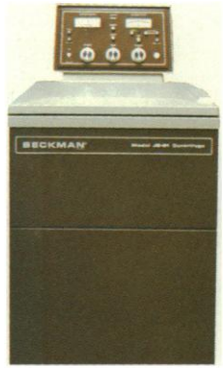

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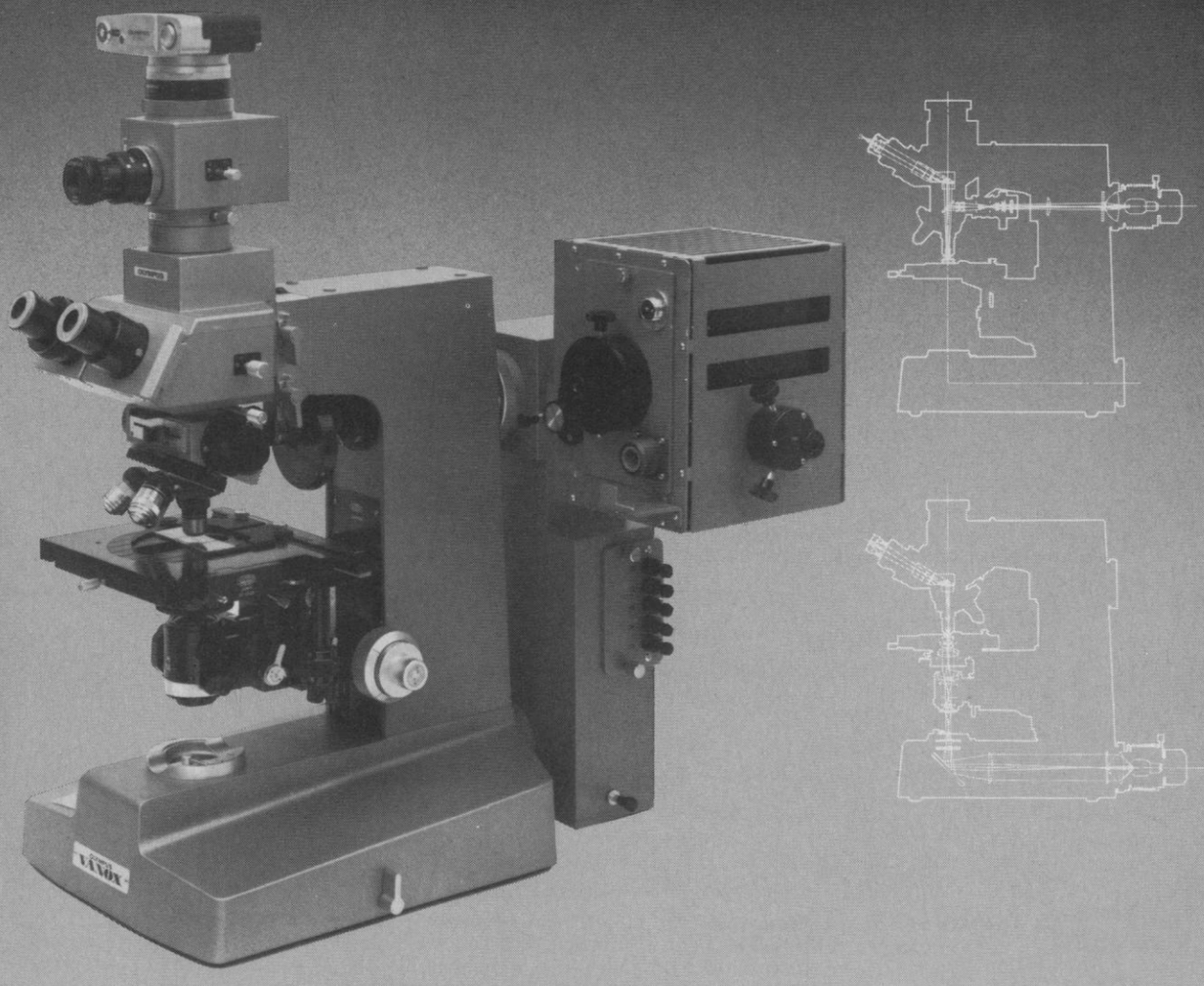

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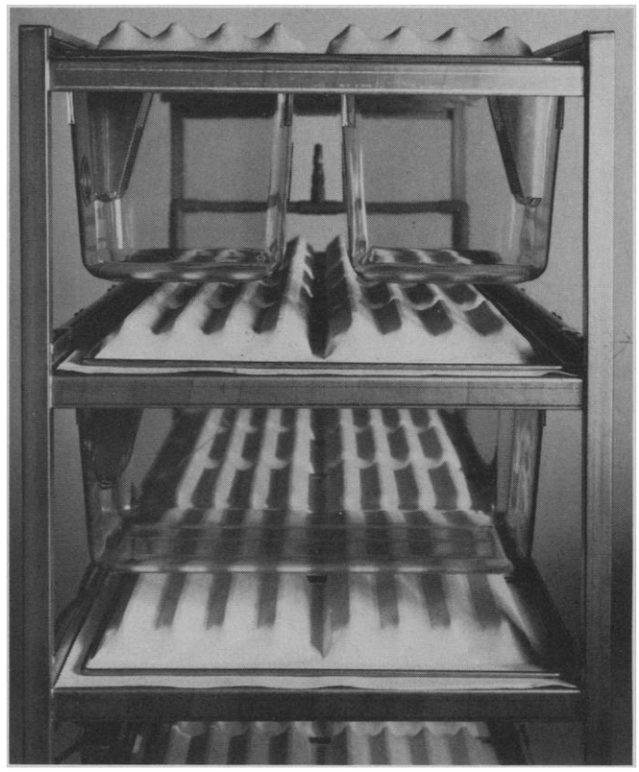

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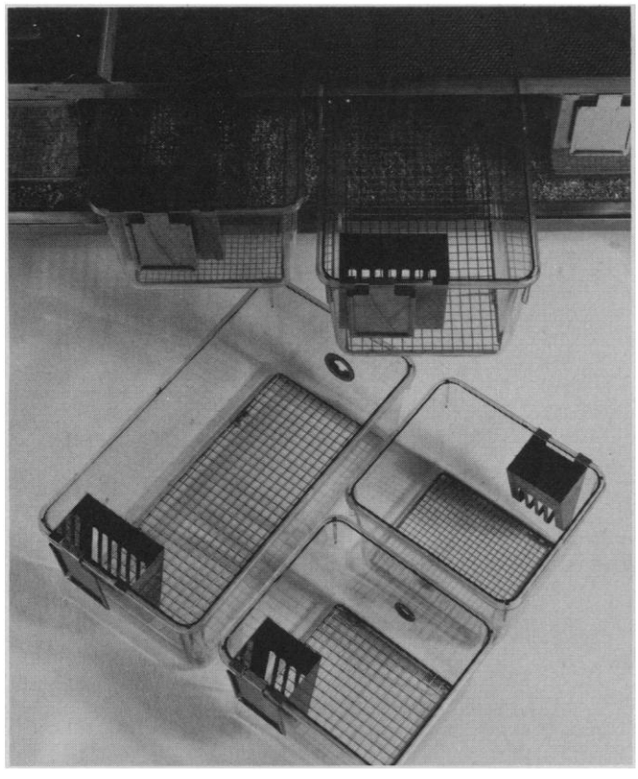

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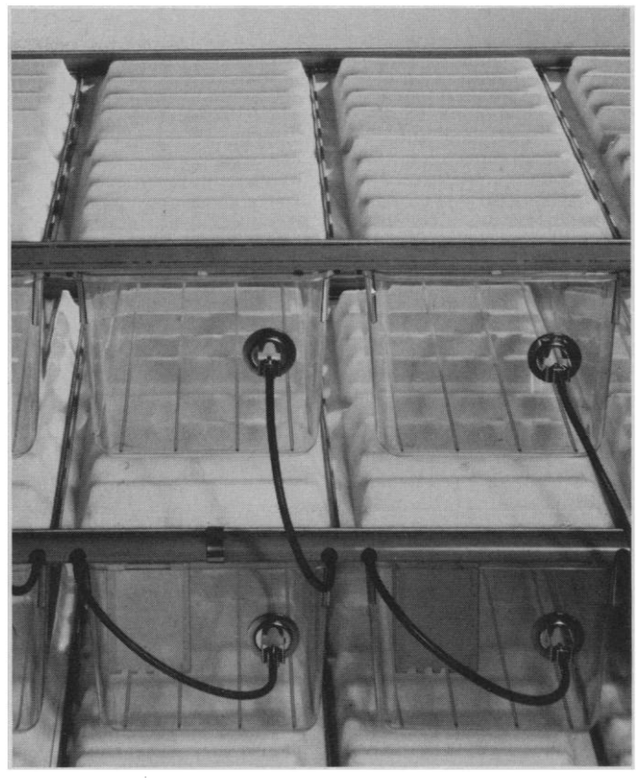

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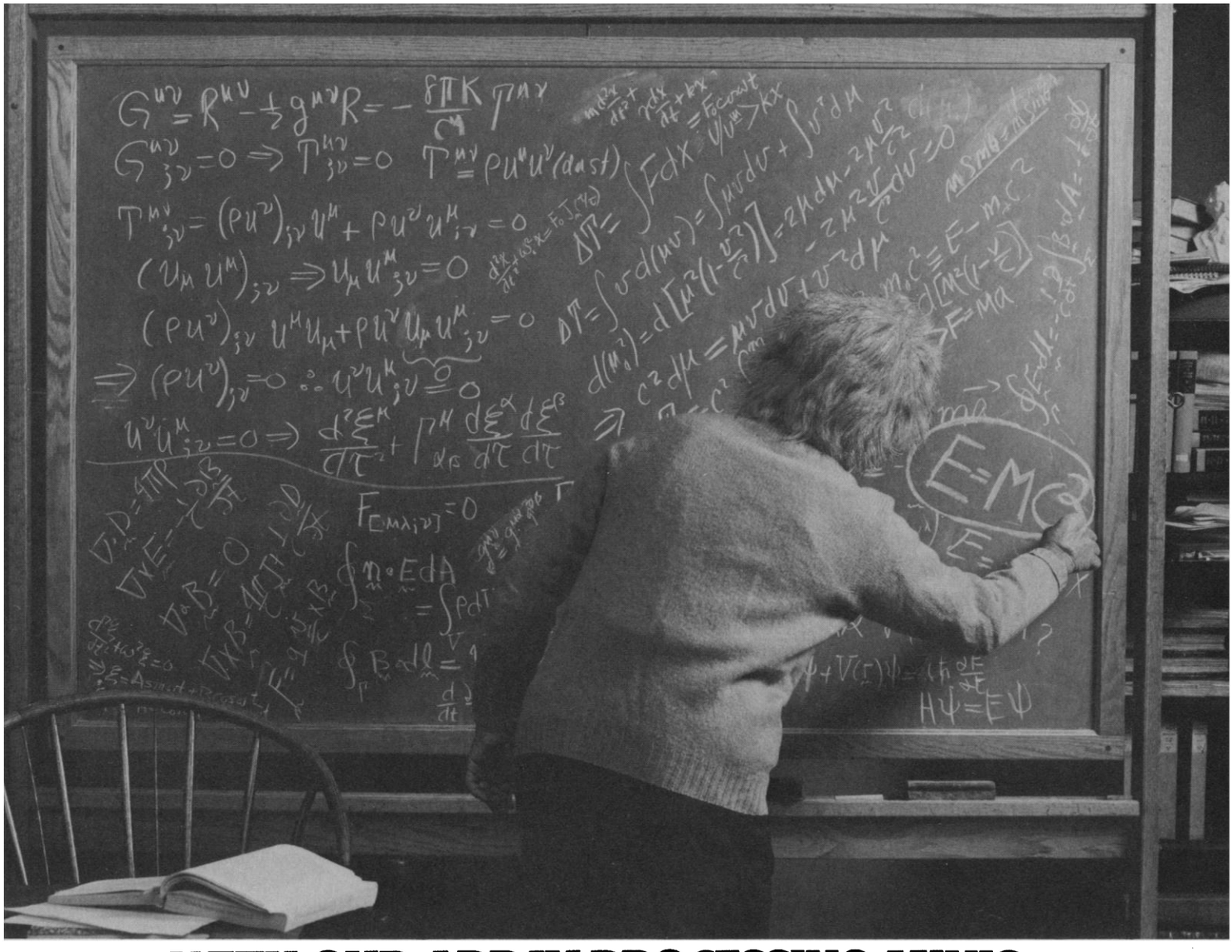

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LETTERS

EPA Air Pollution Standard

Eliot Marshall's article (News and Comment, 1 Dec. 1978, p. 949) on the proposed Environmental Protection Agency (EPA) standard for photochemical oxidants raises several serious questions, some in a misleading light.

Marshall suggests EPA is proceeding in the face of opposition from the scientific community and without consultation. Having been a scientific reviewer of the "Photochemical oxidant criteria document," an author of the "Oxides of nitrogen document," and one of those presently preparing the "Sulfur oxides and particulate document," I find this contention incredulous. The former two documents were circulated in at least two drafts, and criticisms were incorporated from both EPA's science advisory board (SAB) and outside reviewers. True, there were and are differences of opinion but, to my knowledge, the photochemical oxidant document was never "rejected" by the SAB. Marshall does not distinguish between a request for revision and rejection. The criteria documents are immense efforts by a broad spectrum of scientists. EPA has taken the proper position that, because they are public documents, comments by the public should be incoporated as far as possible. To my knowledge, this has happened. To suggest that the contributions of nongovernment scientists to these documents have been discarded is a slur on the efforts of many.

The issue of using ozone in place of total oxidants as a pollution index has been, and continues to be, controversial. As Marshall points out, some scientists, such as James Pitts, Jr., regard this move as impractical. I both agree with Pitts' contention that ozone alone is not a sufficient standard for polluted air and contend that ozone is a reasonable interim approach to regulation as proposed by EPA. Ozone has been better studied than other photochemical pollutants and its toxicity is better understood. The toxicity of the complex mixture of polluted air is poorly understood, and there is simply not enough data available to make a reasonable judgment or defense of a more general standard.

While no one can fault obtaining a better inventory of the toxicants in air, the Clean Air Act amendments require action before added data can be obtained. I am not so pessimistic about support for added research on the composition of

polluted air or its health effects. The storm clouds of the new budget may prove that I am incorrect.

A critical issue is the safety of a higher air quality standard than the present 0.08 part per million (ppm) of pollutant. Present data suggest that chronic toxicity will occur at a level of at least 0.5 ppm. To ignore the animal toxicity data supporting this contention is to ignore the basic concept of prediction of safety from experimental studies as a whole. Human pulmonary function tests are much less sensitive than biochemical, physiological, and morphological studies in animals and thus tend to underestimate, short of lifetime exposures, the hazards from ozone. A standard of 0.2 ppm will provide little, or no, safety margin. More important, the effects of cyclical, short-term exposure regimens, mimicking human exposures in urban areas, are lacking.

The gaps in critical data in air pollutant toxicology are not for want of trying. Rather, they reflect the overall sophistication of toxicology and the improved sensitivity of pathophysiological measurements. What is needed is stronger support for intensive, long-term scientific studies of the highest quality. If the initiative to clean up the environment is to survive, EPA and other agencies regulating the outpouring of pollutants need the support and contribution of the scientific community as a whole.

DANIEL B. MENZEL
Departments of Pharmacology and Medicine, Duke University Medical Center, Durham, North Carolina 27710

Federal Regulation: What Role for Universities?

Eliot Marshall (News and Comment, 1 Dec. 1978, p. 955) reports on Massachusetts Institute of Technology president Jerome B. Wiesner's concern over federal intrusion into internal university operation and management. The suggested solution appears to be the establishment, or reestablishment, of a special "federal-academic relationship" that would exempt universities from the enforcement of government regulations applied to others.

One concerned about the welfare of our universities can only sympathize with the problem Wiesner raises and applaud him and others who speak out. But one concerned about the overall welfare of our society may also ask whether it is responsible for the universities to plead for special treatment. After all, government regulations are intended to help achieve ideals to which all of us ascribe: equality of opportunity regardless of race, religion, sex, or physical handicap; prevention of cruelty to animals; control or elimination of activities with risk to health or safety; fair labor practices; sound financial management—especially of public funds; decent treatment of the aged, and so forth, and so forth.

Do universities have a special role that should exempt them from trying to reach these ideals? Might one not argue, instead, that universities should show exemplary conformance with government regulations intended to help achieve these goals?

Let me suggest that it is not the goals, but unbalanced and intrusive federal actions connected with the achievement of those goals, that are the problem. If this is so, shouldn't the universities, on the basis of their own experience, be seeking to change this federal approach wherever it is applied?

Is it responsible for those in universities—so long as they are not directly affected—to ignore, or even support, the same regulatory approach they find so "repressive"?

BERTRAM WOLFE
15453 Via Vaquero, Monte Sereno, California 95030

Problems

I am frankly baffled by Soviet mathematician Grigori Freiman's reported baffflement. Gina Bari Kolata, in her article on alleged anti-Semitism in Soviet mathematics (News and Comment, 15 Dec. 1978, p. 1167), describes Freiman as being amazed that a Soviet Jewish student could solve the "difficult" problem, "Which is greater, sin 8/7 or $8\pi/7$?" Either the problem is garbled, or I am missing something, because the relationship sought is elementary (easier, I'd judge, than proving the problem alleged to be less difficult—that "$\log_2 3$" is irrational). So my curiosity is aroused. What was the problem?

GEORGE GREENE
524 Oakdale Avenue, Chicago, Illinois 60657

Both problems were given incorrectly in my article. The difficult problem was to decide, without the use of tables, which is greater, sin 8/7 or $8\pi/27$. The other problem was to prove that $\log_2 3$ is irrational.—GINA BARI KOLATA

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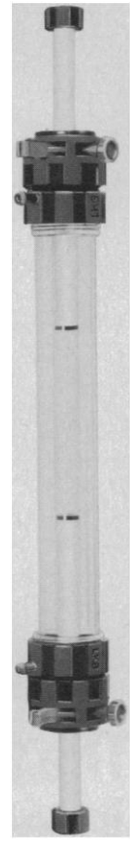

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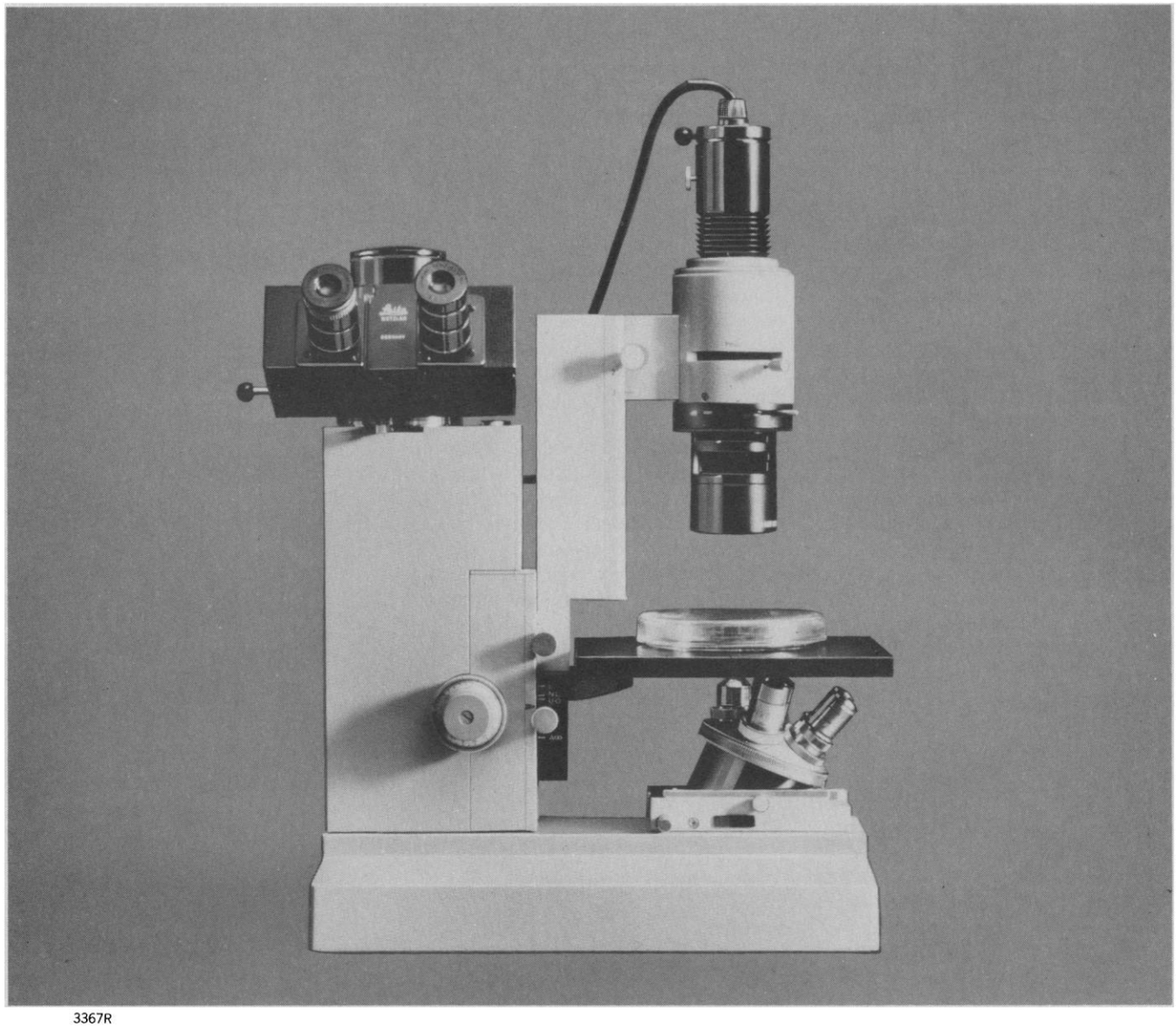

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Scientific Relations with China

President Carter's decision to normalize relations with China has met a mixed public response. However, in scientific and educational circles the reaction is more favorable. There one finds awareness and appreciation of the intellectual potentials of the Chinese, of the great inventive contributions during past millennia, and a feeling that the United States should be on friendly terms with a nation that includes one-fourth of the world's population. U.S. scientists are disposed to give Chinese visiting scholars a warm welcome and many are eager to spend some time in China. The extent of interchange and cooperation will be determined by the Chinese rather than by reluctance here.

Current official attitudes of the Chinese toward interaction are in sharp contrast to those that prevailed only a few years ago. From 1948 to 1971 there were few contacts. Then a gradual change occurred in which science and technology had a major role. A pivotal moment was the Nixon visit to China in 1972. But even before that, scholarly groups here were trying to foster relationships. In 1966 a Committee on Scholarly Communication with Mainland China was formed to explore and pursue opportunities to facilitate scientific and other scholarly communication. The Committee included four major sectors of American scholarly activities—the American Council of Learned Societies, the National Academy of Engineering, the National Academy of Sciences, and the Social Science Research Council.

Early efforts to achieve a working relationship with China were not fruitful, but in 1972 the Committee, renamed the Committee on Scholarly Communication with the People's Republic of China, became a major factor in exchanges. From 1972 through 1978 the Committee and its staff served as hosts to 37 Chinese scientific delegations to the United States. Since the spring of 1973 the Committee has sent 30 American scholarly delegations to China, selecting the exchange topics and participants.

This organized effort was supplemented by private groups and individuals. Notably effective were Chinese-Americans, some of whom prepared trip reports that were published. The various visits made clear to the Chinese that a good and friendly climate for interchange existed.

In July 1978 President Carter sent his science adviser, Frank Press, and a delegation of heads of science and technology-related government agencies to China. Their mission was to investigate the possibility of cooperation going beyond the survey trips. Press had earlier served as chairman of the Committee on Scholarly Communication with the People's Republic of China and he had been a member of an American visiting delegation. This background was helpful in discussions leading to opening the way for serious scholarly cooperation. The Press mission probably had a significance that went beyond scholarship. When two major powers make an agreement, many factors are involved. But in the normalization of relations, considerations of scientific and technological interchange surely were an important factor.

With the resumption of diplomatic relations between the United States and China, interchange will occur through other mechanisms such as commerical relationships and exchanges between universities. To obtain information to better formulate a cooperative program, most of the members of the Board of Directors of AAAS visited China from 14 November to 3 December 1978. The delegation was able to examine a broad cross section of Chinese life, education, and science and technology. In the course of the visit, many hundreds of photographs were taken both on film and in the mind. In this issue there are a few pictures and impressions of changing scenes in China in late 1978. What is presented is somewhat different, less euphoric than the views of earlier visitors. In turn, it is to be expected that what will be reported a few years hence will differ from the present portrayal, for the vast energy of China is being channeled in new directions and change for better or worse is inevitable.—PHILIP H. ABELSON

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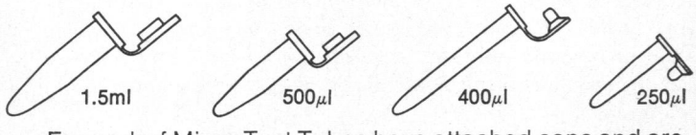

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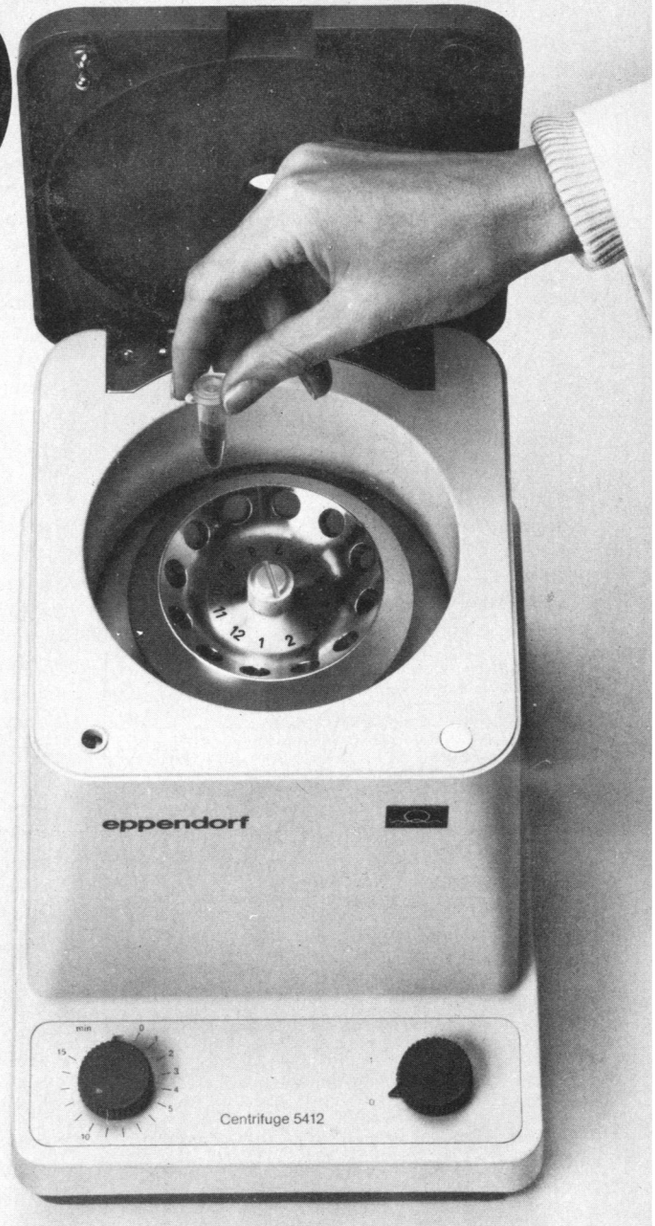

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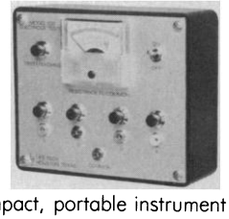

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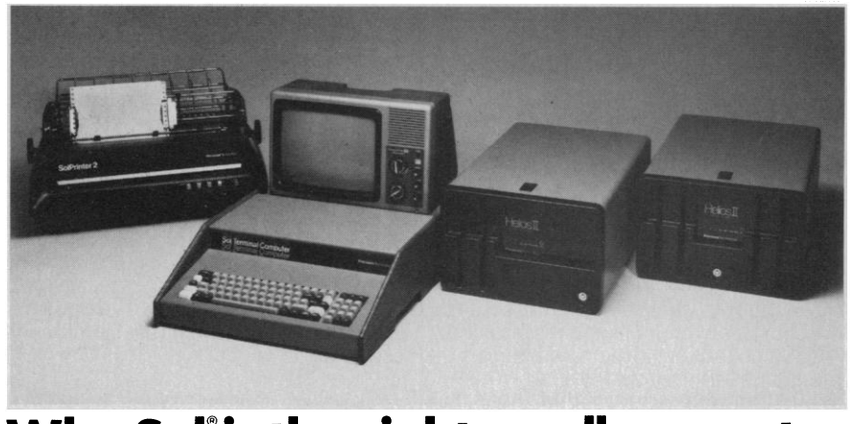

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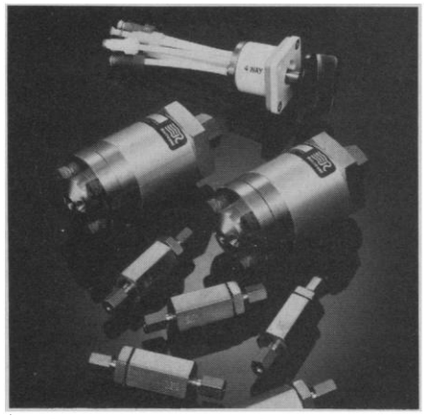

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(Continued from page 540)

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Consciousness and Self-Regulation. Advances in Research and Theory. Vol. 2. Gary E. Schwartz and David Shapiro, Eds. Plenum, New York, 1978. xxiv, 446 pp. $22.50.

Contrary to Nature. Being an Illustrated Commentary on Some Persons and Events of Historical Importance in the Development of Knowledge Concerning Cancer. Michael B. Shimkin. National Institutes of Health, Bethesda, Md., 1977 (available from the Superintendent of Documents, Washington, D.C.). xx, 498 pp., illus. $12.75. DHEW Publication No. (NIH) 76-720.

Desert Tortoise Council Proceedings of 1977 Symposium. Las Vegas, Mar. 1977. Desert Tortoise Council, San Diego, Calif., 1978. viii, 188 pp., illus. Paper, $5.

Developmental Neurobiology. Marcus Jacobson. Plenum, New York, ed. 2, 1978. xii, 562 pp., illus. $37.50.

Dynamic Morphology of Leukemia Cells. A Comparative Study by Scanning Electron Microscopy and Microcinematography. H. Felis, G. Haemmerli, and P. Sträuli. Springer-Verlag, New York, 1978. xiv, 192 pp., illus. $49. *To order this book circle No. 581 on Readers' Service Card*

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Economic Microbiology. Vol. 2, Primary Products of Metabolism. A. H. Rose, Ed. Academic Press, New York, 1978. xviii, 470 pp., illus. $44.

Epidemiology of Cancer in Texas. Incidence Analyzed by Type, Ethnic Group, and Geographic Location. Eleanor J. Macdonald and Evelyn B. Heinze. Raven, New York, 1978. xx, 650 pp. $45.

Experimental Psychology. A Methodological Approach. F. J. McGuigan. Prentice-Hall, Englewood Cliffs, N.J., ed. 3, 1978. xvi, 496 pp., illus. $13.95.

Fáánakkar: Cultural Values in a Micronesion Society. John L. Caughey. University of Pennsylvania Department of Anthropology, Philadelphia, 1977. x, 180 pp., illus. Paper, $17. University of Pennsylvania Publications in Anthropology, No. 2.

Fatty Acids and Glycerides. Arnis Kuksis, Ed. Plenum, New York, 1978. xviii, 470 pp., illus. $35. Handbook of Lipid Research, vol. 1.

Handbook of Sex Therapy. Joseph LoPiccolo and Leslie LoPiccolo, Eds. Plenum, New York, 1978. xx, 532 pp., illus. $29.50. Perspectives in Sexuality.

Highly Hazardous Materials Spills and Emergency Planning. J. E. Zajic and W. A. Himmelman. Dekker, New York, 1978. xii, 226 pp. $24.50. Hazardous and Toxic Substances, 1.

Historical Archaeology. A Guide to Substantive and Theoretical Contributions. Robert L. Schuyler, Ed. Baywood Publishing Company, Farmingdale, N.Y., 1978. xiv, 286 pp., illus. $15.

Historical Studies in the Physical Sciences. Ninth Annual Volume. Russell McCormmach, Lewis Pyenson, and Roy Steven Turner, Eds. Johns Hopkins University Press, Baltimore, 1978. xii, 362 pp. $18.95.

Humanscape. Environments for People. Stephen Kaplan and Rachel Kaplan, Eds. Duxbury Press (Wadsworth), North Scituate, Mass., 1978. xvi, 480 pp., illus. Paper, $9.95.

Hyperspaces of Sets. A Text with Research Questions. Sam B. Nadler, Jr. Dekker, New York, 1978. xvi, 708 pp. $45. Monographs and Textbooks in Pure and Applied Mathematics, 49.

Image and Pilgrimage in Christian Culture. Anthropological Perspectives. Victor Turner and Edith Turner. Columbia University Press, New York, 1978. xx, 282 pp. + plates. $15. Lectures on the History of Religions.

In the Center of Immensities. Bernard Lovell. Harper and Row, New York, 1978. xx, 172 pp. $10.95. World Perspectives, vol. 53.

Indicators of Viruses in Water and Food. Gerald Berg, Ed. Ann Arbor Science, Ann Arbor, Mich., 1978. viii, 424 pp. $39.95.

Inelastic Electron Tunneling Spectroscopy. Proceedings of a conference, Columbia, Mo., May 1977. T. Wolfram, Ed. Springer-Verlag, New York, 1978. viii, 242 pp., illus. $29. Springer Series in Solid-State Sciences, vol. 4. *To order this book circle No. 582 on Readers' Service Card*

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Laboratory Manual for Invertebrate Zoology. Emphasizing Marine Forms. Ju-Shey Ho. Illustrated by David M. Marschall. Hwong Publishing Co., Los Alamitos, Calif., 1978. viii, 152 pp. Paper, $7.95.

Linguistic Theory and Psychological Reality. Morris Halle, Joan Bresnan, and George A. Miller, Eds. MIT Press, Cambridge, Mass., 1978. xx, 330 pp., illus. $17.50. MIT Bicentennial Studies, 3.

The Mammals of the Palaearctic Region. A Taxonomic Review. C. B. Corbet. British Museum (Natural History), London, and Cornell University Press, Ithaca, New York, 1978. viii, 314 pp., illus. $38.50.

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The Mind Unfolded. Essays on Psychology's Historic Texts. Daniel N. Robinson. Uni-

versity Publications of America, Washington, D.C., 1978. xii, 544 pp. Cloth, $24; paper, $8.

Mineral Economics and Basic Industries in Asia. K. P. Wang and E. Chin. Westview Press, Boulder, Colo., 1978. xxvi, 358 pp., illus. $23.70. Westview Special Studies on China and East Asia/South and Southeast Asia.

Molecular and Cellular Aspects of Vascular Smooth Muscle in Health and Disease. Proceedings of a symposium, Honolulu, Jan. 1977. D. F. Bohr and F. Takenaka, Eds. Karger, Basel, 1978. 216 pp., illus. Paper, $47.50. *Blood Vessels*, vol. 15, Nos. 1-3.

The Natural History of the Whale. L. Harrison Matthews. Columbia University Press, New York, 1978. xiv, 220 pp., illus. + plates. $19.95.

Neurochemical and Immunologic Components in Schizophrenia. Proceedings of a conference, Galveston, Tex., Oct. 1976. Daniel Bergsma, Allan L. Goldstein, Bernard Haber, Geraldine H. Cohen, Natalie W. Paul, and Jeanne Mudge, Eds. Liss, New York, 1978. xvi, 432 pp., illus. $46. Birth Defects: Original Article Series, vol. 14, No. 5. *To order this book circle No. 584 on Readers' Service Card*

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Oscar Zariski: Collected Papers. Vol. 3, Topology of Curves and Surfaces, and Special Topics in the Theory of Algebraic Varieties. M. Artin and B. Mazur, Eds. MIT Press, Cambridge, Mass., 1978. xxvi, 480 pp. $35. Mathematicians of Our Time.

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Placodermi. Robert Denison. Gustav Fischer, New York, 1978. vi, 128 pp., illus. $65.70. Handbook of Paleoichthyology, vol. 2.

Plant Tissue Culture and Its Bio-technological Application. Proceedings of a congress, Munich, Sept. 1976. W. Barz, E. Reinhard, and M. H. Zenk, Eds. Springer-Verlag, New York, 1977. xvi, 422 pp., illus. $38.80. Proceedings in Life Sciences. *To order this book circle No. 578 on Readers' Service Card*

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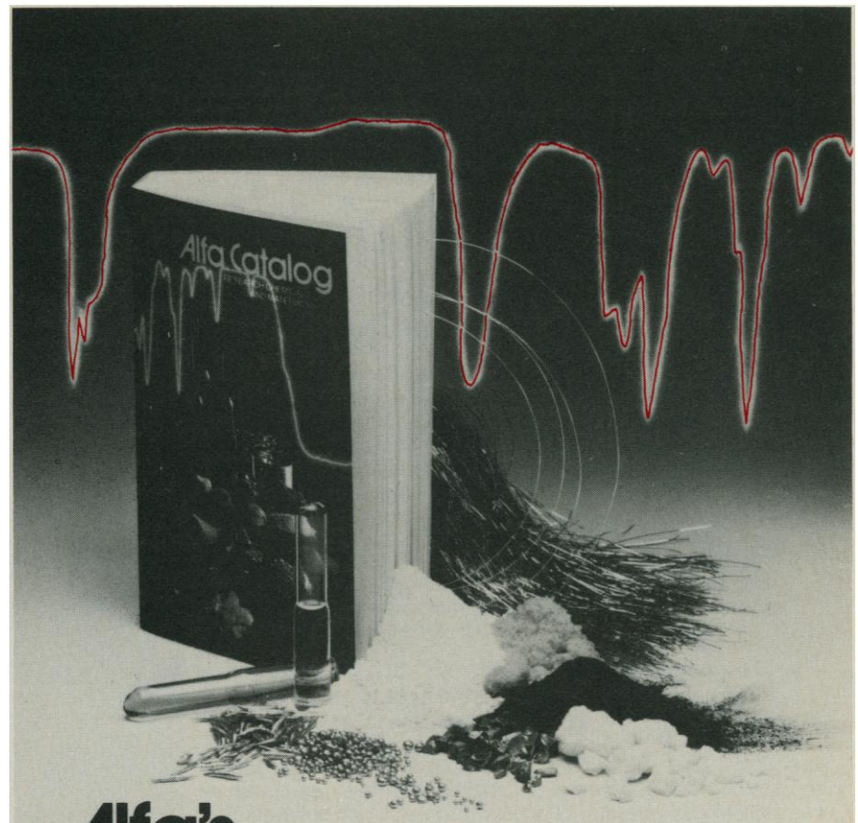

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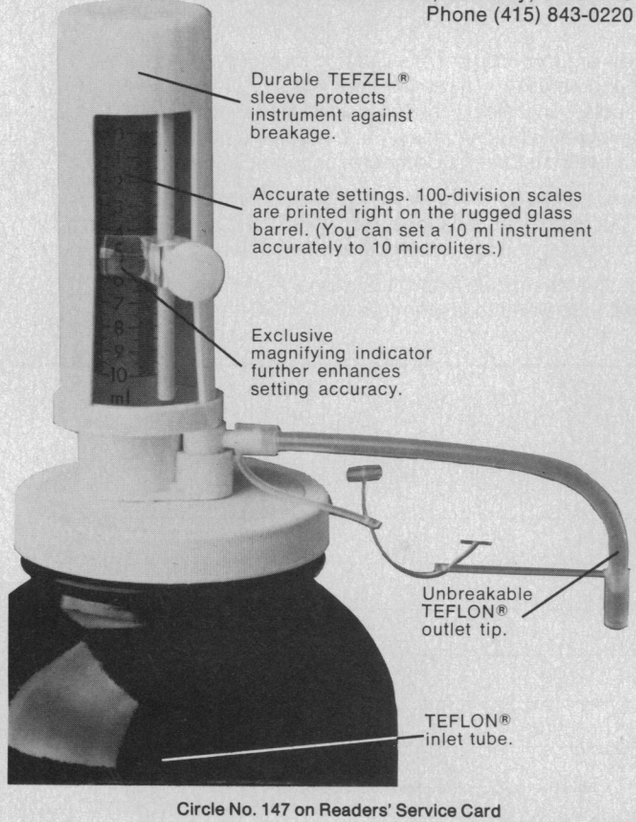

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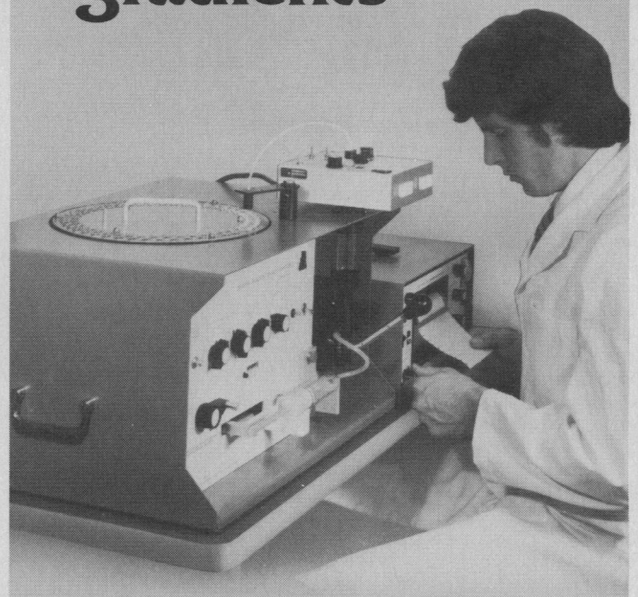

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