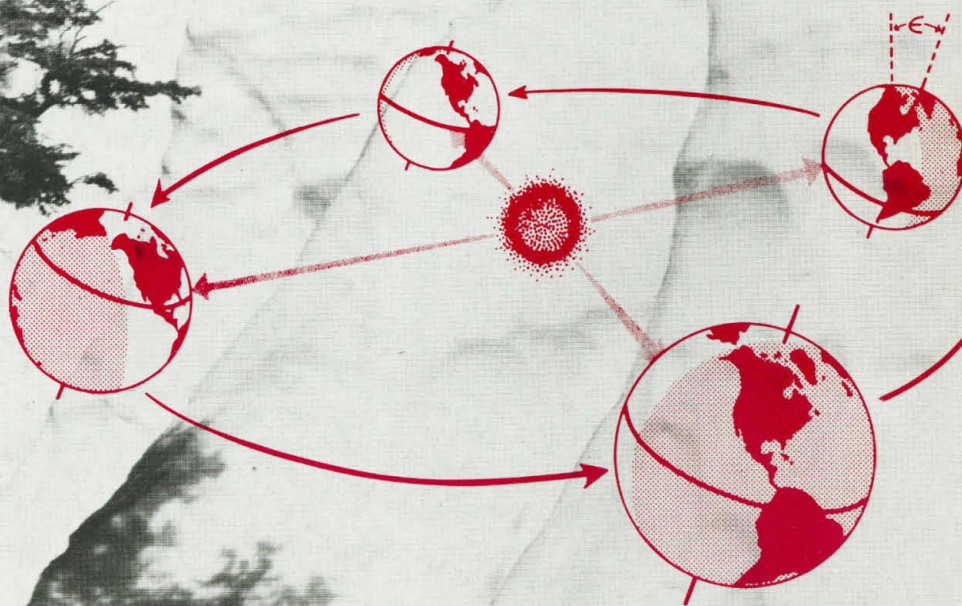


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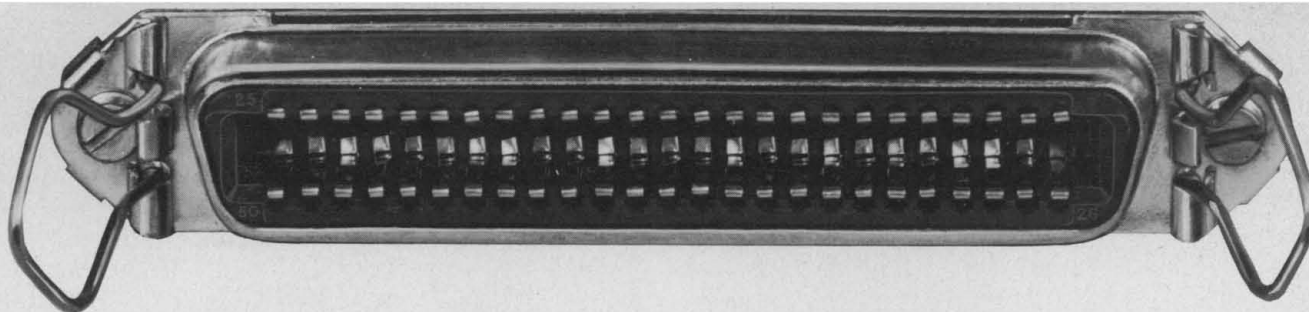
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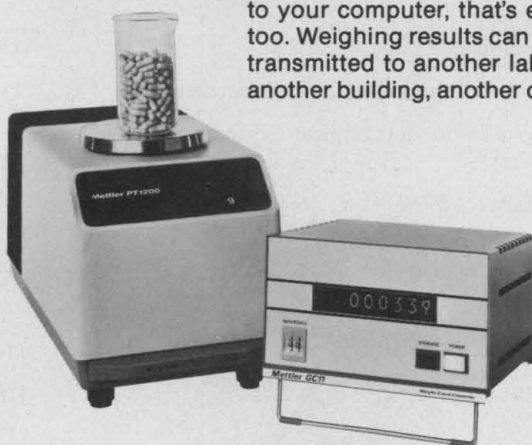


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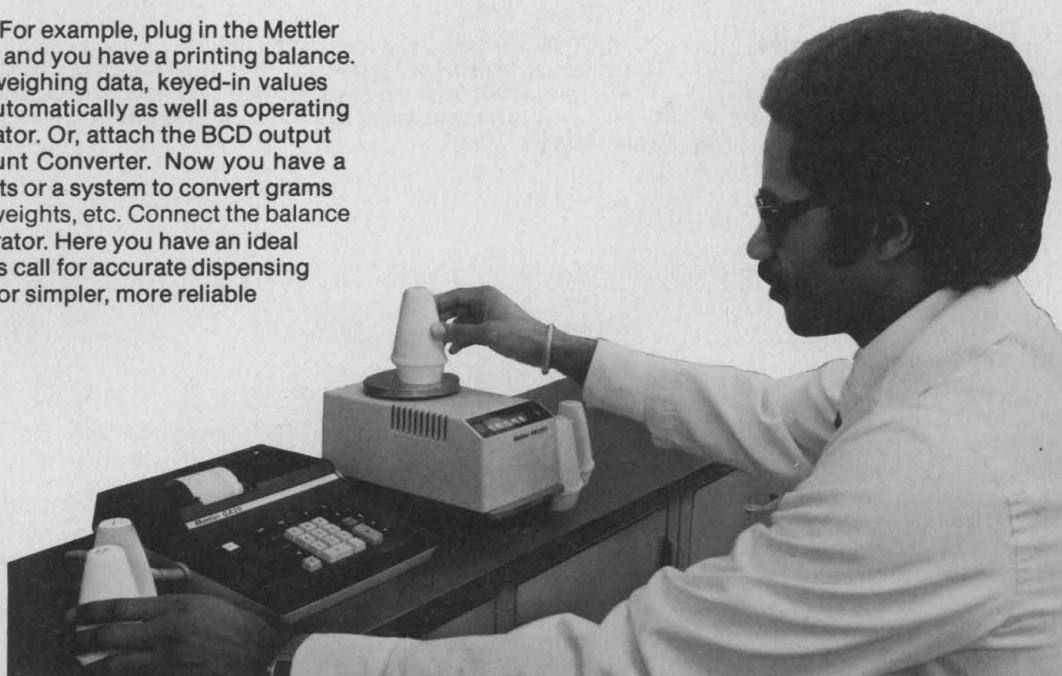
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COVER

Moreno Glacier at Lago Argentino in the Andes of Argentina with its terminus advancing into a stand of southern beech (*Nothofagus pumilio*) [J. H. Mercer, Ohio State University, Columbus]. The orbital diagram [G. Kukla, Lamont-Doherty Geological Observatory, Palisades, New York] symbolizes conclusion of research that variations in the earth's orbit are the fundamental cause of the succession of late Pleistocene ice ages. See page 1121.

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Photomicrographs 1, 2 & 3: Julie Langham Grilly, Los Alamos Scientific Laboratory.

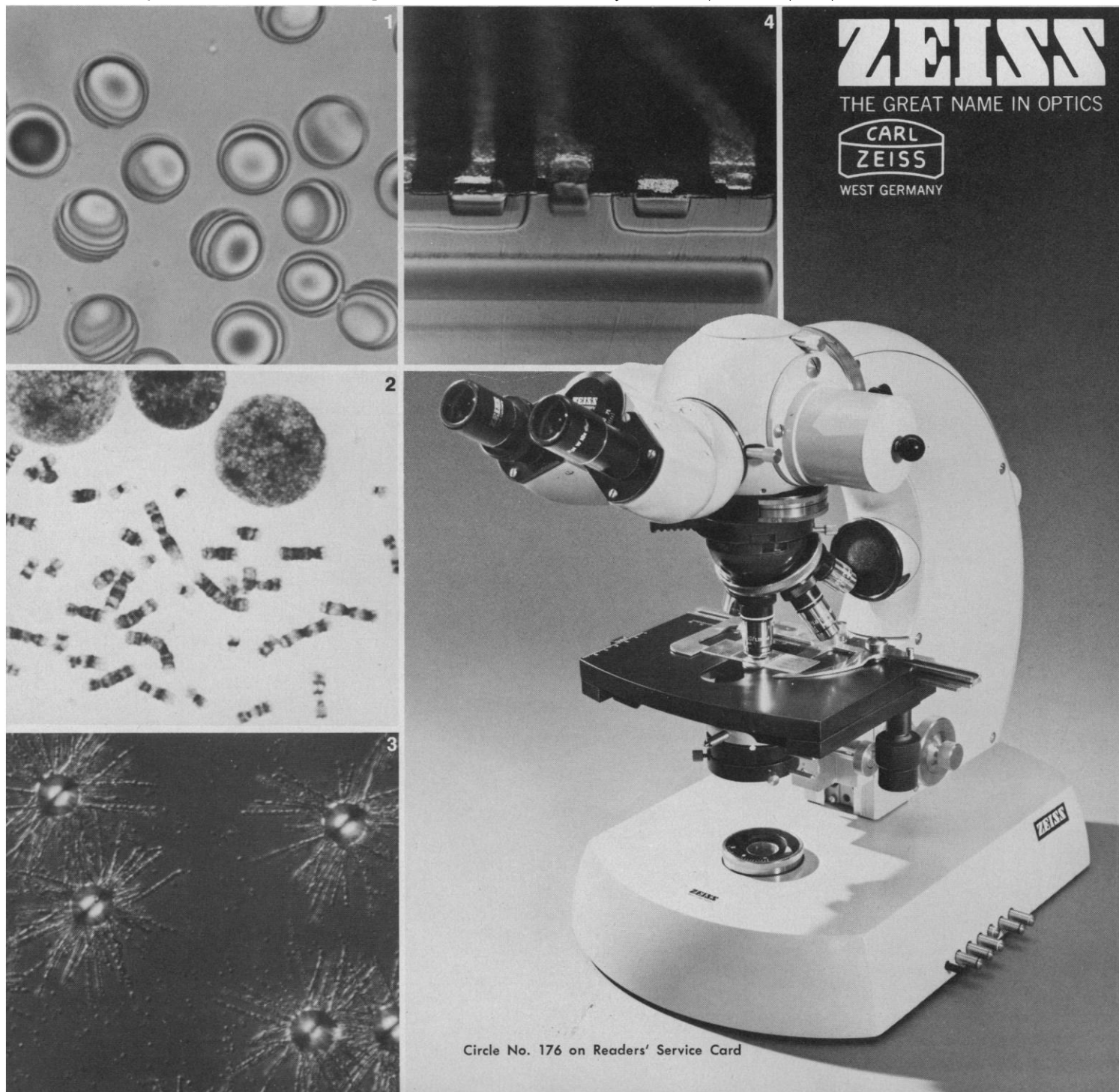
4. Semiconductor

Tapered cross section after etch, showing emitter base, buried layer, isolation and resistor diffusions. Nomarski differential interference contrast. Negative magnification: 528X.

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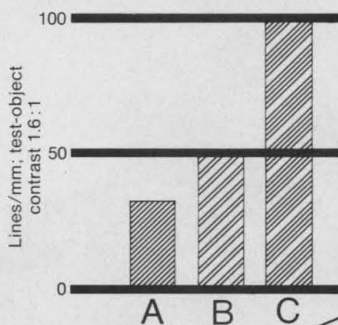
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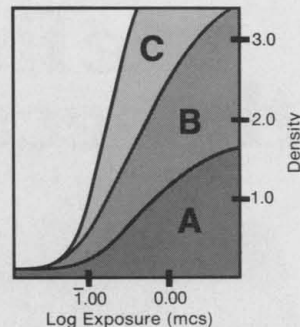
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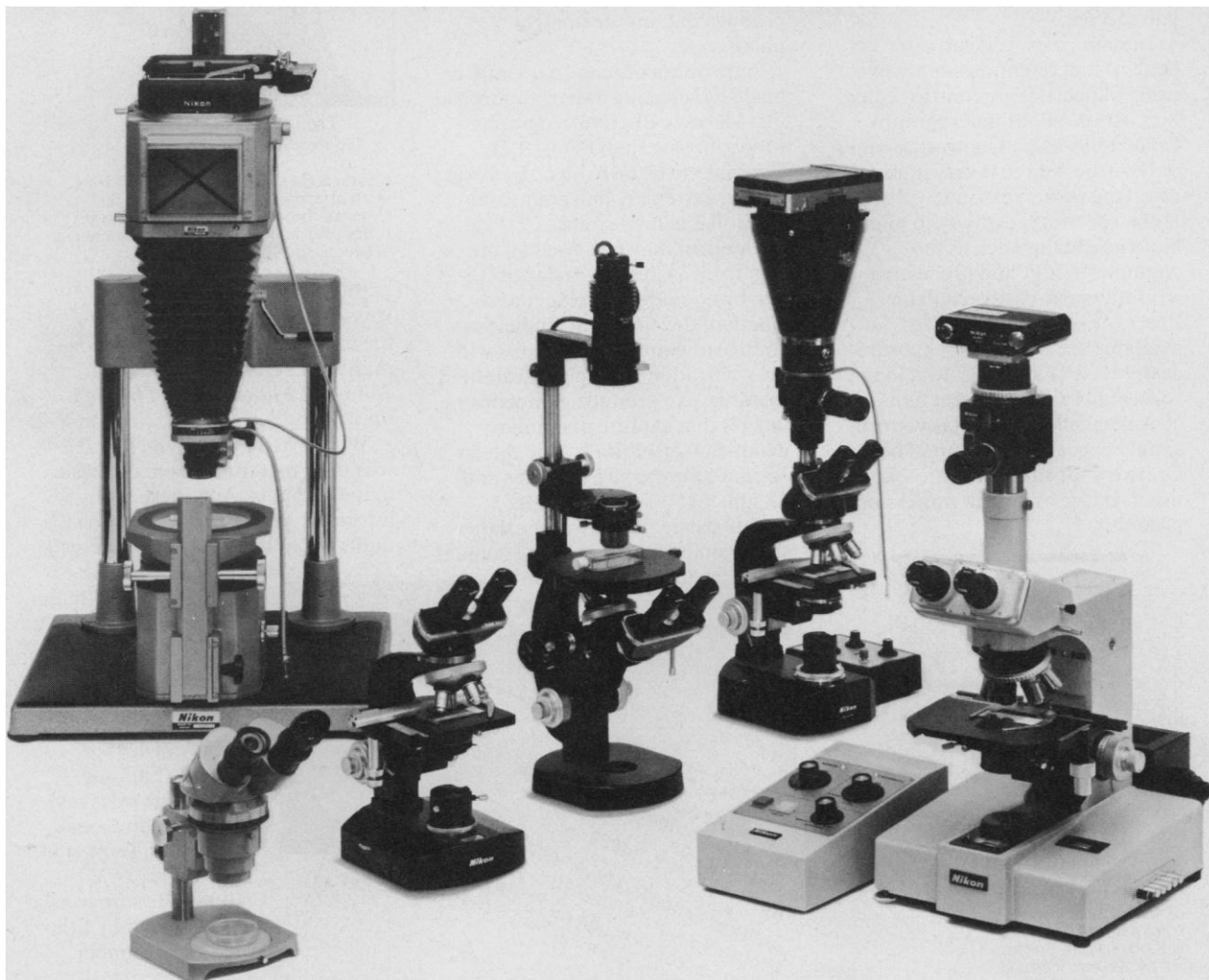
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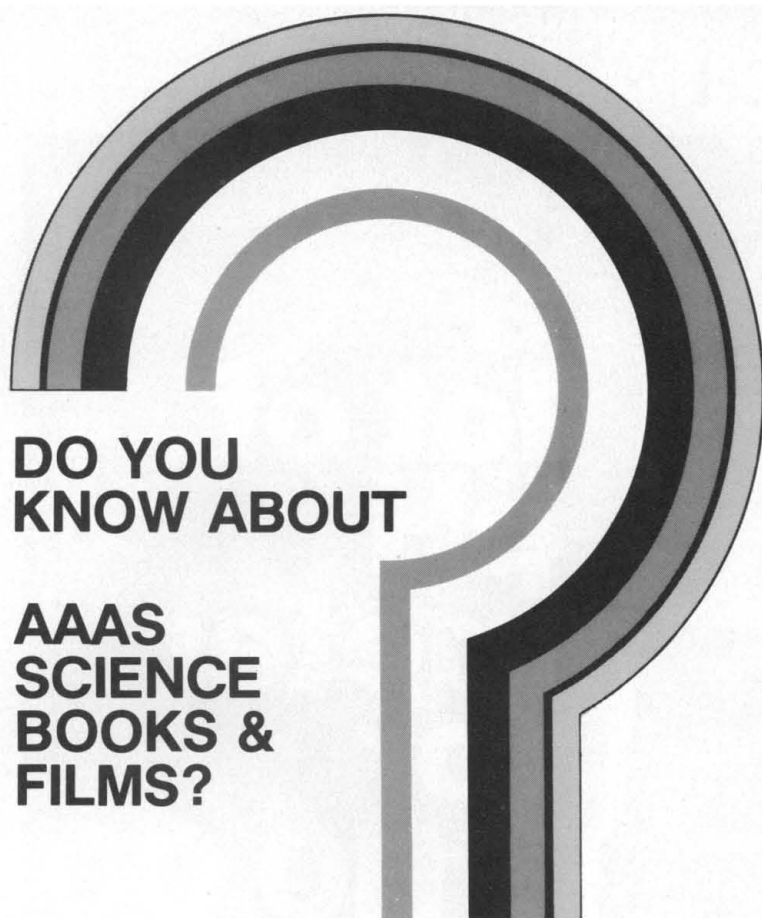
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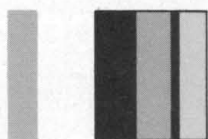
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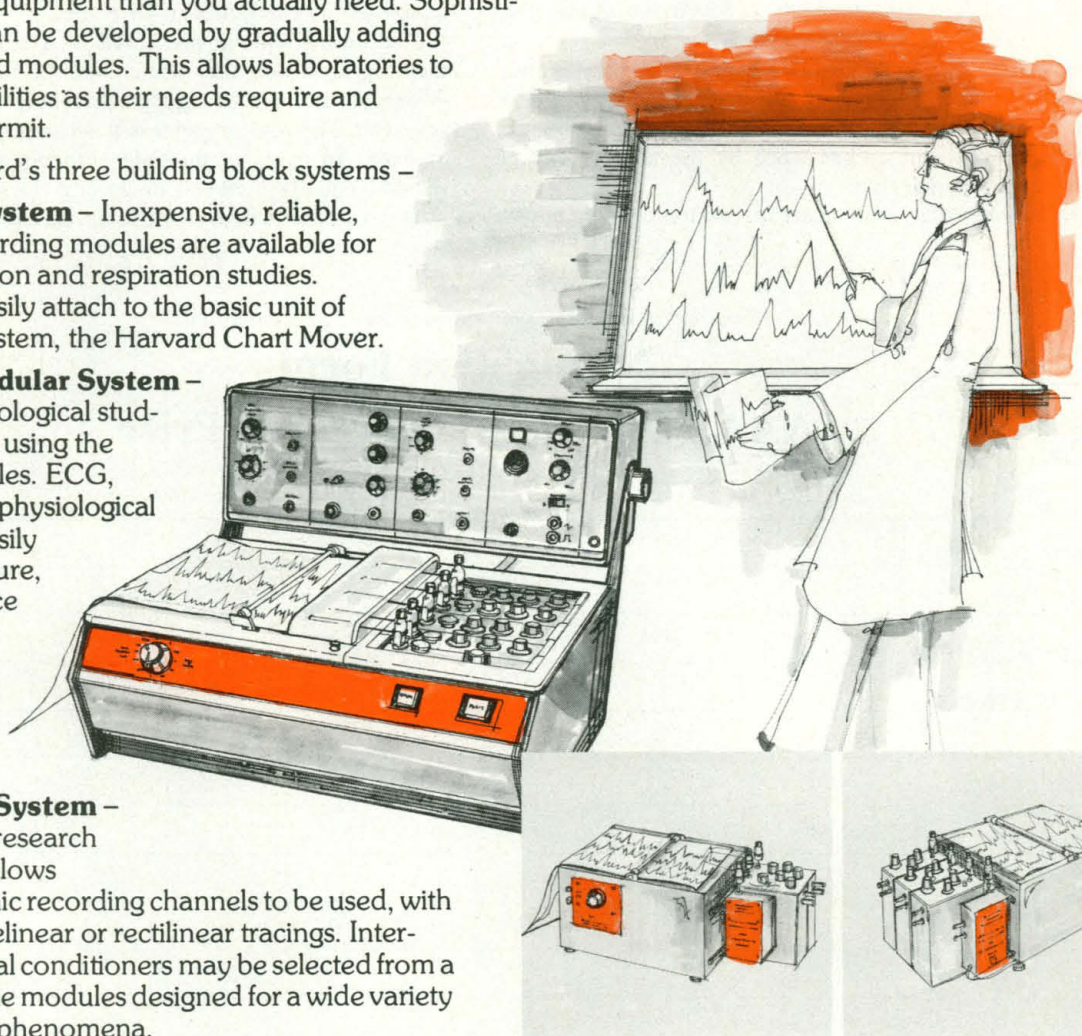
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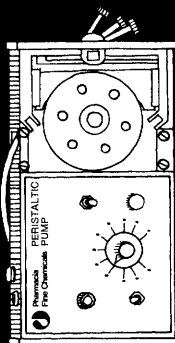
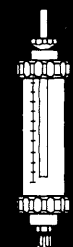
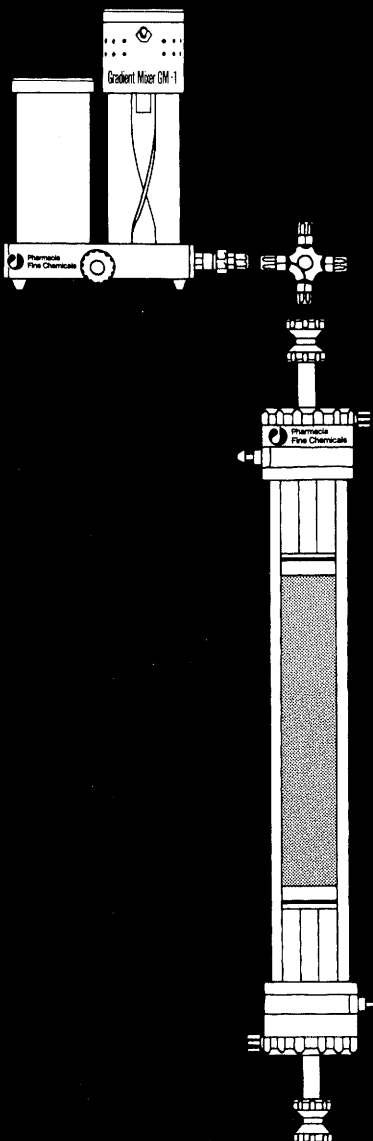
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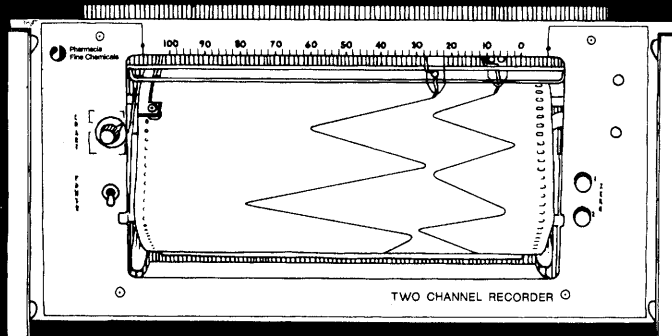
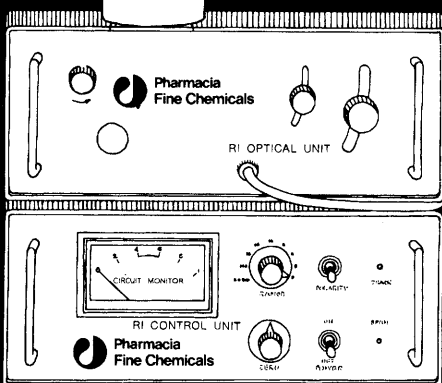
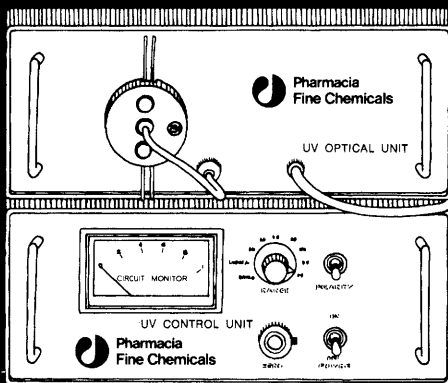
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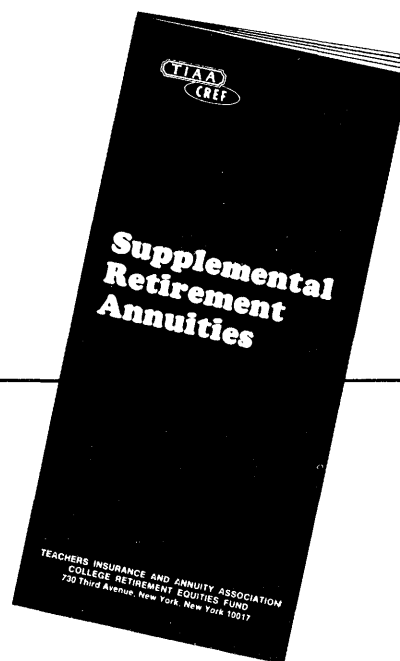
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LETTERS

Antitumor Drug Interactions: Additional Data

In response to the article "Cancer chemotherapy: An unexpected drug interaction" by Thomas H. Maugh II (Research News, 15 Oct., p. 310), we would like to call attention to published data (1) from our laboratory presented at the annual meeting of the American Association for Cancer Research in Toronto in March 1976. The data clearly show an unfavorable interaction between methotrexate and 5-fluorouracil with respect to their antimetabolic effect in de novo DNA synthesis. These studies were done in the L1210 cell system and more recently confirmed in the Friend leukemia system and in human bone marrow. We utilized the deoxyuridine suppression assay and tritiated deoxyuridine incorporation into DNA as sensitive indicators of de novo DNA synthesis which can measure the effects of 7.5×10^{-9} molar methotrexate and 0.2 microgram of 5-fluorouracil per milliliter (2). The combination of 5-fluorouracil and methotrexate added to the cell lines or bone marrow did not significantly increase the de novo DNA defect as compared to the same amount of 5-fluorouracil or methotrexate alone (Table 1). The anti-DNA effect of methotrexate in this system could be significantly reduced by washing the cell lines after drug exposure, whereas the effect produced by 5-fluorouracil was not significantly reduced by washout. However, washing of the cells following exposure to the combination of the two drugs resulted in a 70 percent loss of the 5-fluorouracil effect. This decrease of 5-fluorouracil effect was directly related to the concentration of methotrexate and occurred even in sequential exposure. The addition of 5-formyltetrahydrofolic acid (folinic acid) to the drug combination appeared to prevent the washout of the 5-fluorouracil effect. We interpreted these results to mean that (i) some methotrexate-5-fluorouracil combinations are not additive or synergistic; (ii) methotrexate may diminish 5-fluorouracil effect during washout by preventing expression of 5-fluorouracil action mediated through a 5-fluorouracil high-affinity site; and (iii) the loss of 5-fluorouracil effect in the presence of methotrexate probably resulted from a deficiency of the necessary folate coenzyme for the methylation of deoxyuridylate.

Our findings are supported by those of Santi and Martin, who have shown that methotrexate can interfere with the activ-

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Table 1. Methotrexate (MTX) and 5-fluorouracil (5-FU) interaction in L1210 leukemia. Cells were first incubated for 3 hours at 37°C in Hanks' balanced salt solution. Some were then washed three times with cold Hanks' solution. After the washout, [³H]deoxyuridine (0.1 µc per tube) was added, and the incubation continued for 90 minutes. Additional details are given in (2).

Additions	[³ H]Deoxyuridine incorporated into DNA	
	No washout (%)	Washout (%)
Saline	100.0	100.0
MTX, 10 ⁻⁶ M	17.4	95.6
MTX, 10 ⁻⁷ M	90.0	105.1
5-FU, 3.1 µg/ml	6.9	13.9
5-FU, 0.78 µg/ml	37.1	22.2
MTX, 10 ⁻⁶ M + 5-FU, 0.78 µg/ml	15.8	60.8

ity of 5-fluorodeoxyuridine when given in combination. Similarly, we and others have demonstrated that the cellular uptake of methotrexate and its antimetabolic effect may be reduced by 50 percent in the presence of certain corticosteroids commonly used in combination chemotherapy (2, 3). These studies emphasize the need for careful pharmacologic and biochemical assessments of the interaction of cancer chemotherapeutic agents when used in combination.

SAMUEL WAXMAN

HOWARD BRUCKNER

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References

1. S. Waxman, H. Bruckner, M. Rubinoff, E. M. Greenspan, *Proc. Am. Assoc. Cancer Res.* 17, 157 (1976), abstr. No. 628.
2. H. W. Bruckner, S. Schreiber, S. Waxman, *Cancer Res.* 35, 801 (1975).
3. R. F. Zager, S. A. Frisby, V. T. Oliverio, *ibid.* 33, 1670 (1973).

We also have been concerned about the use of methotrexate and 5-fluorouracil in combination in the clinic and about the conflicting evidence as to whether this combination of drugs is synergistic, additive, or antagonistic (1). We hypothesized that the combination would give additive or synergistic antitumor effects if treatment with high doses of methotrexate preceded treatment with 5-fluorouracil, and that this combination would be antagonistic if the drugs were administered in the reverse sequence. The rationale for this theory was that pretreatment with methotrexate would result in high intracellular levels of this drug which would act as an analog of

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N^5,N^{10} -methylenetetrahydrofolate, the coenzyme for thymidylate biosynthesis, and as a result 5-fluorodeoxyuridine monophosphate would bind irreversibly in ternary complex with methotrexate to thymidylate synthetase (2). The reverse sequence would not result in irreversible inhibition, since 5-fluorodeoxyuridine monophosphate levels would be falling at a time when methotrexate levels would be increasing. Use of high doses of methotrexate would also be important, since low intracellular levels of methotrexate would inhibit dihydrofolate reductase, but not thymidylate synthetase, thus leading to a decrease in N^5,N^{10} -methylenetetrahydrofolate levels, and possible antagonism with 5-fluorouracil.

We have shown (3) that, in accord with this concept, treatment of mice bearing the sarcoma 180 with methotrexate 1 to 4 hours before treatment with fluorouracil enhances antitumor effects of fluorouracil; when the combination is given simultaneously, no additive effects are present; when treatment with 5-fluorouracil precedes treatment with methotrexate the effect is antagonism (less effect than either drug alone). Martin *et al.* (4) have also reported that methotrexate pretreatment (1 hour) followed by treatment with 5-fluorouracil resulted in therapeutic synergy against a spontaneous (CD8FI) mammary cancer.

In light of these results we have instituted clinical studies using pretreatment with methotrexate in combination with treatment with 5-fluorouracil in patients with breast cancer and colon cancer. If the experimental tumor data are applicable to human cancer, this should lead to an increased therapeutic effect without an increase in drug toxicity.

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References

1. C. R. Bareham, D. E. Griswold, P. Calabresi, *Cancer Res.* **34**, 571 (1974); I. Kline, J. M. Venditti, J. A. R. Mead, D. D. Tyrer, A. Goldin, *ibid.* **26**, 848 (1966); M. H. N. Tattersal, R. C. Jackson, T. A. Connors, K. R. Harrup, *Eur. J. Cancer* **9**, 733 (1973).
2. D. V. Santi, C. S. McHenry, A. Sommer, *Biochemistry* **13**, 471 (1974).
3. J. R. Bertino, C. A. Lindquist, W. L. Sawicki, V. S. Gupta, *Cancer Res.*, in press.
4. D. S. Martin, P. Hayworth, E. Davin, R. Stolfi, R. Fugmann, *Proc. Am. Assoc. Cancer Res.* **17**, 130 (1976).

Maugh refers to an observation of Santi and Martin that methotrexate interferes with the activity of 5-fluorodeoxyuridine on tumor cells grown in culture when the drugs are given at the same time. He also indicates that methotrex-

ate should interfere with the activity of 5-fluorouracil, since the mechanism of action is similar to that of 5-fluorodeoxyuridine. In his article, Maugh states that Martin and Santi contacted the National Cancer Institute, and that from limited data it was concluded that no additive effects were observed when methotrexate and 5-fluorodeoxyuridine were employed in combination chemotherapy of tumor-bearing mice.

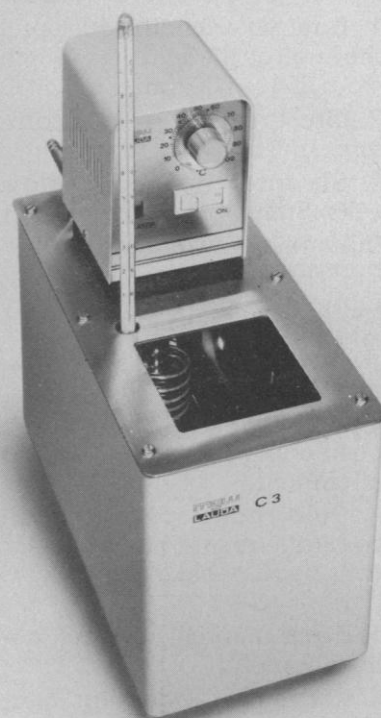
In view of this, we should like to call attention to studies involving combination chemotherapy with methotrexate plus 5-fluorouracil in the treatment of mice with advanced leukemia L1210 (1). In a series of five experiments, Kline *et al.* observed that concomitant daily treatment with methotrexate plus 5-fluorouracil was more effective in increasing the survival time of the mice than daily treatment with the drugs employed individually. In these experiments the drugs were combined in a number of methotrexate/5-fluorouracil dosage ratios, and a wide range of daily treatment levels was employed for each combination ratio. Daily methotrexate alone was consistently more effective than daily 5-fluorouracil alone in increasing survival time, and the optimal combination treatment was 11 to 57 percent more effective than the optimal daily dose of methotrexate alone. In these experiments the improved therapeutic effect was observed with a relatively low daily dose of 5-fluorouracil combined with a dose of methotrexate which was optimal or higher than the optimal daily dose for methotrexate alone. The data suggest that, on the daily schedule, 5-fluorouracil contributed to the enhanced therapeutic effect without itself adding significantly to the toxicity for the host. Other schedules of therapy for which a therapeutic advantage was obtained with this drug combination include 5-fluorouracil administered as a single dose (day 6 after leukemic inoculation) plus methotrexate administered either every 4 days or daily (from day 6).

In another experiment (2), a comparison was made of concomitant daily treatment with methotrexate plus 5-fluorouracil and methotrexate plus 5-fluorodeoxyuridine in the treatment of mice with advanced leukemia L1210. Both drug combinations were approximately equally effective in enhancing therapy relative to the drugs employed individually.

The selection for combination chemotherapy of methotrexate plus 5-fluorouracil (and 5-fluorodeoxyuridine) was based on the biochemical rationale that therapeutic enhancement might result

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from a sequential blockade in thymidylate synthesis or as a form of concurrent blockade involving purine and thymidylate biosynthesis. However, although therapeutic enhancement was obtained with the combination, it was concluded that the fundamental nature of the enhanced therapeutic response remained to be determined. Thus, although in accordance with the rationale, an "expected drug interaction" occurred, the fundamental basis for the therapeutic enhancement may not have been related at all to this interaction.

A wide variety of combinations of drugs has been demonstrated, in animal tumor systems, to provide a therapeutic advantage over that observed with the drugs employed individually. The demonstration of such therapeutic synergism may be dependent upon the dosage ratios employed, the dosage levels, and the schedule of administration, including the interval between treatments, number of treatments, total duration of treatment, and the timing of administration of the drugs relative to one another. The degree of advancement of disease and extent of infiltration or metastasis, as well as a variety of factors pertaining to the host, may influence the extent of therapeutic effect observed. Any biochemical rationale pertaining to fundamental interactions of a drug combination must be reflected in increased antitumor specificity in the tumorous host in order to obtain an improved therapeutic response.

We agree with Maugh that detailed investigations of drug combinations should be conducted and that fundamental investigations of biochemical and pharmacologic action, both in vitro and in vivo should be pursued, both retrospectively and prospectively, in relation to the usefulness of drug combinations in the treatment of clinical neoplasia.

ABRAHAM GOLDIN

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References

1. I. Kline, J. M. Venditti, J. A. R. Mead, D. D. Tyrer, A. Goldin, *Cancer Res.* **26**, 848 (1966).
2. I. Kline, J. M. Venditti, M. Gang, A. Goldin, unpublished data.

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Social Science in the White House

For nearly two decades social scientists have been talking about the desirability of having a voice in the highest policy-making councils of the nation. Some have favored placing in the White House a Council of Social Advisors, which would function like the Council of Economic Advisors. Others would rather add social scientists to that council.

More recently, high-level representation has been in disfavor among social scientists because they believe that such "high visibility" would make them into whipping boys of Congress. This is feared because social science tends to deal with value-laden issues and to have a relatively weak basis for many of its positions. Hiding behind the economists or natural scientists is hence considered prudent. Thus, it is said, social science does fare well within the National Science Foundation, and the best place for a social science adviser in the White House is as one of the deputies of the science adviser to the President.

Putting aside the question of how social science's voice is to be heard in national policy-making, it seems that despite its fledgling status, social science has significant contributions to make.

First, its representatives would provide an institutionalized source of basic social facts policy-makers are quick to ignore—for example, that many welfare clients are not able-bodied males, but old or disabled Americans, or mothers of several young children.

Similarly, if consulted before the recent rush to "de-institutionalize" mental patients, retarded children, and juvenile delinquents, most experienced social scientists would have pointed out that while many of those now in institutions can and should be released, (i) some cannot function on their own and have no families or community to return to, and (ii) some who are not now institutionalized need the kind of around-the-clock service only institutions provide. Therefore, closing institutions, as several states recently did, is premature to say the least.

There are literally thousands of such social facts, many summarized in Berelson and Steiner's *Human Behavior* and Rothman's *Planning and Organizing for Social Change*.^{*} Unfortunately, books do not speak, and institutionalized occasions are needed to call attention to their content and to spell out their implications.

In addition to facts, social science perspectives ought to be represented in councils, which often contain only persons whose background is politics, law, or natural science. Thus, politicians typically tend to believe in the potency of the "Madison Avenue" approach. However, social scientists will point out that the view of human nature as subject to manipulation through advertising is probably erroneous. Ads may work well for products people already have a preference for, and are effective in switching people around among nearly identical products, but to overcome addictions or prejudices ads tend to be ineffectual. This has been established by studies on attitudes toward everything from campaigns against smoking to drives against prejudice. Can one, for example, expect an addict to heed such an emotionally shallow and brief input as a 60-second ad, compared to all the social, psychological, and physiological forces that bind him? Or, to put it more technically, can formal communication fight values and peer relations, community and social structure, personality, and biology?

True, social scientists will often not agree on what advice to give, but advisers from other specialties also disagree. And out of the heat of give-and-take a light does arise. Policy-makers should certainly not base their decisions solely on social science, but they might well be better off if they formed them after the social scientists' voices have been heard.—AMITAI ETZIONI, *Columbia University, New York 10027, and Center for Policy Research, Inc., 475 Riverside Drive, New York 10027*

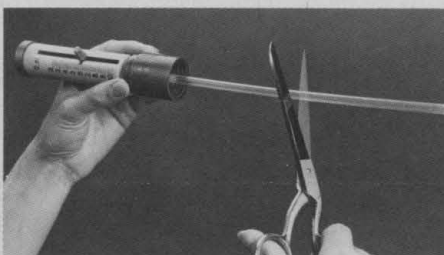
^{*}B. Berelson and G. A. Steiner, *Human Behavior: An Inventory of Scientific Findings* (Harcourt Brace, New York, 1967); J. Rothman, *Planning and Organizing for Social Change* (Columbia University Press, New York, 1974).

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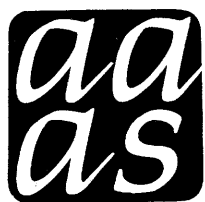
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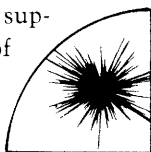
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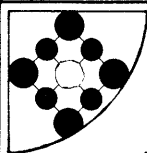
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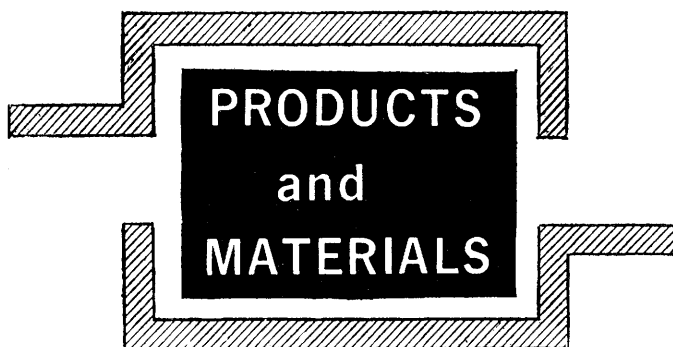
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Literature

Fluorescence News for October 1976 features an article on Protoporphyrin and Protoporphyrin Measurement. American Instrument. Circle 706.

Cell Biology is the latest data book from FASEB. It is available from the Federation at \$45. FASEB. Circle 707.

Laboratory Equipment and Supplies includes a complete line of scientific apparatus for researchers in chromatography, electrophoresis, and spectrophotometry. Manalco Supply. Circle 708.

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Trace Oxygen Analyzer describes a device for the detection of oxygen in carbon dioxide. Thermco Instrument. Circle 710.

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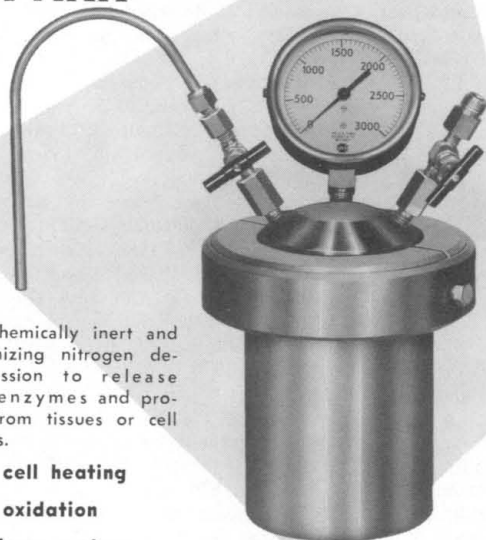
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Debugging System 360/370 Programs Using OS and VS Storage Dumps. Daniel H. Rindfleisch. Prentice-Hall, Englewood Cliffs, N.J., 1976. viii, 262 pp. \$15.95.

Dental Biochemistry. Eugene P. Lazzari. Lea and Febiger, Philadelphia, ed. 2, 1976. x, 390 pp., illus. \$16.50.

Development from Below. Anthropologists and Development Situations. Papers from a meeting, Chicago, 1973. David C. Pitt, Ed. Mouton, The Hague, 1976 (U.S. distributor, Aldine, Chicago). x, 278 pp. \$17.50. World Anthropology.

Developments in Industrial Microbiology. Vol. 17. Proceedings of a meeting, Kingston, R.I., Aug. 1975. American Institute of Biological Sciences, Washington, D.C., 1976. xii, 456 pp., illus. \$20. A Publication of the Society for Industrial Microbiology.

Digital Circuits and Logic Design. Samuel C. Lee. Prentice-Hall, Englewood Cliffs, N.J., 1976. xii, 594 pp., illus. \$26.95.

Digital System Implementation. Gerrit A. Blaauw. Prentice-Hall, Englewood Cliffs, N.J., 1976. xxxii, 384 pp., illus. \$16.95. Prentice-Hall Series in Automatic Computation.

Diocles on Burning Mirrors. The Arabic Translation of the Lost Greek Original. Edited, with English translation and commentary by G. J. Toomer. Springer-Verlag, New York, 1976. x, 252 pp., illus. \$27.90. Sources in the History of Mathematics and Physical Sciences 1.

Discussions on War and Human Aggression. Proceedings of a conference, Notre Dame, Ind., Aug. 1973. R. Dale Givens and Martin A. Nettleship, Eds. Mouton, The Hague, 1976 (U.S. distributor, Aldine, Chicago). xvi, 232 pp. \$12.50. World Anthropology.

Diving Medicine. Richard H. Strauss, Ed. Grune and Stratton, New York, 1976. xii, 420 pp., illus. \$21.

The Dynamic Synthesis, Analysis, and Design of Modeled Cam Systems. Delbert Tesar and Gary K. Matthew. Lexington (Heath), Lexington, Mass., 1976. xxiv, 352 pp., illus. \$24.95.

The Dynamical Behaviour of Structures. G. B. Warburton. Pergamon, New York, ed. 2, 1976. viii, 354 pp., illus. Cloth, \$25; paper, \$12.50. Structures and Solid Body Mechanics Series.

Early Signs of Nutritional Deficiencies. Proceedings of a symposium, Sofia and Varna, Bulgaria, May 1974. J. C. Somogyi and T. Tashev, Eds. Karger, Basel, 1976. viii, 174 pp., illus. Paper, \$39.75. Bibliotheca 'Nutritio et Dieta,' No. 23.

Ecological Guidelines for the Use of Natural Resources in the Middle East and South West Asia. Proceedings of a meeting, Persepolis, Iran, May 1975. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland, 1976. 232 pp., illus. Paper, \$6. IUCN Publications New Series, No. 34.

Ecological Impacts of Snowpack Augmentation in the San Juan Mountains of Colorado. Final Report of the San Juan Ecology Project. Harold W. Steinhoff and Jack D. Ives, Eds. Prepared for the Bureau of Reclamation, Denver, by Colorado State University College of Forestry and Natural Resources, Fort Collins, 1976 (available as PB-255-012/LL from the National Technical Information Service, Springfield, Va.). xii, 490 pp., illus. Paper, \$12.75.

Economic Crises and Crime. Correlations between the State of the Economy, Deviance and the Control of Deviance. United Nations Social Defense Research Institute, Rome, 1976. 248 pp. Paper. UNSDRI Publication No. 15.

Education for Transformation. Implications in Lewis Mumford's Ecohumanism. David R. Conrad. ETC Publications, Palm Springs, Calif., 1976. x, 230 pp. \$10.

Effects of Pollutants on Aquatic Organisms. Papers from a seminar, Liverpool, Apr. 1975. A. P. M. Lockwood, Ed. Cambridge University Press, New York, 1976. x, 194 pp., illus. Cloth, \$19.95; paper, \$8.95. Society for Experimental Biology Seminar Series, 2.

Elements of Medical Genetics. Alan E. H. Emery. University of California Press, Berkeley, ed. 4, 1976. vi, 246 pp., illus. Paper, \$4.25.

Emotions and Anxiety. New Concepts, Methods, and Applications. Marvin Zuckerman and Charles D. Spielberger, Eds. Erlbaum, Hillsdale, N.J., 1976 (distributor, Halsted [Wiley], New York). x, 362 pp., illus. \$24.95.

The Engineering of Abundance. An Oral History Memoir of Roy Bainer. University of California Oral History Program, Davis, 1975. (available from Roy Bainer, 623 Miller Dr., Davis, Calif.). x, 450 pp. \$17.

Environmental Quality—1976. The Seventh Annual Report of the Council on Environmental Quality. Council on Environmental Quality, Washington, D.C., 1976 (available from the Superintendent of Documents, Washington, D.C.). xx, 378 pp., illus. Paper, \$3.50.

Environmentology. Earth's Environment and Energy Resources. J. J. Bhatt. Published by the author, Department of Physics, Rhode Island Junior College, Warwick, 1975. viii, 412 pp., illus. Paper, \$8.95.

Epidemics. Geoffrey Marks and William K. Beatty. Scribner, New York, 1976. xii, 324 pp. \$10.

Essentials of Bacterial and Viral Genetics. David M. Carlberg. Thomas, Springfield, Ill., 1976. xvi, 320 pp., illus. \$24.75.

Ethnicity in the Americas. Papers from a conference, Chicago, 1973. Frances Henry, Ed. Mouton, The Hague, 1976 (U.S. distributor, Aldine, Chicago). xii, 456 pp. \$22.50. World Anthropology.

Everything You Want to Know about Ageing. Vernon Coleman. Gordon and Breach, London, 1976 (U.S. distributor, Atheneum, New York). xiv, 226 pp., illus. \$9.95.

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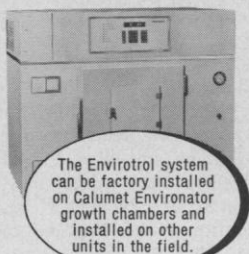
Extrusion of Plastics. E. G. Fisher assisted by E. C. Whitfield. Published for the Plastics and Rubber Institute by Halsted (Wiley), New York, ed. 3, 1976. xii, 344 pp., illus. \$22.50.

Eye Movements and Psychological Processes. Papers from a symposium, Princeton, N.J., Apr. 1974. Richard A. Monty and John W. Senders, Eds. Erlbaum, Hillsdale, N.J., 1976 (distributor, Halsted [Wiley], New York). x, 550 pp., illus. \$35.

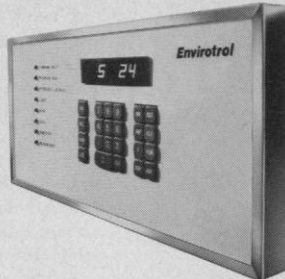
Fabric of the Universe. Denis Postle. Crown, New York, 1976. 208 pp., illus. Cloth, \$9.95; paper, \$5.95.

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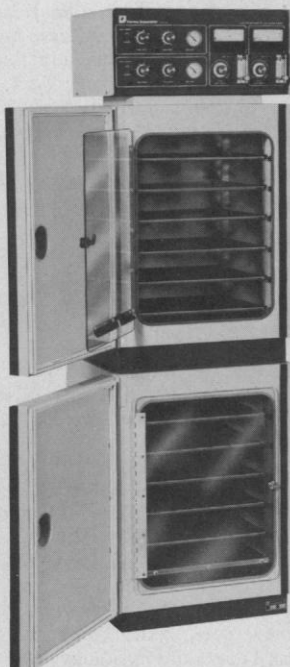
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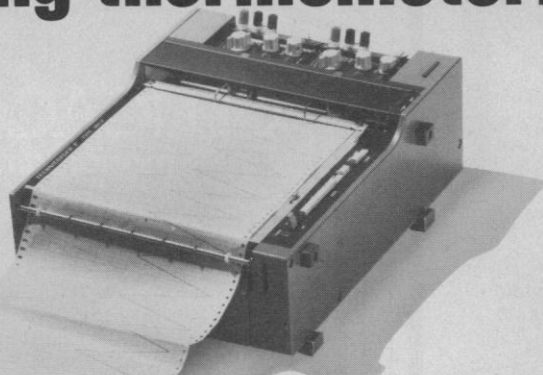
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Friends and Lovers. Robert Brain. Basic, New York, 1976. 288 pp. \$10.95.

From School to Work. Improving the Transition. A Collection of Policy Papers Prepared for the National Commission for Manpower Policy. National Commission for Manpower Policy, Washington, D.C., 1976 (available from the Superintendent of Documents, Washington, D.C.). x, 310 pp. Paper, \$3. Stock No. 040-000-00364-9.

Genetic Evolution. Chen Kang Chai. University of Chicago Press, Chicago, 1976. xviii, 342 pp., illus. \$20.

The Genus Epilobium (Onagraceae) in Australasia. A Systematic and Evolutionary Study. Peter H. Raven and Tamra Engelhorn Raven. Illustrations by Keith R. West. New Zealand Department of Scientific and Industrial Research, Christchurch, 1976. 322 pp. NZ\$20. New Zealand Department of Scientific and Industrial Research Bulletin 216.

The Good Life. Models for a Healthy Personality. Nicholas S. CiCaprio. Prentice-Hall, Englewood Cliffs, N.J., 1976. xiv, 210 pp. Cloth, \$8.95; paper, \$2.95. A Spectrum Book.

Growth of Crystals. Vol. 10. N. N. Sheftal', Ed. Translated from the Russian edition (Moscow, 1974) by J. E. S. Bradley. Consultants Bureau (Plenum), New York, 1976. x, 290 pp., illus. \$37.50.

Handbook of Learning and Cognitive Processes. Vol. 3, Approaches to Human Learning and Motivation. W. K. Estes, Ed. Erlbaum, Hillsdale, N.J., 1976 (distributor, Halsted [Wiley], New York). x, 374 pp., illus. \$18.50.

Handbook of Proton Ionization Heats and Related Thermodynamic Quantities. James J. Christensen, Lee D. Hansen, and Reed M. Izatt. Wiley-Interscience, New York, 1976. xvi, 270 pp. \$22.50. Contribution no. 85 from the Center for Thermochemical Studies, Brigham Young University.

Health Care in Yugoslavia and the United States. Robert L. Berg, M. Roy Brooks, Jr., and Miomir Savičević. National Institutes of Health, Bethesda, Md., 1976 (available from the Superintendent of Documents, Washington, D.C.). x, 252 pp., illus. \$5.20. Fogarty International Center Proceedings No. 34. DHEW Publication No. (NIH) 75-911.

The Health of the Oceans. Edward D. Goldberg. Unesco Press, Paris, 1976 (U.S. distributor, Unipub, New York). 172 pp., illus. Paper, \$9.25.

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The HLA System. An Introductory Survey. A. Svegaard and six others. Karger, Basel, 1976. viii, 104 pp. Paper, \$15.50. Monographs in Human Genetics, vol. 7.

Holocene Tidal Sedimentation. George de Vries Klein, Ed. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1976 (distributor, Halsted [Wiley], New York). xvi, 426 pp., illus. \$30. Benchmark Papers in Geology, vol. 30.

Hormone Research I. Papers from a symposium, Jefferson, Ark., Nov. 1974. M. Norvell and T. Shellenberger, Eds. Hemisphere, Washington, D.C., 1976. pp. 543-682, illus. \$21.50. Reprint of *Journal of Toxicology and Environmental Health*, vol. 1, No. 4.

How to Have Intercourse without Getting Screwed. Jennifer Wear and King Holmes. Madrona, Seattle, 1976. xii, 184 pp. Paper, \$3.95.

Human Haemoglobin Variants and Their Characteristics. H. Lehmann and P. A. M. Kynoch. North-Holland, Amsterdam, 1976 (U.S. distributor, Elsevier, New York). vi, 242 pp. \$23.25.

Index Europäischer Kartoffelsorten. Bestimmung durch elektrophoretische Spektren. Zulassungslisten, Bonitierung, genetische Daten. Index of European Potato Varieties. Hermann Stegemann and Volkmar Loeschcke. Biologische Bundesanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, 1976. 214 pp. + plates. Paper, DM 26.40. Mitteilungen aus der Biologischen Bundesanstalt für Land- und Forstwirtschaft, Heft 168.

Infant Nutrition. Doris H. Merritt, Ed. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1976 (distributor, Halsted [Wiley], New York). xvi, 432 pp., illus. \$25. Benchmark Papers in Human Physiology, vol. 7.

Intermountain Medical Malpractice Seminar. Salt Lake City, Aug. 1975. National Center for Health Services Research, Rockville, Md., 1976. x, 124 pp. Paper. DHEW Publication no. (HRA) 76-3150.

An Introduction to Biology. Robert M. Chute. Harper and Row, New York, 1976. xvi, 456 pp., illus. Paper, \$10.95.

An Introduction to Developmental Biology. John McKenzie. Halsted (Wiley), New York, 1976. viii, 224 pp., illus. Paper, \$10.75.

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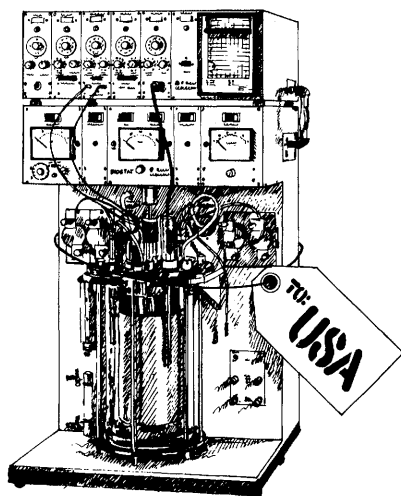
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Malignant Bone Tumors. Papers from a symposium, Düsseldorf, Oct. 1974. E. Grundmann, Ed. Springer-Verlag, New York, 1976. viii, 282 pp., illus. \$24.60. Recent Results in Cancer Research, 54.

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The Origin of Forms and Qualities. (The Theoretical Part) Robert Boyle. Sheffield Press, Manhattan Beach, Calif., 1976. xiv, 80 pp. Paper, \$5.95.

Perceptions 2: Implications of the Changing Age Structure of the Canadian Population. Science Council of Canada Study on Population and Technology. Lewis Auerbach and Andrea Gerber. Science Council of Canada, Ottawa, 1976 (available from Printing and Publishing Supply and Services Canada, Ottawa). x, 126 pp., illus. Paper, C\$3.90.

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Preventive Medicine USA. Theory, Practice and Application of Prevention in Personal Health Services; Quality Control and Evaluation of Preventive Health Services. Task Force Reports sponsored by the John E. Fogarty International Center and the American College of Preventive Medicine. PRODIST (Neale Watson), New York, 1976. viii, 166 pp. Paper, \$3.95.

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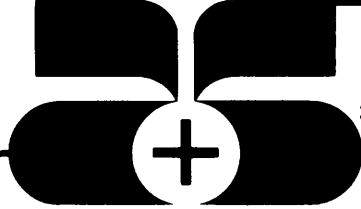
Proceedings of a Seminar on Nonstructural Flood Plain Management Measures. Fort Belvoir, Va., May 1976. Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, Calif., 1976. viii, 194 pp., illus. Paper.

Processes of Animal Memory. Papers from a conference, Rock Island, Ill., Oct. 1974. Douglas L. Medin, William A. Roberts, and Roger T. Davis, Eds. Erlbaum, Hillsdale, N.J., 1976 (distributor, Halsted [Wiley], New York). xiv, 268 pp., illus. \$14.95.

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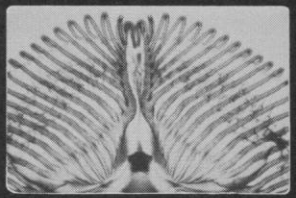


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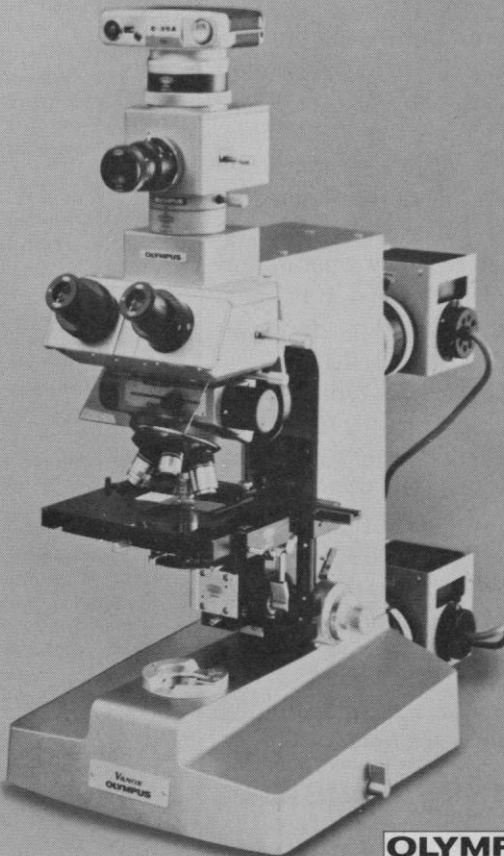


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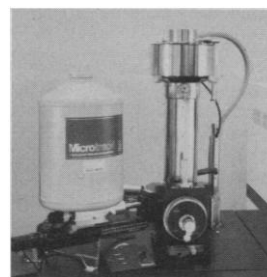
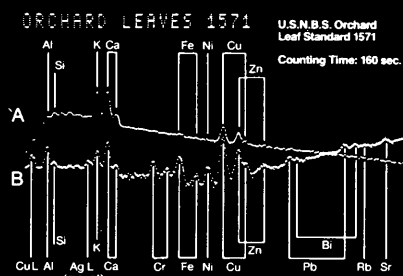
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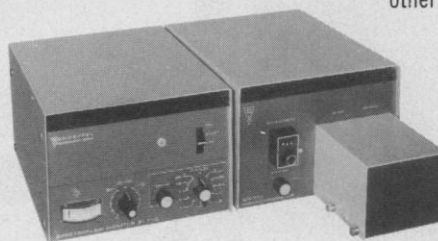
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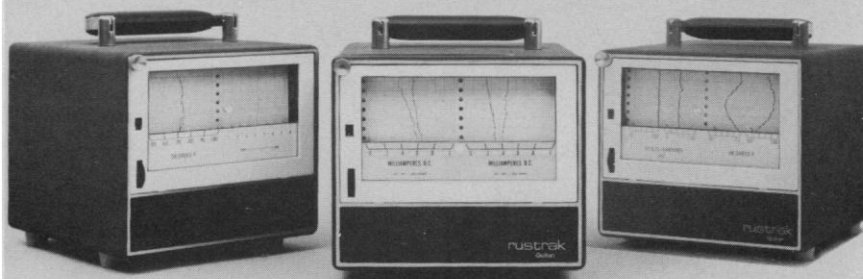
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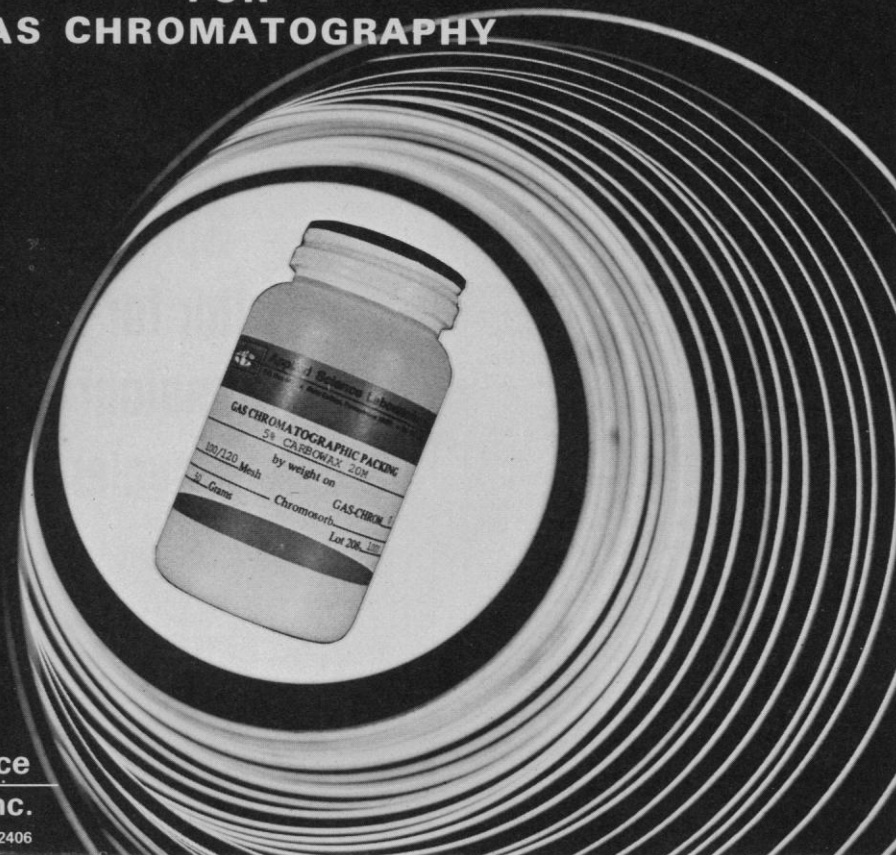
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