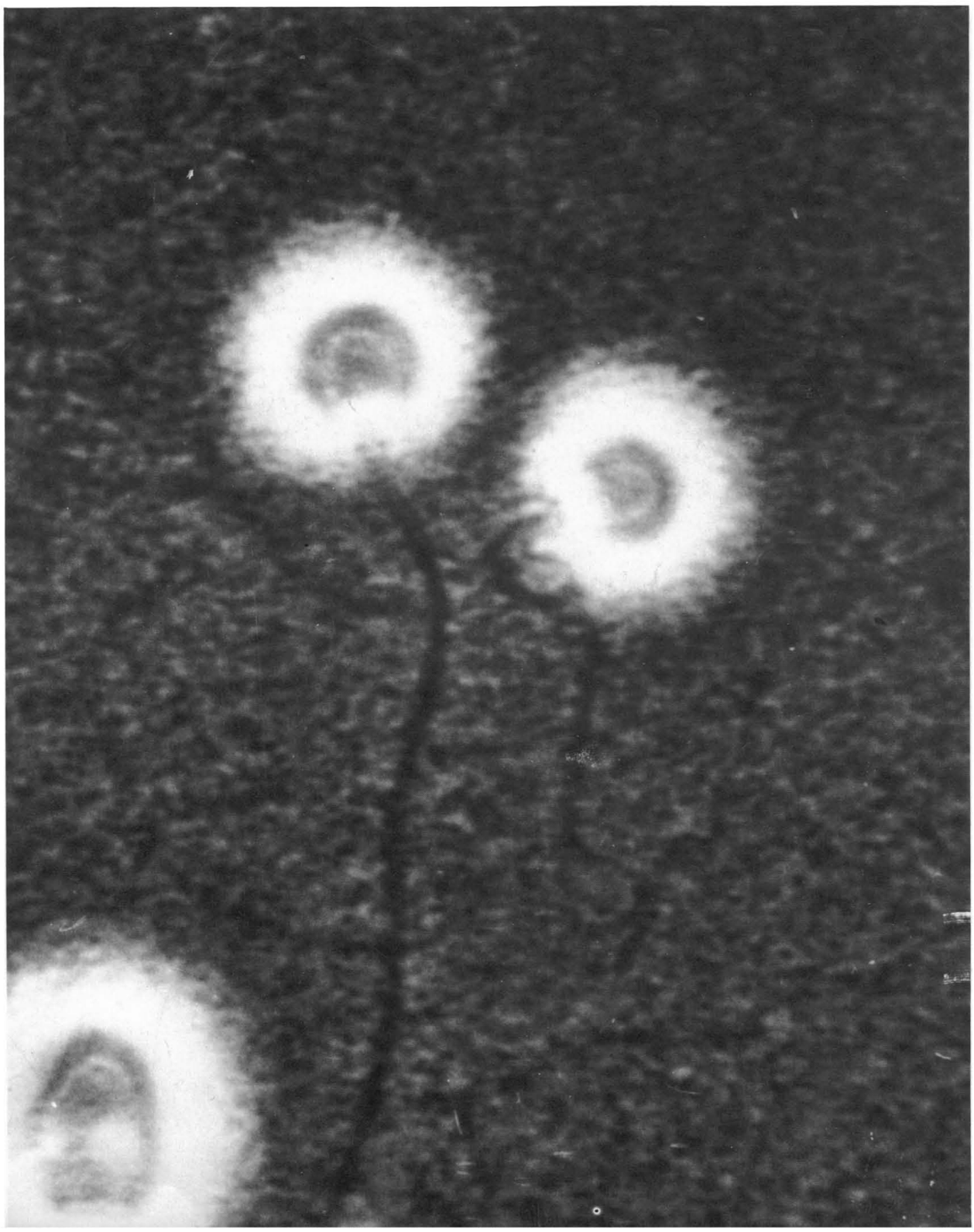
SCIENCE 13 November 1970
Vol. 170, No. 3959
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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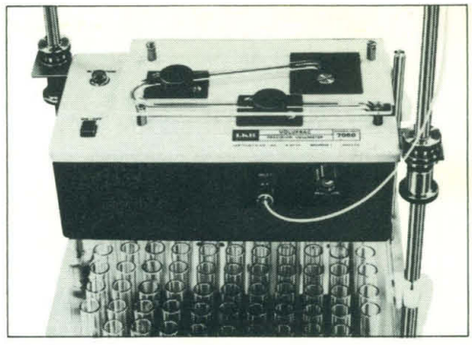

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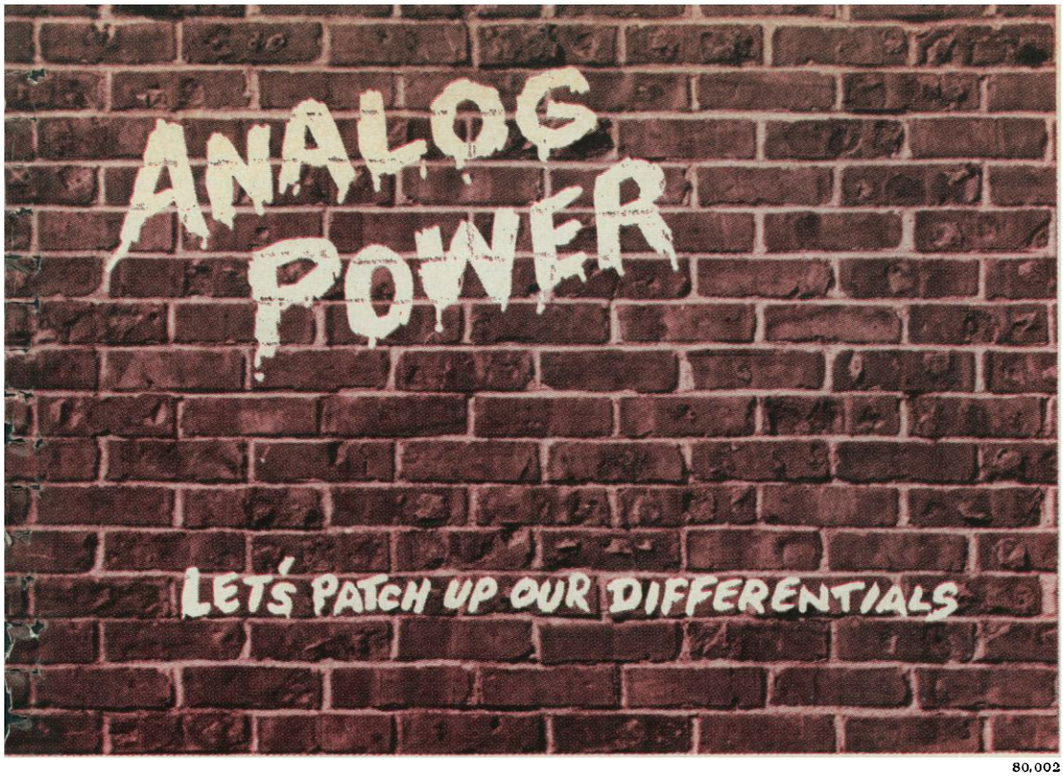
COVER

Mammalian spermatozoa applied to thin layers of gelatin impregnated with India ink and fixed in glutaraldehyde (method of Dr. Noel Owers) show proteolytic activity confined to the acrosome. Release of the enzyme occurs solely in the region of the acrosome, in a manner which is species-specific. See page 749. [Penelope Gaddum and Richard J. Blandau, University of Washington]



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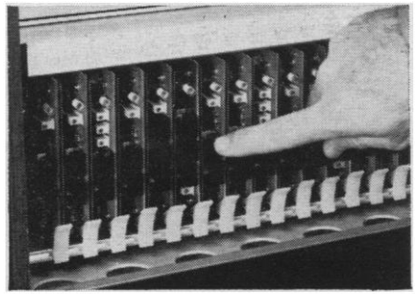

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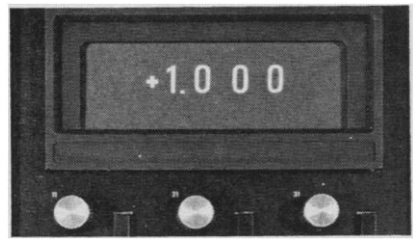

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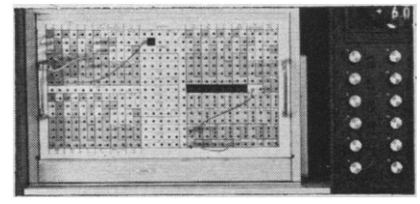

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erence to the possibility that a study has profound implications for our understanding "perhaps for origin and distribution of ore deposits," as I have recently been working on this very subject (*1*). In this study I come to the conclusion that the constituents that form the metal deposits probably originated in the earth's upper mantle, at a depth of some 25 miles below the surface. I would therefore be much more interested in knowing the constitution of the earth's upper mantle, 25 miles below us, than the constitution of the moon, 250,000 miles away in space.

A sidelight of my study of the metal provinces was that one particular area in southern Arizona, partly overlapping into New Mexico, has a record of production plus probably reserves of copper of some $26 billion of gross value. This is by far the greatest known concentration of value of nonferrous metallic wealth in the United States. It will be noted that this total gross value is very nearly equal to the total cost of the entire Apollo program including development, research, and facilities ($24 billion). On the other hand, the *net* value of the metallic wealth is very much less. In fact, I doubt very much if the *net* value of all the known metallic wealth of the United States is equal to the cost of the Apollo program.

JAMES A. NOBLE
1474 East California Boulevard,
Pasadena, California 91106

Reference

1. J. A. Noble, *Geol. Soc. Amer. Bull.* **81**, 1607 (1970).

Appalachia: Focus of Health Care

As a member of the Student Health Coalition whose activities were discussed in "Appalachia: Two approaches in student summer health projects" (21 Aug., p. 746), I would like to clarify the relationship between our project and Vanderbilt University. Goldhaber implied that there was a lack of cooperation on the part of the university. In actual fact our project received considerable support from a number of faculty members and the offices of the dean of the medical school and the chancellor of Vanderbilt. . . . The lack of cooperation alluded to does not pertain to individuals but to the institutional framework. The medical school has investigated but not committed itself to the academic questions involving comprehensive health care. A faculty committee recently issued a report concerning the university's role in health care and declared, "It is really not a question as to whether the Vanderbilt Medical Center can afford to hire such a Director [for comprehensive health care programs] but rather whether it can afford not to and still provide leadership for or even remain in the mainstream of American medicine in the future."

We are hopeful that the recommendations of this report can be realized, and that the university will be increasingly responsive to the need for research in new methods of urban and rural health care delivery.

WILLIAM W. DOW
Box 40, Station 17,
Vanderbilt Medical School,
Nashville, Tennessee 37203

Federal Largesse

In Greenberg's article ("Daddario: Scientific community's friend on the Hill is leaving," 25 Sept., p. 1291) I believe there is a misconception of the power of the appropriations subcommittees vis-à-vis the authorizing committees. He suggests that the legislative process consists solely of doling out money and that a member who is not on the appropriations committees might just as well stay home. This isn't so. The overview committees for federal programs do exercise great influence, particularly when they also handle annual authorization bills. The Joint Committee on Atomic Energy, the Senate and House Armed Services Committees, and the Space Committees of each body have had a major impact on science, research, and development. Senator Lister Hill chaired the Labor and Public Welfare Committee and thus influenced the course of the National Institutes of Health.

An objective analysis would show substantial effects of the National Science Foundation authorization hearings on appropriations this past session—only the second year they have been held. It seems clear that these annual hearings in the House and Senate—given the direction and momentum of the Daddario era—will have a key role in the determination of the future federal patronage of science.

RICHARD A. CARPENTER
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Sticking to it

You were younger than 3 when you first understood clearly that one thing can be made to stick to another. Can you explain how it happens?

* * *

In 1943 sharp-seeing aerial reconnaissance lenses were coming apart. Canada balsam, the only optical cement anybody had ever heard of, had generally been used on smaller, more pampered optics. Bob Dann, a Kodak chemist anxious to do his bit, worked hard and found something better. Now there are six KODAK Optical Cements, none of them Canada balsam, all known to those who need to know about them, probably.[1] We find it hard to make money selling optical cement, but our lenses hold together well.

* * *

EASTMAN 910 Adhesive has become very well known but not as an optical cement, though it was discovered when an attempt to measure the refractive index of methyl cyanoacrylate permanently stuck together the prisms of one of our refractometers. Now we feel strong excitement at the prospect of how much of the world's goods—even its clothing—might be put together with EASTMAN Adhesives, which don't all have to be cyanoacrylates and indeed are not. Meanwhile we have announced improved versions of cyanoacrylate EASTMAN 910 Adhesive.[2]

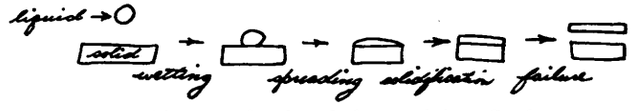
* * *

Adhesion matters to us for more than industrial adhesives. Why do our photographic emulsions stick so nicely to our film base? "Why?" like "how?" can be a deep question. J. R. Dann's work and thought on adhesion have developed to the point of asserting on p 321 of the February, 1970 issue of *Journal of Colloid and Interface Science:*[3]

> A modification of the Good-Girafalco-Fowkes-Young equation is used to calculate nondispersion interactions I^{P}_{SL} at the interface for nine polymeric solids and four polar series of liquids. The relationship of I^{P}_{SL} to work of adhesion W_A and the spreading coefficient S_e is shown. A linear relationship is found to exist between I^{P}_{SL} and γ_L^P, the nondispersion energy component of the liquids, for the series of polar liquids and the solids studied. The slopes of the I^{P}_{SL} vs. γ_L^P curves vary depending upon the polymer surface. Intercepts of the curves may be a measure of π_S, the reduction in the surface energy of the solid resulting from adsorption of vapor from the liquid.

* * *

Dann is asked why this appears under the title "Forces Involved in the Adhesive Process." He steps to the blackboard and draws:



That's the history of a bond, he explains. Surface energetics of wetting and spreading are what the paper is about. It examines the significance of the cosine of the angle of contact as a measure of work required to form interface. Misconceptions, if any, will be cleansed in the flames of controversy. Then it will be necessary to tackle the rheology of the system: kinetics of spreading, viscoelastic behavior of both the adhesive and the substrate. Solidification follows—by polymerization, freezing, or solvent evaporation. Some of the best of chemists will continue to study degree and orientation of crystallinity, glass transition temperatures, melting points, moduli, and their relation to molecular architecture. Fracture mechanisms constitute, of course, still another discipline.

It has been a long haul since 1943. There is still a long way to go.

[1] If we have missed you, complain to Special Products Sales, Kodak Apparatus Division, Rochester, N.Y. 14650.

[2] Details from Industrial Chemicals Division, Eastman Chemical Products, Inc., Kingsport, Tenn. 37662.

[3] Reprint on request from Kodak, Department 55W, Rochester, N.Y. 14650.

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SCIENCE

Young Scientists and the AAAS

Young scientists, including committed undergraduates, graduate students, and postdoctoral fellows, are the principal consumers of science education. They also do a significant portion of the university-based teaching and research in science. Raised in the post-Hiroshima era, they want to know how to act responsibly and how to avoid becoming the passive technical instruments of others' policies. They expect to inherit the demands of a misled public for magical solutions to unforeseen as well as ancient problems. They see that the structure of science reflects that of society and is therefore deficient in matters such as the full inclusion of minority-group members and women at all levels and the rational and humane allocation of resources. As younger citizens, they will suffer longer the irreversible effects of public (and of private industrial) policies significantly influenced by science or by a lack of science's insights.

The Committee of Young Scientists attempted last spring to find ways in which the AAAS might serve these and other needs of young scientists. The committee grew out of a significant innovation of the AAAS Board of Directors, which invited a group of young scientists to meet with it in October 1969. The young scientists requested the opportunity to report to the Board on matters of major concern to young scientists. Their work culminated in a report containing specific recommendations for a variety of programmatic and institutional changes in the AAAS. Informing the report were the beliefs that the unique multi- and interdisciplinary resources of the AAAS should be extended to science institutions and education; that local organization, meaningful membership which structures and elicits member activity, and a democratic organization would enhance the purposes of the AAAS; and that active participation of members is necessary to render the AAAS potent in effecting public policy and in promoting better understanding of science by the public.

Accordingly, the Committee of Young Scientists recommended that regional AAAS offices catalyze and support multiple experiments in education concerning the responsibility of scientists, their varied roles in society, and interdisciplinary approaches to major problems. They urged structural changes in the AAAS to make its governing council less cumbersome and to make the Board of Directors even more responsive than it is now, by direct election of members. They recommended continued involvement of young people at all levels of the AAAS. They suggested expansion of debate in *Science* on controversial matters of science and society, and creation of a new type of newspaper column of science controversy. They urged formation of a committee of minority-group scientists. They made many suggestions designed to increase the interest of young scientists in the AAAS. Finally, they urged that the issues they raised be actively debated in the pages of *Science*.

The Board of Directors acted promptly on several of the recommendations. They formed a committee of minority-group scientists. They created a council of young scientists and assigned each to a significant AAAS committee. They then referred most of the other recommendations to various AAAS committees. They also shifted their approach from one of asking for consultation with the young scientists to requests for their active participation in specific projects.

The Youth Council now plans to present its coordinated goals to diverse committees and hopes to get action through these channels. Its members will participate actively in the annual meetings. But further progress will depend on the initiative demonstrated by other young scientists as well as by AAAS members (readers of *Science*).

—MACK LIPKIN, JR., *AAAS Youth Council*

BOOKS RECEIVED

(*Continued from page 726*)

Molecular Biology. Mikhail V. Vol'kenshtein. Translated from the Russian edition (Moscow, 1965) by Serge N. Timasheff. Plenum, New York, 1970. xiv, 514 pp., illus. $15.

Myeloproliferative Disorders of Animals and Man. Proceedings of an annual symposium, Richland, Wash., May 1968. W. J. Clarke, E. B. Howard, and P. L. Hackett, Eds. U.S. Atomic Energy Commission, Oak Ridge, Tenn., 1970 (available as CONF-680529 from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.). xii, 768 pp., illus. Paper, $3.

Nasca Gravelots in the Uhle Collection from the Ica Valley, Peru. Donald A. Proulx. Department of Anthropology, University of Massachusetts, Amherst, 1970. viii, 104 pp., illus. + plates. Paper. Anthropology Department Research Reports No. 5.

New Math Puzzle Book. L. H. Longley-Cook. Van Nostrand Reinhold, New York, 1970. x, 176 pp., illus. $4.95.

Occurrence of Pesticides in Aquatic Environments. Part 1, Insecticide Distribution on an Agricultural Plot. Ervin Hindin and Paul J. Bennett. Technical Extension Service, Washington State University, Pullman, 1970. xii, 46 pp., illus. Paper. College of Engineering, Bulletin 317.

Operational Calculus. Gregers Krabbe. Springer-Verlag, New York, 1970. xvi, 350 pp., illus. $14.90.

The Organization and Support of Scientific Research and Development in Mainland China. Yuan-li Wu and Robert B. Sheeks. Assisted by Lawrence J. Lau and Grace Wu; under the direction and editorial supervision of Ralph J. Watkins. Published for the National Science Foundation by Praeger, New York, 1970. xxvi, 594 pp., illus. $17.50. Praeger Special Studies in International Economics and Development.

Parametric Processes. A. Yariv and J. E. Pearson. Pergamon, New York, 1969. iv, 50 pp., illus. Paper, $2.75. Progress in Quantum Electronics, vol. 1, part 1.

The Path of the Pole. Charles H. Hapgood. Chilton, Philadelphia, 1970. xxviii, 414 pp., illus. $14.95.

The Pathology of Leadership. Hugh L'Etang. Hawthorn, New York, 1970. vi, 218 pp. $6.95.

The Paths of Culture. A General Ethnology. Kaj Birket-Smith. Translated from the Danish by Karin Fennow. University of Wisconsin Press, Madison, 1965. xii, 536 pp. + plates. Cloth, $10; paper, $2.95.

Photophysiology. Current Topics in Photobiology and Photochemistry. Vol. 5. Arthur C. Giese, Ed. Academic Press, New York, 1970. xviii, 290 pp., illus. $15.50.

Physical Properties of Plant and Animal Materials. Vol. 1, Structure, Physical Characteristics and Mechanical Properties. Nuri N. Mohsenin. Gordon and Breach, New York, 1970. xvi, 734 pp., illus. $24.50; to libraries, $45.

The Physiology and Biochemistry of Muscle as a Food. Vol. 2. Proceedings of an international symposium, Madison, Wis., July 1969. E. J. Briskey, R. G. Cassens, and B. B. Marsh, Eds. University of Wisconsin Press, Madison, 1970, xvi, 844 pp, illus. $20.

Physiology and Pharmacology of Local Anesthesia. Rudolph H. de Jong. Thomas, Springfield, Ill., 1970. xiv, 268 pp., illus. $12.50.

The Physiology of Insect Reproduction. Franz Engelmann. Pergamon, New York, 1970. x, 308 pp., illus. $18.75.

Phytochemical Phylogeny. Proceedings of a symposium, Bristol, England, April 1969. J. B. Harborne, Ed. Academic Press, New York, 1970. xvi, 336 pp., illus. $16.50.

Pictorial Guide to the Birds of North America. Text and photographs by Leonard Lee Rue III. Crowell, New York, 1970. xviii, 368 pp. $12.50.

Pleneurethic. R. B. Collier. Published by the author, Rama Hotel, Bangkok, 1969. Vol. 3, viii, 228 pp.; vol. 5, x, 196 pp.

Principles of Aerosol Technology. Paul A. Sanders. Van Nostrand Reinhold, New York, 1970. x, 418 pp., illus. $17.50.

Principles of Lithogenesis. Vol. 2. N. M. Strakhov. Translated from the Russian edition (Moscow, 1962) by J. Paul Fitzsimmons. S. I. Tomkeieff and J. E. Hemingway, Eds. Consultants Bureau, New York; Oliver and Boyd, Edinburgh, 1969. xii, 610 pp., illus. + plates. $35.

Proceedings of the Fourth Asian-Pacific Congress of Cardiology, Jerusalem and Tel Aviv, Israel, September 1968. Marcel Eliakim, Ed. Academic Press, New York, 1969. 516 pp., illus. $24.50.

Proceedings of International Symposium on Sensory Evaluation of Food. Principles and Methods. Kungälv (near Göteborg), Sweden, September 1968. B. Drake, Ed. Swedish Institute for Food Preservation Research, Göteborg, 1969. 56 pp. Paper.

Processing of Optical Data by Organisms and by Machines. Proceedings of the International School of Physics "Enrico Fermi," Course 43, Varenna, Italy, July 1968. W. Reichardt, Ed. Academic Press, New York, 1969. xviii, 616 pp., illus. $28.50.

A Propos du Mécanisme Terrestre. Georges Dubourdieu. Imprimerie du Neubourg, Le Neubourg, France, 1970. 70 pp. illus. Paper.

Psychoanalysis and Interpersonal Psychiatry. The Contributions of Harry Stack Sullivan. Patrick Mullahy. Science House, New York, 1970. xvi, 752 pp. $15.

The Psychology of Gambling. Edmund Bergler. International Universities Press, New York, 1970. xii, 244 pp. $7.50. Reprint of the 1957 edition.

Quantum Optics. Proceedings of the International School of Physics "Enrico Fermi," Course 42, Varenna, Italy, 1967. R. J. Glauber, Ed. Academic Press, New York, 1969. xx, 762 pp., illus. $31.

Recent Advances in Phytochemistry. Vol. 3. Proceedings of an annual symposium, Tucson, Ariz., June 1968. Cornelius Steelink and V. C. Runeckles, Eds. Appleton-Century-Crofts (Meredith), New York, 1970. xvi, 268 pp., illus. $14.50.

Satellites and Probes. The Development