elegant and meticulous work on the mitotic spindle. Their warnings concerning extrapolation from one species to another and conclusions based solely on fixed material (where, in the time required to kill, chromosomes may move as much as 0.5 micrometer and membranes may be formed or destroyed) might well be heeded by workers in other areas. The relationship of microtubules to chromosome movement is imperfectly understood. It appears that kinetochore fibers pull kinetochores during most mitotic movements, but microtubules are not attached to the poles in either plants or animals. Educated guesses are that anaphase movement is triggered by the removal of some blocking material and that kinetochore microtubules grow poleward with elimination occurring at the poles at metaphase and through anaphase. The entire fiber could thus be transported poleward, pulling the chromosome, the motive force possibly supplied by interaction between kinetochore fibers and continuous fibers.

Bahr, in a paper on mitochondrial DNA content and x-irradiation, concludes that DNA content is correlated with dry mass. He suggests that a mitochondrion containing only one DNA molecule must have a minimum dry mass, the "unit mitochondrion."

Several of the authors seem to favor strongly the chromatid folded fiber unineme structure model previously proposed by the editor, without reference to other possibilities. Although this model may prove to be correct, it can be questioned whether the current state of knowledge warrants such reverence. Consider, for example, that the model could impose magnificent acrobatics during the terminalization process on chromatids involved in chiasmata.

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### **Analytical Chemistry**

Spectrochemical Methods of Analysis. Quantitative Analysis of Atoms and Molecules. J. D. WINEFORDNER, Ed. Wiley-Interscience, New York, 1971. xiv, 530 pp., illus. \$23. Advances in Analytical Chemistry and Instrumentation, vol. 9.

The two major divisions of this book cover, respectively, flame spectrometric methods of analysis and absorption and luminescence spectrometry in solutions. Each division has an opening chapter which is intended to introduce the theory by describing excitation and deexcitation processes. The chapter by Alkemade and Zeegers on these processes in flames is long (125 pp.), detailed, and inclusive. It should be of great value to serious workers in flame spectrometric research and could be read with benefit by most others who are using flame spectrometric methods. It is probably much too detailed for the beginner. The corresponding chapter by McGlynn, Srinivasan, and Maria on solution spectrometry is much shorter (35 pp.) and quite narrow in approach. It assumes considerable knowledge of the subject and treats only phosphorescence kinetics. These authors state, "We hope . . . we will provide a little information and impart a few attitudes which will be helpful to the reader." Without faulting these aims, one can wonder if they were the intentions of the editor.

Each of these introductory chapters is good in its own way. Many of the others are of much poorer quality. The appendix on signal-to-noise ratio theory in optical spectrometry, by the late W. J. McCarthy, must be mentioned as an outstanding feature of this book. It is concise and lucid and deserves to be read by the majority of us, students and workers, who are not already familiar with this topic. The mathematical analysis of signals and noise has proven its value in the design of instruments and experimental procedures, and this is the clearest introduction to the subject that I have seen.

The editor states in the preface that the book is intended for analytical chemists, for other scientists using spectrometric methods, and for students, and that it is intended to introduce the subjects and to serve as a review of recent work. I'm afraid that these several aims are too contradictory to coexist in a single volume. Each author not only has focused on a single topic, but also has focused on a single aim. Although the book offers something for almost any individual, it also has many parts which will be essentially useless for that same person.

This is not a textbook. This is not a reference book. This is not a set of reviews. This book cannot be classified. Many scientists and students will benefit by selective reading from it.

Marvin Margoshes
Technicon Instruments Corporation,
Tarrytown, New York

#### **Books Received**

Advances in Agronomy. Vol. 23. N. C. Brady, Ed. Prepared under the auspices of the American Society of Agronomy. Academic Press, New York, 1971. xvi, 408 pp., illus. \$21.

Advances in Electronics and Electron Physics. Vol. 30. L. Marton and Claire Marton, Eds. Academic Press, New York, 1971. xii, 334 pp., illus. \$19.50.

Advances in Immunology. Vol. 13. F. J. Dixon and Henry G. Kunkel, Eds. Academic Press, New York, 1971. xvi, 336 pp., illus. \$16.50.

Advances in Microwaves. Vol. 7. Leo Young, Ed. Academic Press, New York, 1971. xiv, 294 pp., illus. \$18.50.

The American Ideology of National Science, 1919-1930. Ronald C. Tobey. University of Pittsburgh Press, Pittsburgh, 1971. xiv, 264 pp. \$9.95.

Animals of the Arctic. The Ecology of the Far North. Bernard Stonehouse. Holt, Rinehart and Winston, New York, 1971. 172 pp., illus. \$10.95.

Annual Review of Phytopathology. Vol. 9. James G. Horsfall, Kenneth F. Baker, and George A. Zentmyer, Eds. Annual Reviews, Palo Alto, Calif., 1971. xii, 494 pp., illus. \$10.

Atlas of Fossil Man. C. Loring Brace, Harry Nelson, and Noel Korn. Holt, Rinehart and Winston, New York, 1971. x, 150 pp., illus. \$3.25.

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Computer Applications in Civil Engineering. Paul D. Spindel. Van Nostrand Reinhold, New York, 1971. viii, 216 pp., illus. \$8.95.

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Contributions to Sensory Physiology. Vol. 5. William D. Neff, Ed. Academic Press, New York, 1971. xiv, 224 pp., illus. \$12.50.

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Experimental Coelenterate Biology. Howard M. Lenhoff, Leonard Muscatine, and Lary V. Davis, Eds. University of Hawaii Press, Honolulu, 1971. x, 282 pp., illus. \$12.

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TECHNOLOGY AND PERCEPTION by Daniel Cappon, York Univ., Toronto, Canada. '71, 282 pp. (6 3/4 x 9 3/4), 6 il., 4 tables, \$14.75

CELLULAR PHARMACOLOGY: The Effects of Drugs on Living Vertebrate Cells In Vitro by Mary Dawson, The Univ. of Strathclyde, Glasgow, Scotland. '72, 336 pp., 32 il., \$18.00

INTERACTIONS OF DRUGS WITH CELLS: A Topic in Cell Biology by D. R. H. Gourley, Univ. of Virginia School of Medicine, Charlottesville, '71, 160 pp., 32 il., 3 tables, \$8.50

ENVIRONMENTAL LEGISLATION by William D. Hurley, President, Institute for Environmental Technology and Occupational Safety and Health, Washington, D. C. '71, 96 pp., \$6.50

INNOVATIVE ORGANIZATION FOR POPULATION RESEARCH edited by Sylvan J. Kaplan, Department of the Interior, Washington, D. C., and Robert K. McCormick, National Broadcasting Company. Foreword by Philip A. Corfman. (50 Contributors) '71, 416 pp., 11 il., 1 table, \$15.25

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ENVIRONMENTAL SURVEILLANCE IN THE VICINITY OF NUCLEAR FACILITIES. Proceedings of a Symposium Sponsored by the Health Physics Society edited by William C. Reinig, E. I. du Pont de Nemours and Company, Aiken, South Carolina. (82 Contributors) '70, 480 pp. (7 x 10), 118 il., 106 tables, \$29.00

TRACER PROBES IN STEADY STATE SYSTEMS by Robert Steele, New York Univ. School of Medicine, New York. '71,' 244 pp., 54 il., 9 tables, \$17.00

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