violations of the rule of equality of allele recovery in meiotic tetrads) and crossing-over (the process of simultaneous production of complementary recombinant types for genetic markers located further apart than the length of the splices).

If these facts were all we had, a survey of the field would be easy to write; on the other hand, it wouldn't really be needed. The true state of things is that there is a vast body of information bearing on the "fundamental" processes described above which, in its details, varies from creature to creature, from locus to locus, from site to site within a gene, and from mutant to mutant at or near a given site. The outside observer can only throw up his hands and wait for the experts to proclaim a party line. But there aren't any experts. One student of recombination may know fungi (or at least one or two fungi, or at least one or two loci in one fungus) but will be at sea when it comes to T4 recombination. The lambda expert is likely to shun *Sordaria* literature (out of self-defense). The professional model builder often defends his model as if it were a deduction, forgetting that it is a guess the abundance of whose parameters (increased as need be) thwarts the very tests which might raise it to a higher level. Perhaps a lucid survey could be forthcoming from a highly intelligent being from outer space on the basis of a dispassionate and exhaustive reading of the pertinent literature. Or perhaps such an effort would be doomed to failure by the technical flaws and cryptic assumptions in the original literature itself.

Kushev has tried hard, and those planning a similar effort may profit from his attempt. Other readers will not. Kushev has understood a lot, but misunderstood too much. He has said many things well, but misstated too many others. He has touched on almost all the important observations, but his descriptions of many of them are so brief as to be unintelligible. He has been translated into light, pleasant English which (I suspect) has introduced occasional flaws in meaning. Kushev has capped his effort by presenting a comprehensive model ("directed correction") for recombination. His model, a variant of Holliday's (*Genet. Res.* **5**, 282 [1964]), adds a novel parameter with the assumption that mismatch correction operates by special rules on those heteroduplexes whose formation did not involve crossing-over of the flanking markers. This assumption derives from a presumption about the molecular basis for the difference in efficiency of transformation by different markers in *Pneumococcus*. I confess to being unable to judge whether the arguments offered in support of the theory of directed correction are compelling, and the theory may be valuable even if the germinal observations on *Pneumococcus* should prove to have a different explanation (see G. Tiraby and M. S. Fox, *Proc. Natl. Acad. Sci. U.S.A.* **70**, 3541 [1973]).

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Radio Astronomy

Galactic and Extra-Galactic Radio Astronomy. GERRIT L. VERSCHUUR, KENNETH I. KELLERMAN, and VIRGINIA VAN BRUNT, Eds. Springer-Verlag, New York, 1974. xii, 402 pp., illus. $37.80.

Radio astronomers have lamented the lack of a comprehensive resume of the observational and interpretational products of radio astronomy. At last we have it, to the extent possible in such a fast-moving field. In this book the editors' goal was "to take over where most textbooks on radio astronomy leave off" and to provide "a discussion of what is actually known from the research done." The book is this and considerably more, in that a great deal of basic theory and even information on observational techniques is included because of the individual contributors' evident compulsion for completeness. I consider this to the good, since it allows the book to stand almost alone.

There are chapters by various contributors on all aspects of radio astronomy outside the solar system, from the now familiar supernova remnants, spiral structure derived from neutral hydrogen motions, and H II regions, to the more recently discovered pulsars, radio stars, and interstellar molecules. The inevitable variations in style and level of presentation occur as the script moves from one author to another, but all the chapters are good and some are outstanding. I particularly like the chapter on aperture synthesis, which is a particularly clear description of this key technique; the chapter on interstellar molecules, a subject on which some thorough discussion and an attempt to sort it all out have long been needed; and the beautiful chapter on cosmology, which casts this esoteric subject in a form that allows one to see the universe despite the trees.

More careful editing might have been in order: we find in at least two places almost identical reviews of the basics of synchrotron radiation, radiative transfer, and Faraday rotation, even with different notation. Yet the important phenomenon of synchrotron self-absorption is kept a dark secret until p. 342, and the important figure 13.10 described in the text surely isn't the printed figure 13.10, but maybe it is part of 13.11. All this does not hurt significantly; if we were to ask for any important change, it would be the addition of the beautiful results from the Westerbork instrument, results perhaps too recent to meet the publishing schedule.

This book is just what is needed as a textbook for graduate radio astronomy courses. It is a tragedy that the price is prohibitive for graduate students.

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Books Received

Advances in Microwaves. Vol. 8. Leo Young and H. Sobol, Eds. Academic Press, New York, 1974. xiv, 408 pp., illus. $35.

Bronchial Carcinoma. Thomas W. Shields with sections by Roy E. Ritts, Jr. Thomas, Springfield, Ill., 1974. xii, 182 pp., illus. $12.75. American Lecture Series, No. 942.

Cadmium in the Environment. Lars Friberg, Magnus Piscator, Gunnar F. Nordberg, and Tord Kjellström. CRC Press (Chemical Rubber Co.), Cleveland, ed. 2, 1974. xii, 248 pp., illus. $29.95.

Complex Stochastic Processes. An Introduction to Theory and Application. Kenneth S. Miller. Addison-Wesley, Reading, Mass., 1974. xiv, 238 pp. Cloth, $16.50; paper, $9.50.

Developmental Aspects of Carcinogenesis and Immunity. Proceedings of a symposium, Manhattan, Kans., June 1973. Thomas J. King, Ed. Academic Press, New York, 1974. xvi, 218 pp., illus. $8.95.

Electronic Circuits and Applications. Stephen D. Senturia and Bruce D. Wedlock. Wiley, New York, 1975. xii, 624 pp., illus. $16.95.

Electronic Measuring Instruments. Comparison Catalogue. Prepared by Erich Terner and Team. Služba Vyzkumu, Prague, Czechoslovakia, ed. 5, 1973. Variously paged, illus. $36.

Fourier Series. N. W. Gowar and J. E. Baker. Chatto and Windus, London, and Collins, Glasgow, 1974 (U.S. distributor, Crane, Russak, New York). x, 140 pp., illus. $31.50.

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AAAS NEWS

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nating Committee of the Associations for the Advancement of Science in the Americas to become editor of the new trilingual (Spanish, English, and Portuguese) journal, *Science and Man.* Roche, 54, is widely regarded as one of Latin America's most distinguished scientists. He has been professor of physiopathology at the Central University of Venezuela since 1958.

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Communications: The Department will be cosponsoring a seminar on Food and Nutrition with the Fernbank Science Center in Atlanta, 15–16 May. In conjunction with the seminar, an experimental membership registration project was conducted. Two-page questionnaires were mailed to the 864 AAAS members in the Atlanta area, inquiring about their interest in public understanding of science activities, both with the AAAS and the Fernbank Center. The response has been very good.

Other regional seminars planned by the Department are "Energy: Alternatives for Ohio," to be held in Cleveland 9–10 May; and "Energy Conservation—Resource Recycling and Reclamation," in Montgomery, Alabama, 10–11 June. The Department is also assisting the Weekend College of Wayne State in Detroit with their plans for a food science seminar the last weekend in May.

NOVA Program Schedule: The full 1974–75 NOVA season will be rebroadcast over all PBS stations, beginning Tuesday, 22 April, at 8:30 p.m. and repeating Saturday, 26 April, at 8:00 p.m. The program schedule for May is:

6 May. *The Hunting of the Quark.* Smashing matter into ever smaller pieces in an attempt to find its fundamental building blocks has produced a confused nightmare of particles. One way they can be made sense of is to postulate the existence of the quark (BBC).

13 May. *The Secrets of Sleep.* Most of us spend one-third of our lives in a state of which we understand remarkably little. The film challenges traditional notions about how much sleep we need (BBC/WGBH).

20 May. *Inside the Golden Gate.* How San Francisco Bay works—its physics, chemistry, biology (WGBH).

27 May. *The Men Who Painted Caves.* French and American archeologists piece together cave art of the last Ice Age (BBC).

BOOKS RECEIVED

(Continued from page 444)

Functional Chemistry of the Brain. Adrian J. Dunn and Stephen C. Bondy. SP Books (Spectrum Publications), Flushing, N.Y., 1974 (distributor, Halsted [Wiley], New York). xvi, 272 pp., illus. $14.95. Monographs in Modern Neurobiology.

The Growth of Competence. Proceedings of a meeting, London, Jan. 1972. Kevin Connolly and Jerome Bruner, Eds. Academic Press, New York, 1974. xii, 328 pp., illus. $17.50. Developmental Sciences Series.

Handbook of Applied Mathematics. Selected Results and Methods. Carl E. Pearson, Ed. Van Nostrand Reinhold, New York, 1974. xiv, 1266 pp., illus. $37.50.

Initial Reports of the Deep Sea Drilling Project. Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES). Vol. 26. Sept.–Oct. 1972. Prepared for the National Science Foundation by the Scripps Institution of Oceanography, La Jolla, Calif., 1974 (available from the Superintendent of Documents, Washington, D.C.). xx, 1130 pp., illus. $20.15.

Lifespan and Factors Affecting It. Aging Theories in Gerontology. Daniel Hershey. Thomas, Springfield, Ill., 1974. xiv, 158 pp., illus. Paper, $9.75.

Manter and Gatz's Essentials of Clinical Neuroanatomy and Neurophysiology. Ronald G. Clark. Davis, Philadelphia, ed. 5, 1975. viii, 182 pp., illus. Paper, $6.

The Nebular Variables. John S. Glasby. Pergamon, New York, 1974. x, 210 pp., illus. $22.50. International Series of Monographs in Natural Philosophy, vol. 69.

North of Latitude Eighty. The Defence Research Board in Ellesmere Island. G. Hattersley-Smith. Canada Defence Research Board, Ottawa, 1974 (available from Information Canada, Ottawa). x, 122 pp., illus. + loose map. Paper, $C6.75.

Pain Patients. Traits and Treatment. Richard A. Sternbach. Academic Press, New York, 1974. xiv, 136 pp., illus. $9.50.

PASCAL. User Manual and Report. Kathleen Jensen and Niklaus Wirth. Springer-Verlag, New York, 1974. viii, 170 pp., illus. Paper, $8.20. Lecture Notes in Computer Science, vol. 18.

Perception. Essays in Honor of James J. Gibson. Robert B. MacLeod and Herbert L. Pick, Jr., Eds. Cornell University Press, Ithaca, N.Y., 1974. 318 pp., illus. $14.50.

Planet Earth. Readings from *Scientific American.* Frank Press and Raymond Siever, Eds. Freeman, San Francisco, 1974. x, 304 pp., illus. Cloth, $12; paper, $6.95.

Polymer-Plastics Technology and Engineering. Vol. 3. Louis Naturman, Ed. Dekker, New York, 1974. xiv, 252 pp., illus. $29.50.

Scanning Electron Microscopy. Oliver C. Wells with portions contributed by Alan Boyde, Eric Lifshin, and Alex Rezanowich. McGraw-Hill, New York, 1974. xviii, 422 pp., illus. $22.95.

The Science and Politics of I.Q. Leon J. Kamin. Erlbaum, Potomac, Md., 1974 (distributor, Halsted [Wiley], New York). viii, 184 pp. $10.95. Complex Human Behavior.