

land communities in Ireland bogs and blanket mires are specifically excluded.

The editor is well known for his palynological and stratigraphical studies of mire development. He has brought together in this volume a great deal of information on the vegetation of European mires that is not available in English and is often known only locally. The book is well edited, with few spelling errors, and is written in surprisingly good English. The editor obviously made a major effort in editing the papers by non-English-speaking contributors. Overall, this is a helpful reference book on the vegetation and classification of European mires.

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Aging in Cells

Cellular Ageing. H. W. SAUER, Ed. Karger, Basel, 1984. x, 276 pp., illus. \$88.75. Monographs in Developmental Biology, vol. 17.

This slim, handsome volume brings together a group of 17 papers (presumably a subset of the best) submitted in response to the announcement of the 20th annual competition of the Heinz Karger Memorial Foundation. In brief introductory remarks by Dr. Thomas Karger and Steven Karger (this event is obviously a family affair), we learn that Dr. Heinz Karger was a director of the publishing house of S. Karger from 1935 until his death in 1959 and that the Foundation has been honoring outstanding scientific researchers from a diversity of fields for the past 20 years through financial prizes awarded as a result of regular competitions. The 20th competition, which I understand was for a cash award of some 20,000 Swiss francs, dealt with the theme of cellular aging. It departed from tradition by permitting review papers as well as reports of original research and by the publication of a collection of the submissions in book form.

The book contains accounts of some outstanding research, and these include the papers by the two prizewinners (who shared the award), Thomas B. L. Kirkwood and James R. Smith. Both are comparatively young investigators, which is a good omen (although we gerontologists have special affection for late bloomers). Smith is an expert in mammalian cell culture and has produced (often in collaboration with Olivia Pereira-Smith) a most elegant series of papers

dealing with the phenomenon of clonal attenuation of normal human diploid cells. Here is an example of a line of gerontological investigation (pioneered by Leonard Hayflick and Paul S. Moorhead) that was pretty much ignored by a number of tumor biologists, who for years utilized, almost exclusively, such immortal cell lines as 3T3 and BHK for their research on in vitro "transformation." Smith's paper describing in vitro demonstrations of replicative mortality of fibroblasts is "must" reading for any investigator interested in the regulation of cell proliferation and the general problem of proliferative homeostasis. A good companion piece to Smith's paper is David E. Harrison's description of his nicely designed investigations of the serial replication of hemopoietic stem cells in vivo. Harrison believes his evidence strongly suggests that these stem cells have an essentially unlimited replicative potential.

Kirkwood is primarily a theoretical biologist, though he has collaborated closely with an experimental geneticist, Robin Holliday (who, incidentally, has two contributions in the volume). In his review essay, Kirkwood argues compellingly that adaptive explanations of aging are unsound and reviews his "disposable soma" theory of aging, which predicts that, in organisms that are iteroparous (reproduce repeatedly) and in which, therefore, one does not observe the tight coupling between reproduction and somatic death found in organisms that are semelparous (reproduce only once), the level of repair of macromolecular damage to somatic cells is insufficient to prevent cumulative damage and, eventually, organismic death. He believes there is a trade-off, in evolutionary strategy, between the energy required for somatic maintenance and that required for reproduction, the investment of resources in maintenance and repair of the soma being always less than what is required for indefinite survival.

Other contributions include a series of papers on senescence of the immune system (including a very useful review by M. E. Weksler and G. W. Siskind), which is the most fruitful system for the investigation of how cell-cell interactions might be altered during aging; a timely review by D. M. Bowen of the selective vulnerability of cholinergic neurons, a topic of immense clinical importance; comparisons between in vitro and in vivo aging, including a description by M. T. Flood and colleagues of a new cellular model system for aging research, human retinal epithelium (photographs of which are displayed on the book jacket); and a

number of papers on cytoplasmic aging. Among these last papers, those by M. M. B. Kay and D. J. Cummings are of special interest. Kay reports evidence that a specific transmembrane polypeptide undergoes proteolytic degradation in a variety of mammalian cell types during aging. Cummings reports on a series of elegant molecular genetic studies that establish a correlation between the excision and amplification of segments of mitochondrial DNA and the clonal senescence of the fungus *Podospora anserina*.

I have little hesitation in recommending the book to my colleagues in gerontology. It is not a systematic or balanced representation of the field, however, and non-gerontologists are likely to be disappointed by it. Nevertheless, the editor and his colleague K. J. Aufderheide (who was given the awesome assignment of writing an integrated overview of this heterogeneous material) have done a creditable job, and we can be grateful to them for persevering.

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Reprints of Books Previously Reviewed

In Search of Mind. Essays in Autobiography. Jerome Bruner. Harper and Row, New York, 1984. Paper, \$6.95. Harper Colophon Books. *Reviewed* 224, 720 (1984).

Man Discovers the Galaxies. Richard Berendzen, Richard Hart, and Daniel Seeley. Columbia University Press, New York, 1984. \$30; paper, \$10.95. *Reviewed* 199, 763 (1978).

The Zapotecs. Princes, Priests, and Peasants. Joseph W. Whitecotton. University of Oklahoma Press, Norman, 1984. Paper, \$9.95. *Reviewed* 220, 661 (1978).

Books Received

Asymptotic Theory for Econometricians. Halbert White. Academic Press, Orlando, Fla., 1984. x, 230 pp. \$39. *Economic Theory, Econometrics, and Mathematical Economics.*

Atlas of Sedimentary Rocks under the Microscope. A. E. Adams, W. S. MacKenzie, and C. Guilford. Halsted (Wiley), New York, 1984. vi, 104 pp. Paper, \$24.95.

Living and Working in the Sea. James W. Miller and Ian G. Koblick. Illustrated by William Boggess. Van Nostrand Reinhold, New York, 1984. xiv, 433 pp. \$32.95.

Living with the Louisiana Shore. Joseph T. Kelley et al. Duke University Press, Durham, N.C., 1984. xii, 164 pp., illus. \$22.75; paper, \$9.75. *Living with the Shore.*

Making Money with Your Home Computer. Dana K. Cassell. Dodd, Mead, New York, 1984. xii, 143 pp., Paper, \$5.95.

Zoological Philosophy. An Exposition with Regard to the Natural History of Animals. J. B. Lamarck. Introductory Essays by David L. Hull and Richard W. Burkhardt, Jr. University of Chicago Press, Chicago, 1984. lxvii, 458 pp. \$30; paper, \$15. Translated from the French edition by Hugh Elliot. *in Mechanics and Thermal Sciences.*