of the full implications of continental glaciation during the Pleistocene.

Bailey's own reminiscences have special values. He knew men who knew both Lyell and Darwin. Bailey could also write (p. 28) "When I think of Lamarck my mind goes back to the battle of the Somme. I had noticed some bricks in the side of a trench, the only relic of the village of Bazantin, northeast of Albert. Someone unknown paused beside me: 'This,' he said, 'was the birthplace of Lamarck'; and on he went."

A. O. WOODFORD
Department of Geology,
Pomona College

Darwin and the Antipodes

The Evolution of Living Organisms. A symposium to mark the centenary of Darwin's *Origin of Species* and of the Royal Society of Victoria, held in Melbourne, December 1959. G. W. Leeper, Ed. Melbourne University Press, Victoria; Cambridge University Press, New York, 1962. 459 pp. Illus. $22.50.

This book, the latest, and likely the last, portion of the long harvest of books celebrating the centennial of Darwin's great classic, consists of 36 articles by 42 authors. Although most of the contributors are Australians and New Zealanders, Gavin de Beer and T. S. Westoll from England and Ernst Mayr from the United States participated in the symposium and contributed to the volume. Mayr's paper, "Accident or design: The paradox of evolution," the opening one at the symposium, was a tribute to Oscar Tiegs.

The articles are quite disparate; some are reviews or discussions of fields of study or of general problems, and others present original data with relatively little comment. That some are singled out for mention is not an indication of superior merit.

Darwin did not observe evolution happening; he inferred that evolution must have happened. It is a rather better guess than most "would-have-beens" that to behold evolution actually taking place would have pleased Darwin enormously. In "Evolution made visible," F. M. Burnet summarizes the observations on evolution taking place in poliomyelitis, influenza, and myxomatosis viruses and in their human and rabbit hosts in Australia and elsewhere. M. J. D. White and L. E. Andrew can justly claim that they have "seen" the operation of natural selection in the populations of the grasshopper *Moraba scurra*, although there selection mostly maintains a status quo. F. H. W. Morley, C. I. Davern, V. E. Rogers, and J. W. Peak observe changes produced by natural selection in different environments in the introduced pasture plant, subterranean clover (*Trifolium subterraneum*). A known mixture of 13 clones of this plant was sown on a series of plots in localities that have different climatic and soil conditions, and rapid changes in the composition of the mixture were recorded, different clones being most successful under different conditions. C. A. Fleming did not exactly witness species forming in the lamellibranch genus *Bassina*, and neither did I. M. Mackerras in the Tabanid flies or A. R. Main in the Australian frogs, but their elegant papers are probably as close as we can come to proving this by inference from observational and experimental data in true Darwinian tradition.

Another group of papers are concerned with experimental studies of the mechanisms that bring about evolution. A. S. Fraser's lively, contentious "Survival of the mediocre" claims that the genetic models of population structure used by Fisher, Wright, Haldane, and others "are gross oversimplifications." What has been disregarded is the genetic variability due to balanced polymorphism and to epistatic gene interactions, and especially to the phenomenon of developmental canalization. A very thoughtful paper by J. LeGay Brereton raises the fundamental but difficult question "Can evolution work at the group level?" and concludes that "there is evidence that it can, for how else could behavior which is disadvantageous to the individual but of advantage to the group have evolved?" Some interesting data on the "self-regulation" of experimental populations of the beetle *Tribolium* are presented, and data on populous birds, mammals, and isopods are discussed.

The two concluding papers, by D. J. Carr and S. G. M. Carr and by L. D. Pryor, essay various approaches to the formidable problem of the systematics of the Australian tree genus *Eucalyptus*. A recent revision recognizes 522 species names, but, even though "with some application, foresters quickly learn to recognize the facies of the species in their districts," it is becoming clear that species in *Eucalyptus* is simply not the same biological phenomenon which it is in, say, *Drosophila* or birds or, presumably, in most of the living world. This may be a source of vexation to some minds addicted to order and simplicity, but it is this kind of "disorder" which led Darwin to conclude that species are not fixed entities but products of evolution.

The gracious article by Gavin de Beer manages deftly to pay well-deserved compliments to his Australian hosts by citing Darwin's praise of the Australia of 1836, praise which is fully applicable to the Australia of 1960.

THEODOSIUS DOBZHANSKY
Rockefeller Institute

Biology of the Chordates

The Life of Vertebrates. J. Z. Young. Oxford University Press, New York, ed. 2, 1962. xv + 820 pp. Illus. $10.

The many admirers of J. Z. Young's book, *The Life of Vertebrates*, will welcome the second edition of that excellent text, which was generally acclaimed at its first publication for its felicitous blending of anatomy, physiology, ecology, and phylogeny into an integrated and comprehensive account of the biology of the chordates.

The revision retains the format and plan of the first edition. As Young says in his preface, "I thought it better that the book should continue to show the idiosyncrasies and interests of the author." These interests, as the book itself attests, are remarkably wide-ranging. The past 12 years have been fruitful ones in many areas of vertebrate zoology and much of this progress is reflected in the present edition. Many sections have been rewritten, and new material has been added which incorporates such recent advances as Enami's work on the teleost urohypophysis and Bone's on the nervous system of Amphioxus, as well as various contributions in sensory physiology, and new discoveries in primate paleontology, to select but a few examples. The taxonomy has, in a number of instances, been revised to accord with current authoritative usage. A number of errors that crept into the first edition have been corrected.

Several exceptions may be recorded (these may be scored against the first

edition as well). The eclecticism of Young's conception, admirable as it is, has led him to include a number of short essays, such as that on the growth of human populations, that are so brief as to be mere adumbrations. Some will object, too, to the occasional lapses into teleological phrasing. These are metaphors, to be sure, but they tend to beguile the student away from rigorous thinking on the nature and mechanisms of selection. I found confusing the use of the term *lungfishes* for both Rhipidistia and Dipnoi, especially as the question of the diphyletic origin of tetrapods is not explicitly discussed.

But these are minor reservations. *The Life of Vertebrates* remains almost unique in its sweep and stimulation and in its synthetic treatment of the living animal as a whole. At a time when study of the unhomogenized, unextracted, and unfractionated organism is less fashionable than it once was, Young's contribution is more valuable than ever.

MORDECAI L. GABRIEL
Department of Biology,
Brooklyn College

Notes

Marine Sciences

William J. Cromie's **Exploring the Secrets of the Sea** (Prentice-Hall, Englewood Cliffs, N.J., 1962. 300 pp. $5.95) is another "rewrite" of the marine sciences. Like many of its counterparts, Cromie's book suffers in comparison with Rachel Carson's *The Sea Around Us*, in which painstaking research and a certain freshness in writing and subject matter resulted in a most stimulating book. Cromie's effort can best be described as a somewhat unsatisfactory collation of scientific material of interest to the author combined with a collection of fantasy and adventure stories. The pages are liberally sprinkled with scientific errors and trivial information.

The book is distinguished by some rather delightful and imaginative illustrations, but they do not compensate for either the book's inadequacies or its rather high price. One secret is worth exploring: What motivated the publisher to bring out the volume in its present form?

EDWARD D. GOLDBERG
Scripps Institution of Oceanography,
La Jolla, California

Oceanography

Oceanographic Vessels of the World (U.S. Hydrographic Office, Washington, D.C., 1961. $4.50) compiled by Luis Capurro, Albert Bargeski, and William Myers and published jointly by the IGY World Data Center A for Oceanography (at the Agricultural and Mechanical College of Texas) and the National Oceanographic Data Center, is an alphabetically arranged (by country and by name of the vessel) descriptive list of the vessels, which provides information about their specifications, equipment, and scientific capabilities. There is an index of ship names.

New Books

Mathematics, Physical Sciences, and Engineering

Advances in Chemical Physics. vol. 4. I. Prigogine, Ed. Interscience (Wiley), New York, 1962. 410 pp. Illus. $16.50.

Advances in Tracer Methodology. vol. 1. Proceedings of the fifth annual symposium on tracer methodology, October 1961. Seymour Rothchild, Ed. Plenum Press, New York, 1963. 344 pp. Illus. $12.

Analogue Computing at Ultra-High Speed. An experimental and theoretical study. Donald M. McKay and Michael E. Fisher. Wiley, New York, 1962. 411 pp. Illus. $11.50.

The Brittleness of Steel. M. Szcepanski. Wiley, New York, 1963. 478 pp. Illus. $17.50.

Chemical Bonding and the Geometry of Molecules. George E. Ryschkewitsch. Reinhold, New York; Chapman and Hall, London, 1963. 126 pp. Illus. Paper, $1.95.

The Chemistry of Heterocyclic Compounds. vol. 17, *Five- and Six-Membered Compounds with Nitrogen and Oxygen (Excluding Oxazoles)*. Richard H. Wiley, Ed. Interscience (Wiley), New York, 1962. 511 pp. Illus. $35.

Computer Applications, 1961. Proceedings of a symposium, October 1961. 206 pp. Illus. $8.95.

Design of Thin Concrete Shells. vol. 1, *Positive Curvature Index*. A. M. Haas. Wiley, New York, 1962. 137 pp. Illus. $7.50.

The Distribution and Motion of Interstellar Matter in Galaxies. Proceedings of a conference (Princeton, N.J.), April 1961. L. Woltjer, Ed. Benjamin, New York, 1962. 344 pp. Illus. $11.75.

Energy Conversion. Sheldon S. L. Chang. Prentice-Hall, Englewood Cliffs, N.J., 1963. 251 pp. Illus. Trade ed., $9.25; text ed., $6.95.

Engineering. Samuel Rapport and Helen Wright, Eds. New York Univ. Press, New York, 1963. 396 pp. Illus. $4.95.

Entropy. The significance of the concept of entropy and its applications in science and technology. J. D. Fast. Translated from the second German edition (1960) by Mulder-Woolcock. McGraw-Hill, New York, 1962. 325 pp. Illus. $10.75.

Evolution of Stars and Galaxies. Walter Baade. Cecilia Payne-Gaposchkin, Ed. Harvard Univ. Press, Cambridge, Mass., 1963. 335 pp. Illus. $6.75.

Flat Rolled Products. vol. 16. Proceedings of the fourth technical conference sponsored by the Metallurgical Society and the American Institute of Mining, Metallurgical, and Petroleum Engineers, January 1962. E. W. Earhart, Ed. Interscience (Wiley), New York, 1962. 171 pp. Illus. $8.

Lasers. Generation of light by stimulated emission. Bela A. Lengyel. Wiley, New York, 1962. 137 pp. Illus. $6.95.

Mathematics. Samuel Rapport and Helen Wright, Eds. New York Univ. Press, New York, 1963. 335 pp. Illus. $4.95.

Metallic Corrosion. First International Congress, April 1961. Butterworth, Washington, D.C., 1962. 728 pp. Illus. $35.

Microchemical Techniques. A symposium, Pennsylvania State University, August 1961. Nicholas D. Cheronis, Ed. Interscience (Wiley), New York, 1962. 1199 pp. Illus.

Molecules Today and Tomorrow. Margaret O. Hyde. McGraw-Hill, New York, 1963. 144 pp. Illus. $3.25 (juvenile book).

Nuclear Physics. Robert A. Howard. Wadsworth, Belmont, Calif., 1963. 592 pp. Illus.

Physics of Heat Exchange and Gas Dynamics. A. S. Predvoditelev, Ed. Authorized translation from the Russian edition, (Moscow 1961). Consultants Bureau, New York, 1963. 275 pp. Illus. Paper, $17.50.

Progress in Inorganic Chemistry. vol. 4. F. Albert Cotton, Ed. Interscience (Wiley), New York, 1962. 585 pp. Illus. $15.

Propositional Calculus. P. H. Nidditch. Free Press (Macmillan), New York, 1963. 91 pp. Illus. Paper, $1.25.

Rheology of Polymers. Edward T. Severs, Reinhold, New York; Chapman and Hall, London, 1962. 192 pp. Illus.

Royal Society (London) International Geophysical Year Antarctic Expedition. Halley Bay. Coats Land, Falkland Islands Dependencies, 1955–59. vols. 2 and 3. vol. 2, *Radio Astronomy, Ionospheric Physics* (305 pp.); vol. 3, *Seismology, Meteorology* (400 pp.). Sir David Brunt, Ed. Royal Soc., London, 1962. Illus. $23 each.

Soviet Progress in Neutron Physics. P. A. Krupchitskii, Ed. Translated from the Russian edition (Moscow, 1961). Consultants Bureau, New York, 1963. 275 pp. Illus. Paper, $40.

Superconductors. Proceedings of sessions sponsored by the American Institute of Mining, Metallurgical, and Petroleum Engineers (New York), February 1962. M. Tanenbaum and W. V. Wright, Eds. Interscience (Wiley), New York, 1962. 161 pp. Illus. $7.

Tables of Random Permutations. Lincoln E. Moses and Robert V. Oakford. Stanford Univ. Press, Stanford, Calif., 1963. 239 pp. $7.

Thermodynamic Properties of Helium. To 50,000°K. Wilbert J. Lick and Howard W. Emmons. Harvard Univ. Press, Cambridge, Mass., 1962. 127 pp. Charts. Illus.