he should be remembered as a minor late-18th-century versifier whose choice of scientific and technical subjects drew attention to his poetry. Artistically, then, he is not on the level of a da Vinci or a Goethe. What about his scientific contributions?

The assessment of E. Darwin as a scientist is a difficult one. It is true that he spelled out, in some detail, a theory of organic evolution over 50 years prior to the publication of the *Origin of Species*, but King-Hele in his analysis and evaluation overlooks two aspects of that theory. First, there is need for a thorough study of the relationship between the evolutionary ideas of grandfather and grandson. Second, Erasmus' transmutation theory must be evaluated in comparison with similar views put forth by Maupertuis, Lamarck, and other Continental thinkers. Treated in isolation, and presented in modern garb, as it is by King-Hele, the evolutionary theory of the 18th-century Darwin is made to appear more original and forward-looking than it actually was. Only when the two above-mentioned tasks have been accomplished will we be able to assess the significance of E. Darwin's scientific contributions.

It is easier to determine Darwin's place in the practical than in the scientific realm. He was a successful physician, one who accepted and originated innovations in medical practice. Furthermore, he possessed an inventive streak that is revealed in his detailed plans for a host of mechanical gadgets —ranging from a steam car to a speaking machine and centrifuge couch— and that is indicated by his close friendship with some of the major inventors and manufacturers of the Industrial Revolution.

My short summary of Darwin's achievements records but a few of the high points in his long career as physician, poet, inventor, and speculative scientist. At the end of the book the editor lists 75 of Darwin's achievements and then asks the reader to serve on the jury that would evaluate them. The jury is not yet ready to return its final verdict because neither King-Hele nor any other scholar has placed Erasmus Darwin where he belongs—within the 18th-century intellectual milieu. While the jury deliberates it might profitably, and cautiously, use this compilation of the writings of Erasmus Darwin as an introduction to the thought of an extraordinarily interesting figure. I say cautiously because the editor is prone to exaggerate the modernity of Darwin's work, and because his enthusiasm for his subject often outstrips his critical sense. Nevertheless, he does provide a guide to *The Botanic Garden, Zoonomia, Phytologia,* and the *Temple of Nature* as well as to the less well-known printed pieces and correspondence.

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Good Things To See

Between Pacific Tides. EDWARD F. RICKETTS and JACK CALVIN. Fourth edition, revised by JOEL W. HEDGPETH. Stanford University Press, Stanford, Calif., 1968. xvi + 624 pp., illus. $10.

During the late 1930's, E. F. Ricketts turned, according to Hedgpeth, from the moderately profitable business of selling beautifully preserved animals of the seashore to the unprofitable pastime of writing about them. The result, *Between Pacific Tides*, describes the rich and diverse Pacific coast intertidal invertebrate fauna, "the fabulous and multiform little brothers," in Steinbeck's words. As in earlier editions of the book, vertical zonation of the intertidal region forms its warp; the strands of woof are habitat types: open coast, protected outer coast, and bay and estuary. It is well that most of the text is still substantially Ricketts, for style and content remain as fresh as when first published 30 years ago. Hedgpeth's three final chapters, on recently introduced species, analysis of intertidal zonation, and the ocean beyond the shore, are somewhat reorganized from the revised third edition of 1962, but largely by updating and deserved attention to technological threats to maintenance of marine environments suitable for the support of life. The useful annotated systematic bibliography is expanded and constitutes 20 percent of the book. The illustrations are improved and more usefully placed with the relevant text.

The old foreword by John Steinbeck and Calvin and Hedgpeth's "Preface: About this book and Ed Ricketts" are gone, and I for one miss them. Sentimentalism? Nostalgia? Perhaps, but Steinbeck's words, like the tide-pool world he contemplated, remain timely and belie the much discussed schism between reductionist and synthetic or evolutionary biology.

To Steinbeck, "This book then says: there are good things to see in the tidepools and there are exciting and interesting thoughts to be generated from the seeing. Every new eye applied to the peep hole which looks out at the world may fish in some new beauty and some new pattern, and the world of the human mind must be enriched by such fishing." The fourth edition does not apply a new eye to the peephole. It does justice to, in G. E. Hutchinson's apt phraseology, the ecological theater. Other eyes are beginning to fish in new patterns of the adaptive strategies of intertidal organisms for making a living in their world, and of the dynamic aspects of the structure of their communities. Perhaps the next edition will also present part of the evolutionary play.

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A Vast Marine Province

Atlas of the Great Barrier Reef. W. G. H. MAXWELL. Elsevier, New York, 1968. viii + 260 pp., illus. $32.50.

Just before 11 on the night of 10 June 1770, the bark *Endeavour*, Lieutenant James Cook commanding, grounded on a coral reef off the east coast of Australia in latitude 15°47′S. The greatest navigator of the 18th century had "discovered" the Great Barrier Reefs (for so this vast complex was later first and properly named by Matthew Flinders). Since that historic moment, unmentioned in this book, this greatest of organic structural features has been one of the most intriguing but least known geologically, while to biologists it has yielded the most varied of tropical reef biotas. Its vast area embraces practically all known reef environments and affords an unexampled source of data for the interpretation of the still only partially understood fossil reefs of the past. Maxwell emphasizes that this study is principally a geological appreciation in which he has attempted to synthesize the widely scattered work of many others as well as his own very extensive experience.

The first chapters describe the regional setting and geological framework of the reefs and their relation to the southwestern Pacific area. There follow chapters on the bathymetry, hydrology, and climatology of the

"Great Barrier Reef Province" and on the morphology and distribution of the reefs, with a classification of living reef types in general and of those of the Great Barrier complex, including some new terms. Maxwell recognizes *platform, lagoonal platform, elongate platform, wall, cuspate, prong, apron, open ring, open mesh, closed ring, closed mesh, plug, resorbed,* and *remnant patch reefs,* surely a sufficient terminology for the most exacting hermatologist.

The biological character of the reefs receives less attention, and the treatment of the various organic groups is somewhat uneven. Although the author points out that the dominant components in reef building biotas are the corals and calcareous algae, there are seemingly exhaustive lists of the species of the latter and the Foraminifera, but only a few genera are given for the hermatypic corals.

Chapter 8, dealing with the sediments now accumulating, is one of the most important, for, after all, the clastics and bioclastics contribute the main mass of reef materials. Those of the Great Barrier include a much wider range than is found on other reef complexes, from the high terrigenous quartzose sands and muddy sands to almost pure carbonates. Among the latter are the surprisingly large stretches of bryozoan detritus, contrasted with the relatively small areas of coral clastics.

Lavishly and well illustrated, this book is rightly termed an atlas, with its many clear, neatly drafted maps and diagrams supplemented with an imposing array of reasonably well reproduced photographs. Maxwell has assembled the first comprehensive physical analysis of a great earth feature.

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A Victorian Naturalist

The Eccentric Ark. The Curious World of Frank Buckland. G. H. O. BURGESS. Horizon, New York, 1968. xii + 242 pp. + 15 plates. $6.50.

This book is partly biography, partly natural history, and altogether unique. Frank Buckland (1826–1880) was in a way a composite of Ben Franklin, Will Beebe, and P. T. Barnum. Son of the "scientific" Dean of Westminster, himself a noted geologist, Frank was educated at Oxford and embarked on a career in surgery, but only briefly. He served as House Surgeon at St. George's, and was later appointed assistant surgeon to the Second Life Guards, a post which provided him with ample time to pursue his varied and widespread interests. He has been described as "the man who tried everything" and "surely the most independent eccentric of all time." He loved riding on the open top of an omnibus in the rain; he once made in his basement a plaster cast of a large sunfish, only to find it would not fit through the doorway; he disrobed and attempted to climb up a waterfall, to appreciate the sensations of migrating salmon; he personally attempted to doctor a moribund porpoise at the Zoological Gardens in London. At home he kept an odd assortment of pets, served exotic dishes, and entertained giants and dwarfs, rat catchers and flea trainers, as well as the leaders of London's society. Everything curious, unusual, or bizarre interested him, and he had the happy trait of transmitting his enthusiasm to others.

Through these pages stride such eminent scientists and celebrities as Louis Agassiz, Charles Darwin, Michael Faraday, Francis Galton, Thomas Henry

Frank Buckland dosing a porpoise with sal volatile and water, November 1862. Buckland and his friend A. D. Bartlett, superintendent of the London Zoological Gardens, were eager to obtain a live porpoise for display. "Buckland spent much time and trouble in attempting to revive dying specimens which reached the Gardens and in travelling to the coast to inspect and arrange for the transportation of porpoises caught by local fishermen. None of the animals which reached the Gardens alive survived for more than a few days. Buckland, however, maintained public interest in the attempts not only by his contributions to *The Field* but also by writing letters to *The Times* . . . announcing the arrival of yet another specimen. . . . People flocked to the Gardens, generally to discover that the newcomer had just died." [From Buckland's *Curiosities of Natural History*, 3rd series; reprinted in *The Eccentric Ark*]