

under review. Bartram's *Travels* was issued in ten editions between 1791 and 1801. It was printed in English, Dutch, German, and French, and it did its full share in establishing the romantic European attitude toward nature and toward the American Indian. The seeds that Bartram collected and his drawings of American plants and animals became European desiderata.

The drawings reproduced in this opulent volume are those that were sent by Bartram to the British botanist Dr. John Fothergill. They are of both botanical and historical importance. Twenty-three of them (there are 60 in all) are the first representations of the species they depict. In 1780, the drawings were bought by Sir Joseph Banks, and in 1827 they became the property of the Natural History Division of the British Museum. Photostats of some of the drawings have been published, but here and for the first time they are reproduced in full. Nineteen of them are in color, and even those in black and white are reproduced with all the finish of a skillful etching.

As we would expect, Bartram's interests were primarily in botany, but he

also drew birds, turtles, snakes, frogs, and fish. His flowers are drawn with all the details that a botanist would need, although sometimes the accompanying notes are not as complete as we might desire. No ornithologist should have any difficulty in identifying the birds, nor should a herpetologist find it difficult to identify the snakes. It should be emphasized also that the fine details, important to systematists, in no way detract from the pictures as a whole. The frontispiece is, appropriately enough, a colored reproduction of *Franklinia alatamaha*, the flowering tree that Bartram's collection of seeds saved from extinction.

The scholarly apparatus provided by Joseph Ewan is exceptionally complete and detailed. It consists of a biographical sketch of Bartram as a naturalist and artist and an account of his travels and discoveries. Ewan has identified all the specimens depicted in the plates—to the species level in most instances and wherever it was possible. He has also traced briefly what is known of their history. Bartram's "remarks," which accompany his drawings, are reproduced. The folio ends with a bib-

liography of some 250 titles, an index of scientific names, and an adequate general index. *William Bartram: Botanical and Zoological Drawings, 1756-1788*, is well worth its price.

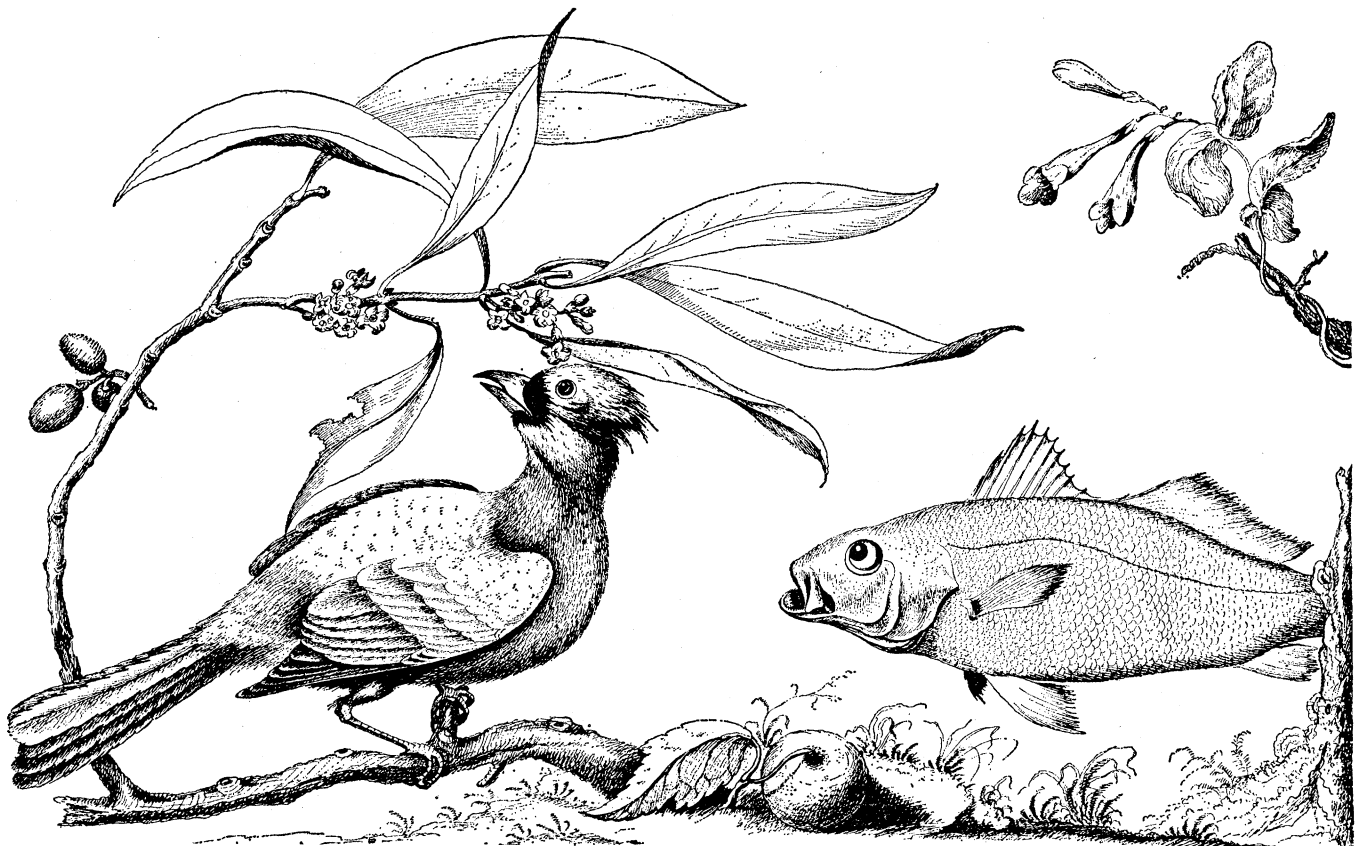
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The 18th-Century Darwin

The Essential Writings of Erasmus Darwin. Chosen, edited, and with commentary by DESMOND KING-HELE. Hillary House, New York, 1969. 224 pp. + 16 plates. \$7.

"[Erasmus] Darwin belongs with Leonardo da Vinci and Goethe," writes Desmond King-Hele, "in the small band of great all-rounders who excelled in both practical and theoretical work, in both literature and science." High praise indeed, but does the grandfather of Charles Darwin deserve it? Let us begin with literature. Erasmus Darwin was a popular poet in his day, one who influenced the verse of Coleridge, Wordsworth, and Keats, but the editor has not proven much more than that



Drawing dated 1772. Plants: left, *Osmanthus americanus* (L.) A. Gray, described by Bartram as "Olea Americana, Purple berr'd Bay of Cat[esby]"; center, "Wild Crab of North Carolina" (probably *Pyrus angustifolia* Ait.); upper right, the coral honeysuckle, *Lonicera sempervirens* L. The bird, *Richmondia cardinalis cardinalis*, Bartram labeled "red Sparaw or Red bird of America." No identification is offered of the fish. [From *William Bartram: Botanical and Zoological Drawings, 1756-1788*]

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 tide-pools 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