tempt for science. Indeed, what with petty disputes and missed opportunities and the loss of men and ships that seemed a mark of the expedition's leadership, the wonder is that anything was accomplished at all.

And yet, the great U.S. Exploring Expedition proved a considerable success. It established America's political and military interest in the Pacific and, by virtue of important contributions to knowledge, it also established the nation's claim to intellectual maturity. In fact, so great was the number of specimens brought back, a generation of scientific activity was required to analyze them. Publishing the results involved some of America's best talent—Asa Gray, James Dwight Dana, Horatio Hale, and Charles Pickering—though in a final piece of lunacy Congress authorized the printing of only a hundred copies. At the beginning the scientists had been powerless to control the shape and direction of the expedition, but a decade later, when it came time to make sense of the collections, Wilkes had no one else to turn to. By that process, the United States and its scientists gained a reputation. However, Stanton argues, the expedition's legacy was more than the careers it advanced or the institutions it created. At a time when democracy seemed to portend cultural mediocrity, the expedition proved that the life of the mind had found a place in American society.

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Colonial Science Elsewhere

Scientists in Nineteenth Century Australia. A Documentary History. ANN MOZLEY MOYAL, Ed. Cassell Australia, Melbourne, 1976. viii, 280 pp. Paper, $5.95 Australian.

Science played a major role in bringing the English to Australia. The justification for Cook's voyage can be traced back to 4 December 1639, when Jeremiah Hurrocks became the first man to predict the occurrence of and to observe the passage of Venus between the earth and the sun. Following on the suggestion of another Englishman, Halley, that transits of Venus could be used to determine the distance of the sun, the British awaited the subsequent transits of 1761 and 1769 with considerable national interest. Two expeditions were mounted to observe the 1761 transit; one party went to St. Helena, where observations were marred by clouds, and the other sailed for Sumatra but was waylaid by the French and never got there. Given that no further observations would be possible until 1874, even greater significance was attached to the 1769 expedition. Suffice it to note here that Cook was dispatched to the South Pacific, that he successfully observed the transit at Tahiti, and that on his way home he discovered the east coast of Australia.

In the book under review, patterned on Nathan Reingold's *Science in Nineteenth Century America* (Hill and Wang, 1964), social historian Ann Moyal outlines the course of Australian scientific history during the colonial period. Skillfully using excerpts from 140 documents from Australian and British archives, she captures the essence of this hitherto neglected subject. The accompanying text and notes, which constitute a third of the volume, serve as an excellent primer for those unfamiliar with the details of the local situation. Historians of science will be interested in the specifics of the Australian chronicle and the contrasts and parallels that may be drawn between the Australian experience and that of other areas. Far from entering a *terra incognita*, readers will find they are already familiar with many of the scientists discussed.

Australia's early years as a convict-emancipist society were not conducive to the development of a resident scientific community. The continent remained, as visiting geologist J. D. Dana noted, "a grand place for Scientific Exploration." Other scientific visitors included botanists—Joseph (Botany Bay) Banks, Robert Brown, and William and Joseph Hooker—and zoologists—Charles Darwin, Thomas Huxley, and John Gould. The significance of the "colonial interludes" of these scientists has sometimes been underestimated, and Moyal's volume will begin to redress the balance. Darwin, for example, held that J. Hooker's *Flora Tasmaniae* was "the greatest buttress to the theory of evolution"; and Huxley's scientific career began, by his own admission, in Australian seas. Still others, like Richard Owen, built reputations on specimens shipped "home" from Australia. Moyal makes extensive use of the correspondence between these biologists and the gifted naturalists who aided them in their explorations of the Australian "never-never."

One of the most fascinating figures of this period is the zoologist W. S. Macleay. Trained at Cambridge and in Cuvier's laboratory, Macleay had gained a considerable reputation in the 1820's, before moving to Sydney, for his Quinary system of classification. Whether his systematics motivated Darwin's barnacle studies remains debatable. It is clear from Moyal's account, however, that he had a major impact on Huxley's scientific development at a critical time in the latter's career. In 1850, a year after returning to England, the young Huxley wrote to Macleay, "In England there is nothing to be done—it is a most hopeless prospect," and sought his help in securing the new University of Sydney's projected natural history chair. We are left wondering what would have happened to Darwin had his "bulldog" emigrated.

Around the middle of the 19th century we see a growing self-confidence among colonial scientists. Moyal traces the development of regional Royal Societies, universities, astronomical and meteorological observatories, geological surveys, and herbaria and museums. She illustrates the antipodean challenge to the hegemony of English scientists and their institutions with a series of examples. In botany the debate is between Hooker and the Victorian botanist Mueller over the authorship of the *Flora Australiensis*; in geology it involves the British Museum and the National Museum of Victoria and concerns the disposition of the Cranbourne meteorites; in paleontology, Australian Museum zoologist Krefft disputes Richard Owen's reconstruction of the "marsupial lion" *Thylacoleo* as a leonine carnivore (holding, possibly correctly, that the animal was a vegetarian).

Moyal goes on to illustrate the rise of science in the new universities and focuses on the careers of physicist William Bragg, chemist David Masson, and physiologist J. T. Wilson. She concludes her excellent survey by discussing three scientists who worked outside academia: physicist William Sutherland (of the Sutherland constant), wheat breeder William Farrer, and aeronautical engineer Lawrence Hargrave. Hargrave was a remarkable inventor whose curved wing surfaces cropped up, though unacknowledged, in the Wright brothers' successful plane. Clearly, by the end of the century, Australian scientists had begun to overcome the tyranny of distance and assume their true positions around the international table of science.

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