low on the social ladder, by large and small business enterprises, and by individual settlers. In the process, a resource-intensive economy developed along with a belief that American natural wealth was inexhaustible. The latter perception resulted in prodigality. It is a sad tale because of the waste and because, as William K. Wyant observes, "Maldistribution of the public lands has a profound persistent social and economic impact."

To the extent that Wyant and Craig W. Allin relate the early history of land disposal, they merely rephrase and summarize the scholarship of Vernon Carstensen, Paul W. Gates, Roy M. Robbins, and other historians. Their important contribution is in their description and analysis of issues and events in the recent history of public natural resources. Allin concentrates on wilderness preservation, accomplishing for the political history of that subject what Roderick Nash did for the intellectual history of wilderness in America. Wyant's focus is on land disposal in general, including mineral, timber, and grazing lands. The literary styles of the two books differ markedly. Allin's chronological narrative is a sober and lucid legislative and administrative history. Wyant, a journalist, chose a topical approach, but his topics are not always discrete. Often he reaches too far for a metaphor or allusion; for example, concerning Interior Secretary Krug's statement about the degradation of grazing lands he writes, "Krug's statement was another alarm bell that went unheard. The same kind of report was being made a quarter century later, haunting and familiar, like the 'On the Trail' part of Grofé's *Grand Canyon Suite* played by a high school band." Both writers close with a description of the Alaska land settlement.

Neither writer clarifies the role of scientists and engineers. There is almost no mention of them in the pages of *Westward in Eden*, except for an occasional passing reference to obvious figures such as John Wesley Powell, Gifford Pinchot, and William Pecora. On this matter Allin's work is not much more illuminating. He states that George Perkins Marsh's *Man and Nature* (1864) "placed science on the side of forest preservation." Ferdinand V. Hayden's expedition of 1871 returned with photographs of Yellowstone, and Hayden may have helped to write the legislation making it a park. The American Association for the Advancement of Science, meeting in 1873, heard a paper by Franklin B. Hough entitled "On the duty of governments in the preservation of forests." The Association passed appropriate resolutions that resulted in a bill in Congress to create a forestry commission. Hough was the first commissioner of forestry. He and his successor, Bernard E. Fernow, along with Charles S. Sargent of Harvard, were instrumental in preserving a part of the Adirondacks. The American Forestry Congress and the AAAS lobbied for the Forest Reserve Act of 1891, and a report by the National Academy of Sciences stimulated the creation of new forest reserves by President Cleveland. Anthropologists supported passage of the American Antiquities Act of 1906, a significant law because of the broad powers it granted conservation-minded presidents from Theodore Roosevelt to Jimmy Carter. The Ecological Society of America advocated wilderness reserves for scientific study, a position endorsed by the AAAS in 1921, but when the National Park Service created such reservations it received "no particular support from the scientific community," and they were abolished. Aside from such scraps of information, Allin leaves us in the dark about the place of science in the history of conservation, although according to a widely accepted historical interpretation technical experts were chiefly responsible for conservation during the Progressive era, and although the Wilderness Act of 1964 defines a wilderness area as an area containing "ecological, geological, or other features of scientific, educational, scenic, or historical value." Wyant and Allin do deal with government agencies employing scientists and engineers, but the agencies are treated as political, not scientific, institutions, and the influence of science is not factored in to explain their behavior. The omission leaves an impression that scientific considerations were of no importance in the political process, only economic, recreational, and esthetic concerns.

Both Allin and Wyant conclude that recent events signaled the end of an older governmental policy to dispose of the public domain and the beginning of a policy to protect it. Allin stands somewhat in awe of the achievements, accomplished so quickly, given the usual sluggishness of the congressional system. Wyant worries more about weaknesses in federal environmental protection and about raids on the public domain by "sagebrush rebels" and mineral claimants taking advantage of the archaic Mining Law of 1872. Allin's thoughtful explanation of why he believes present wilderness areas are likely to remain intact deserves quotation at some length. "If Americans adhere to the concept of spaceship earth, then wilderness will be cherished for its naturalness and for its ability to preserve ecological systems. It will be preserved as a symbol of the natural order to which we must adapt our civilization. If, on the other hand, Americans see science as savior, the anticipated technological fix will make it unnecessary to give serious consideration to plowing up our protected wilderness. The economic gain potentially available by doing so will appear insignificant compared to our ever-increasing ability to accomplish what we want by technological means."

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A Scottish Mathematician

The Collected Letters of Colin MacLaurin. STELLA MILLS, Ed. Shiva, Nantwich, Cheshire, England, 1982 (U.S. distributor, Birkhäuser, Boston). xx, 496 pp. $35.

Historians of mathematics have long asked why the differential and integral calculus made little headway in the British Isles during the 18th century, even though Isaac Newton, an Englishman, was one of its inventors. No single satisfactory explanation has emerged, although a rigid adherence to Newton's inferior notation and a preference for geometry over analysis are the most likely candidates. An alternative approach has been to point out exceptions to the general rule. In this approach Colin MacLaurin appears as the most notable exception.

MacLaurin's advocacy of Newton's mathematics and methods went well beyond a mere popularization of Newton's ideas, a fact that was well recognized on the Continent. In 1722 MacLaurin traveled to France, where in 1724 he won the prize of the Royal Academy of Sciences for an essay on the collision of bodies. The mathematicians at the French Academy, Clairaut, Maupertuis, and Dortous de Mairan, waited impatiently for his *Treatise of Fluxions* (1742) to appear (Jean d'Alembert used it in his famous *Traité de dynamique* of 1743), and they corresponded at length with him over the vexing question of the shape of the earth. Thus MacLaurin was a key figure not only in the development of the calculus after the *Principia* but also in the transfer of mathematical ideas between Britain and the Continent.

Now with the collecting and editing of MacLaurin's correspondence completed

we will be in a much better position to investigate his mathematical activities and judge his broader role in the French and Scottish Enlightenment. The majority of the letters in this volume were collected by John C. Eaton, who died in 1972 before completing the editorial project. Stella Mills has added numerous additional letters, has edited them all knowledgeably, and has provided translations where necessary. She has also included a brief historical introduction. The book is easy to use and will be a great boon to historians of 18th-century mathematics.

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Arachnids

Biology of Spiders. RAINER F. FOELIX. Translated with revisions from the German edition (Stuttgart, 1979). Harvard University Press, Cambridge, Mass., 1982. x, 306 pp., illus. $30.

The approximately 30,000 species of spiders that make up the largest and most commonly encountered arachnid order are surprisingly diverse in and well adapted to most terrestrial habitats. Despite this, they have received comparatively little attention and are only poorly known by most biologists. This may be in part because most books devoted to the group have focused extensively on taxonomy and natural history and have treated other aspects of spider biology only cursorily. It is this deficiency that Foelix attempts to remedy.

The book is a solid introduction and reference for persons interested in spiders. Chapters on functional anatomy, metabolism, neurobiology, development, ecology, and phylogeny and systematics follow an introductory chapter in which basic features and classification are presented and a profile of five common families is provided for perspective. The book is clearly written, well integrated, and enhanced by an impressive number of illustrations, many of which have previously appeared only in its German edition. The book's 180 figures contain 17 graphs, 182 diagrams and drawings, 65 photographs, and 108 light, transmission electron, and scanning electron micrographs. A list of 563 references provides an effective introduction to the literature.

The reader is shown a world in which some effectively blind inhabitants instantaneously transform protein solution into stable strands twice as elastic as nylon and, using legs operated in part by hydraulic pressure, fashion this silk into often species-specific webs used to snare prey and, eventually, as an instrument for vibratory courtship. Still other members of this exclusively predatory world see prey at distances of 40 centimeters and use tetraocular vision to stalk it.

Remaining detailed and conclusive, the book yet conceals neither the many unresolved facets of spider biology nor the potential use of spiders as tools for investigations in various disciplines. For example, mechanical and evolutionary problems inherent in coupling of intricate male and female genitalia become evident, as do metabolic problems associated with transferral and activation of sperm stored in a quiescent state by both sexes.

The chapters on ecology and on phylogeny and systematics include, as the author notes, only selected aspects and do not, as the others do, present more comprehensive treatments. In the case of phylogeny and systematics this is probably appropriate, but a more complete discussion of ecology seems warranted. However, many aspects of the subject are treated in other chapters, and a reader is provided with a well-balanced view of spider biology.

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