sive firms. He finds no evidence of economies of scale justifying IBM's size—although it should be noted that customers gained what competitors lost from the shift in risk and protracted cash flow associated with leasing. IBM's "plug incompatibility" tactic, designed to segment its own markets as well as combat manufacturers of plug-compatible peripherals, has resulted in what DeLamarter depicts as a systems network architecture "mess" of incompatible IBM components. By manufacturing its own semiconductor chips, IBM has denied non-integrated U.S. chip manufacturers experience that he contends gave an important advantage to integrated Japanese manufacturers in outstripping the U.S. industry. Though IBM is less efficient and progressive than the leading Japanese computer firms, DeLamarter nevertheless thinks it possible that IBM will come to dominate the world market through the same tactics that proved so successful at home. Given the growing importance of information processing throughout the economy, he concludes that IBM's market power poses a severe political as well as economic threat.

This book is not the definitive study of IBM, or of appropriate public policy toward that firm and the information industry. It does not, in my opinion, make an adequate assessment of the competition that can be expected in the future from foreign as well as domestic computer manufacturers. DeLamarter's assertion that barriers to reentry into various segments of the industry are and will remain high enough for the continued success of IBM's past tactics is neither substantiated nor convincing. By and large, the analysis is not rigorous where rigor is needed for thorough comprehension, most probably as a concession to the archetypal "general reader." But it is a knowledgeable, perceptive, and significant contribution to our understanding of a firm and an industry that will continue to pose major problems for public policy.

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American Naturalists

The Eagle's Nest. Natural History and American Ideas, 1812–1842. Charlotte M. Porter. University of Alabama Press, University, AL, 1986. xiv, 253 pp., illus. $24.95. History of American Science and Technology Series.

The editor of a new series in the history of American science and technology presents this first volume as "a splendid picture of scientific endeavors and the American state of mind in the first third of the nineteenth century." So it is, in the same sense in which one may discern splendor in Edward Hicks's *Peaceable Kingdoms*, a succession of canvases analysis of which commands the final chapter of the book. Like them the book abounds in curiosa, queer juxtapositions, seeming irrelevances. And there is more in both than first meets the eye.

In response to Buffon's observation that the New World environment—too hot, too wet—was deleterious to life (though the slander informs every chapter of this book, Antonello Gerbi's magisterial study of it, *The Dispute of the New World*, somehow goes unmentioned), American naturalists organized themselves in societies for the purpose of classifying the native flora and fauna. Focusing particularly though by no means exclusively on Philadelphia's Academy of Natural Sciences, for some years after its founding in 1812 the most vigorous and fruitful of the societies, the author examines the ensuing three decades of transition in American natural history—from the heyday of the individual field naturalist busily affixing labels to new species and genera, his labors usually privately funded, to the emergence, all within a decade, of the Corps of Topographical Engineers, the United States Exploring Expedition, and the Smithsonian Institution and with them the professional, "closet" investigator working in the laboratory on specimens gathered by collectors in the field. Like the contemporary craftsman confronted by the emerging factory system, the field naturalist became an employee. Institutional collections absorbed his cabinet of curiosities and peer review closed off his access to publication. Arrested careers and broken reputations resulted.

At a time when natural history's first concern was taxonomy, the field investigator fell because, necessarily without reference collections and type specimens at hand, he tended to multiply species. Nomenclature ran amok. By thus subjecting American science to ridicule, the field investigator offended the nostrils of the "closet" scientist jealous for its reputation. (Itself a response to Buffon's slander, that jealousy receives little notice here.) When game was scarce Titian Peale and Thomas Say dined on hawk where Asa Gray would gather plants from a railroad car bearing wife and cook. To the unfortunates done in by peer review the author accords her full sympathy, fixing the while a baleful eye on her chosen type specimen of the new professional, Asa Gray.

To dramatize her account the author makes the most of the tension between Philadelphia's Academy, rapidly succumbing to peer review, and those of its members—including its financial angel, the geologist William Maclure—who, deriving a social science from natural history, became "Industrious Producers" at Robert Owen's New Harmony establishment. The stage chosen is really too small to support the cast, and the book would have benefitted from a firmer editorial hand (for byways of fact and interpretation abound). Though it fails to shed sustained light, however, it does throw off a succession of scintillations.

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Webs and Web-Builders

Spiders. Webs, Behavior, and Evolution. William A. Shear, Ed. Stanford University Press, Stanford, CA, 1986. xvi, 492 pp., illus. $55. Based on a symposium, Knoxville, TN, 1981.

For spiders, webs provide an answer to the question of how to catch prey. For arachnologists, they provide questions about spider behavior, ecology, and systematics. A 1981 symposium provided 16 arachnologists with an opportunity to answer some of these questions. Expansions of their papers form this book's 13 chapters, each of which summarizes the framework, findings, and current directions of a line of research. Within this broader context, most focus on their authors' own research, and together they address four major issues: the evolution of different types of spider webs; the construction, use, and dismantling of webs; web architecture, prey-capturing abilities, and placement; and the importance of webs in mediating spider sociality. Many chapters discuss several of these issues. Persons unfamiliar with spiders will find the book's taxonomic glossary a helpful introduction to the distribution and natural history of all genera and families mentioned in the text.

This volume introduces many new questions. For example, Carico asks, "How does a spider take down its web?" He shows that two methods may be used, one that completely destroys the web and another that simultaneously establishes the framework for a new web.

Coyle demonstrates that even primitive spiders use silk threads to detect prey passing near their burrows and that others extend the silk lining of these burrows to form sheets that both detect and hinder the passage of a prey. The spinning apparatus of more advanced spiders permits them to add sticky capture threads to their webs. Shear suggests that selection for cost-effective placement of these threads led to the familiar wagon-wheel-like aerial orb-web.

On the basis of their spiral capture threads, two types of orb-webs can be distinguished. Lubin describes the webs and prey capture behavior of spiders that employ dry, fuzzy capture threads, and seven chapters treat those that use viscous capture threads. Since the 1800's arachnologists have argued the relationships of these two types of webs. Coddington provides the most comprehensive analysis of the issue to date. His cladistic analysis includes both morphological and behavioral characters and shows that the orb-web evolved only once and is not, as some have suggested, convergent.

Such orb-web features as diameter, sticky spiral spacing, and number of radii are often species-typical, but even within a single genus they may vary greatly in ways not explained by spider size. Eberhard uses both modeling and field studies to show that these web parameters are not independent of one another and that orb-webs do not act as passive sieves. The spacing of a given length of capture thread influences the length of framework and anchor threads as well as the behavioral cost of producing the web and its ability to intercept and hold prey. Thus, design constraint, construction cost, and capture efficiency appear to adapt each species' web to a particular type of prey.

Web vibrations produced by a struggling prey alert a spider to a catch. Masters, Markl, and Moffat show that an orb-web transmits effectively only lower-frequency vibrations such as those produced by a buzzing fly. This differential attenuation of vibrations together with the sensitivity of the spider's receptors may determine its response to web vibrations.

Despite its efficiency and intricacy, the orb is not the pinnacle of web evolution. Lubin describes a member of an orb-weaving family that spins only random, sticky threads and uses these much like fishing lines. Stowe describes another spider that simply hangs from a silk scaffold waiting with spread legs for male moths that are attracted to its odor, thinking they are flying to a pheromone-emitting female moth. Even jumping spiders, known for their active prey capture, show evidence of a sedentary, web-using ancestry. Jackson shows that one primitive jumper can still spin and use an elaborate web and can also invade an orb-web, feed on its owner, and then use the web to capture other prey.

Two chapters evaluate the importance of physical features and prey abundance in determining where a spider will place its web, how long it will remain at the site, and how it will fare. Janetos shows that both random and successional events cause greater variability in the prey caught by an orb-web than by a sheet-web. This and the lower cost of constructing an orb-web suggest that orb-weavers should demonstrate less web-site tenacity than sheet-weavers. Riechert and Gillespie find that as desert funnel-weavers grow, competition for suitable web sites increases radically and females that occupy the small percentage of sites that offer both thermal protection and high insect densities have much higher reproductive success.

In spiders sociality has been observed only in web-builders. Uetz describes an orb-weaver whose colony size and web spacing are determined by prey density. Larger colonies have greater prey-capture efficiencies, although a spider's position in the colony influences the number and size of prey it is likely to catch. Each of these spiders spins and uses its own web, although Tietjen considers another colonial species whose sheet-weaving members share the construction of a large, communal web and the prey this web captures.

Shear introduces this volume by stating that it is "a book of questions." I have focused here on some of the significant new answers that it provides. However, many chapters also make important contributions by more clearly organizing and carefully asking questions that will catch the interest of many readers.

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Chinese Geology

The Geology of China. Yang Zunyi, Cheng Yuqi, and Wang Hongzhen. Clarendon (Oxford University Press), 1986. x, 303 pp., illus. $79. Oxford Monographs on Geology and Geophysics, no. 3.

The last book in English with this title (by Li Siguang, also known as J. S. Lee) was published in 1939. Since then not only have tremendous efforts been expended on Chinese geology, it has become recognized that there are many features of the geology of China that are both distinctive and of great global significance. The effects of the active collision of the Indian continent, although spread over much of Asia, are most spectacularly developed in China. China and Southeast Asia have been assembled by microcontinental and island arc collisions over the last 250 million years, so China is one of the best places in the world to study how continents form—a process that was largely complete in North America a billion years ago. Moreover Chinese sedimentary basins are sufficiently distinctive that they were recognized by A. Bally as a separate class, and petroleum geologists in all countries have learned from their Chinese colleagues during the last 15 years that lake beds can be important sources of oil and gas.

The Geology of China is basically an advanced general textbook and as such provides a broad background for foreign geologists interested in these and other distinctive features of Chinese geology. Readers should be warned that using the book effectively requires supplementary material, such as the Geological Map of the People's Republic of China published by the Chinese Academy of Geological Sciences (Beijing, 1976) and a good Pinyin gazetteer or first-class atlas, as well as patience and skill because of a condensed style.

The first few pages give a brief account of the development of Chinese geology in both ancient and modern times. We are told of the existence in 700 B.C. of a copper smelter that produced a ton a day (though not of the rumored 1-kilometer-deep gas well drilled in 200 B.C.). This introduction is followed by several pages on China's unusual relief features and drainage systems. About one-third of the drainage is internal; most of China's sea-reaching rivers drain to the Pacific, but some Tibetan and Himalayan rivers flow to the Indian Ocean, and a tiny area in the northwesternmost part of the country drains to the Arctic.

Two-thirds of the book deals with stratigraphy. There is a brief introduction by Wang Hongzhen on stratigraphic principles, including a map identifying distinct stratigraphic regions. This raises an interesting point about Chinese stratigraphy. What is now China was formerly in six to ten separate blocks (some of them parts of Gondwanaland). Thus systems such as the Devonian, which were coherent units elsewhere, were not yet in one piece in China. This fact is ignored here, and the question of how and when China was assembled is deferred to later chapters.

Cheng Yuqi discusses the Chinese Archean, most of which outcrops within the North China block. Gneiss-granulite associations dominate, although high-grade metamorphic equivalents of greenstone belt rocks are present. Numerous isotopic ages, mostly determined in Chinese laboratories, including several in excess of 3 Ga, are reported. Wang Hongzhen writes on the