

not a utilitarian argument, though attempts to defend this position would often default into arguments of utility. The problem with arguments of utility in this context is that it is much easier to document the utility of fresh water to a large urban population than it is to document the utility of an unblemished scenic view to a handful of day-trippers.

Driving the conflict was industrial Manchester's unquenchable appetite for more water. This was being driven by industrial growth, but also by sanitary reform. A common story throughout industrializing Britain is that the introduction of piped water and water closets and, later on, the addition of more taps and modern appliances led to a huge jump in per capita usage that prompted the search for more and more supply, pushing municipal governments far into their hinterlands. The book traces such developments driven by Manchester's thirst from the Longendale Scheme of the 1840s (in the Pennines) and provides regional context through comparisons to Glasgow's use of Loch Katrine and Liverpool's Vyrnwy reservoir in Wales.

The two main actors in this struggle were the Thirlmere Defense Association (TDA) and the Manchester Corporation and its Waterworks Committee. The conflict is very detailed, and we are introduced to key players on both sides. The most effective arguments against the reservoir were aesthetic and intangible, leading to emotionally laden claims about history, morals, beauty, and the corruption of industrial society. This, to Ritvo, along with the extralocal and international support for the TDA, is evidence of a new kind of environmentalism: "The deeper opposition to the Thirlmere Scheme rested on claims that were absolute, novel, and difficult to assess. It invoked a nebulous new sense of ownership—a sense that the citizens of a nation should have some say in the disposition of significant landscapes even if they held no formal title to the property in question" (p. 104).

This is an important and interesting study of a conflict that has long demanded more attention. But I am not a fan of the title, nor of the comparisons to the damming of Hetch-Hetchy in Yosemite National Park in the United States. Briefly, San Francisco's arguments in favor of damming were backed up by the earthquake and fire of 1906. Two other major demarcation points are that even though the valley was dammed, the debate led to the 1916 National Parks Act prohibiting further development of that kind in the parks, and that the Sierra Club was positioned to be one of the most powerful and vibrant environmental organizations of the twentieth century. Whether the Thirlmere epi-

sode represents the "dawn of green" is less clear when one considers that later efforts of resistance to development modeled on the TDA "usually ended in failure" (p. 161). Even within the Lake District, resistance to the later Haweswater scheme was much more subdued and less effective. And as the author points out, "Tucked into the middle of most articles was an acknowledgement of the early resistance, which was then dismissed as misguided in either its judgment . . . or its priorities" (p. 172).

Aside from the above concerns, this is a finely written, well-researched, and compelling narrative. The debates over afforestation in the land controlled by Manchester add another interesting element to the story and the evolving views of what was natural, what was scenic, and what was progress. In the end, the TDA was much less influential than other groups, like the National Trust (founded in part by former TDA members) and the Commons Preservation Society, but the episode was significant in raising consciousness of the importance of preservation and conservation in England.

MATTHEW OSBORN

Pedro Ruiz-Castell. *Astronomy and Astrophysics in Spain (1850–1914)*. xii + 316 pp., illus., tables, bibl., index. Newcastle: Cambridge Scholars Publishing, 2008. \$59.99 (cloth).

Thinking of going on a tour in the south of Europe? Some late Victorian amateur men of science undertook what was seen, in those days, as an adventurous but affordable trip, compatible with their intellectual curiosity about one of the most popular sciences of all times: astronomy. In this book, Pedro Ruiz-Castell takes us on a tour to late nineteenth- and early twentieth-century Spain, a tour that culminates with two expeditions to observe total solar eclipses in 1900 and 1905. On the way, we become acquainted with the social, political, religious, and institutional intricacies that shaped the face of astronomy and astrophysics in that country. We also get a glimpse of the very troublesome history of Spain during the nineteenth century, culminating with the loss of the last colonies (Cuba and the Philippines) in 1898. In the context of the collective national depression that these events triggered, two eclipses whose path of totality could be seen in parts of Spain were used as a means to export and import scientific tools, skills, and prestige.

In the first part of the book the reader learns about the establishment of brand new astronomical institutions and observatories in Spain dur-

ing the nineteenth century. Making use of an overwhelming wealth of archival material available only to readers of Spanish, Ruiz-Castell describes the processes by which these new institutions were created: the central observatory in Madrid, the independent and amateur observatories funded by local philanthropists, the observatories created by the Company of Jesus, and some university observatories. In all cases, the need was felt to promote science in general, and astronomy in particular, as a way to enhance national patriotism, since there was a strong awareness of the poor state of Spanish science. The problems confronted in the founding of these observatories and the establishment of clear research projects for them, however, reflect the tensions between those who thought of the new institutions only as tools for national propaganda and those advocating serious scientific research. The latter often faced great difficulties in pursuing their agenda owing to the shortage of funds and of skilled personnel.

The second half of the book describes the international, national, and local expeditions to observe the solar eclipses of 1900 and 1905 on Spanish soil. These events were used, by foreign and Spanish teams alike, as a way to boost their international reputation and to foster long-lasting connections. Ruiz-Castell invites us to take part in the collective frenzy of those days by giving detailed accounts of some of these expeditions (instruments used, personnel, observations to be undertaken), as well as describing the local arrangements and the hospitality extended to celebrate the event (including a special bull-fighting festival and a royal visit to Burgos).

Astronomy and Astrophysics in Spain (1850–1914) is very well documented and adds substantially to the meager bibliography on Spanish science written in English. The establishment of the STEP (Science and Technology in the European Periphery) group over a decade ago has triggered the production of a new wave of high-quality scholarly research on the history of science in the European periphery and has helped channel the aspirations of a young generation of scholars working in this field. Ruiz-Castell's book is one result of such encouragement to scholarship. As he says in the prologue, however, the book presents his Oxford University doctoral dissertation with only minor changes. It would have benefited from major reworking, to save the reader from unnecessary lists of names, places, and dates that add very little to the narrative. He might also have avoided taking for granted connections that he mentions, but that he does not justify, such as the relationship be-

tween industrialization and the development of science in certain Spanish regions or the tensions between observatories founded by the state and those established by religious orders—a tension that he takes for granted but that is never discussed in the narrative of the book.

JAUME NAVARRO

Cyrus Schayegh. *Who Is Knowledgeable Is Strong: Science, Class, and the Formation of Modern Iranian Society, 1900–1950.* x + 340 pp., bibl., index. Berkeley/Los Angeles: University of California Press, 2009. \$49.95 (cloth).

The history of modernism in Iran has been the topic of numerous publications. In the majority of these studies, however, a focus on the political and intellectual aspects of modernism has overshadowed the social consequences of an underlying process originating from the introduction of modern science and technology. In fact, in the study of the changing society of Iran from the mid-nineteenth century, especially during and after the Persian Constitutional Revolution (1905–1911), issues such as intellectualism, obstacles to the establishment of democracy, the interaction between secularism and religion, modern literary movements, women's movements, human rights, and so forth have been at the center of attention. The history of modern science and technology in Iran has been marginalized, and despite the appearance of historiographical studies that treat other aspects of modernism, those that focus on science have been few.

With this book, Cyrus Schayegh presents one of the most extensive monographs to date on the history of biomedical sciences in Iran in the first half of the twentieth century and their impact on the reformist movement in the country. The main title of the book—*Who Is Knowledgeable Is Strong*—a translation of a line from Iran's famous poet Ferdawsi (tenth–eleventh century), cleverly asserts Schayegh's central argument about the class-forming role of science (in this case, biomedical science) in modern Iran. Schayegh seeks the actors responsible for the adaptation of modern biomedical science in Iran, discusses how modern science in general was assumed to form the cultural and economic capital of a newly rising middle class, clarifies how the members of this middle class saw utilizing modern science as imperative for making a modern society after the Constitutional Revolution, and, most fundamentally for his purposes here, argues that biomedical sciences received the critical recognition in building modern Iran.