perspective that attends to matters of race, class, and gender.

While the essays on the whole show that gender analysis has provided important insights in science, some fall short in explaining how these insights might be used to bring about transformation or minimize biases. For example, Lori Hager catalogues gender biases in archaeology and the sexing of skeletons, but there is less discussion about how bias might be addressed. Hager argues that archaeologists need to "let skeletons tell their own stories" (pp. 76–77) rather than imposing modern-day assumptions and stereotypes on them. Yet this solution seems unlikely, insofar as skeletons and other data are observed through theory-laden models and interpreted by humans. Similarly, Tatiana Temm provides an engaging account of how Volvo designed a car to address the needs of women consumers and ended up with a vehicle that was also appealing to men (pp. 131–149). There is little analysis, however, as to why this happened or of the implications for how gender can influence engineering. Were the innovations made in designing the car related to the fact that all the Volvo engineers working on the project were women? Did alternative research questions and solutions emerge because the designers focused on women consumers? Did the design of the car shift because engineers had previously unconsciously focused on the needs of male consumers? Are women just pickier consumers—so that, when their particular needs were addressed, the resulting car appealed to everyone? Without further analysis, it is not clear what lessons should be learned from this particular case or how those lessons might be used to generate future successes.

Even without the answers to all of these questions, however, *Gendered Innovations* provides a comprehensive account of a variety of ways in which scientific understanding has been enhanced by gender analysis. The readings advance debates about gender and science for a multidisciplinary audience of historians of science, feminist scholars, and scientists.

KRISTEN INTEMANN

Sreeramula Rajeswara Sarma. *The Archaic and the Exotic: Studies in the History of Indian Astronomical Instruments*. 319 pp., figs., index. New Delhi: Manohar, 2008. $19.88 (cloth).

The Archaic and the Exotic is a collection of fifteen essays by S. R. Sarma on Indian astronomical and time-measuring devices. Most were originally published in the 1990s. The author has not changed the original essays, apart from referencing his own articles.

As suggested by the title of the book, Sarma has divided the Indian astronomical instruments into two categories: the archaic and the exotic. The archaic category includes the original Indian instruments that were described in the *yantra* (instrument) chapters of the Sanskrit astronomical texts. Astrolabes and celestial globes, which are of Western origin, belong to the exotic category. The fifteen articles are grouped under four headings: "The Context" (articles 1–4), "The Water Clock" (articles 5–8), "The Astrolabe" (articles 9–13), and "The Celestial Globe" (articles 14 and 15).

In the first article, written in 1994, Sarma announces his grand project of cataloguing Indian astronomical and time-measuring devices that are scattered throughout the world. After fifteen years of research, it seems that he is nearly ready to publish a catalogue of about four hundred instruments. In the second piece, the author provides textual evidence for Indian "perpetual motion" devices that traced back to Brahmagupta's *Brāhmasphuṭasiddhānta*. The third article, "Perpetual Motion Machines and Their Design in Ancient India," elaborates on the same topic. The fourth essay, "Astronomical Instruments in Mughal Miniatures," interprets the eleven paintings that depict astrologer/astronomers' activities in the Mughal court. I was most impressed by the miniature of the astrologers casting the horoscope of Jahāngīr, the fourth emperor of the Mughal Dynasty. Four astrologers, two Hindus and two Muslims, are depicted working together to draw an accurate horoscope for the newborn prince. Sarma identifies the two Hindus as Nīlakaṇṭha and Kṛṣṇa Daivajña, who were well known for their works on astronomy. This painting provides very convincing evidence that Hindu and Muslim scientists collaborated in the early Mughal period.

The fifth article, "The Bowl That Sinks and Tells Time," was originally published in the popular *India Magazine*. Perhaps because of the nonacademic nature of this magazine, no bibliographical references were provided. Readers unfamiliar with the topic may be left to wonder as to the source of the interesting words of I-Tsing. It is only in footnote 6 of the next article ("Announcing Time: The Unique Method at Hayatnagar, 1676") that they will learn that the quotation came from J. Takakusu's English translation, *A Record of the Buddhist Religion as Practised in India and the Malay Archipelago* (p. 146). In fact, the original Chinese text can be found in the *Taisho Tripiṭaka* (Vol. 54, p. 226, col. 1).

The seventh article, "Measuring Time with Long Syllables," presents an exemplary, beautiful aspect of Indian sciences—the synthesis of science and literature. Sarma himself is one of those individuals, rare in modern times, who is well versed in both fields. The eighth article, "Setting Up the Water Clock for Telling the Time of Marriage," was originally published in 2004 and is the most recent of the fifteen essays in the book. This article is another example of the beautiful harmony of science and literature in India, perpetuated thanks to writers like Sarma.

The rest of the articles are mostly technical descriptions of instruments, namely astrolabes and celestial globes. It is noteworthy that a large number of these instruments were produced by a few members of a family in Lahore. Following in the footsteps of the patriarch, Allāhdād, whose first astrolabe was dated 1567, six individuals belonging to three successive generations produced more than a hundred instruments. Thus the title of the tenth article is "The Lahore Family of Astrolabists and Their *Ouvrage*."

Many photographs of instruments appear in these articles. However, the resolution of some of them is poor. Readers would benefit from better photographic quality as they read through the detailed technical explanations of these instruments. Enlargements of details of some the photographs would have been especially useful to help readers grasp the special characteristics of the instruments. For example, although Sarma has provided an English translation of the plaque describing a Sanskrit astrolabe (Fig. 11.4), the text is unreadable because of its poor quality.

Given that the book is a collage of independent essays, it is not surprising that some topics recur frequently. One minor quibble: I found a discrepancy in two articles published in the same year (1994) in the same journal. The number of astrolabes made by Muḥammad Muqīm is reported as thirty-seven in article 10 (p. 205) and as thirty-two in article 14 (p. 279). Sarma should have rectified this inconsistency.

These problems do not detract from the value of the book. This is the best companion book to the history of Indian astronomical instruments.

MICHIO YANO

Jakob Vogel. *Ein schillerndes Kristall: Eine Wissensgeschichte des Salzes zwischen Früher Neuzeit und Moderne*. 522 pp., bibls., indexes. Cologne: Böhlau Verlag, 2008. €64.90 (cloth).

What is salt? Sodium chloride (NaCl)? Decades of industrial and economic history would suggest that salt has always been a chemical compound. Salt simply *is* NaCl. But Jakob Vogel considers the chemical definition limiting. *Ein schillerndes Kristall* is a tour de force of social history that deconstructs the object—not merely to undermine prior economic *history* but to construct new *histories* of an object. Salt, in Vogel's sharp analysis, was NaCl for some, "essence" of mineral baths for others, medication for still others, and kitchen spice for many more. Drawing in part on Thomas Gieryn's theory of boundary-work, Vogel argues that the identity of salt depended on a discourse among important social groups, each with its own interests, in which early chemists and progressive state bureaucrats were leading but not the only major voices. The "chemical revolution" in salt met resistance at every turn, and the *Hausfrau* purchased her cooking salt when it looked and tasted a certain way, not when the seller claimed that it was chemically pure.

Vogel has scoured select archives and libraries in Berlin, Halle, Vienna, and Linz to expose a disjunction between chemistry and salt production in Prussia and Austria over the course of the eighteenth and nineteenth centuries. The result is a book in five chapters, each a case study of competing interests and the contested definition of an object. Chapter 1 illustrates the difficulty that a learned physician and chemist, David Becher, had in promoting a new evaporation technology and purer product (*Sprudelsalz*) in the famous spa town of Carlsbad. The support of an Enlightenment-minded empress notwithstanding, Becher met fierce resistance from local bath masters, apothecaries, and the citizens. Only after two decades of struggle and ingratiating himself with the local community could Becher claim a niche for his "chemical salt."

Chapter 2 follows the fate of salt makers as the state took over production. Particularly for Prussia after 1790, Vogel sees an attempt to graft the same model of enlightened management and science over salt that had been implemented in mining and metallurgy. But salt springs were unlike rock stratifications, and there was precious little on salt taught at the Freiberg Mining Academy. Abraham Werner's geognosy did not explain the origin of salt springs or formations particularly well, and boring technology came to salt relatively late (the 1850s). Vogel concludes, contrary to canonical economic historians (David