

Brief Reviews of Books

Pathways into the Study of Ancient Sciences: Selected Essays. By DAVID PINGREE. Edited by ISABELLE PINGREE and JOHN M. STEELE. Transactions of the American Philosophical Society, vol. 104, pt. 3. Philadelphia: AMERICAN PHILOSOPHICAL SOCIETY PRESS, 2014. Pp. xxii + 503.

Pathways into the Study of Ancient Sciences is a commemorative anthology of essays by David Pingree, the renowned historian of science, who died in 2005. The studies collected in this volume have been chosen in order to introduce students to a discipline that requires many recondite forms of expertise and knowledge. Pingree's capacious definition of science, reproduced in the editors' preface—"a systematic explanation of perceived or imaginary phenomena, or . . . based on such an explanation"—includes divination and astrology, topics on which Pingree published a considerable amount. This collection foregrounds his contributions to the history of astronomy.

It would be difficult in a single volume to represent the full range of Pingree's contribution faithfully (and just as difficult to review such a volume). Nevertheless *Pathways* succeeds in capturing two primary features of Pingree's historical vision: its broad geographical and temporal scope and its focus on transmission between cultures. The organization of the volume is intended to demonstrate both. It is arranged into six sections: General Studies (4 essays), Mesopotamia (3), The Classical World (4), India (12), Islam (5), and Byzantine, Medieval, and Renaissance Europe (6). The selection thus ranges temporally from the second millennium BCE to the early modern era, and geographically from Europe across the Middle East to South Asia. The anthology allows additional space for its last three sections, and highlights Pingree's work on Indian sciences, where he devoted rather more of his energies.

As for Pingree's vision of a Eurasian continent-wide circulation of scientific ideas, *Pathways* foregrounds moments when particular techniques and numerical values that were developed in one scientific tradition and that are distinct and recognizable in their specificity—parameters and methods of calculation, for example—were transmitted to another. The support for the argument that a transmission took place is primarily textual. It is based, whenever possible, on surviving translations or adaptations of known and dateable texts. In the ideal case, the texts that served both as the source and as the result survive; more often only the latter is extant, the former remembered only by name. In yet other cases, even the fact of both earlier texts is known only at a second remove, from a later work which may

be in a third language. Further support comes sometimes from the history of the settings in which translations and adaptations were fostered, especially by rulers with scientific ambitions. Another kind of argument from the historical context is made when it is known for other reasons that there was contact between the two cultures through which, it can be demonstrated, other sorts of diffusion and appropriation took place. Finally, there can be a presumptive argument: that a scientific idea, the history of whose development can be explained in one culture, and which appears without obvious predecessor in another where nothing explains its development, is most plausibly described as an importation and adaptation.

A transmission from one extant text to another is shown, for example, in Pingree's essay on the *Preceptum Canonis Ptolomei* (pp. 113–33), which Pingree edited in 1997. The *Preceptum* is an opaque Latin rendering of Ptolemy's *Handy Tables*. It preserves fragments of ancient astronomy that are not otherwise known. It must have been somewhat baffling to its early medieval readers, however, since its method of translation consisted mostly in transliteration. Pingree traces the transmission from a lost text to a partially extant one in his study of the *Zij al Sindhind al Kabīr* of al Fazārī, an eighth-century Arabic text based on a Sanskrit work that was probably entitled the *Mahāsiddhānta*. Al Fazārī's *Zij* survives in fragments and epitomes in the work of later authors. Other works called the *Zij al Sindhind* used parts of al Fazārī's version, most prominent among these al Khwārizmī's ninth-century treatise, which combined the astronomy of the *Mahāsiddhānta* with that of other sources. In turn, al Khwārizmī's *Zij* and its commentaries have survived in significant part only in Latin and Hebrew translations produced in medieval Europe. Pingree's essay on this later life of the *Mahāsiddhānta* (pp. 241–50) serves as an example of the third sort of transmission story that he tells.

As for the influence of courtly settings, the collection includes treatments of al Bīrūnī at the court of Mahmūd, the Ghaznavid (pp. 347–61), and of Nityānanda at the court of Shah Jahān in Delhi (pp. 230–34), among many others. Other sites of contact that come up for discussion include Alexandria, Jundī-Shapūr, Baghdad, Byzantium, Trebizond, and Toledo. The most fully developed example of the presumptive argument is found in Pingree's hypothesis of a Greek origin for the model of the double epicycle in Indian astronomical mathematics (pp. 91–96). In a less sustained form it is found in the arguments for the earlier transmission of mathematical astronomy to India from Mesopotamia (pp. 189–200), where, too, no explicit contact text has been identified.

Thus Pingree's transmission histories have varying degrees of probability built into the form of their argument. Since his death, some of Pingree's more circumstantial reconstructions have been pushed back against both by those more cautious and those more under the sway of geo-linguistic disciplinarity. This volume reminds us that Pingree's transmission-oriented vision of, for example, the history of astronomy in India as part of a worldwide history of science, the most comprehensive and integrative such history yet attempted, is supported by a dossier of evidence drawn from many sources, including sources from outside India: from the Pahlavi *Bundahishn*, for example, or from what survives of the work of the 'Abbāsī astronomer, Ya'qūb ibn Tāriq. Pingree's argument would be that the cultural nativist or nationalist version of a history of science cannot simply ignore the dossier of fragments that are dispersed in many literary corpora in many languages, for, in the end, a good explanation is replaced only by a better one.

Despite his emphasis on a global vision and on transmission between cultures, Pingree did write synthetic essays on the culture of science in particular language ecumenes. Three such essays appear in *Pathways*: the early "Hellenophilia Versus the History of Science" (pp. 3–12) and two about the Indian culture of science (pp. 217–23, where a page is omitted, and pp. 261–69). The emphasis in all is on a scientific pluralism, an anti-teleological idea of science as pursuing different aims and offering different conditions of possibility. As a collection, *Pathways* is, then, representative of Pingree's main ideas and of his method. Students will find different parts of the book difficult, depending on their background.

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Religion and Identity in South Asia and Beyond: Essays in Honor of Patrick Olivelle. Edited by STEVEN E. LINDQUIST. Cultural, Historical and Textual Studies of South Asian Religions. London.: ANTHEM PRESS, 2011. Pp. 392.

This Festschrift in honor of Patrick Olivelle contains an impressive range of contributions, many by more junior scholars, and reflects the extent of Olivelle's research, teaching, and generous advising. The editor Steven Lindquist's introduction contains a short account and discussion of Olivelle's extensive body of scholarship, emphasizing the great variety of scholarship produced by his former students, especially studies with a focus on social history and religious identity. Thus the essays in the volume deal with historical periods from the *Rg Veda* to the present, and religious traditions from Hinduism to Manichaeism. With such a varied selection

of high quality contributions, this book, like all the best Festschriften, will long remain a repository of important scholarship on a number of topics as well as a source of intellectual pleasure.

The chapters are arranged in four sections and I present here just a small selection of the contents. In the first section dealing with "Word, Text, Context," the authors explore what we can say about the social and historical worlds of ancient texts, proposing some bold theses. Timothy Lubin presents a detailed discussion of the figure known as the "bath graduate" (*snātaka*), a graduate of Veda study. He points out that in several texts the status of married householder and bath graduate are quite distinct. The bath graduate was actually subject to more rigorous rules of conduct. By implication it seems that the householder of classical Indian texts was by no means always a Veda graduate. Jarod Whitaker's theoretically subtle paper tackles what "lengthening life" may have meant in the ritual, social, and political world of the *Rg Veda*. Moving away from a literal interpretation of this concept in terms of some sort of magical thinking, he concludes that when poets prolong the life (*āyus*) of their patrons this "represents then a badge of membership within early Vedic society, as it is tantamount to declaring a commitment to the endless performance of rituals" (64). Brian Black's paper lays out a clear, literary reading of the *Upaniṣads* in terms of a rhetoric of secrecy. He suggests this explicitly esoteric discourse creates a sense that the *Upaniṣads* contain alternative, rare teachings, and that this may reflect attempts to "reframe" Vedic knowledge at a time when ritual itself was waning in importance.

The next section deals with law and intellectual history. Robert Yelle's interesting short paper on "Punishing Puns" compares classical Hindu and more recent British academic theories of etymologizing (e.g., in Max Müller). He concludes that the two methods, though radically opposed in many respects, nevertheless share the goal of articulating a perfect language that corresponds to reality. Donald Davis's important contribution is a case study of Hindu adoption law as it was construed in an early modern legal text from Kerala where some communities had matrilineal kinship. In contrast to some scholarly assumptions, he demonstrates that females could be adopted, and suggests that this example helps us understand how Hindu law was created in practice: "a continuous process of accommodation and translating idealized, yet incomplete Dharmaśāstra rules into a system of positive, practicable laws" (p. 162).

In the next section, on "Buddhist and Jains as Selves and Others," Lisa Owen's chapter is a reflection on the *yakṣas* and *yakṣīs* in the cave temples at Ellora. Following a critique of earlier iconographic studies of these images, she turns to the function and meaning of these images in the caves. Rather than considering all these images together, she turns to the individual nuances of these