

SINE QUADRANT IN INDIA  
SANSKRIT TEXTS AND EXTANT SPECIMENS

Sreeramula Rajeswara Sarma

The history of Indian astronomy in the medieval period is characterized by an active interaction with Islamic astronomy and astronomical instruments. While the astrolabe, the Islamic instrument *par excellence*, made a flamboyant entry into India and was received as the *yantrarāja*, “king of astronomical instruments,” the sine quadrant made a rather discreet entrance in the entourage of the *yantrarāja* but received a warm welcome nevertheless. Because of its usefulness in solving trigonometric problems graphically, the sine quadrant was easily absorbed into the repertoire of Indian astronomical instruments.

The sine quadrant was described for the first time in Sanskrit by Padmanābha, who also wrote a manual on a special kind of astrolabe in 1423. Padmanābha prescribed that a sine quadrant be engraved on the back of the *dhuvabhrama-yantra* which he had invented. In the subsequent centuries the instrument was described in several texts. Jñānarāja’s *Sundarasiddhānta* (1503) discusses its construction and use in 19 verses. In 1572 Bhūdhara of Kāmpilya devoted to it an exclusive work entitled *Turyayantraprakāśa* in 21 chapters and 265 verses. Probably in the same century Cakradhara composed another exclusive but short text *Yantracintāmaṇi* together with a commentary. This text enjoyed great popularity. Besides the author’s own *vivarāṇa*, two other commentaries by Rāma Daivajña (ca. 1625) and by Dādābhāi (ca. 1719) are extant. Moreover, some 90 manuscript copies of this work are known to exist. In 1658 Kamalākara of Kāśī devoted 76 verses to the construction and use of the sine quadrant at the end of the *Tripraśnādhikāra* of his *Siddhāntatattvaviveka*.

In this paper, I shall discuss these and other Sanskrit texts on the sine quadrant, explain the reasons for its popularity, and dwell on the trigonometric problems that were sought to be solved by this instrument. I shall supplement this narrative with a discussion of the extant specimens preserved in different museums.