

# The *Tithicintāmaṇi* of Gaṇeśa, A Medieval Indian Treatise on Astronomical Tables

Setsuro Ikeyama

*Brown University.*  
E-mail: setsuro.ikeyama@nifty.ne.jp

Kim Plofker

*Brown University.*  
E-mail: Kim\_Plofker@Brown.edu

The *Tithicintāmaṇi* (TC) is one of the astronomical tables written for the convenience of Indian calendar-makers by Gaṇeśa, a famous astronomer who flourished in the early 16th century.

In this paper, after giving a minimal introduction to Indian astronomy and calendars, we give an overview of this treatise, explain the individual verses which describe rules to calculate the arguments for using the tables, and attempt to reconstruct the tables and demonstrate the meanings of each of their columns.

## I Basic Description of the Indian Calendar

### I.1 Elements of the Calendar

The traditional Indian calendar is called pañcāṅga<sup>1</sup> which literally means “having five subdivisions.” These subdivisions are vāra, tithi, nakṣatra, yoga, and karaṇa.

**Vāra** A vāra is a weekday, counted from Sunday to Saturday. Weekdays generally begin from sunrise. Therefore, each week begins from the sunrise of Sunday. Some schools of Indian astronomy, however, employ midnight epoch where weekdays begin at midnight. Hence it is sometimes necessary to convert the midnight epoch to the sunrise epoch, and vice versa. This kind of problem in the TC is discussed in section III.2.

**Tithi** A tithi is a “lunar day,” or 1/30 of a synodic month, during which the longitudinal elongation between the sun and moon increases by 12 degrees. When tithis are measured or calculated using mean longitudes of the sun and moon, the tithis are also mean. If the true longitudes are used, those are true. The first tithi of a synodic month begins with the conjunction of the sun and moon at new moon (hereafter NM), or opposition of those two at full moon (hereafter FM). Tithis are used to number each day of a month; when the sunrise of a day is included in the

---

<sup>1</sup>For more information about pañcāṅga see, for example, IAS pp. 100–109; and YANO, pp. 46–61, 93–105, and 148–178.