Biographical Encyclopedia of Astronomers

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Brahmagupta

Born Bhillamäla (Bhinmal, Rajasthan, India), 598

Died after 665

Brahmagupta was an Indian (Hindu) astronomer. He probably lived at Bhillamäla (modern Bhinmal in the southwest of Rajasthan). His father was Jiṣṇu, and Brahmagupta was sometimes called Jiṣṇu-suta (son of Jiṣṇu). Brahmagupta was a follower (and possibly the founder) of the Brahma School, one of four principal schools of classical astronomy (from the late 5th to the 12th centuries) active in that period

Brahmagupta composed two principal works: the *Brahmasphutasiddhanta* in 628 (a precise treatise of the Brahma school) and the *Khandakhadyaka* in 665. In the *Brahmasphutasiddhanta*, Brahmagupta criticized Aryabhasha I, the founder of the Arya School. But in his *Khandakhadyaka*, Brahmagupta accepted the system of the Aerdharatrika School, another school founded by Aryabhasha I. Brahmagupta was a contemporary of another Indian astronomer, Bhāskara I, but it is not known whether they knew each other.

Brahmagupta composed the *Brahmasphutasiddhanta* when he was 30 years old. He states that his work is an improved version of the astronomical system described by Brahman. If this were true, then the Brahma School, whose name is a derivative of Brahman, might have existed before Brahmagupta. The *Brahmasphutasiddhanta*, whose author and date are not definitively known, is the earliest extant work of the Brahma School. It consists of 24 chapters (and in some editions has an added chapter of versified tables).

In classical Hindu astronomy, both geocentric epicyclic and eccentric systems are used to calculate the positions of the planets. In the *Brahmasphutasiddhanta*, the method used is one of successive approximations (except for the case of Mars). This tells us that the Indian model of planetary motion was not a simple imitation of the Greek geometrical model

Thirty-seven years later, Brahmagupta composed the *Khandakhadyaka*. In its first part, the *Pürvakhandakhadyaka*, he followed the Ardharātrika School, while in the second part, the *Uttarakhandakhadyaka*, he presented his own improved system. Here, Brahmagupta did not use the method of successive approximations to calculate planetary positions. He used several mathematical devices, including second-order interpolation, for his astronomical calculations.

The Brahma School promoted by Brahmagupta was followed by Śrīpati in his *Siddhāntaśekhara* and by Bhaskara II in his *Siddhantaśiromaṇi*. Brahmagupta's astronomy was transmitted to Arabia in the latter half of the 8th century. Brahmagupta was well known to al-Birūnī and mentioned in his India.

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