



KĀZENI, ABU'L-FATH

KĀZENI, ABU'L-FATH 'ABD-AL-RAḤMĀN (late 11th-mid 12th centuries), astronomer, mathematician, and mechanist originally from the city of Marv in Khorasan.

Kāzeni's exact dates are not known, but the textual evidence allows us to assume that he flourished during the reign of the Saljuqid Sultan Sanjar b. Malekšāh (r. 1097- 1157), to whom he dedicated several of his works. We also know that he wrote three of his most important works between 1118 and 1131. Of Byzantine origin, Kāzeni was the freed slave of Abu'l-Ḥosayn (or Abu'l-Ḥasan) 'Ali b. Moḥammad Kāzen Marvazi, a distinguished scholar and patron of science and letters, who was Kāzeni's patron and provided him with a solid education in the fields of mathematics and philosophy. Kāzeni's training in geometry too was perfect, according to his contemporary biographer Zāhir-al-Din Bayhaqi (p. 181), whose statement testifies to the great reputation of Kāzeni among the scholars of his time as well as his scientific correspondence with them. A statement by the astronomer Qoṭb-al-Din Širāzi (d. 1310) also attests to Kāzeni's great abilities in matters of astronomical observation and to the esteem he enjoyed among his successors (Hall, p. 337). We know nothing more of his life except that he was very pious and led a very austere life.

Kāzeni's field of scholarship was especially vast, as he dealt with mathematics, mechanics, astronomy, and the construction of astronomical and mechanical instruments. We do not know whether Kāzeni composed any original work in mathematics, because his surviving works are those on astronomy and mechanics. However, Bayhaqi (p. 181) tells us that he mastered the



mathematical techniques of his time. This claim can be backed up by Kāzeni's use of mathematical solutions in the field of physics in his work on mechanics, *Ketāb mizān al-ḥekma*, written in 515/ 1121, which is no doubt the most important of his extant works. We also know, from his own account (in his *Ketāb mizān al-ḥekma*) that he had continued the work done on statics undertaken by his predecessor at the court, the mathematician Abu Ḥātam Asfezāri.

Kāzeni was an astronomer of great stature—one of the twenty Arabic-language astronomers who carried out original observations (Kennedy, p. 169), and Qoṭb-al-Din Širāzi attests to the high quality of the work. Kāzeni's best-known astronomical treatise is *al-Zij al-mo'tabar al-sanjari al-solṭāni*, which consists of more than 150 astronomical tables dedicated to Sultan Sanjar. The manuscripts of this work bear no date, but historical and literary inquiries into the text suggest that they must have been composed between 1118 and 1131 (Hall, p. 337). There exist at least two known manuscripts of this work. The Vatican manuscript, which has been cataloged under the call number Ar. 761, seems to be an autograph copy of the work, and the other one, which is in British Library, can be accessed under the call number Or 6669 (Gari, pp. 201- 15). To these two versions we can add an imperfect copy, which is part of a miscellaneous manuscript that belongs to the Sepahsālār Library in Tehran (Hall, p. 336). The text was translated into Latin. We also have an extract of the Zij prepared by the author in the year 1130-31 and titled *Wajiz al-zij al-mo'tabar al-sanjari al-solṭāni*. Kāzeni specifically excelled at designing instruments. His *Ketāb mizān al-ḥekma* gives instruction for the construction of several mechanical instruments, including the balance, and discusses and illuminates the theoretical aspects of the whole process from the theory of gravity centers to hydrostatics to the law of the lever.

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