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Ibn Bāṣo: Abū ʿAlī al-Ḥusayn ibn Abī Jaʿfar Aḥmad ibn Yūsuf ibn Bāṣo

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Died **Granada, (Spain), 1316**

Ibn Bāṣo was the head of the timekeepers (*raʾīs al-muwaqqitīn*) in the Great Mosque of Granada. He was also a master of the science of calculation, highly skilled in astronomical observation, an inventor, and the author of several treatises.

Little is known about Ibn Bāṣo's life. He was probably one of the two Ibn Bāṣos mentioned by Ibn al-Khaṭīb in his biographical work, *al-Iḥāṭa*, although this author gives his name as Abū ʿAlī Ḥasan ibn Muḥammad ibn Bāṣo.

According to Ibn al-Khaṭīb, Ibn Bāṣo was from the *Sharq al-Andalus*, the eastern part of the Iberian Peninsula. The fact that he was the head of the timekeepers (*raʾīs al-muwaqqitīn*) in the Great Mosque of Granada is extremely interesting, because it suggests that the mosque had an organized, institutionalized group devoted to timekeeping.

Two of Ibn Bāṣo's written texts are preserved. One of them is the *Risālat al-ṣafīḥa al-jāmiʿa li-jamīʿ al-ʿurūḍ* (Treatise on the universal plate for all latitudes). The other is the *Risālat al-ṣafīḥa al-mujayyaba dhāt al-awtār* (Treatise on the plate of sines provided with chords). In both texts the author is named as Abū ʿAlī al-Ḥusayn ibn Abī Jaʿfar Aḥmad ibn Yūsuf ibn Bāṣo and is described as *amīn awqāt al-ṣalawāt* (keeper of the times of prayers) and *imām al-muʾadhdhinīn* (leader of the muezzins).

The differences in name between what one finds in Ibn al-Khaṭīb's biography and in the treatises themselves have led some specialists (such as George Sarton) to suggest that there were two Ibn Bāṣos. However, later investigators—H. P. J. Renaud, among others—proposed that the treatises were the work of one and the same person, adducing that differences in the name were frequent in Arabic biographies.

The first treatise, the *Risālat al-ṣafīḥa al-jāmiʿa li-jamīʿ al-ʿurūḍ*, was compiled in the year 1273 and was devoted to the description of the use of a universal plate for all latitudes. The author states that he was the inventor of the instrument. The treatise suggests that the author was aware of the work of previous astronomers in the Muslim world, especially of the work carried out in the 11th century in Andalusia. There are also similarities with some treatises of *mīqāt* written in 13th-century Egypt. The astrolabe plate is one in which the horizontal coordinates have been omitted, and the horizons have been multiplied in order to serve for different latitudes. It corresponds to the type of instrument usually called *ṣafīḥa āfāqiyya*, "plate of horizons," and it is similar to a conventional astrolabe plate. The fact that this plate does not have horizontal coordinates and is limited to the projection of a set of horizons has led specialists to think that it was used only for simple operations. However, a study of the treatise shows that the instrument was as versatile as any other astrolabe plate, although it is difficult to use because of the number of lines in its layout and because of the complicated procedures that the user would need to know. In this treatise the author is not seeking great precision: the values are clearly rounded. It was probably the didactic potential of the plate that the author was most interested in exploiting. Indeed, using the plate would have provided a very useful exercise for anybody who wanted to become familiar with the celestial spheres and

their properties. This plate seems to have been designed to carry out all types of speculative calculation: its use in extreme northern latitudes or in latitudes south of the equator cannot be considered a practical application. Nevertheless, the possibility of using this plate as a southern astrolabe plate, in spite of the fact that it is designed for the Northern Hemisphere and is meant to fit in a northern astrolabe, is its most original characteristic and thus can be considered a forerunner of later instruments.

Ibn Bāṣo's work became well known. There are a number of summaries of the treatise, most of them of Maghribi origin, and the projection was included in several instruments still preserved in Andalusia, North Africa, and also in the Islamic East as is the case of instruments constructed by **Mizzī** in Damascus and Allāh-Dād in Lahore. Although universal instruments of this type had already been described by earlier astronomers such as **Sijzī** or **Bīrūnī**, they do not seem to have been built until the time of Ibn Bāṣo, when, starting in the 14th century, they seem to have proliferated in North Africa and the Muslim East as well as in Europe.

The other treatise written by Ibn Bāṣo that is still preserved, the *Risālat al-ṣafīḥa al-mujayyaba dhāt al-awtār*, is contained in manuscript 5550 of the National Library of Tunisia. The introduction of this treatise presents abundant similarities to that of the previous one. In this treatise, the author describes the use of a trigonometric plate of his invention that can perform all kinds of calculations of spherical astronomy.

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