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Alfonso X

Julio Samsó

Alternate names

Alfonso el Sabio

Alfonso the Learned

Alfonso the Wise

Born **Castile, (Spain), 1221**

Died **Castile, (Spain), 1284**

King Alfonso X reigned from 1252 until 1284. He was a patron of literature and learning and made a great effort to recover Arabic and, very especially, Andalusian astronomical materials by translating them into Spanish, thus becoming a pioneer in the use of the vernacular as a scientific language. Later, probably coinciding with the period (1256–1275) in which he aspired to become the Emperor of Germany, he had some of these works retranslated into Latin. The highest expression of this cultural policy can be found in his *Alfonsine Tables*, in which we find an aspiration to universality very much in keeping with a project of producing a set of "imperial" astronomical tables.

His collaborators were a Muslim convert to Christianity (Bernardo el Arábigo), and eight Christians, of whom four were Spaniards (Fernando de Toledo, Garci Pérez, Guillén Arremón d'Aspa, and Juan d'Aspa), and four Italians (John of Cremona, **John of Messina**, Petrus de Regio, and Egidius Tebaldi of Parma). The Italian group seems to have been involved mainly with the retranslations into Latin. To these one should add a very important group of five Jews (Yehudah ben Mosheh, **Isaac ibn Sid** called Rabiçag, Abraham Alfaquín, Samuel ha-Leví, and a certain Mosheh). Two (Yehudah and Rabiçag) take pride of place due to the number and importance of the works they wrote; in particular, they were the authors of the *Alfonsine Tables*. Of these two, only Yehudah was a translator, while Rabiçag wrote original works and built scientific instruments. Alfonso failed in his attempt to persuade a Muslim scientist, Muḥammad al-Riqūṭī, to join his team; they probably met on the king's visit to Murcia in 1271.

Alfonsine translations are based on Arabic works that had not been previously translated into Latin.

It is conceivable that these sources were found in libraries that came under Christian control as a result of the conquests of Cordova (1236) and Seville (1248) by Alfonso's father king Fernando III. Some of these translations preserve Andalusian astronomical works that would have been lost otherwise; this is the case, for example, of the *Libro de las Cruzes* (Book of crosses), a late Latin astrological handbook based on a versified Arabic version that had been written in the first half of the 9th century and subsequently revised by a certain ʿUbayd Allāh in the 11th century. Other works that are only known through Alfonso's translations are the *Lapidario* (a book on the magical applications of stones) written by the otherwise unknown author of *Abolays*, the two books on the construction of equatoria written by **Ibn al-Samḥ** (died: 1035) and **Zarqālī** (died: 1100), **ʿAlī ibn Khalaf**'s book on the use of the plate for all latitudes (*Lámina Universal*, Toledo, 11th century), and Zarqālī's treatise on the construction of the armillary sphere.

King Alfonso seems to have devised a well-structured project for producing two collections of translations and original works. The first collection was devoted to magic and contained the *Picatrix* (only the Latin text is extant), the series of lapidaries, and the *Libro de la mágica de los signos*. The second was an astronomical and astrological collection and in it we find the well-known *Libros del Saber de Astronomía*, **Ibn al-Haytham**'s *Configuration of the Universe*, **Battānī**'s *Canons* (Instructions for the use of his tables), the treatise on the use of the *Cuadrante sennero* (sine quadrant?), the *Alfonsine Tables*, **Ptolemy**'s *Quadripartitum* with the commentary by ʿAlī ibn Ridwān, the *Libro conplido en los iudizios de las estrellas* (*Kitāb al-Bāriʿ fī aḥkām al-nujūm*) by ʿAlī ibn Abī al-Rijāl, and the anonymous *Libro de las Cruzes*.

The first book of the *Libros del Saber de Astronomía* (*Ochava Espera*) is a treatise on uranography partially based on **Ṣūfī**. The rest of the collection is composed of treatises on astronomical instruments that are mainly analogical calculators (celestial sphere, spherical and plane astrolabe, saphea, and plate for all latitudes) whose main purpose is to provide graphic solutions for problems of spherical astronomy and astrology that can be applied to the casting of a horoscope. The purpose of the rest of the instruments (quadrant of the type called *vetus*, sundial, clepsydras) is to determine the time, something which is also needed to cast the horoscope. The king wished to have a treatise on the construction and another one on the use of each of these instruments. If an adequate Arabic source was available, Alfonso ordered its translation. Otherwise, an original treatise was written, usually by Rabiçag. For obvious reasons, most of the Alfonsine works that are original are concerned with the construction of instruments, for such texts are more difficult to find than treatises on their use.

We also find in the *Libros* the two treatises on equatoria, instruments whose purpose is to provide approximate calculations of planetary longitudes using Ptolemaic planetary models drawn to scale that allow a graphical solution of a problem that is, again, essential for casting a horoscope. Evidently, Alfonso's tabular works (Zarqālī's *Almanach*, Battānī's *Canons*, and the *Alfonsine Tables*) have exactly the same object.

A last group of Alfonsine works comprises works on judicial astrology (*Quadripartitum*, *Libro de las Cruzes*, *Libro conplido*), which allow the reader to interpret the horoscope and predict the future as well as works on magic whose purpose is to fabricate talismans in propitious astrological conditions in order to modify this same future. When seen from the point of view of a king who was extremely interested in both astrology and magic, his astronomical, astrological, and magical works form an impressive unit that seems to be the result of a well-designed plan. Only two works fall outside this frame; one of them is the aforementioned *Ochava Espera* that contains, apart from a description of the 48 Ptolemaic constellations, enough connections with the lapidaries and other magical texts to consider it as an exception. The second is the translation of Ibn al-Haytham's *Cosmography*, which corresponds to a type of theoretical interest not all that common in the corpus of Alfonso X.

The *Alfonsine Tables* represents Alfonso's most important astronomical work. However, it poses numerous problems, the most obvious of which is the existence of two different versions (one in Spanish, another in Latin). On the one hand, we have the Spanish text of a set of canons without the corresponding collection of numerical tables. These canons have a prologue in which it is said that their authors are Yehudah ben Mosheh and Rabiçag; the text was written between 1263 and 1272; 200 years after the observations of Zarqālī, the king had ordered the construction of the necessary astronomical instruments to make observations in Toledo; and the two astronomers, following the royal orders, made observations of the Sun, planetary conjunctions, and solar and lunar eclipses. Unfortunately, it is difficult to check the veracity of these assertions except for three lunar eclipses (one in 1265 and two in 1266) and one solar (1263) eclipse, on which we have a report transmitted by Isaac Israeli (*circa* 1310). The few numerical parameters mentioned in the canons or in the rest of the Alfonsine works extant in Spanish derive from the *Toledan Tables* or from the work of the Maghribī astronomer **Ibn Isḥāq** (flourished: *circa* 1193–1222). On the other hand, in the Latin tables one finds new parameters that might be the result of the alleged Alfonsine observations.

In about 1320, a new set of *Alfonsine Tables* appeared containing numerical tables with titles in Latin but without the canons that could be attributed to the Alfonsine circle. Many authors from various parts of Europe (beginning with the Parisian group of **John of Saxony**, **John of Murs**, and **John of Lignères**) wrote original canons allowing the use of the numerical tables. The tables were enormously successful and became standard in Late Medieval and Early Renaissance Europe until 1551, when **Erasmus Reinhold** published the *Prutenic Tables*. **Nicolaus Copernicus** used parameters derived from the *Alfonsine Tables* in his *Commentariolus*, and the Alfonsine tropical year of 365 days, 5 hours, 49 minutes, and almost 16 seconds was the mean tropical year used in the *De revolutionibus* and became the basis for the Gregorian reform.

The total lack of information about the tables between *circa* 1272 and *circa* 1320, and their complicated textual history between the 14th and 16th centuries, when every version or adaptation of this work added new tables to the original corpus, has recently led to a number of different opinions among historians. At least one (Poulle) has denied any relation between the Latin tables and the work of Alfonso X. Others (North, Goldstein, Chabás, Mancha, and Samsó) have discussed this point and argued in favor of the presence of materials in the Latin tables that have a clear relation to others attested in the undisputed Spanish works of Alfonso X. In the opinion of this author, Yehudah ben Mosheh and Rabiçag wrote the Spanish canons under the influence of Zarqālī and the *Toledan Tables*. Later they began a new set of tables following Battānī's tradition. In this second set, the language used was Latin, reflecting the imperial aspirations of King Alfonso. This is not the interpretation adopted by Chabás and Goldstein in a recent book: they believe that the revision was made in Paris, on the basis of the Alfonsine materials mainly represented by the Castilian canons. Whatever the truth, it seems a fact that the *Alfonsine Tables* are the result of the work of the Alfonsine collaborators and that they mark the starting point of an original European astronomy that was still strongly influenced by an Arabic tradition.

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