

## RESEÑAS

HERNÁNDEZ PÉREZ, Azucena, *Astrolabios en al-Andalus y los reinos medievales hispanos*, Madrid, La Ergástula, 2018, 244 pp., and *Catálogo razonado de los astrolabios de la España medieval*, Madrid, La Ergástula, 2018, 405 pp.

These two books are the publication, in two volumes, of Dr. Hernández's Ph.D. dissertation (Dept. of Art History, Universidad Complutense of Madrid, 2017). Hernández's study and catalogue are destined to be a seminal contribution to the study of astrolabes, especially for her typologies of this instrument in the Iberian Peninsula (49 specimens studied in detail, one of them suitably taken from a manuscript source). Hernández's distinctive and original contribution to the field of medieval scientific instrumentation lies in these typologies (this is the first time that a mathematical instrument is approached through the methodology and terminology of history of art), her illuminating insights into the material aspects of astrolabe construction, and the important clues she discovers about the existence of Andalusian and Christian astrolabe workshops in the Iberian Peninsula. Since an earlier review has underscored the essential contributions of Azucena Hernández's study and catalogue (Julio Samsó, *Suhayl*, 18, pp. 299-302), an evaluation that I completely agree with, I will not repeat here what has been said but instead will focus on some aspects of this important study and catalogue that may require revision and correction.

*Astrolabios en al-Andalus y los reinos medievales hispanos* presents (i) a general introduction to astrolabes, (ii) an overview of the different skills involved in astrolabe craftsmanship and the possible astrolabe workshops in al-Andalus and the Christian kingdoms of Spain, (iii) a historical discussion of the astrolabe and how it might have entered the Iberian Peninsula, the presence of astrolabes in different social groups of Islamic and Christian medieval societies, and (iv) some reflections on the artistic and symbolic

dimensions of this object. This book ends with three appendices: a list of the star names found on Christian and Andalusian astrolabes of the Iberian Peninsula (original script, transcription, and modern name), a list of cities and/or latitudes engraved on the latitude plates of the studied instruments, and a glossary of astronomical/mathematical terms used in the book. As noted earlier, this book is an important contribution; notwithstanding, it presents some inaccuracies that need to be indicated for those readers who are not experts in the field or do not know Arabic. A few examples will illustrate what I mean.

Regarding the glossary, the equatorial coordinate (pp. 221-222) of "right ascension" ("rising times at *sphaera recta*" in the medieval terminology) was not used as a star coordinate for the stars of the medieval astrolabes described in this study; rather, medieval astrolabists used the equatorial coordinate "mediation", but this notion is not mentioned in the book or glossary. Hernández indicates (p. 21) that the term "astrolabe" comes from ancient Greek *ástro* plus *lámblonō* but the correct etymology is *ástron* plus *lambánō*. In relation to the astrological plates of astrolabes, the author says (p. 37) that "sólo un 27% de astrolabios aquí estudiado contienen este tipo de láminas lo cual denota un interés relevante pero no mayoritario de este tipo concreto de uso". In fact, the same engravings serving astronomy also serve astrology, so that there is no need for specific astrological engravings/plates for astrological purposes; when these engravings are present, it is mainly for ornamental purposes or to please the commissioner. Concerning the textual tradition, no list of authors and/or texts on the use or construction of astrolabes during the Middle

Ages—either in the Islamicate or the Christian world—is given in the book, and the bibliography on medieval textual sources on the astrolabe is too short.

In several places (for instance, p. 53, n. 125), the author distinguishes between the process of constructing and the process of engraving the astrolabe, but most of the engravings (almucantars, azimuth lines, circles of the equator and the tropics of Cancer and Capricorn in the latitude plates, the calendar scales on the back of the mater, or the ecliptic and star pointers in the rete) are structural and so are an integral part of the construction that cannot be engraved later. Only names and numbers can be engraved in the final step when all the divisions, lines, arcs, and circles of the construction have been completed. Consequently, some of the different professionals involved in the construction of an astrolabe and some of Hernández's distinctions as regards the different makers of the different tasks around its construction (see Figure 12 on p. 65: astronomer → geometrician/draftsman → metalworker → goldsmith → geometrician/engraver → calligrapher/engraver) seem redundant. Despite Hernández's meritorious efforts, it is not yet clear how the transition from the geometric design to the piece of metal, engraved with the projection of each component and their corresponding graduations, took place in the medieval period, if in fact several persons were involved in these specific tasks or if there was a previous design in paper or parchment.

On a few occasions, there are bibliographical references in the footnotes that are not included in the final bibliography (e.g., Castiñeiras on p. 87, n. 179, and Caiazza p. 144, n. 254). Hernández affirms in one of her descriptions (pp. 104-105) that astrolabe A21 of her classification (Ḥamā'irī, dated 628H) has no indication of its place of construction, but on the back of this instrument is clearly written, in Arabic, that Ḥamā'irī made it “in Seville” (and so it is described in King's unpublished catalogue). The use of the medieval astrolabe to calculate the solstices and equinoxes (p. 40) is not a common use of astrolabes; tables were the main tool for these calculations. The debate of 1437 in the faculty of Medicine of Paris, where it was decided that having an astrolabe was essential for the practice of medicine and surgery (p. 162), is left without any source or bibliographical reference in the body text or in the footnotes. These are just some examples taken from the first book.

*Catálogo razonado de los astrolabios de la España medieval* describes—in about two pages each—the Andalusian and Christian Iberian astrolabes included in the study (in addition to planispheric astrolabes, Hernández also includes several universal instruments). The description of each item includes excellent images, in most cases of the front (with the ruler when there is one) and back (with the alidade), rete, throne, and star pointers, as well as tables of the corresponding stellar names, cities/latitudes, and perpetual calendars displayed in the corresponding instrument. This volume opens with a short introduction explaining how the catalogue works and also overviews the different components of an astrolabe and their nomenclature. It is worth praising Dr. Hernández's skills in describing the style and typology of the retes and their ornamental features as well as those of the thrones (the most distinctive components of astrolabes to identify the period and culture of a specific instrument and the most artistic ones as well). Hernández provides a table (Table 2, p. 24) with the Arabic forms of the Christian months (in transliteration) that she considers to represent these names in all the calendar scales of the Andalusian astrolabes. However, just as the Latin names of the Christian months present variants of the same forms on the calendar scales of the astrolabes constructed in Christian lands, Andalusian astrolabes also present different forms in the Arabic transcription of these names that reveal their different pronunciation according to regions/localities, as well as the socio-cultural background of the engravers. The author ignores these differences in pronunciation in her description, and so we do not learn what these differences could tell us about the provenance and contexts of their makers. Continuing with the transcription problems found in the first book, in this second book, Table 4 (p. 32) displays the Arabic form and translation of the numerical values of the latitude and the hours of daylight engraved on each latitude plate of astrolabe A1 (a tenth-century astrolabe drawn on a manuscript that Hernández has very rightly included in her study). Either the Arabic values of the hours of plates 3a and 3b are miscopied, or Hernández has mistranslated them (Arabic numbers 15 and 14,30 are translated as 14 and 13,30, respectively). Table 7 (p. 40, Arabic star names in Arabic, Latin transcription, and Spanish translation of astrolabe A2) shows a problem of mistranscription/misplacing of the Arabic pharyngeal stop ʕ: “*al-wāqi*” rather than the correct *al-wāqi*’, “*al-a'zal*” rather than *al-'azal*,

and “*banāt al-na’s*” rather than *banāt al-na’aš*. Table 12 (p. 48) displays latitudes and hours for the plates of astrolabe A3. Plates 3a and 3b again miscopy or mistranslate the values: the Arabic hour numbers 13,45 and 31 are wrongly translated as 13,35 and 30, respectively. Table 13 (p. 55) shows the Arabic names, Latin transcriptions, and Spanish translations of the star names of the rete of astrolabe A4: “*al-ši’rā al-’abūr*” is translated as *the leader and the transit*, but the correct would be *al-ši’rā* (uncertain meaning) *that crosses* (the Milky Way); “*al-nīr min kawākab al-šuyā*” should be *al-nīr/nayyir min kawākib al-šuyā*”; etc. There is some confusion (p. 56) about the relation of the astrological houses/plates and the astrological technique called “the projection of the rays” when it is said, in regard to astrolabe A4, “la presencia de una lámina dedicada por ambas caras a usos astrológicos, construida según el método de la proyección de los rayos”. This astrological plate is not constructed according to the projection of the rays; rather, the projection of the rays/aspects is calculated for a specific horizon with its engravings. Table 15 (p. 57) displays the Arabic inscriptions and Spanish translations of the engravings found on the latitude plates of astrolabe A4. Here one finds twice the same mistake in the translation of the Arabic script of plates 9a and 9b: the Arabic expression *nuqṭat samt al-ra’s*, which Hernández wrongly copies as “*nuqṭat šamt al-rafs*”, should be translated “point of the zenith” (lit. “point of the direction of the head”), rather than “punto del sol”. There is either omission of data in the reproduction of the Arabic script of the signatures and the geographical data of the plates or introduction of “creative” data that are not in the Arabic text that Hernández reproduces in her book. For instance, the author forgets to include the Arabic preposition *fī* before the Arabic word for *year* when she copied the signature of astrolabe A5 (p. 59, picture of the signature on p. 61) and forgets to copy the city name *Yathrib* in Table 28 (p. 87, plate 1b), but introduces the city names *Daroca* and *Lleida* that are not in the Arabic she copied in Table 28 (p. 87, plate 5b). Table 16 (p. 63) also presents an error in copying the Arabic of the astrolabe and in transcribing it: “*magīb al-šafaq*” should be *mugīb al-šafaq* (“the end of the <evening> twilight”), which is repeated in Table 19 (p. 66). Given these mistakes, readers do not

know whether the original Arabic of the astrolabe or Hernández’s copy of it is the source of the wrong Arabic script. Table 24 of astrolabe A6 (p. 77) also presents some inaccuracies; for example, plate 5b has in Arabic 14,33 for the longest duration of the day, but the translation reads 15,5.

I stop at p. 77 of the 405 pages of the *Catálogo razonado*, which I have read from the beginning to the end. In the remaining pages of the book, we find additional inaccuracies in the copying, transcription, or translation of original Arabic terms and some other misunderstandings. Hernández has sufficiently proved her hard work, skill, and stamina to describe and catalogue these instruments scattered all over the world, but researchers and students cannot rely on all the data included in the two books. This fact impairs the expected impact of this important research. That said, it would be desirable to have a new edition of Hernández’s work after a revision of the Spanish text (perhaps in English translation, so that most historians of science could benefit from this excellent research). Then these two books could become what they are meant to be, a reference work in astrolabe literature, to be placed on bookshelves next to Robert T. Gunther’s *The Astrolabes of the World*; Salvador García Franco’s *Catálogo crítico de astrolabios existentes en España*; and any of David A. King’s books, among many others, who have contributed to our understanding of this beautiful and sophisticated instrument.

## Bibliography

- García Franco, Salvador, *Catálogo crítico de astrolabios existentes en España*, Madrid, Instituto Histórico de Marina, 1945.
- Gunther, Robert T., *The Astrolabes of the World*, London, Holland Press, 1976.
- Samsó, Julio, “Reseña de: *Azucena Hernández Pérez, Astrolabios en al-Andalus y los reinos medievales hispanos*, Madrid, La Ergástula, 2018, 243 pp., and *Catálogo razonado de los astrolabios de la España medieval*, Madrid, La Ergástula, 2018, 405 pp.”, *Suhayl*, 18 (2020), pp. 299-302.

Josefina Rodríguez-Arribas

Polish Academy of Sciences, Warsaw

ORCID iD: <https://orcid.org/0000-0003-0926-3918>