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In memoriam José Chabás Bergón (1948–2024)

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In memoriam José Chabás Bergón (1948–2024)

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José Chabás Bergón (or simply José Chabás), professor emeritus at Universitat Pompeu Fabra (Barcelona), died on June 9, 2024 in Barcelona of complications following bypass surgery. His contributions to the study of astronomical tables significantly added to our knowledge of technical astronomy as practiced in the Middle Ages. Indeed, he was a leading scholar in this field.

José was born in Barcelona on October 4, 1948. He attended the University of Barcelona and obtained the degree of MSc in physics in 1973 and then a PhD in physics in 1989. He published three articles on modern physics and astronomy between 1973 and 1983 before turning to medieval astronomy. Surprisingly, his doctoral dissertation, published in Catalan in 1992, on the astronomy of Jacob ben David Bonjorn (*fl.* 1361), was presented to the faculty of Physics [see Chabás 1992]. His supervisor, who persuaded the faculty to accept a thesis in the history of science, was Luis Navarro Veguillas. In this work, José already displayed his full command of the relevant sources and the computational methods and revealed a hitherto unknown lunar period used by the author of about 31 Julian years (more precisely, 11,324 days, 23 hours, 34 minutes, and "a bit more") or 383.5 synodic months or 767 consecutive syzygies. His results were summarized in an article that appeared in Chabás 1991. In this article, he demonstrated that Bonjorn's value for the mean synodic month was taken from Levi ben Gerson (Orange,

* Bernard R. Goldstein, university professor emeritus in the Dietrich School of Arts and Sciences of the University of Pittsburgh, collaborated with José Chabás for close to three decades. Among their joint publications are *The Alfonsine Tables of Toledo* (Archimedes: New Studies in the History and Philosophy of Science and Technology 8. Dordrecht: Kluwer, 2003); *Essays on Medieval Computational Astronomy* (Leiden: Brill, 2015); and "The Medieval Moon in a Matrix: Double Argument Tables for Lunar Motion". *Archive for History of Exact Sciences* 73 (2019): 335–359.

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France, d. 1344), whose influence on Bonjorn had not previously been recognized. José came back to the history of this lunar cycle in an article that we coauthored [Chabás and Goldstein 2020], since, in the years after 1992, this cycle had been found in several other astronomical texts: the *zij* (astronomical handbook) by Ibn ʿAzzūz al-Qusanṭīnī (Fez, d. 1354); the *zij* by Joseph ben Waqār (Seville and Córdoba, *fl.* 1360–1397); an anonymous set of tables (14th century) in the Vatican, Biblioteca Apostolica Vaticana, MS Heb. 384; and the *Almanach perpetuum* (*editio princeps*, 1496) by Abraham Zacut (Salamanca, 1452–1514). The tables in the *Almanach perpetuum* were translations of those that had previously appeared in Hebrew in Zacut's *ha-Ḥibbur ha-gadol*. As we will see, this was not the only instance where José returned to a theme that he had already explored.

José's career began as a secondary school teacher in mathematics and physics (1974–1988) and he never held a position in history of science. He also had no formal training in history or science or in the history of astronomy—he was truly an autodidact, based on his access to a few fundamental texts in the history of ancient and medieval astronomy. His "day jobs" after 1988 all involved his skills as a translator of modern technical books into Spanish:

- *Senior Reviser and Head of Unit*
  Research, Telecommunications, Energy, Industry and Environment of the Spanish Service at the Translation Directorate of the European Commission (EU), Brussels, Belgium (1988–1998).
- *Senior Reviser and Head of the Spanish Translation Unit*
  Food and Agriculture Organization of the United Nations (FAO), Rome, Italy (2006–2010).
- *University Professor* in translation of scientific and technical texts.
  Universitat Pompeu Fabra, Barcelona, Facultat de Traducció i Interpretació (1998–2024). Professor Emeritus (September 2011–June 2024).

Some of José's early studies in the history of astronomy were undertaken in collaboration with Antoni Roca and Xavier Rodríguez. For example, an article with Antoni Roca [Chabás and Roca 1998] concerned the *Lunari* of Bernat de Granollachs (Barcelona, d. 1487?), published in 1485. In it José and Antoni described a "best seller" in the early years of printing, perhaps ranking 10th in popularity among scientific *incunabula*. The text includes computed data for 1,632 syzygies over a period of 66 years, but there is no reference to any previous astronomer. In 1984, when José and Antoni began to study this work, they were unable to identify the source. But in 1998 they were able to say with confidence that Granollachs depended on Bonjorn and they provided the computations in support of this conclusion. When José encountered difficulties—whether computational or historical—he continued to examine the issues involved and often solved the problem after a few years. He did not give up easily.

José was very productive and it was my pleasure to collaborate with him for over 30 years. I was reminded of our early interactions by a remark in the preface to his book on Bonjorn [Chabás 1992], where he wrote that "the work on Bonjorn has initiated a research collaboration with Goldstein that is proving to be very fruitful." This was written before we had any joint publications! José was particularly proud of several of his publications that had related themes on the role of Spanish astronomers in the history of astronomy as well as the transmission of their work to Paris for diffusion throughout the rest of Europe, notably in the books on Abraham Zacut of Salamanca, the Castilian Alfonsine tables of Toledo, and the tables of John of Lignères of Paris [Chabás and Goldstein 2000; 2003; and Chabás and Saby 2022].

On one of my early visits to José in Brussels, he suggested that we look at a page of tables in the *Tabulae resolutae* (1536) [see Schöner 1536; Chabás 2002] in the Bibliothèque Royale Albert I. I do not remember what the table was that interested José, but I suggested looking at the next page, where we found a totally unexpected table for daily planetary velocities that had not been previously described in the secondary literature. The *Tabulae resolutae* are a variant of the Alfonsine Tables, and we immediately inspected José's notes on various manuscripts in this tradition to see if this table had been overlooked. To our satisfaction, we found more and more copies of this table as time passed. In our initial publication [Goldstein, Chabás, and Mancha 1994], we listed over 20 copies in Latin manuscripts and printed editions. The issue of greatest interest was the relation of Alfonsine astronomy in Paris, beginning in about 1320, with Alfonsine astronomy in Castile in the 13th century. In support of the claim that this table for planetary velocities came to Paris from Castile, we compared the description of them in chapter 27 of the Castilian Alfonsine Tables (composed *ca* 1272) with the corresponding passage in canon 44 to John of Lignères' tables for 1322.[1] Despite the fact that the passage in the Castilian Alfonsine Tables is in Castilian and that of John of Lignères is in Latin, the two texts agree very closely. Hence,

[1] John of Lignères (*fl.* 1320–1340) was one of the principal architects of the Parisian Alfonsine Tables [see Chabás and Goldstein 2019].

either they had a common origin or John of Lignères (or his source) had access to the Castilian version. In any event, John of Lignères clearly had access to a text produced in Castile. In this project, we had the cooperation of Marie-Madeleine Saby, whose dissertation included an edition of John of Lignères' canons to his tables that she shared with us [Saby 1987]. We also benefited in many ways from the erudition of our collaborator, José Luis Mancha. The same table was edited a second time in the book *The Alfonsine Tables of Toledo*, where we now listed 40 manuscripts and printed editions and added two Hebrew and two Arabic manuscripts that contain this table. But there was to be more: in 2013 we published an article on the "astrological month" of 28 days and $2;17,37^h$ with a year of 365 days and $5;49,0^h$ ($= 13 \cdot 28^d 2;17,37^h$). Dividing the tropical year into 13 parts has no astronomical meaning, but this month appears in many astrological texts, and multiples of 13;52,52° ($= 390°/28^d 2;17,37^h$)] are the basis of a column of numbers in various tables, including column 14 of the table for planetary velocities that we first published in Goldstein, Chabás, and Mancha 1994. This too was not the end of the story: in the edition of John of Lignères' *Tables for 1322*, table 10 is entitled "Daily unequal motion of the planets" [see Chabás and Saby 2022, 84–87], that is, the daily velocities of the planets.

Here are two examples of my close collaboration with José. After he had discovered the lunar period of 11,325 days, I found a table in the Vatican, Biblioteca Apostolica Vaticana, MS Heb. 384, which had 11,325 numbered rows over several pages, but no title and no headings for the columns. The table was clearly for lunar positions, but I did not know how the entries had been computed. To add to the difficulties, some entries had three numbers (zodiacal sign, degrees [less than 30], and minutes), but others just had two numbers (blank for the zodiacal sign, degrees, and minutes), which meant there were 12 possible longitudes for each of those entries! I thought that deciphering this table was hopeless, but José came back to it several times over a period of years, and finally he found the solution which then made sense of the information on the surrounding pages. As was often the case, he insisted that I be first author although the solution was mainly his [see Goldstein and Chabás 2015].

In another jointly authored paper, we described an anonymous set of tables in Latin that José had discovered [Chabás and Goldstein 2013]. It is the first example of a set of "displaced" tables to be found in a Latin manuscript, although such tables had already been noted by E. S. Kennedy in medieval Arabic *zij*es. A table is said to be displaced with respect to another when its entries are the same as those in the standard table after adding a constant to its argument (horizontal displacement) or are derived from the entries in the standard table by adding a constant (vertical displacement). One goal in this procedure is to avoid subtractions, which often required a complicated set of arithmetic rules. These displaced tables in Latin are a reworking of the tables in the Parisian Alfonsine Tables and yield the same results. The absence of any instructions as well as unusual technical terms in the headings made it difficult to appreciate the cleverness that went into the construction of these tables, which are extant in a unique copy. In this case, we worked together exchanging email messages on a daily basis, and the resulting solution was the product of a joint effort. José also helped to improve many papers for which I was the sole author—he was generous with his time and often offered perspectives that had not occurred to me.

It is likely that José's most enduring legacy will be his *magnum opus* on medieval mathematical astronomy [Chabás 2019]. It contains summaries of previous work (often based on his own contributions) as well as new discussions that reflect his profound knowledge of this field. The table of contents shows the range of the subjects treated, but it does not capture his many new insights. Still, it conveys a lot of information:

(I) Before Al-Andalus;
(II) From East to West (Toledan Tables, etc.);
(III) The Making of Alfonsine Astronomy (Castilian Alfonsine Tables, Tables of John Vimond, etc.);
(IV) From 1350 to 1500 (Tables of Jacob ben David Bonjorn, Tables of Barcelona, etc.).

Note that José had written the definitive accounts of many of these sets of tables.[2] Each section contains a brief account of the author and the tables, followed by a summary of the content of the tables and ending with a list of the relevant manuscripts and secondary sources. In many cases, José figures prominently among the secondary sources, which is appropriate, given the range and significance of his contributions.

One major theme is "user-friendliness", that is, recasting a set of tables so that the user has to do less computational work and the compiler does more. As José remarked in the introduction [Chabás 2019, 17],

> As will be argued in this book, the sets of astronomical tables, and the tables themselves, evolved throughout the Middle Ages without challenging the Ptolemaic geometrical models underlying them.... This evolution, rarely in

[2] In addition to works already cited, see, e.g., Chabás and Goldstein 2004 and Chabás 1996.

> response to new observations, aimed at facilitating the task of practitioners, by generating new tables or recasting old ones, to reduce the computational effort in using them…thus enhancing user friendliness, which was the main driving force, not observation.… Sets of tables carry astronomical knowledge which is transmitted through the individual tables.… In many cases it is what could be called innovative appropriation, when something useful or new, or both, is added to a table: higher precision, more entries, adaptation to local coordinates, different format, and occasionally even new underlying parameters.… Globally, as far as tables in this period are concerned, innovation is mostly in presentation.

In addition to his own research, from 2014 to 2024 José was one of the principal participants in the European Research Council project *ALFA: Shaping a European Scientific Scene, Alfonsine Astronomy*, hosted by the Paris Observatory from 2017 to 2023. José served as one of the main scientific editors, together with Richard Kremer and Matthieu Husson, for the book series ALFA, published by Brepols. In this capacity, he provided invaluable guidance and editorial advice to all contributors, in addition to his own substantial scholarly output in the form of articles, book chapters, and a coauthored monograph with Marie-Madeleine Saby. As Matthieu Husson has remarked,

> José's contributions to ALFA extend beyond these remarkable achievements. With characteristic generosity, rigor, and patience, he mentored a new generation of scholars in the field of the history of astronomy which, in its own way and capacity, will undoubtedly maintain his heritage and bring it to new horizons. [private communication]

On a personal note, José and Clara, his partner of more than 40 years, were generous hosts on my many visits to Brussels and Barcelona and once in Rome. We became close friends despite the thousands of miles that separated us. I miss José for both his sage counsel and his warm friendship.

José is survived by his partner, Clara García Pleyan; his two sisters, Amparo Chabás Bergón and Consuelo Chabás Bergón; his two daughters, Mirnaya Chabás Segura and Amanda Chabás Segura; and four grandchildren, Martí Reñé Chabás, Adrià Reñé Chabás, Júlia Atxaga Chabás, and Alex B. Chabás.

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