

Rashed's *Encyclopedia* but I think that a version written by a single author would be extremely useful for general historians of science. Nobody is better qualified to write such a book than George Saliba.

Julio Samsó

David Juste, *Les Alchandreana primitifs. Étude sur les plus anciens traités astrologiques latins d'origine arabe (Xe siècle)*. Brill's Studies in Intellectual History Vol. 152. Brill's Texts and Sources in Intellectual History Vol. 2. Leiden-Boston, 2007. XVI + 726 pp + 6 plates.

In 1931, Josep M^a Millàs Vallicrosa published his *Assaig d'història de les idees físiques i matemàtiques a la Catalunya Medieval* which contained, among many other things, a critical edition of the "old corpus" (Kunitzsch) or "old collection" (Burnett) of Latin texts, based on Arabic sources, on the construction and use of the astrolabe, the astronomical quadrant, and a few other instruments. In 2004 I was invited to write a state of the art concerning the collection and I carefully revised all the available sources, discovering, to my surprise, that they contained very few astrological materials. I have now found the answer to this intriguing puzzle in David Juste's book which is, to the best of my knowledge, the most important documentary contribution to the study of the early introduction

of Arabic astronomy and astrology in Europe since Millàs Vallicrosa's work.

Juste's book contains a critical edition and very complete study of a series of eight astrological texts which share common prediction techniques: the data of the horoscope are calculated using numerological procedures (numerical values of the letters forming the name of the subject) and the prediction is based on isolated elements (the onomatomantic ascendant, the planetary hours, the position of the planets in the triplicities or in the lunar mansions, etc.). This kind of very simplified astrology is represented in two other works written in the Iberian Peninsula during the Middle Ages: the Alfonsine *Libro de las Cruces* and Raimundus Lullius' *Tractatus de nova astronomia*. Both books represent the same tendency towards simplification as the *Alchandreana* collection, although they have very little in common with it.

The books contained are either anonymous or attributed to a mysterious writer called Alchandreus. Apart from him, the other authorities quoted are Alexander Macedo, Ascalu Hismaelita, Argafalau/ Arfarfau Caldeus and Aluaten Sarracenus. Quite convincingly, Juste establishes relations between Ascalu and the 18th lunar mansion (*al-Qalb* spelt *Alcalu* in several sources of the collection), between Argafalau and the 26th mansion (*al-Fargh al-Awwal*, *Algarfalaul*) and between Aluaten and the 28th mansion (*Baṭn al-Hūt*, *Aluaten*). As for Alchandreus, Juste is inclined to equate this name with a corruption of al-Kindī but, given the degree of

creativity shown by the texts' author, who invents names of scholars very similar to those of lunar mansions, I will repeat a hypothesis I made a few years ago when reviewing one of the papers published by Juste on the *Alchandreana*. Bearing in mind that one of the derivations of the corpus is the *Liber Arcandam*, very popular from the 16th c. onwards, I believe that Alchandreus may be a corruption of the *Arkand*, an Indian astronomical book known with this name in Arabic: the name, at least, circulated in al-Andalus towards the middle of the 9th c.

David Juste's volume contains a presentation of the books which form the corpus (pp. 29-98) and of which he has made a very careful critical edition (pp. 433-652; editorial criteria pp. 391-431). They are: 1) *Liber Alchandreus*; 2) *Epistola Argafalau ad Alexandrum*; 3) *Breviarium Alhandrei summi astrologi*; 4) *Quicumque nosse desiderat legem astrorum*; 5) *Proportiones competentes in astrorum industria*; 6) *In principio fecit Deus caelum et terram*; 7) *Benedictum nomen Domini* and 8) a collection of *Fragmenta Alchandreana* (22 chapters extant in several MSS which do not appear in the other works). Of these Juste considers that 6) and 7) are "vulgar" texts consisting in translations or adaptations of Arabic originals, while 1), 2), 3), 4) and 5) are more elaborate versions based on previous translations from the Arabic but which also use other sources. It is very difficult to establish the Arabic sources used by the authors of the collection: it is only clear that they derive from a milieu in

which we find *Sarraceni. Iudaei, Barbari, Romani/ Christiani* and *Melli (mawālī?)* (*Benedictum*, see pp. 79, 609-610). Place names in the Iberian Peninsula (*Corduba, Serragoza, Ciscitra?*) appear in the *Proportiones* (pp. 197, 556). Similarities with an Andalusī source on the making of talismans related to the lunar mansions and dated towards the middle of the 10th c. (Ibn al-Ḥātim's *De imaginibus*) have been underlined by Juste in the *Benedictum* (pp. 81-82). To this he adds the use of a Maghribī alpha-numerical system (*abjad*) (pp. 153-154) and the Western names of the planets *al-Muqātil* (Saturn), *al-Aḥmar* (Mars) and *al-Kātib* (Mercury) (pp. 75, 222, 653-654), to which one could add names of zodiacal signs also common in al-Andalus: *al-Kabsh* (Aries) and *al-Taw'amān* (Gemini) (pp. 655-656). All this points to an Andalusī source or group of sources circulating in Cordova towards the middle of the 10th c. at a time when, under the conservative Caliphate of 'Abd al-Raḥmān III (912-961), astrology survived only in secret, and books like the *Ghāyat al-ḥakīm/ Picatrix* (with a strong interest in lunar mansions) and the *De imaginibus* were written. The atmosphere of the period fits very well the non-mathematical character of the astrology represented in the *Alchandreana* collection. This is not contradicted by the fact that Juste has found a few references to Eastern astrological sources: Māshā'allāh's (fl. 762-809) *Liber de interrogationibus*, for example, is identified with the *Breviarium* in one of the MSS (p. 50), while two MSS of the *Proportiones*

consider that this book is Māshā'allāh's *Liber iudiciorum* (p. 60). As for actual sources and, apart from the Latin ones (Martianus Capella, *Excerpta Plinii, In quo signo versetur Mars*, computus treatises, p. 219), there are parallels with the *Secretum secretorum*, a Syriac medical compilation, the Mandaean Book of the Zodiac and the Book of Nativities attributed to Abū Ma'shar (d. 886) (pp. 224-226). All this forms a body of information which was available in Cordova at that time, or in the Christian lands where the translation/adaptation was made.

The origins and subsequent development of the collection (until the 16th c.) are investigated by Juste in chapter 3 ("Histoire des Alchandreana" pp. 219-294). Juste argues convincingly that it originated in Catalonia towards the end of the 10th c. before the "old collection" of texts on the astrolabe and other instruments was compiled. He refers to the analysis made by Bernard Bischoff of the language of *In principio* (a bad Latin contaminated by the influence of a Romance dialect which he places in Catalonia) (pp. 75-77). Bischoff's examples do not seem very conclusive to me and I find a much stronger argument in Juste's analysis of the *Proportiones*. This text is particularly interesting because it contains the only reference, in the whole corpus, to a translation from the Arabic (pp. 69, 554): the author has not been able to find what he is going to explain (astrological predictions based on the vision of comets) in Christian or Hebrew sources, but in Arabic texts

translated into Latin by the wisest master of the Arabs as he was instructing him. This book also contains a date: an example is given on the computation of planetary longitudes for year 4715 (although in the process of the calculation he uses 4795 systematically) *ab initio mundi*. If the Jewish chronology (year of Creation 3761 B.C.) is used, this gives $4715 - 3761 = 954$, which fits neatly with what one might expect (pp. 69, 535-537), since the oldest MS (Paris BNF 17868), containing five treatises of the *Alchandreana*, is dated towards the end of the 10th c. Besides, the *Proportiones*, a revision of the *Benedictum*, and the Compilation of El Burgo de Osma (one of the MSS containing the *Fragmenta*) seem to have been written by the same author. They all use an uncommon vocabulary which apparently derives from the Glossaries compiled at the Monastery of Ripoll, and the style of this text coincides fully with the extant works of Miró Bonfill (d. 984), bishop of Gerona since 971 and correspondent of Gerbert of Aurillac who, in 984, asked him for a copy of the *De multiplicatione et divisione numerorum* written by a mysterious Joseph Sapiens. Miró Bonfill would, therefore, be the author of the *Proportiones* and the two other related texts. Besides, Juste considers that the traditional identification of the *Liber de astrologia* which Gerbert requested, also in 984, from its "translator" (*translatum a te*), Lupitus Barchinonensis (fl. 975-995), with one of the Latin texts on the astrolabe is unjustified and that a better hypothesis

would be to identify it with the three first treatises of the Alchandreana collection (*Liber Alchandreï, Epistola Argafalau* and *Breviarium Alchandreï*), given the fact that the first, at least, of these books bears the title of *Liber de astrologia*. If this very reasonable hypothesis proved to be true, *Lupitus* would be the name of another of the authors of the collection (see pp. 249-257). There are, therefore, at least two Christian scholars (Miró Bonfill and, perhaps, *Lupitus*), an Arab (who helped Miró with the translation) and, without any doubt, a Jewish collaborator who, in Juste's opinion, made a serious effort to hebraize the Arabic sources used by the compilers of the collection. This explains the appearance in it of the Hebrew alphabet used as an alphanumerical system and the Hebrew names of the planets, and zodiacal signs which we find, especially, in the *Liber Alchandreï*, but also in the *Breviarium, Quicumque* and *Benedictum*.

Chapter 2 (pp. 99-217) deals at length with the technical contents of the collection: periods of revolution of the planets (101-104), domiciles, exaltations and falls (104-105), planetary apogees (109-111), *Thema mundi* (111-112), astrological characteristics of planets (112-119), zodiacal signs and triplicities (119-123), lunar mansions (123-126), houses of the horoscope identified with zodiacal signs (126-128), "Egyptian" terms (135-137), planetary and zodiacal hours (137-141), sign and planet of birth (141-147), numerical alphabets (147-155) and prognostications based on single elements, such as the sign or

planet at birth, the planetary hour (for interrogations), the ascending sign at the moment of interrogation, the ascending triplicity, the position of the planets in the houses, the four quadrants or the triplicities, the Moon in the lunar mansions etc. (pp. 156-217). The computation of the planetary positions has an astronomical logic, as it uses the planetary periods of revolution and the number of years since the moment of the creation of the world, for which a horoscope (with the position of the planets in the signs) is supposed to be known (as a matter of fact, two different horoscopes are attested in our sources). The procedure appears in two variants which Juste calls "System A" and "System B" (which bear no relation whatsoever to the systems with the same denomination in Babylonian astronomy) and the pages dedicated to its study here (pp. 105-109) are a summary of the most important paper published by the author himself in the *Studies in the History of the Exact Sciences in Honour of David Pingree* (Leiden-Boston, 2004, pp. 181-222). The method explained by Juste gives a clear solution of a problem that worried me many years ago: how could astrologers working in al-Andalus towards the beginning of the 9th c. cast a horoscope at a time when no astronomical tables were available? In 1985 I suggested the same kind of solution as Juste but I was unable to examine the contemporary sources, as he has done now. Juste seems to have solved the problem quite definitively.

In many instances, however, the procedures explained in these texts to

determine the ascendant (and therefore the signs corresponding to the houses), the sign and planet of birth are independent of any astronomical consideration and base themselves on numerological speculations. This is in spite of the fact that the system of zodiacal hours (pp. 140-141) contains the embryo of a vaguely approximate method to determine the ascendant and that the *In principio* (pp. 204-205, 579, 599) seems to be aware of a more sophisticated kind of astronomy when it explains the stations and retrogradations of the superior planets as a function of their elongation from the Sun. This appears to be an instance of the use of a different kind of source from those that are standard in the *Alchandreana*. Juste also notes some instances (pp. 199-203) in which astrological predictions take into consideration several predictive elements, something which bears witness to a more developed kind of astrology.

This excellent volume contains a careful description of the 71 extant MSS and a 16th c. edition which document the spread of the collection (pp. 297-390) and an important series of careful appendices which summarize, in tables, the spellings, in the different sources, of Arabic names of planets, zodiacal signs, lunar mansions and letters of the alphabet (pp. 653-666); the Hebrew names of planets, signs and letters of the Hebrew alphabet (pp. 667-674); the numerical alphabets (pp. 675-682) and the list of subjects in the *Alchandreana*. The book ends with a list of sources and bibliography (pp. 687-710) and indexes of Latin technical terms (pp. 711-

714), Latin proper names (pp. 715-716), a general index of names and titles of works (pp. 717-722) and another of MSS (pp. 723-726). To conclude: this is a brilliant book on a subject which, at least in my opinion, is important.

Julio Samsó

Roshdi Rashed, *Les mathématiques infinitésimales du IX^e au XI^e siècle. Volume V: Ibn al-Haytham, Astronomie, Géométrie sphérique et trigonométrie*. Al-Furqān, Islamic Heritage Foundation. London, 1427/2006. XIV + 972 + V (Arabic summary of the introduction) pp.

In 1996, Rashed began this impressive collection of editions, French translations and thorough studies of Arabic mathematical texts related to infinitesimal mathematics which has now reached its fifth volume. Most, if not all, of the texts edited in vols. II-V are due to Ibn al-Haytham and make an enormous contribution to our knowledge of the mathematical aspects of his work. Rashed here adds a collection of four of Ibn al-Haytham's works dealing with mathematical astronomy and in which infinitesimal geometry is used. This is an important contribution given the limited number of Ibn al-Haytham's astronomical books that have, so far, received due attention. Among other examples, I will only mention Sabra and Shehaby's edition of the *Shukūk* (1971), Tzvi Langermann's *Fī hay'at al-'ālam* (1990), see