several appendices (pp. 158 ff.) one of which (App. C, pp. 178-181) is a translation of the canons corresponding to tables A1 and A2. The volume ends with a bibliography, and indexes of persons, manuscripts and papyri. The whole book is an and impressive exhaustive treatment of an extremely important subject which had been neglected for many years. We can only hope that Tihon and Mercier will continue this project until it is completed.

Julio Samsó

KING, David A., *Islamic Astronomy and Geography.* Ashgate-Variorum. Farnham, Surrey, 2012. XLII + 376 pp.

According to accepted standards, I should never write a review of a book dedicated to me and to the Barcelona school. However, I feel that both David King and myself are "au-delà du bien et du mal" and I do not believe that David really needs an adequate review in order to ask for funds for another research project. Therefore I have decided to forget about standards and to write something on a book which has been a pleasure for me to read and which has drawn my attention to some papers of David that I had missed, in spite of the fact that I am fairly well acquainted with his scientific production.

This is the fifth volume of King's collected papers in the Variorum series. It begins with a Preface (pp. VII-XIII) in which the author explains and justifies his choice of the materials selected and ends with a most interesting paragraph on the decline of Islamic science after the 15th century, in which he says that "Muslim scientists after the 15th century (...) simply dealt with the same old problems of ancient and medieval astronomy and mathematics, citing the same old authorities (...). No new questions were posed since there was, in most places in the Islamic world, no access to any findings based on the telescope." This is a more elaborate version of a comment he made to me many years ago, saying that "Islamic science declined because it had already answered all questions posed". The the preface is followed by a very long and extremely useful list of King's publications (261 items) until October 2012 (pp. XV-XLII).

The volume contains twelve papers and ends with an alphabetical index. The contents respond to David King's main scientific interests which are well reflected in his last three large volumes published by Brill: in 1999, World-Maps for finding the direction and distance to Mecca (on the gibla problem and "sacred geography") and, in 2004-2005, the two volumes entitled In Synchrony with the Heavens (on timekeeping and astronomical instruments). Besides this, King has always been very active in producing general surveys and states of the art (see the great number of articles he has published in the second edition of the Encyclopaedia of Islam) and here we have a sample in his paper number I ("Islamic Astronomy", 1996) which sets out what are, in his opinion, the main topics that professionals in the discipline should address: mathematical astronomy and folk-astronomy. the Persian. Indian and Greek heritage, modifications of Ptolemaic astronomy before and after Maragha, zījes, applications of astronomy to religious practice, observations, regional schools, instruments and transmission to Europe. One should stress here that some of these (folk-astronomy and mīqāt mainly) were topics which had attracted very little attention from the scholarly world before

King started to explore them. After all, as David King told me, also many years ago, *mīqāt* or astronomical timekeeping is the branch of the discipline which should properly be called "Islamic astronomy".

Papers II and III ("From inscriptions to context: some Islamic astronomical instruments and their secrets", 2004, and "Some illustrations in Islamic scientific manuscripts and their secrets", 1995) deal with instruments of all kinds (astrolabes, sundials, magnetic compasses, compendia, world-maps, navicula de Venetiis) and with illustrations in manuscripts related to astrolabes, *qibla* maps, orientations of ventilators in Cairo (a topic that also appears in paper IV), and the Ka'ba. This reflects, again, the interest King has always felt for the analysis of illustrations: anybody who has followed his production since the nineteen seventies will know that his papers have always been richly illustrated with photographs of manuscript pages or astronomical instruments.

Papers IV-VI are concerned with regional schools. Number IV ("Aspects of Fatimid astronomy", 1999) deals with Ibn Yūnus' contribution: his $z\bar{i}j$ (the subject of King's PhD thesis, which I have never been able to read) and his tables for timekeeping. The paper also studies the gibla oriented buildings of Fatimid Cairo and adds an analysis of a set of myths related to Ibn Yūnus (pp. 507-509). Paper V ("Mamluk astronomy and the institution of the muwaqqit', 1998) deals with Mamluk Syria and Egypt between the 13^{th} and the beginning of the 16th centuries and contains information on prominent figures like Muhyī al-Dīn al-Maghribī, Naim al-Dīn al-Misrī, Abū 'Alī al-Marrākushī, Ibn al-Sarrāj and Ibn al-Shāțir, as well as tables for timekeeping, the appearance of the first attested *muwaqqit*s (in the 'Amr mosque of Cairo between ca. 1250-1320) and the continuity of the profession in Egypt, Syria and Palestine. It is truly surprising that this institution appears only slightly later (end of the 13th c.) in the Maghrib and al-Andalus and I do not think anybody has ever given an explanation of this phenomenon. Paper VI ("On the history of astronomy in the medieval Maghrib", 1990, revised in 1999) is the most complete general survey of Maghribī astronomy ever published. It deals with mathematical and folk-astronomy, astrology, timekeeping and instruments, and ends with a list of selected

manuscripts which deserve an edition and study, lists of extant Maghribī astrolabes, quadrants and sundials as well as a complete bibliography which is updated on p. IX (fn. 8) of the introduction. As King himself explains, in the preface of the volume (p. X), "the inspiration for this study was the rediscovery of the unique Hyderabad manuscript of the astronomical handbook $(z\bar{i})$ of the 13th century Tunisian astronomer Ibn Ishāq (...)". He is referring to the manuscript Andra Pradesh State Library 298 which, thanks to our better knowledge of the history of Maghribī zījes in the 13th and the 14th centuries, can no longer be considered the zīi of Ibn Ishaq. It is, in fact, a recension of this unfinished zīj made by an anonymous Tunisian astronomer ca. 1280-81. Other recensions of the same work were prepared by Ibn al-Bannā' (Minhāj al-țālib fī taʿdīl al*kawākib*) and by Ibn al-Raqqām (the Mustawfi, Qawim and Shāmil zījes). These five sets of astronomical tables have a lot in common – that is to say, the extant materials of Ibn Ishāq's zīj. David King is aware of this fact as, in paper number VII (p. 11), he qualifies the Hyderabad manuscript as a "recension" of Ibn Ishāq's zīj.

Astrology – a topic that King does not often study - is the subject of paper nº VII ("A Hellenistic astrological table deemed worthy of being penned in gold ink: the Arabic tradition of Vettius Valens' auxiliary function for finding the length of life", 2004) and the reason for his choice of the subject was, of course, the fact that he wrote it for the Festschrift for David Pingree. It is a thorough analysis of a table contained in a Greek manuscript of Vettius Valens' Anthology, a book critically edit-ed by Pingree. This table was copied in Arabic in early 9th century Baghdad and King has found it in ten Arabic manuscripts, one of which is Hyderabad A.P. 298. King edits the Arabic table designed to calculate the length of life, explains how it was computed, and translates the relevant texts explaining how the tables should be used, as well as a text on Vettius Valens' namūdār, an astrological technique used to determine the moment of conception and the time the unborn child will remain in its mother's womb.

Papers VIII ("The sacred geography of Islam", 2005) and IX ("Al-Bazdawī on the qibla in early Islamic Transoxania", 1983-86) deal with two of King's favourite topics: "sacred geography" (world-maps centred on Mecca) and *gibla*, as they are dealt with by legal scholars and by astronomers. Abū l-Yusr al-Bazdawī (late 11^{th} c.) gives excellent examples of the legal scholars' approaches to the qibla problem and King edits the Arabic text of a work of his, translates it, and provides careful comments. It contains interesting information on the procedures used in the region of Bukhara and Samargand to determine the qibla, which King tries to compare with the scarce information available on the orientation of religious buildings in the area.

Paper X ("Too many cooks... A new account of the earliest Muslim geodetic measurements", 2000) was published in the first volume of Suhayl. It contains a review of the known sources (Habash, al-Bīrūnī, Ibn Yūnus) giving information on the measurement of a degree of the Earth's meridian undertaken ca. 830 during the caliphate of al-Ma'mūn. To this our author adds the edition. translation and commentary of a new source, an Egyptian treatise on folk-astronomy written in 1210 by Sirāj al-Dunyā wa l-Dīn, identified in paper XI (p. 138) as the legal scholar Sirāj al-Dīn Muhammad

ibn Muhammad al-Sajāwandī (fl. ca. 1200). This source contains a report on the scientific expedition the ultimate source of which is a text written by the hapless qādī Yahyā ibn Aktham, commissioned by caliph al-Ma'mūn to put on record the results of the experience. King's highly critical analysis shows the flaws in the extant information. The report also gives information about the contemporary observation of a lunar eclipse in Baghdad and Mecca, in order to establish the difference in longitude between the two cities and to determine the *qibla* in Baghdad, as well as the measurement of the terrestrial distance between them. It is interesting to note (p. 229) that the mosque in the new Abbasid city of Samarra, built in year 847, had an orientation of about 15° West of South, which might be the result of the aforementioned observations.

Papers XI ("A world-map in the tradition of al-Bīrūnī and al-Khāzinī", 2007) and XII ("Mathematical geography in 15^{th} century Egypt", 2008) deal with mathematical geography in a period of decline. The first one begins by explaining the lack of information about al-Ma'mūn's famous world-map and the existence of maps of this kind in which cities are marked according to their longitudes and latitudes using a latitude scale or a grid. The sources available are late and do not seem to have been carefully drawn. King presents here a new world-map found in the aforementioned treatise on folk-astronomy (1210) written by al-Sajāwandī. It has a circular shape and the surrounding circle aims to be a kind of horizon in which the rising and setting points of the beginnings of the zodiacal signs are marked: the values involved do not correspond to any latitude. The northern hemisphere is represented in the lower semicircle and the cities appearing in them should, in principle, have projected according to been their longitudes (a scale of longitudes is marked on the horizontal diameter) and latitudes (scale on the lower half of the vertical diameter). King gives a list of the 55 cities appearing in the map and adds an estimation of the longitudes and latitudes involved, which, surprisingly, seem to coincide with the values of the geographical table (604 localities) included by al-Bīrūnī in his al-Oānūn al-Mas'ūdī, but only in the recension later used by al-Khāzinī in the al-Zīj al-Sanjarī.

Paper XII is a study of the geographical table of the 15th century Egyptian astronomer Muhibb al-Dīn, Abū 'Abd Allāh Muhammad b. Muhammad, known as Ibn al-'Attār, which contains the longitudes, latitudes and qibla values of ca. 425 localities. They are distributed along seven climates which do not correspond to the Ptolemaic ones, as the first climate begins at latitude 0° and the seventh ends at latitude 66;25° (the Arctic Circle). This corresponds to an Egyptian tradition existing, at least, since the beginning of the 14th c. King does not edit the whole table but gives the coordinates of nine localities as examples, some of which contain several sets of different values (four in the case of Mecca, five for Cairo, and so on), and he identifies the sources from which these coordinates were copied.

I hope that this summary of the contents of the volume does some justice to its obvious interest. In David King's preface (p. XIII), he expresses his gratitude to John Smedley, who has been responsible for the publication of King's five Variorum volumes, and ends by saying "Perhaps the best way to thank him is to promise him not to submit any more materials for another volume". I can only hope he breaks this promise: when I go over his list of publications, I note quite a number of them which I would like to see reprinted.

Julio Samsó