

# East-Asian Observations

## An Essay Review

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*East-Asian Archaeoastronomy---Historical Records of Astronomical Observations of China, Japan and Korea.* Zhengtao Xu, David W. Pankenier and Yaotiao Jiang (Gordon and Breach Science Publishers, The Netherlands, 2000). Pp. x + 430 + 8 plates. \$127. ISBN 905699302x.

For those interested in historical records of astronomical observations in East Asia but who are hindered by language obstacles, this book will be an indispensable bridge. As the result of lengthy, painstaking efforts in collecting, selecting, and collating a vast amount of original texts, the authors finally bring to their readers a technically accurate translation of 1416 observational records of various astronomical phenomena, ranging from solar and lunar eclipses to Comet Halley, guest stars, sunspots, aurora borealis, and groupings of multiple planets, dated from circa the 13<sup>th</sup> century BC to the end of the 17<sup>th</sup> century. In addition, the whole book is preceded by a brief but very pertinent introduction, and each specific category of records also begins with preliminary remarks of the same character. The introduction and the remarks sketch out not only the historical, cultural, and technical contexts in which these observations were conducted and documented, but they also outline the modern researches and applications of these records. By so doing, the book does not come out simply as a long, humdrum list of dry data, but as an elementary guide to the historical studies of astronomy based on these materials.

The translation of all collected records is done in a very professional manner so that, as the authors note in the preface, researchers will now be able to make direct use of these astronomical records in their works, without further complications. Modern equivalents of traditional Chinese ways of expressing dates, times, asterisms, as well as the coordinates of heavenly bodies are inserted either in the translation, or explained in the Introduction, preliminary remarks, or Appendix II of the book. Supposed locations of the different observations and their geographical coordinates are also provided. Unfortunately, however, basic notes for several of traditional Chinese notions seem to be overlooked. For example, there are no suitable explanations for the traditional Chinese units, *fen* (division) and *miao* (secondary division), of the magnitude of solar and lunar eclipses, although they are directly used a couple of times in the translation of the observations of luni-solar eclipses. Another example concerns the translation of the system of 24

cardinal points used in traditional Chinese texts to indicate the azimuth of a heavenly body or a celestial event. Although an illustration of the system (Fig.1.4) appears in the context of explaining the time reckoning methods of traditional China, our authors do not connect it explicitly with the names of the cardinal points most frequently occurring in the records of the aurora borealis. Neither do they give any warning on their representation of these directions with symbols like E, SW, NNW, WNW, and so on, which do not make a very good match with the system of 24 *shan*.

Another omission seems to be that the authors do not give an explicit explanation as to why they have ended the whole collection in the 17<sup>th</sup> century, whereas the history of the traditional Chinese practice of astronomical observation and recording did not disappear until the fall of the Qing dynasty in 1911. They also say nothing about the reason why the collected records of solar eclipses, lunar eclipses, Comet Halley, and groupings of multiple planets should end up respectively at the years 1634, 1624, 1378 and 1662, while the observational records of each category between these years and the end of the 17<sup>th</sup> century are still plentiful in East Asian sources. We can guess, perhaps, that the years 1634 and 1624 are chosen with a view to exclude the post-telescopic observations of luni-solar eclipses, while the selection of the year 1378 may have been due to the reason that, as F. Stephenson and K. C. Yau remark, after the beginning of accurate European positional measurements of Halley's comet at the 1456 apparition, the Far Eastern observations have little more than curiosity value (*Journal of the British Interplanetary Society*, xxxvii (1985), p.195). It seems, however, that no suitable justification can be found for the authors' choice of 1662 as the ending point for their collection of the observational records of planetary groupings.

One of the most interesting parts of the book is the section featuring astronomical observations from the oracle-bone inscriptions, including observations on solar and lunar eclipses, sunspots, Jupiter, comets, several specific fixed stars, new stars, etc. But due to the difficulty and subtlety involved in the deciphering of these old and abstruse inscriptions, great ambiguity still remains in the modern interpretation of some well-known oracle texts, including those that appear under the title aurora borealis in the oracle-bone section of this book. The key issue here concerns the deciphering of the word *zhi*. According to some paleographers, in this context *zhi* refers to spots or naevi, and therefore, "the sun has *zhi*" means the sun has spots, which is adopted by the authors of this book. But there are other paleographers as well who believe that this word can be understood as a homophonic substitution of the word *shi*, the regular character used by ancient Chinese people to indicate an eclipse. This opinion has gained much strength since the discovery in 1980 of an oracle bone bearing the inscription "on the day *renyin*, the moon has *zhi*", which is more reasonably interpreted as the occurrence of an eclipse of the moon than to be deciphered as the sudden appearance of some spots on the disk of the moon.

For the records from later dynasties, considerable trickiness still exists in distinguishing, for instance, new stars from comets, or sunspots and aurora borealis from other meteorological or optical phenomena, as well as distinguishing between actual events and some fancied phenomena in such cases as the occurrences of so-called *qixing* (strange stars), *yixing* (anomalous stars), *jixing* (auspicious stars), and so on. Under such a situation, reasonable criteria are most critical. Our authors' new criteria for the selection of sunspots are successful. One contribution here is their identification of the so-called *ridou* (sun struggle) with the appearance of sunspots. Literally understood, this notion shows no relation with sunspots. But according to ancient Chinese books on judicial astrology, the visibility of spots in the sun is a prerequisite in the identification of *ridou*. Their criteria for inclusion of original records of guest stars and aurora borealis are also more acceptable than those of their forerunners.

Like some of their forerunners such as Xi Zezong and Bo Shuren (*Acta astronomica sinica*, iii (1955), pp.183-196 and xiii (1965), pp.1-22), the authors also excerpt from the *Qing qintianjian tiben* (*Memorials of the Qing Bureau of Astronomy to the Throne*) a record about the 1690 guest star (p.338, no.106 (2)) and translate it into English (p.146, AD 1690 Sep 29 [China] (2)). But it turns out that the Chinese texts originally reproduced by Xi Zezong and Bo Shuren contains a critical typo: the three words describing the location of the guest star should be *zai chou gong* (in the zodiac sign *chou*), rather than *zai chou wei* (literally in the tail of *chou*, which simply makes no sense). Unfortunately, this typo has not been previously detected and remains uncorrected in our authors' collection of original texts. In addition, the authors seem to have misunderstood the system of coordinates adopted by the Qing Bureau of Astronomy. Therefore, the positional information of the guest star is mistranslated as: "instrumental measurement placed it in the direction *chou* [NNE], longitude 3 *du*, 18 *fen* in WEI [LM 6] with a southerly latitude (declination) of 34 *du*, 20 *fen*". In fact, the correct translation should be: "instrumental measurement placed it in the zodiac sign *chou* [Capricorn], longitude [Capricorn] 3°18' with a southerly latitude 34°20'." Since the standard ecliptic system of coordinates was adopted by the Qing Bureau of Astronomy, the longitude and latitude used here are not traditional Chinese equatorial coordinates, measured in traditional Chinese *du* and *fen* of arc, as our authors seem to believe.

Again, like all of their forerunners, our authors have missed the observation of another guest star that appeared two years earlier, on 11 November 1688, but which was also recorded in the *Qing qintianjian tiben*. Since this record has not been included in any hitherto available catalogue of historical new stars, I translate it here, in the same orthographic style of our authors, as follows: "Emperor Shenzu of Qing, 27<sup>th</sup> year of the Kangxi reign period, 10<sup>th</sup> month, 10<sup>th</sup> day, *jiyou* [46]. In the fourth watch at night, an anomalous star was observed to appear in the southwest, right under the TIANQUN. It was white and lacked a rayed tail. Instrumental measurement placed it in

the zodiac sign *xu* [Aries], longitude [Aries]  $27^{\circ}5'$  with a southerly latitude  $15^{\circ}56'$ , within the range of KUI [LM 15]. On 11<sup>th</sup> day in the forth watch at night, measurement located it under the TIANQUN. On the 12<sup>th</sup> day in the fifth watch [at night], more careful measurement showed that the star is still under the TIANQUN and did not move. It did not have a rayed tail as well and therefore was a guest star.”

Compared to the more than 10,000 historical records incorporated in the *Union Table of Astronomical Records of Ancient China (Zhongguo gudai tianxiang jilu zongji*, Nanjing: Jiansu kexue jishu chubanshe, 1988), the collection in this book may still seem to be a small dwarf. Considering that it is the first attempt to translate comprehensively such historical materials into English, we should not be too demanding. But for a revised edition, our authors may need to consider the possibility of making available for Western readers the vast number of observational records of such celestial phenomena like ordinary comets, shooting stars, and the occultation of the moon and planets over the fixed stars, which are of high interest in the historical study of astronomy. There are also a few points of carelessness in the proof reading and printing that need to be corrected. For example, the “8.1” in line 13 on page 184 should be “8.2”; and the “last” in line 6 on page 186 should be “least.” The page numbers of Xi Zezong and Bo Shuren (1965) on page 129 are incomplete, while the publisher’s information concerning N. Z. Dai and M. D. Chen (1980) on page 187 is missing, and the transliteration/romanization of the Japanese title and publisher of M. Osaki (1994) on page 188 is obviously incorrect. Another problem is that the record of the AD 1634 solar eclipse on page 52 may need to be deleted because, as the record itself clearly indicates, all of its data are calculated results rather than observed ones. In fact, a detailed observational record of the same eclipse can be found in the long introductory section of the *Xiyang xinfa lishu (Treatises on Calendrical Astronomy According to New Methods from the West)*. Moreover, the *sui xing* in line 31 on page 192 may not be translated as “falling stars”, because in classical Chinese *sui* has no connection with “falling”. But it could be used in substitution of the homophonic word meaning a fire-making tool, a torch, or a beacon fire, which fits into this context very well.

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