

Ambiguity, Scope, and Significance: Difficulties in Interpreting Celestial Phenomena in Chinese Records

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Abstract. Several problems contribute to difficulties in interpreting transient celestial phenomena as described in Chinese records. Frameworks are an overarching problem. *Tianwen*, the modern Chinese term for astronomy, in pre-modern times included meteorological phenomena and was concerned with omenology. Manuscripts that include star charts and comets but also meteorological phenomena and omen reading texts were routinely reframed in modern scholarship to appear as if they included only astronomical content. The scope of pre-modern *tianwen*, however, was broader than its modern sense. Pre-modern celestial phenomena had political and religious significance. Apparent ambiguity arises from the presence of both meteorological and astronomical phenomena in a single category and from features of the classical Chinese language. Accounting for these problems is essential for research into transient phenomena using historical archives.

Keywords. history and philosophy of astronomy, sociology of astronomy, (Sun:) sunspots, comets: general

1. Misinterpretations and Category Errors

Misinterpretations of East Asian records of transient phenomena stem from three basic problems: (a) the broad scope of the celestial sciences in East Asia, (b) the omenological significance of celestial phenomena within broader historical narratives, and (c) aspects of the classical Chinese language, East Asia's pre-modern *lingua franca*.

Category errors lie at the heart of the problem. The modern Chinese word for astronomy is *tianwen*, but the same term had a broader scope in pre-modern times. Literally, it meant “celestial patterns.” *Tianwen* included both astronomical and meteorological phenomena, encompassing omenological interpretation as well as observational practices. Nonetheless, modern scholarship sometimes treats *tianwen* as if it included only astronomical phenomena. Liu *et al.* (2014) misinterpreted a dust storm in *tianwen* records as a reference to “dust rain” from a comet, citing this as evidence that a comet's impact with the Earth's atmosphere had caused the global spike in levels of ^{14}C and ^{10}B in the late 8th century. Because this explanation is based on a faulty translation, it has been rejected (Chapman, Csikszentmihalyi, & Neuhäuser 2014; Stephenson 2015).

Understanding East Asian records of celestial phenomena requires considering how and why pre-modern observers recorded and categorized them. Modern readers do not expect to see human historical events mixed up with records of celestial ones. While Chinese models of celestial regularities became increasingly precise, accurate and predictive over time (Morgan 2017), the political significance of celestial phenomena persisted. This was especially true of irregular and unpredictable phenomena—transient phenomena—such as

comets, novæ, and auroræ, as well as appearances of what modern researchers regard as meteorological events: strange clouds, rainbows, floods and droughts, and halos around the Sun and the Moon.

2. Frameworks

The category of astronomy is a framework that influences the way technical materials are represented in scholarly journals and monographs. The scholar writing on the history of astronomy faces a difficult task when working with pre-modern records and manuscripts. Excising seemingly irrelevant parts of technical manuscripts obscures differences between modern astronomy and pre-modern modes of observing the heavens.

Scholarship surrounding a complex omenological manuscript found in the tombs of the Marquises of Dai at Mawangdui (*terminus ad quem* 168 BC) provides an illustrative case. In his history of *tianwen* in China, Chen Meidong refers to the manuscript simply as a “chart of comets” (Chen 2008). Archaeologist Feng Shi likewise creates the sense that the manuscript primarily features comets, presenting in his *Archaeoastronomy in China* a photographic image including eight comets and a line-drawing including 29 comets (Feng 2001). However, the six horizontal registers of the full manuscript contain a variety of phenomena including rainbows, halos around the Sun and Moon, eclipses, clouds shaped like animals, trees, and in one case the Big Dipper, plus others more difficult to identify. The images are paired with prognostic statements predicting military victories and defeats, bumper crops and famines, murdered kings and political disorder (Qiu 2014).

A manuscript discovered at the Dunhuang caves (Or.8210/S.3326), billed as the world’s earliest extant star chart, presents a better-known example. Non-astronomical portions of this manuscript have also been excised so that it appears more cleanly and unambiguously scientific. Like the Mawangdui manuscript, the so-called “Dunhuang Star Chart” or “Dunhuang Star Atlas” is more complex than its conventional name implies. Images of clouds paired with prognostic information make up about half of the total manuscript. Bonnet-Bidaud *et al.* (2009) largely elide the cloud divination text in their discussion of the manuscript, while Feng Shi (2001) and Sun & Kistemaker (1997), further removed from the manuscript, leave it out entirely.

3. Scope of the Celestial Sciences

The scope of phenomena that early observers tracked can be seen not only in rare manuscripts but also in treatises in the standard histories. Technical treatises reveal both the organization and the significance of actor categories. These categories are also manifest in the structures of the institutions responsible for observing and recording celestial phenomena.

The first of the standard histories in the Chinese tradition was compiled by Sima Qian (145–86). He served as *Taishi ling*, a title that has been rendered into English as “Senior Archivist” (Nylan 1998–1999), “Director of Astronomy” (Loewe 2000), and “Prefect Grand Astrologer” (Bielenstein 1980). Sima Qian included in his history a series of technical treatises. His treatise on the “Celestial Offices” described celestial bodies, explained their omenological significance, and argued that the observation and interpretation of celestial signs was a crucial component of sage governance.

Sima Qian’s treatise compiles technical information concerning celestial bodies and omen reading. It enumerates some 412 stars scattered over 89 asterisms (Pankenier 2013), and gives detailed accounts of the movements of each of the five visible planets. It provides omenological information on halos around the Sun and Moon, eclipses, *qi* phenomena, and aberrant behaviour by the planets, such as unexpected retrograde motion or scintillation. Transient phenomena play a major role in the treatise. It describes various types of

xing – a word usually translated as star – that appear, or are said to appear, as baleful or auspicious omens; meteors, comets, and novæ are identified as *xing* of this type. It also includes information on interpreting clouds and *qi*.

Eastern Han records (24–220) show institutions that map onto a scope of practice similar to that in Sima Qian's treatise. Under the *Taishi ling*, there were three major Assistants, one of whom acted as director of the Imperial Observatory. The observatory employed fourteen officials responsible for observing various types of *xing*. It also included twelve officials responsible for observing *qi* phenomena such as auroræ, halos, and strange clouds (Bielenstein 1980).

By the Eastern Han, Chinese approaches to the heavens would be divided into two major categories, *tianwen* and *lǐli* (harmonics and mathematical astronomy), both of which received individual treatises in many of the Chinese dynastic histories. They played complementary roles. Modern scholars sometimes make a dichotomy between astrology or astro-omenology in *tianwen*, counter to mathematical astronomy in *lǐli*. However, this division can be deceptive. Records of comets, auroræ and novæ are much more likely to appear in a *tianwen* treatise than in a *lǐli* treatise, as transient phenomena usually cannot be assimilated by any mathematical description under pre-modern conditions. The key distinction between *tianwen* and *lǐli* lies in irregularity *versus* regularity. *Lǐli* establishes precise ratios to describe both harmonic intervals and the movements of celestial bodies.

Many of the standard dynastic histories include a general omenological treatise, called the *Wuxing* or “Five Phases” treatise. These include numerous records of celestial phenomena, as well as many phenomena (ranging from two-headed chickens to earthquakes) that have no obvious relationship with the heavens. The *Hanshu* (*History of the Han*) *Wuxing* treatise contains more records of celestial phenomena than does the treatise on *Tianwen*. It organizes each category of sign chronologically, gravitating toward the collapse of the Western Han dynasty.

4. Significance of Celestial Signs

Celestial signs had political and religious significance. The *Hanshu tianwen* treatise explains: [*Signs*] originate in the earth and erupt into the heavens. When governance fails below, then aberrations appear above, just as shadows are the counterparts of their forms and echoes are responses to sounds. This is why the clear-sighted ruler sees them and awakens, putting himself in order and rectifying his affairs (26.1273).

An early folk etymology for the Chinese graph for king demonstrates how early court figures thought about the relationship between human beings and the cosmos. It reads the three horizontal lines in the graph as referring to heaven above, the human realm in the middle, and the earth below. The emperor acts as a veritable *axis mundi*, the vertical line that binds together the whole of the cosmos (Lai 1984, 44.295). His political policies and ritual comportment explain the appearance of inauspicious transient phenomena.

5. The Problem of Ambiguity

The scope and significance of celestial phenomena in East Asian records creates substantial difficulties for researchers who mine them for astronomical data. This difficulty is compounded at times by ambiguities arising from particular words and features of classical Chinese syntax. *Qi*, like *xing*, presents problems. *Qi* operated in human bodies, the terrestrial world, and the cosmos. By the late 1st Century BC, *qi* had multiple processual aspects, *yin* and *yang* and the Five Phases, and it played a role in fields ranging from philosophy to medicine. *Qi* was a kind of “matter that incorporates vitality” (Lloyd & Sivin 2003, p. 198). *Qi* has been variously rendered into English as *material force*, *vapour*, *psychophysical stuff* (Gardner 2007), and *materia vitalis* (Pankenier 2013).

Syntax also presents problems. Classical Chinese does not distinguish between active and passive senses of verbs. The verb *guan*, often used to describe halos or shafts of light, may mean to penetrate or to be penetrated, to encircle or to be encircled. Prepositions are often ambiguous from a purely linguistic standpoint. The phrase *ri pang* could mean “next to the Sun” or “on the side of the Sun”, depending on context. When black *qi* appears on the *ri pang* in a sunspot record, context means the latter form must be chosen (*contra* e.g., Abbott & Juhl 2016).

6. Conclusion

Three points should be kept in mind when using East Asian records to study transient phenomena. First, meteorological phenomena intermingle with (and can be mistaken for) astronomical phenomena in East Asian records. A light in the sky that is actually a backlit cloud might easily be mistaken for an aurora. Second, prepositions are always suspect. There is seldom a hard linguistic distinction between being next to an object or being on the side of an object, or between penetrating an object or encircling it. Finally, records are mediated by the large-scale textual projects in which they are included. Records are part of a broader historical narrative, and historical circumstances played a role in what was transmitted and what survived.

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