Astronomy and Politics

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Contents

Abstract

The relationship between astronomy and politics is a complex but important part of understanding the practice of astronomy throughout history. This chapter explores some of the ways that astronomy, astrology, and politics have interacted, placing particular focus on the way that astronomy and astrology have been used for political purposes by both people in power and people who wish to influence a ruler's policy. Also discussed are the effects that politics has had on the development of astronomy and, in particular, upon the recording and preservation of astronomical knowledge.

Introduction

Astronomy has long had – and still has – a close relationship with politics. State and/or royal funding has provided one of the most common means of support for

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astronomers in many cultures over the past 3,000 years or so. This support has come in various forms including the building of astronomical instruments and observatories and the employment of scholars to provide astronomical and astrological advice to kings and governments. In return, astronomy has served the state in a wide variety of ways both directly practical (e.g., in the regulation of the calendar, in surveying and mapping, and in providing astronomical and astrological advice) and what might be called symbolic (e.g., as a means to illustrate cosmic harmony and by providing the means for a ruler to demonstrate his power and enlightened governance through the patronage of scholars).

The relationship between astronomy and politics is often extremely complicated to understand because of the competing motivations of individual astronomers and the state which can lead to a variety of biases in the development, practice, and recording of astronomy. The most obvious manifestation of this is in the channeling of astronomical activity into specific areas of research directly relevant to problems of state, which might either provide the opportunity for or conversely prevent astronomers from making new astronomical developments. For example, the eighteenth century saw intense activity in area of solar system dynamics, the production of star catalogues, and the development of more accurate instruments for measuring celestial positions. A significant drive behind these astronomical developments was the need to survey new territories, to produce more accurate maps of the known world, and – most notably – to provide a method for the accurate determination of longitude at sea. Many of these activities were funded, either directly by the support of astronomers and the provision of equipment or indirectly through prizes, by governments. Work on solar system dynamics resulted in several significant advances within physics and mathematics, in particular through Euler's development of methods of trigonometrical calculus and perturbation theory in the application of gravitational theory to the solar system bodies. The same centuries, however, saw a decline of interest in cosmological questions, which had no application to the practical needs of governments.

Governments not only have funded astronomical activities but also have sometimes sought to control what types of astronomy are being done and who is doing it. In extreme cases, this has included governments prohibiting the practice of astronomy by anyone who was not a state employee. More commonly, however, it led to the suppression or manipulation of astronomical writings for political ends.

A second aspect of the relationship between astronomy and politics that needs to be considered is the exploitation of this relationship by individual astronomers and the effect this has on their own astronomical practices. This manifests itself in many different ways ranging from undertaking particular astronomical projects of interest to the state in order to provide the funds to also undertake astronomical work of particular interest to the astronomer, to seeking patronage from kings or others through flattery (e.g., Galileo's naming of the moons of Jupiter after the Medicis and Herschel's naming of Uranus as the Georgian planet after George III), to using astronomy or astrology as a means to influence government policy.

The complex relationship between astronomy and politics has had a demonstrable impact on how and in which directions astronomy has developed over the past

3,000 years or so. In these following sections, I discuss some of the different ways in which astronomy and politics have interacted, drawing examples from a variety of different cultures. All my examples come from cultures where written sources provide direct and clear evidence for the relationship between politics and astronomy. But many of the issues relating to the relationship between astronomy and politics that I discuss here must also have counterparts in societies from which written sources are not preserved. Archaeoastronomical researchers may benefit from considering these types of issues when investigating the astronomical practices of early or traditional cultures, although often these complex social relationships between astronomers and rulers are difficult or even impossible to recover from archaeological evidence alone.

The Calendar and the State

Calendars serve several purposes within a state. On a mundane level, a calendar provides a framework for the operation of many parts of a state's bureaucracy such as the collection of taxes and tributes, while on an ideological level, a calendar can serve to strengthen national identity by ensuring that the whole population celebrate festivals and perform rituals at the same time (Steele 2012).

Most calendars are based upon observable astronomical phenomena such as the cycle of the phases of the moon and the cycle of the sun's motion through the stars or along the horizon. For example, many early calendars define the month as the period between successive first visibilities of the new moon crescent, which, barring bad weather, will be seen after either 29 or 30 days. Years are often defined as containing 12 lunar months; this is about 10 days short of the length of the solar year, and so in some calendars an extra ("intercalary") thirteenth month is inserted roughly once every 3 years to keep the calendar in line with the seasons. Astronomical rules for regulating the calendar, simple observational rules of thumb, or more advanced methods based upon cycles or which employ mathematical astronomy to calculate the position of the sun and moon were developed in many cultures, but the decision on whether to use such rules was often a political decision, separate from the question of the accuracy of the rules. For example, a variety of rules for determining when to intercalate are found in second and early first millennium BC texts from Babylonia and Assyria, but we have no evidence for their use in the civil calendar until much later. Indeed, it is probably significant that strict astronomical rules for regulating the calendar were only adopted for use in the Babylonian civil calendar during the Achaemenid period (c. 500 BC), a time of foreign rule in Babylonia. It seems that the earlier, native Babylonian rulers were unwilling to hand over control of the calendar to their astronomers, preferring to retain the prerogative to determine the calendar themselves, probably both as an expression of their own control over the state and because of the freedom it gave them to manipulate the calendar for their own ends, for example, by postponing an expected intercalation in order that tax and tribute payments would be received 1 month earlier (Steele 2011).

Political Factors in the Development and Adoption of Astronomical Systems

States sometimes officially adopt complete systems of theoretical astronomy which provide the means to calculate astronomical phenomena by means of tables or sets of mathematical procedures (I shall call these systems "astronomical systems"). For example, Tobias Mayer's lunar tables were adopted as the basis for the first Nautical Almanac in 1767 and as such acquired official status throughout the British Empire (Forbes 1966). Although Mayer's work on these tables was not funded by the British government, he was encouraged in his efforts by the possibility of winning the so-called Longitude Prize set up by the government (unfortunately, Mayer died before his tables could be fully tested; his widow was eventually awarded a small part of the prize).

China provides even clearer examples of the role of politics in the development of astronomical systems (Eberhard 1957). More than 50 astronomical systems (*li* 曆, often translated as "calendar") were officially adopted by the Chinese emperor between the second century BC and the seventeenth century AD (Yabuuti 1963, pp. 445–492; Sivin 2011). Chinese astronomical systems serve several purposes: (1) they provide the means to calculate the day of the beginning of each month of the year and to determine whether an intercalary month is needed and where it should be placed within the year (Steele 2000, pp. 170–175), (2) they provide the means by which astronomical phenomena such as eclipses and planetary conjunctions can be calculated, and (3) they are a symbol of dynastic legitimacy by the Chinese rulers. These roles derive in part from a political philosophy referred to as the "mandate of heaven" (*tianming* 天命). According to this philosophical system, the emperor was granted the rule of China by heaven, but this mandate could be withdrawn if heaven was displeased with his rule (Pankenier 1995; Loewe 2004, pp. 421–456). In order to maintain the mandate, it was necessary for the emperor to perform regular rituals at specified times to maintain the harmony of the state and the cosmos. The calendar produced by the astronomical system demonstrated the emperor's control over the whole of China (Sivin 2011). Similarly, the ability to predict astronomical phenomena using the astronomical system allowed the heavens to be brought into order, reducing the number of unexpected astronomical events which could be interpreted as omens (Sivin 1969). As a result, a functioning astronomical system was required by the Chinese emperor.

The political importance of astronomical systems in China has several consequences. First and foremost, new astronomical systems could only be adopted when there was the political will to do so, which could lead to delays in adopting a proposed system, or even rejection of a system, even though the proposed system might be astronomically superior to the existing system. For example, reform of the astronomical system used in the second century BC was delayed by several decades until Emperor Wu decided the time was right to adopt a new system (Cullen 1993). Secondly, the reason for adopting a new astronomical system was sometimes itself purely political. For example, in order to establish or renew dynastic legitimacy, when a new dynasty came to power, it was common to replace existing institutions

with new institutions, including the adoption of a new astronomical system (Yabuuti 1974). As a result, some astronomical systems only differ cosmetically from their predecessors: it was necessary to reform and launch a new system, even if that new system was essentially the same as the old system.

A further consequence of the political importance of astronomical systems in China was attempts at certain periods to control astronomical knowledge so that the emperor's political opponents could not have their own astronomical system (necessary to establish legitimacy) ready if they seized power. Such was the importance of the calendar and the astronomical system that as soon as the Mongols took control of China and established the Yuan dynasty, they began constructing a new astronomical system along traditional Chinese lines (Sivin 2009).

Astrology and Political Decision Making

Many cultures have developed systems of astrology for interpreting celestial phenomena that have been utilized by the state. Astrology has been used by rulers ranging from the Neo-Assyrian kings of the eighth century BC to (it has been claimed) 1980s American president Ronald Reagan (Barton 1994, p. 4), both as a source of advice when making decisions and to provide self or public justifications for those decisions. Astrology has also been used by the political opponents of rulers either to criticize the current ruler's performance or to claim support for the policies advocated by his opponent.

In Mesopotamia, the apodoses found in traditional celestial omens always refer to the country as a whole or to the person of the king. These apodoses include references to wars, floods, famines and other environmental circumstances, and the king and his relations with members of his household. During the Neo-Assyrian period, a large body of correspondence is preserved between the Assyrian kings, in particular Esarhaddon (ruled 681–669 BC) and his successor Assurbanipal (669–c. 627 BC), and scholars employed to advise the king based upon the interpretation of omens (Hunger 1992; Parpola 1993; Brown 2000). This correspondence paints a detailed picture of the role of astronomy and astrology in the Neo-Assyrian court (see the case study Astronomy, Divination, and Politics in the Neo-Assyrian Empire). What is of interest here is the kind of advice given by the scholars and their way of presenting this advice. The subject of this advice ranges from the timing of the signing of treaties, military campaigns, and the health of the king to activities in the court and festivals. In all cases, this advice is either stated explicitly or is implied to be based upon the scholar's interpretation of celestial events. However, some scholars took considerable liberties in the interpretation of these omens in order to provide support for the advice that the scholar wished to give the king. In particular, the scholar Bel-Ušezib wrote several letters to the king in which he provided extremely detailed advice about tactics for an ongoing military campaign which bear little connection to the celestial omens he reports at the beginning of his letter. It is hard to avoid the conclusion that for Bel-Ušezib, celestial divination was simply a device by which he could try to influence the king's actions and that

the omens he quotes are little more than window dressing for what is a purely political letter.

The king avoided any single scholar having undue political influence by employing a large group of scholars who would send him independent interpretations of the omens (Koch-Westenholz 1995, pp. 137–151). Often the scholars would send the king differing interpretations – sometimes even directly opposing interpretations of the same event – providing the king with a range of advice from which he could take what he wished. The advice provided by the scholars on the basis of celestial omens can therefore be compared to the range of advice than a modern prime minister or president receives from, say, his economic or scientific advisors. Astrology alone did not determine actions by the government but was part of the political process by which the king reached decisions.

Astrology also made a significant contribution to political decision making in China. As I have discussed in the previous section, astronomy and astrology played an important role in establishing and maintaining a dynasty's heavenly mandate. Consideration of astrology was deemed to be essential to many aspects of state activity, including success in battle. By the early first millennium BC, the system known as "field-allocation astrology" had been developed which correlated parts of the heavens with provinces within China. In later periods, the system was refined, and correlations were made between individual stars and buildings, offices, and institutions of the state (e.g., the *Jinshu* lists the circumpolar stars and their correspondence with the Emperor and the rooms of his palace) (Ho 1966). Pankenier (1999) has shown that the principles of field-allocations astrology were applied in two major battles during the Zhou period: the battle of Muye (1046 BC) and the battle of Chengpu (632 BC).

By the second century BC, portent astrology came to be seen as a means by which heaven could comment on the rule of the emperor. Auspicious and inauspicious omens were drawn from irregular occurrences in the world, including astronomical phenomena such as solar eclipses, comets, guest stars (novae or supernovae), meteors, and sunspots. Too many negative omens could be interpreted as a sign that the emperor's mandate was failing (Eberhard 1957). The observation, memorialization, and recording of celestial and other portents were therefore of major political importance. Wu (1990) has shown that the way in which particularly important portents were presented to the emperor and the time chosen to make the presentation could be affected by political considerations. Studies by Eberhard (1957), Bielenstein (1984), Kern (2000), and others have further shown that the compilers of the dynastic histories also recognized the political significance of the records of portents and manipulated the astronomical record as a form of political commentary on earlier Chinese history by only including a subset of the observations made at the time.

In the west, the most prevalent form of astrology has been the horoscope in which the position of the sun, moon, and planets and the ascendant at a specific moment are calculated and interpreted to give prediction relating to whatever is associated with that moment. Most frequently, horoscopes are cast for the birth of an individual, but horoscopes have also been cast for the founding of cities, the

beginning of journeys, and to determine the best time to make important decisions (Barton 1994; Beck 2007).

Accounts of the political use of horoscopes abound in Roman sources from the first few centuries AD (Cramer 1954; Barton 1994). Although caution must be exercised in interpreting literally the writings of many Latin literary-historical works, the picture that emerges from these works is of a society in which horoscopes were used extensively as political tools. Most commonly, we find references to the horoscopes of the emperors supposedly cast when they were children which predict that the child will become a great ruler. Some of the emperors are themselves said to be highly competent astrologers, who could cast their own horoscopes and those of their enemies. Astrologers such as Thrasyllus were portrayed as the power behind the Emperor's throne. Many of these stories may be fictitious, but fictions only work in literature if they in some fashion reflect reality. The potential political power of horoscopes of the emperor – or of those who might challenge him – led to several attempts to control or even outlaw astrologers in Rome.

Astrology and the Public Sphere

The importance of horoscopes in Roman political life was not simply confined to discussions between members of the elite but also permeated the public sphere. After seizing power, Augustus used references to astrology in order to legitimize his claim as emperor, associating himself with the zodiacal sign Capricorn. He had coins minted with Capricorn on them, and the zodiacal sign appears on many sculptures, reliefs, and pieces of jewelry dating from the time of his reign (Barton 1994, p. 40). Later emperors followed suit, making it known that their horoscope foretold that they were destined to be emperor. Septimius Severus, another who sought to legitimize his rule, reportedly published omens that had predicted that he would become emperor in his autobiography and, according to Dio, even decorated the ceilings of the rooms in his palace with his horoscope, although carefully altering the position of the ascendant in each room so that no one would know all the details of his true horoscope (Barton 1994, p. 46).

The Neo-Assyrian kings also used astrology for political purposes in their public pronouncements. Several royal inscriptions include references to celestial omens (Koch-Westenholz 1994, pp. 152–161). These inscriptions were written in order to commemorate the king and his actions and incorporated into monuments constructed throughout his empire, as both a demonstration of the king's power and a symbol of his control of (and care for?) cities across the empire. Although it is unlikely that these inscriptions could be read by most of the population given both the fairly low levels of literacy and the placement of most of the inscriptions at too great a distance from eye level to be read, people probably knew what the inscriptions said without having to read them. The inclusion of omens which supported the king's actions in the inscriptions therefore needs to be seen in the wider context of the propagandistic use of the inscriptions and the monuments as a whole. This raises the question of whether omens were used for propaganda in other contexts such as speeches.

Conclusion

The examples I have discussed in this chapter demonstrate the important interrelation between astronomy, astrology, and politics and between astronomers, kings, and other political figures. The practice of astronomy in many cultures was significantly influenced by the political circumstances of the time, and this affected the development of astronomy in many different ways. Similarly, many political decisions were influenced by astronomical or astrological considerations. This resulted in a complex social relationship between astronomers and astrologers on the one side and kings and governments on the other, making this a profitable avenue for historical study.

For the historian of science, one other consequence of the interaction between astronomy and politics is important to consider. In situations where astronomical data could be interpreted astrologically with political significance, the recording of the astronomical data or the astrological interpretation becomes itself an act with political consequences. As a result, it is necessary to consider not only how politics influenced the development and practice of astronomy but also how the preserved record on which we reconstruct out understanding of this development and practice has itself been influenced (in some case, even deliberately manipulated) for political reasons. Thus, understanding the political context within which astronomy was practiced and astronomical texts were written and transmitted through time is important for reconstructing the history of astronomy. These political factors are only occasionally explicit in written sources, but, to a greater or lesser extent, they must be present in all astronomical traditions.

Cross-References

- ▶ Ancient Chinese Astronomy - an Overview
- ▶ Astrology as Cultural Astronomy
- ▶ Astronomy and Power
- ▶ Astronomy, Divination, and Politics in the Neo-Assyrian Empire
- ▶ Greco-Roman Astrology
- ▶ Observation of Celestial Phenomena in Ancient China

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