

SAW Conference on Rituals, Mathematics and the Astral sciences 7th and 8th June 2016

organized by

Sho Hirose, Matthieu Husson, Karine Chemla, Agathe Keller and Daniel Morgan

Université Paris Diderot, Condorcet Building room 646A - 9:30 am to 5:30 pm

Programme

Presentation

Ritual is a science of precision. Like any proper performance or game, ritual choreographs action to the beat and bounds of time, and it manipulates symbols with rigorous rules of accounting. The calendar, the timepiece, the tokens, the altars, the counts—to mathematics and the astral sciences are owed the rigor of ritual, one might say, and to ritual, one of the very meanings of these sciences. In this workshop, we will reflect upon the interdependence of ritual, mathematics, and astronomy in the ancient world, giving special attention to the question of astronomical and computational practices unique to the context of ritual.

What textual resources could help us in this reflection? Chinese sources suggest that this question is worth asking. Indeed, as Zhu Yiwen has established in the context of the SAW project, many ancient commentaries on Confucian Classics develop computations precisely in relation to questions of rituals. Moreover, a 6th century mathematical Classic dealing with the mathematical knowledge required for Confucian canons gives rituals pride of place. Why and what for? How can the articulation of mathematics and ritual in this context be understood?

Were there specific mathematical computations developed for ritual? In India a Kerala tradition of astrologers using cauri shells both for computations and for casting horoscopes is known—how localized are such practices? Have they developed specific ways of computing or casting horoscopes?

What were the relations between astral sciences and mathematics in the context of ritual? In the Indian subcontinent, for example, the very first texts on astral science (*jyotiṣa*) and mathematics (*ganita*) are related to Vedic ritual, while being wholly distinct in terms of aims and textual genre. When and how then are mathematics or astral science involved in “Vedic” rituals? What are their connections in this context? How different is this from the situation of “Hindu” rituals? Are there Hindu ritual texts containing references to astral science and/or requiring mathematical activities? What about Jain texts?

Further, how did developments in astronomical knowledge affect the timing, contents, or performance of rituals? For example, in early imperial China, the state astronomical office was a subsidiary of the Ministry of Rites, its task being to “observe the phenomena/signs and grant the seasons” according to the sacrosanct precedent of the Sage Kings of old. In practice, this translated to the operation of an observatory for the purposes of observation, testing, record-keeping, omen-interpretation, and briefing as well as a staff of computers, whose job it was to produce a calendar that would realize the synchronization of humanity, the spirits, and Heaven above. Later detached from the Ministry of Rites, how much of this office’s activities went into state ritual *per se*? What other than symbolism was the substance of debate as concerns the role of the astral sciences in ritual? Equally important, what was the situation like beyond the state ritual apparatus, in the performance of personal and popular rites, or in the great religions of Buddhism and Daoism? In the Indian subcontinent, how much did the introduction of horoscopes affect the assessment of “auspicious days” for rituals?

We also need to better understand how different sub-topics within the astral sciences (e.g. astronomy, horoscopy, divination, ...) could be related to rituals, and in which circumstances they involved computations. For instance, what elements of the Indian almanach, the *pañcāṅga*, are specifically required for the performance of ritual?

How were technologies like water clocks, calendars, and ephemerides used to regulate ritual time? What sort of empirical questions were raised about these technologies in the context of ritual, and how were they resolved?

The realm is very large according to the definition given to “ritual”, and taking into account the long historical span of both India and China, papers then will be on specific case studies addressing some of these questions.

Programme June 2016, Tuesday 7th - room 646 A, Condorcet Building

9:30 - 11:00

Alan Levinovitz (James Madison University, USA), **Daniel P. Morgan** (CNRS, SPHERE & SAW Project, Paris)

Virtue on Trial: Ritual Archery Competitions and Astronomical Testing in Early China

Abstract – In this talk, we will analyze written sources for the “Big Shoot” 大射, a ritual archery contest held at court for the purpose of selecting officers to participate in the royal sacrifices. The key to the “observation of virtue” in sport and/as ritual, we argue, is its quantification and the observed assurance of exact, reproducible benchmarks, and it is there, as concerns scoring and target geometry, where later commentaries spill the most amount of ink. This begs the question of whether the “Big Shoot” represents historical practice or scholastic fantasy, which we address with a survey of historical records from the third century BCE to the ninth century CE. Having explored the transferability of this model of ritualized, meritocratic testing over time, we then turn in the second half to an exploration of how the “shoot” 射 came to inform other forms of testing at the core of the history of science and thought in early Imperial China. The institution of the live trial for making policy decisions as concerns li 曆 calendro-astronomy, it turns out, operates on the same model and same rules of scoring, appealing to the vocabulary of archery to conceptualize accuracy, which comes as little surprise considering as how it was the grand clerk, or astronomer royale, who presided over both competitions. But, we argue, there is more than a bureaucratic connection at stake here. The archery competition reveals to the observers (觀者) the virtue of the participants, and, in turn, the virtue of the commander who chose them. Hitting the targets reveals broader capabilities of those involved—just as the participants aim at (CNRS, Université de Tours) targets to reveal their archery prowess, the “target” system aimed at by the competition is not archery prowess but rather the virtuousness of the participants. The same archetypal testing system transfers neatly over to testing li, where a competition limited to specified targets (heliacal rising, etc.) serve to reveal the adequacy of li to an entire target system, namely the heavens. The accuracy of li, in turn, serves to reveal the “virtue” of its author and the ruler who possesses it. We will discuss these archetypes by building on recent work in philosophy of scientific modeling, looking at the correspondence between a competition and iconic modeling, and considering competition as a widespread but under-theorized form of idealization, the structure of which helps to illuminate foundational epistemic virtues of science.

Commentator: Pascal Brioist (CNRS, CESR, Université de Tours)

11:30 -13:00

Michio Yano (Kyoto Sangyo University, Japan)

Astrology and rituals in India – with special references to the Muhūrtacintāmaṇi

Abstract – Astrology played an important role in India since the Vedic period. Out of the many elements of astrology I would like to focus on the *muhūrta* and its significance in rituals. In the old texts, the *muhūrta* is a time unit of 1/30 of a day, there being 15 *muhūrtas* of day and 15 *muhūrtas* of night, each with its own name. In ritual texts, the *muhūrta* is mentioned in the context of good or bad moment for sacrificial rites. The word *muhūrta* gained a general meaning after the establishment of the five elements (pañcāṅga) of the calendar, namely, the *nakṣatra* (lunar mansion), *tithi* (lunar day), *karaṇa* (half of tithi), *yoga* (based on the sum of solar and lunar longitudes), and *vāra* (weekday). Astrologers were expected to foretell auspicious and inauspicious *muhūrta* based on the combination of all the time units beginning with the year, namely, the half-year, season, month, half-month and the pañcāṅga elements. The planetary weekday was a new element of astrology introduced from the west with the 12 *rāśis* (zodiacal signs) and the 12 bhāvas (houses). These new elements contributed to the further sophistication of the *muhūrta* theory. From the beginning of the second millennium CE, texts dealing exclusively with *muhūrta* appear and begin to form a new genre of astrological literature, *muhūrta-śāstra*.

The most popular text of this genre is the *Muhūrtacintāmaṇi* composed by Rāma in 1600 CE. This text was commented upon by the author himself, and it was only three years later (1603 CE) that Rama's nephew Govinda wrote a very detailed and useful commentary called *Pīyūśadhsadhārā* which contains numerous and valuable citations from astrological as well as *dharmaśāstra* texts. In my presentation, I would like to show the structure of the *Muhūrtacintāmaṇi* and discuss the chapters on rituals.

Commentator: Caterina Guenzi (CEIAS, EHESS, Paris)

14:30 -16:00

Philipp Nothaft (All Souls College, Oxford)

Calendar Reform in the Fourteenth and Fifteenth Centuries: Problems and Perspectives

Abstract – For most of its history in medieval and early modern Europe, the issue of calendar improvement and reform was closely tied to the celebration of Easter and the structure of the liturgical year. A fixed point in most debates of this kind

were the writings of the church fathers and the decrees of the late antique church councils, which had established a firm link between the date of Easter and astronomical criteria – the full moon and the vernal equinox. Astronomical accuracy thus became a fundamental requirement, which the medieval ecclesiastical calendar was supposed to fulfil in theory, but failed to meet in practice. My talk will use the theological and legal background of Easter reckoning as a starting point to analyze the parameters and constraints that shaped the debate surrounding the ecclesiastical calendar in the late Middle Ages, focusing in particular on sources produced at the court of Pope Clement VI in Avignon (1344/45) and at the Council of Basel (1434-43). Special attention will be paid to the way these sources frame the relationship between religious ritual, on the one hand, and astronomical data, on the other, as well as to the general points of intersection between the Easter problem and the history of astronomy in this period. It will be argued that the criteria established in the course of these late medieval debates remained normative throughout the subsequent history leading up to the Gregorian calendar reform of 1582.

Commentator: Matthieu Husson (CNRS, SYRTE-Observatoire de Paris & SAW project)

Programme June 2016, Wednesday 8th - room 646 A, Condorcet Building

9:30-11:00

Zhu Yiwen (Sun Yatsen University)

Commentaries on numbers of ritual through different mathematical knowledges in seventh century China.

Abstract – Numbers of ritual (Lishu 禮數) is a key part of ritual in ancient China. Some studies have been done on it based on ritual texts. On the other hand, Liu Hui 劉徽, who commented on the Nine Chapters on Mathematical Procedures (Jiuzhang suanshu 九章算術), understood this book as a derivative of the *Rites of Zhou* (Zhouli 周禮), and further as a part of Confucianism (Ruxue 儒學). This fact points to the relationship between ritual and mathematics in general. However, it is as yet unclear how scholars in the past understood this relationship in relation to numbers of ritual. On the basis of analyzing different commentaries on numbers of ritual respectively in a mathematical book, called Mathematical Procedures on Five Canons (Wujing suanshu 五經算術), and in Confucian canons, this talk aims at revealing different relationships between numbers of ritual and mathematical knowledges established by different scholars in seventh century China. Furthermore, the special role of numbers of ritual compared to other kind of numbers within the interdependence of ritual and mathematics will be discussed.

Commentator: Béatrice L'Haridon (CRCAO, Université Paris Diderot, France)

11:30 -13:00

Hideki Teshima (Kyoto Bunkyo University)

Vedic Measure System and Its Application in the Ritual Field

Abstract – The *Kalpa–Sūtras* (compiled sometimes after the 6th century BC.) are vedic ritual manuals that contain explanations of how to set up the site where a sacrifice is to be held. In these texts we find mention of various measures used in the preparation of the ritual grounds, the sacred altar, the hearth of divine fire and the other elements of sacrifice. I will begin by summarizing the vedic system of measure, then examining its application in large–scale kingship rituals such as the *Rājasūya* (the Royal Consecration) or the *Aśvamedha* (the Horse Sacrifice). Through this examination we will try to understand the way that vedic ritualists integrate arithmetical/geometrical knowledge with magical procedures designed to realize the wishes of the supplicant king.

Commentators: Sho Hirose (SAW project) & **Agathe Keller** (CNRS, SPHERE & SAW project)

14:30 -16:00

Wu Yan (Inner Mongolia Normal University, China)

*The Replacement of Traditional Ceremonies in the Process of the Movement for “Abolishing the Traditional Calendar and Promoting the National Calendar”:
Focusing on the Memorial Day of the Birth of Confucius*

Abstract – On January 1st, 1912, the Republic of China was founded. At the presidential inauguration, SunYat-sen, the temporary President, announced the adoption of a calendar that used the founding of the Republic as the calendar starting point and the principle of the Gregorian calendar, namely, a solar calendar, arguing that a calendar of this type had been adopted broadly by "advanced" western countries. However, because of the close relation between a calendar and everyday life and customs, the new calendar could not immediately replace the common one, shortly after being promulgated. In 1927, the National Government took power in Nanjing; in the following year, the government initiated a movement named “abolishing the traditional calendar and promoting the national calendar.” This movement established the calendric system, with a starting point at the Republican era and a Gregorian calendric rule, as the

“National Calendar”. At the time, the dates of Chinese traditional festivals and series of Commemorative Days were officially transferred from the traditional calendar to the Gregorian calendar, at fixed days in the latter calendar. For instance, the Memorial Day of the Birth of Confucius was set up as an official festival and its date was transferred from the traditional calendar to the Gregorian calendar on August 27 of each year. However, contemporary researchers determined the Memorial Day for the Birth of Confucius with another procedure. This procedure relied on the luni-solar Chinese calendar, and then converted the day obtained into the newly established calendar. Their results were not accepted by the government. This discrepancy sheds light on how different procedures for computing days for rituals reflect different notions of time. This constitutes a typical case in which the government reconstructed a tradition according to the new order of time. By replacing the date and regulating the ritual, the government re-interpreted the traditional cultural meaning of Confucius and this commemorative day. In contrast to this, the government completely rejected the traditional calendar, referring to it as an “abolished calendar” and claiming that “the fact that one continues to use the old calendar means he carries out the calendar promulgated by Tsing Dynasty, so that he would be the rebel of the Republic of China”. This negative description of traditional calendar and construction of Confucius symbol seem to be contradictory; in essence, however, their aims are both to reconstruct some order of time, through which the government aimed to distinguish itself clearly from the former dynasty and to justify itself. By doing so, the Gregorian calendar as an element of a foreign culture represented an approach to establish the new order of time and also reconstruct a tradition. Meanwhile, by placing the “tradition” into the new order of time, the foreign culture became a part of local culture.

Béatrice David (Université Paris 8, LEGS UMR 8238, France)

A preliminary investigation of the ritual use of the calendar and the oracular script of the Sui (Guizhou, South-West China)

Abstract – The Sui (Shui in Chinese) live in Southeastern Guizhou. They are speakers of a dialect belonging to the Kam-Sui branch of the Tai-Kadai language family. They are one of the 55 official “ethnic groups” labeled as “national minorities”. Sui possess their own calendar and oracular script mainly used for divination purposes. The Sui script and manuscripts (le-sui) entered in the Chinese historiography in the late 19th century but research, mainly carried by Sui researchers, have been largely ignored outside China and even within China. The recent and on-going “development” of their mountainous region opened up for tourism and leisure activities has however brought a new kind of interest on this script in both official and academic circles, which led to its registration in 2006 in the national list of “intangible heritage” and the conservation of the manuscripts (owned by the specialists.

The political and tourism use of the Sui scripts is transforming what has become a “cultural heritage” into a major marker of the Sui ethnicity and some selected specialists as its official ambassador are asked to perform in festivals designed for the official spectacle of ethnicity offered for visitors.

However, outside this arena, the specialists of the Sui script, who distinguished themselves from other specialists playing a role in the interactions between the human-beings and their spiritual counterparts such as the spirit-mediums, do continue to perform the ritual activities requiring their specific intervention as “master of the Sui manuscripts”. The Sui writing, around 300 characters, is an oracular script. It is mainly used at the domestic level to perform divination and rituals such as home setting, wedding and funerals, and at the collective level to perform at territorial rituals such as the Dor and the Mau festivals. These collective rituals take place in the specific time frame of the Sui calendar.

Based on preliminary fieldwork research in the Sui autonomous district of Sandu and exploration of the fertile academic work mainly produced by Sui researchers who have played a major role in the protection of the manuscripts and its official recognition as “a Sui intangible heritage”, the present talk will present the main characteristic of the Sui scripture and calendar. The role of the “master of the le-sui” will be placed in the ritual context of the territorial lineage festival Dor which marks the beginning of the Sui year.

Although the collective ritual has undergone major transformations since the last century, attempts by the “communist” authorities during the time of collectivism in the 1960 and 1970 to change the date of the festival and have it coincide with the celebration of the national day on October 1st, have failed. The “traditional” Sui calendar provides a “time of the self” as Sui, while the festivals of “traditional” luni-solal calendar of the Han nongli contributes in many ways to their sense of Chineseness as members of the Chinese pluri-national nation self-defined as Zhonghua. And the gregorian calendar, or “Western calendar”, yangli, provides the time of the Chinese nation within the rest of the globalized world.