

SAW Conference: Mathematical Practices in relation to the Astral Sciences

March 26-27-28 and 30-31, 2015

The conference is organised by **Karine Chemla** (Sphère, CNRS & University Paris Diderot, SAW Project), **Matthieu Husson** (CNRS, SYRTE, Observatoire de Paris & SAW Project), **Agathe Keller** (Sphère, CNRS & University Paris Diderot, SAW Project), **Christine Proust** (Sphère, CNRS & University Paris Diderot, SAW Project) **and the SAW group.**

**Venue: Paris Diderot University, Condorcet Building
4 rue Elsa Morante 75013 Paris or 10 rue Alice Domon et Léonie Duquet
75013 Paris, <http://sawerc.hypotheses.org/practical-information>**

Room 366 A

9.30 am-5.30 pm

I. Presentation

The conference “Mathematical Practices in relation to the astral sciences” is the final conference of the Phase 2 of the SAW Project. It follows upon the conference Cultures of computation and quantification in the ancient world, held two years ago, which concluded the Phase 1 (<http://sawerc.hypotheses.org/workshop-cultures-of-computation-and-quantification/conference-cultures-of-computation-and-quantification-in-the-ancient-world>).

The conference aims at describing specific “mathematical cultures” that took shape in the context of astral sciences. Moreover, it intends to highlight contrasts between cultures identified in these contexts and mathematical cultures to which other documents testify. We hope to go on with our exploration of “cultures of computation,” aiming at understanding better what a “culture of computation” can be and which features are most relevant to perceive and char-

acterize it. We also hope to widen our scope and explore how other facets of mathematical activities, e.g. geometrical practices, practice with instruments or practices of reasoning, carried out in the context of astral sciences could fruitfully lend themselves to a description in terms of “culture,” and highlight diversity inside and among mathematical cultures.

II. Programme

March 26, 2015

Quantities and Measurements Units

9.30 am-11.00 am

Alexander Jones (New York University, USA)

Approximate results and recursive algorithms in Greek astronomy

Commentators: Sho Hirose and Daniel Morgan

11.00 am-11.30 am: Break

11.30 am-1 pm

Wang Xiaohu (School of Public Administration, South China Normal University, China)

Simulating Clepsydra: Two Methods of Time Measurement for Military in Ancient China

Commentators: Daniel Morgan and John Steele

1 pm-2 pm: Lunch Break

Progressions and ordered lists of numbers

2.15 pm-3.45 pm

Michio Yano (Kyoto Sangyo University, Japan)

Geometrical model and observation in Indian astronomy

Commentators: Zihui Chen and Christine Proust

3.45pm-4pm: Break

4 pm-5.30 pm

Steve Shnider (Bar Ilan University, Israel)

Difference schemes and their relation to interpolation rules in Babylonian lunar ephemerides

Commentators: Pierre Chaigneau and Karine Chemla

March 27, 2015

Progressions and ordered lists of numbers (continued)

9.30 am-11am

Karine Chemla (Sphère, CNRS & University Paris Diderot, SAW Project) **and Li Liang** (Institute for the History of Natural Sciences, Chinese Academy of Sciences, China & SAW Project)

Progressions, motions and changes in the astral sciences of ancient China

Commentators: Mathieu Ossendrijver and Martina Schneider

11 am-11.30 am: Break

Mathematical Reasonings 1

11.30 am-1pm

Sho Hirose (Sphère, CNRS & University Paris Diderot, SAW Project)

Explanations on planes, explanations in space: the usage of the armillary sphere in Parameśvara's Goladīpikā

Commentators: Matthieu Husson and Nathan Sidoli

1 pm-2pm: Lunch Break

2.15 pm-3.45 pm

Setsuro Ikeyama (Kyoto Sangyo University, Japan)
Practical Trigonometry in Indian Astronomy

Commentators: Agathe Keller and Li Liang

3.45 pm-4 pm: Break

4 pm-5.30 pm

Chen Zhihui (Sphère, CNRS & University Paris Diderot, SAW Project)

How Did Mid-Qing (late 1790s) Scholars Use Ancient Calendrical Methods to Calculate Dates of Events Mentioned in Confucian Canons? -- A Study Focusing on Li Rui's (1768-1817) Zhaogao Riming Kao (Research on the Names of the Days in the Announcement by the Duke of Zhao, ca. 1800)

Commentators: Clemency Montelle and Zhou Xiaohan

March 28, 2015

Mathematical Reasonings 2

9.30 am-11 am

Hermann Hunger (University of Vienna, Austria)
Reasoning involving mathematics in schematic Babylonian astronomy

Commentators: Magali Dessagnes and Matthieu Husson

11 am-11.30 am: Break

11.30 am-1 pm

Karine Chemla (Sphère, CNRS & University Paris Diderot, SAW Project)

Conjunctions between the sun and the moon, and pursuit problems. Mathematical reasoning in Chinese writings on astral sciences

Commentators: Baptiste Mèlès and Clemency Montelle

1 pm-2 pm: Lunch Break

2.15 pm-3.45 pm

Glenn Van Brummelen (Quest University, Canada)

Al-Kashi's Two Methods of Determining $\sin(1 \text{ degree})$: Finding Roots and Changing Paths

Commentators: Pierre Chaigneau and Sho Hirose

3.45 pm-4 pm: Break

4pm-5.30 pm

Clemency Montelle (University of Canterbury, New Zealand & SAW Project)

What can numerical data reveal about approximation? Trigonometry and the associated interpolation rules in Brahmagupta's Khaṇḍakhādyaka

Commentators: Li Liang and Christine Proust

March 30, 2015

Mathematical Practices: Contrasts

9.30 am-11 am

Mathieu Ossendrijver (Humboldt University, Germany & SAW Project)

Mathematical Practices in Late Babylonian Mathematical Astronomy

Commentators: Li Liang and Martina Schneider

11 am-11.30 am: Break

11.30 am-1 pm

Nathan Sidoli (Waseda University, Japan & SAW Project)

Geometrical analysis and trigonometry in Greco-Roman mathematics

Commentators: Karine Chemla and Clemency Montelle

1pm-2 pm: Lunch Break

2.15 pm-3.45 pm

Daniel Morgan (Sphère, CNRS & University Paris Diderot, SAW Project)

By Process of Elimination: Further Remarks on the Operation chu 除 in Early Imperial Mathematical Astronomy

Commentators: John Steele and Zhou Xiaohan

3.45 pm-4 pm: Break

4 pm-5.30 pm

Agathe Keller (Sphère, CNRS & University Paris Diderot, SAW Project)

Understanding the vikala, Pṛthūdaka's interpretation of Brahmagupta's rules on quantities with sexagesimal parts

Commentators: Zhihui Chen and Charlotte de Varent

March 31, 2015

Mathematical Practices: Synthesis

9.30 am-11 am

Matthieu Husson (CNRS, SYRTE, Observatoire de Paris & SAW Project)

Operations on sexagesimal numbers outside and inside astronomical texts: a comparison

Commentators: Mathieu Ossendrijver and Charlotte de Varent

11 am-11.30 am: Break

11.30 am-1 pm

John Steele (Brown University, USA & SAW Project)

Babylonian Shadow-Length Schemes: Between Mathematics and Astronomy

Commentators: Magali Dessagnes and Nathan Sidoli

1 pm-2 pm: Lunch Break

2.15 pm-3.45 pm

Zhu Yiwen (Sun Yatsen University, China)

Uncovering Astronomical Procedures Using Counting-diagrams: The Case of Qin Jiushao's Writing on Chinese Remainder Theorem

Commentators: Agathe Keller and Baptiste Mèlès

3.45 pm-4 pm: Break

4. pm-5.30 pm

Taro Mimura (University of Manchester, UK)

The Formation of Zij's in the Integration of Indian and Greek Mathematical Tools

Commentators: Guillaume Loizelet and Emilie Villey