

Seminar SAW

Seminar Exploring 19th and 20th centuries historiographies of mathematics in the ancient world 2015-2016

organized by

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Université Paris Diderot, Condorcet Building
room 483A - 9:30 am to 5:30 pm

<http://sawerc.hypotheses.org/seminars/internal-seminar-historiography-2015>

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Historiography of calculation and computation in the ancient world

Presentation – In the 19th and 20th centuries, some mathematical milieus perceived mathematical activities related to computation as having a status inferior to other types of activities. A similar attitude can be perceived in various historiographies of mathematics and the astral sciences. Two facts seem to attest to this attitude. Documents testifying to a use of various number systems and computations were less studied than other types of documents. “Peoples” who were perceived to have given numbers and calculation pride of place were downplayed for this reason, when compared to “peoples” who had dealt with other types of mathematical topics, or used other methods to approach astral phenomena. This workshop aims to inquire into the history of the historiographies of number systems, number use, and computations, with the following questions in mind: Can a link be established between the two phenomena mentioned above? Which types of historiographies of number use, number systems and computations were written in different social contexts? How were these historiographies written? In other words, what were the sources of these historical inquiries? Did such historiographies rely on other fields of inquiry (such as philology, life sciences, and anthropology) for their values and methods? How were number use, number systems and computations described? What were the values involved in their assessment? How did various historiographies study and understand engagement with number in the ancient world? To which social entities (“social group,” or “civilization”) were number and computational activities believed to be attached?

Baptiste Mèlès, *Conceptions of Computation in Historiography of Mesopotamian Mathematics*

Lisa Indracollo, *Number, Units, and Conceptual Categories. Conceptions and misconceptions about numbers in China and the West*

Serafina Cuomo, *The other Greeks - notation, calculation, and cultural classification?*

HIROSE Sho, *Observation versus Computation in Indian Astronomy*

Baptiste Mèlès (Archives Henri Poincaré)

Conceptions of Computation in Historiography of Mesopotamian Mathematics

Abstract – During the last century, in which appeared both computability theory and complexity theory, conceptions of computation varied a lot; such variations may have changed, in turn, the way historians of mathematics perceive their very objects. The clearest way to test this hypothesis is to examine variations in the study of one and the same object. I will thus try to show how Mesopotamian mathematics in general, and more particularly a set of clay tables, were described by some major authors from the 1930s to the 2000s: Thureau-Dangin, Neugebauer, Sachs, Knuth and Høyrup. What are the conceptions of computation which underlie their seemingly neutral and objective descriptions? Although very close in history, those authors were actually contemporaries of deep mutations occurring both in mathematical logic (with computability theory as the study of computation models) and in computer science (with complexity theory as the study of algorithms). Knuth was even one of the major actors of those mutations. In a very short amount of time, computation ceased to be a mere static relation linking a mathematical formula with a timeless result and began to be seen as a dynamic process requiring both time and resources. Hence, computations began to be described as programs rather than mere arithmetical formulae. This example will show how quickly a shift in the science and technology of a given society was followed by a shift in its very historiography of mathematics.

Lisa Indracollo (University of Zurich)

Number, Units, and Conceptual Categories. Conceptions and misconceptions about numbers in China and the West

Abstract – In the 19th and 20th centuries, Western scholars often developed misleading preconceptions about Chinese scientific thought and methods. In particular, achievements in the field of mathematics were dismissed as primitive, and Chinese conceptualizations of numbers were labeled underdeveloped. As the present paper aims to show, these preconceptions failed to acknowledge the actual value and the originality of Chinese proto-scientific and scientific thinking. China has a rich intellectual history in the field of the exact sciences. There is abundant evidence of the existence of a concept of number and of a highly developed, complex computational system already in Shang Dynasty's (16th-11th century B.C.E.) oracle bone inscriptions. Chinese discourse with numbers and on numbers unravels its complexity through the ages in a canonical set of mathematical texts (the so-called *Suanshu shijing* or *Ten Classics of Mathematics*), but also without such canon, as a few recently acquired manuscript sources prove. Moreover, not only are numbers advanced intellectual instruments to seize upon reality, but the very concepts of 'number' and 'unit' in themselves are at the core of a subtle meta-reflection in Chinese thought. The present paper further analyzes these concepts and their role as knowledge categories in

early Chinese philosophy, further problematizing their relationship with and their use in relatable mathematical sources. In this analysis, a selection of pertinent examples drawn from early Chinese philosophical texts will be taken into consideration, focusing especially on the works of Gongsun Long (4th-3rd century B.C.E.), a pseudo-historical thinker associate with the so-called "School of Names" (*mingjia*).

Serafina Cuomo (Birkbeck College, University of London)

The other Greeks - notation, calculation, and cultural classification?

Abstract – The historiography of numerical notation systems and calculation procedures in classical Greece is marked by the seminal work of epigraphists such as Marcus Niebuhr Tod, whose papers on the acrophonic numerical notation systems were published in the early 20th century, and of archaeologists excavating counting boards from the mid-19th-century onwards. How did scholars working in the 19th and early 20th century reconcile the ideal of ancient Greek mathematics as abstract, universal and demonstrative, with the evidence they were uncovering about the vast diversity of numerical notation systems, and the materiality of calculation techniques? I will explore the question, and try to assess why notation and calculation have been pushed to the margins of scholarly perceptions of Greek cultural identity.

HIROSE Sho (SAW, SPHERE Université Paris Diderot)

Observation versus Computation in Indian Astronomy

Abstract – It is often debated whether the tradition of astronomy in India was purely computational or whether it involved observation. The aim of this presentation is to explore the history of such an opposition.

I shall first focus on the contrasting opinions of two historians in the 19th century: Henry Thomas Colebrooke assumed that observation was important for the Indian astronomers as much as it was for the Greeks and Arabs, while Ebenezer Burgess raises an objection to this view. Burgess chooses, from a number of other texts, the "*Sūryasiddhānta*" as a representative Indian astronomical treatise to translate and publish, and remarks that it shows how observation was crude and unimportant in Indian astronomy. While Burgess remarked that his evaluation of observation had yet to be reexamined due to lack of evidence, his ideas were followed by Otto Neugebauer and David Pingree, influencing the modern view on Indian astronomy.