

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

organized by Karine Chemla, Matthieu Husson, Agathe Keller, Christine Proust  
and the SAW group

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

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

**Programme - April 15<sup>th</sup>, 2016**

### **Historiography of measurement units**

**Presentation** – Metrology is not a topic that had been of great interest for historians of mathematics. They often even eliminated this facet in their description of the sources, and they did not give pride of place to documents that exhibited the mathematical work related to metrology. Measurement units appeared to many historians as conveying transparent meanings, which did not require special attention. Yet metrology is a key area in the history of physics. The purpose of this session is to begin thinking about the divorce between historians of mathematics and physics with regard to metrology. How were measurement units considered, or deliberately ignored, by historians of mathematics? To what extent have certain approaches of measurement units had an impact on the understanding of mathematical notions considered as essential, such as numbers, arithmetic, or algebra? How did historians of mathematics differ (and how do they still differ) from historians of physics in the way in which they discuss measurement units and, more broadly, quantities?

**Présentation** – La métrologie n'est pas un sujet qui a beaucoup intéressé les historiens des mathématiques. Ils ont même souvent éliminé cette facette des sources de leur description, de même qu'ils n'ont pas accordé d'importance aux documents qui témoignaient du travail mathématique lié à la métrologie. Pourtant, c'est un domaine essentiel de l'histoire de la physique. Le but de cette journée est d'amorcer une réflexion sur ce divorce. Comment les unités de mesure ont-elles été considérées, ou délibérément ignorées, par les historiens des mathématiques? Dans quelle mesure certaines approches des unités de mesure ont eu des conséquences sur la façon dont ont été construites des notions mathématiques essentielles comme les nombres, l'arithmétique ou l'algèbre, sans que cela n'ait été thématiqué par les historiens du fait de la transparence qu'ont souvent eue les unités pour eux? Comment les historiens des mathématiques se sont-ils démarqués et se démarquent-ils toujours des historiens de la physique dans le regard qu'ils portent sur les unités de mesure et, d'une façon plus large, les quantités?

**Marie-José Durand-Richard**, *The English Algebraists: from the practice of arithmetics to its theory*

**Pierre Chaigneau**, *In the jungle of Mesopotamian metrologies: on Thureau-Dangin's first approach to cuneiform numbers and quantities*

**Nadine de Courtenay**, *Two different roles units can play in the mathematical formulation of physical relations*

**WANG Xiaofei**, *La réforme des poids et mesures et le calcul d'arithmétique lors de la Révolution Française*

**Marie-José Durand-Richard** (SPHERE, Université Paris Diderot)

*The English Algebraists: from the practice of arithmetics to its theory*

**Abstract** – English algebraists of the first half of the 19th century, notably George Peacock (1791-1858) and Augustus de Morgan (1806-1871), conceived of algebra as belonging to the larger mental process of symbolisation of the mathematical language derived from arithmetical practices. This talk will focus on the way each of them considered how the abstract concept of number was elaborated from the concrete practice of numbers within the various human activities in which mathematics is implied. A special attention will be paid to their commitment in attempts to have the decimal system adopted in England.

**Résumé** – Les algébristes anglais de la première moitié du 19ème siècle, en particulier George Peacock (1791-1858) et Augustus de Morgan (1806-1871) inscrivent leur conception de l'algèbre dans un processus plus vaste de symbolisation du langage mathématique à partir des pratiques de l'arithmétique. L'accent sera mis dans cet exposé sur la façon dont ils envisagent l'un et l'autre l'histoire de l'élaboration du concept abstrait de nombre par rapport à la pratique concrète des

nombres dans les différentes activités humaines impliquant les mathématiques, en accordant une attention particulière à leur implication dans les tentatives d'adoption du système décimal en Angleterre.

**Pierre Chaigneau** (SAW Project, SPHERE Université Paris Diderot)

*In the jungle of Mesopotamian metrologies: on Thureau-Dangin's first approach to cuneiform numbers and quantities*

**Abstract** - This talk aims at studying a corpus of papers published by François Thureau-Dangin, mostly in the *Revue d'Assyriologie* during the first decades of the 20th century, in which the famous assyriologist undertakes to decipher and clarify the at the time widely unexplored jungle of metrologies of the ancient cuneiform Middle East. It is often stated that this task led him to the study of cuneiform mathematics, an investigation that culminated with the publication of *Textes mathématiques babyloniens* in the year 1938. How numbers, quantities, and measuring units were treated in these papers? What were the views of our scholar regarding the cultural range of the reconstructed metrological systems? With such questions in mind, we may be able to reveal lines of influence of these researches on Thureau-Dangin's later work on history of mathematics.

**Nadine de Courtenay** (SPHERE Université Paris Diderot)

*Two different roles units can play in the mathematical formulation of physical relations*

**Abstract** - One seldom takes into consideration how much the construction of a shared system of units contributes to shape the way in which we represent physical relationships mathematically. I will first review the two paths that have been followed in the nineteenth century in order to put physical relations into the form of mathematical equations and point out that they involve quite different conceptions of the role of units. I will go on to examine how these two paths became articulated in the double interpretation of the equations of physics advanced by Maxwell, and now implicitly accepted by physicists. I will finally examine how this double interpretation came to the fore in the context of the discussions raised by the passage from the MKS to the MKSA system of units in the 1950s and why it largely escapes our notice today

**WANG Xiaofei** (SAW Project, SPHERE Université Paris Diderot)

*The reform of measurements and weights in the French Revolution and the changes in teaching arithmetic*

**Abstract** - The reform of measurements and weights, set off in France in 1790, in the wake of the French Revolution, perfected the metric system and facilitated enormously calculations. In correlation with this, there was also a major change in the ways of teaching arithmetic, and the relationship between the arithmetic of measured quantities and that of decimal numbers was modified. This is reflected in Condorcet's posthumous publication of the treatise on arithmetic in 1799, and Lagrange's lectures on elementary mathematics at the Ecole normale in

1795. In fact, arithmetic got recognized of its fundamental status, as Lagrange mentioned arithmetic and geometry as two wings of mathematics. At the same time, we see an interest in France in the history of mathematics in ancient Greece, and also in the “arithmetic of the Greeks”. On the occasion of the publication in 1807 of the translation of Archimedes’ *Opera Omnia* by Peyrard, who had already published the translation of Euclid’s *Elements* three years before, Delambre inserted in the book an article titled “*De l’Arithmétique des Grecs*” in the same book. Moreover, Jean Guillaume Garnier, who had been Lagrange’s assistant at the Ecole polytechnique, compiled an extract of Delambre’s memoir, when the second edition of his *Traité d’arithmétique* appeared in 1808. These facts suggest that the interest in Greek arithmetic and the reform of arithmetic are related. Indeed, in Garnier’s *Traité d’arithmétique*, the history of Greek arithmetic is treated side by side with the ancient and the new arithmetic.

This talk would like to examine why Greek arithmetic became a specific topic of interest, and why the interest was not limited to Greek geometry. Moreover, I would like to examine how this topic was dealt with in the context of the change in the way of teaching arithmetic, from arithmetic of measured quantities to arithmetic of decimal numbers. Finally, I will attempt to understand why Garnier’s book combines history of mathematics and arithmetic with and without measuring units.