



SPHERE

Laboratoire de Philosophie et d'Histoire des Sciences UMR 72191



Conference

David Eugene Smith and the historiography of mathematics

organised by C. Proust, A. Keller and K. Chemla (SPHERE, CNRS et Université Paris Diderot)

Venue: **Université Paris Diderot**, Condorcet Building
10 rue Alice Domon et Léonie Duquet 75013 Paris
9-10 January, 2019 - room Mondrian 646A

Presentation

David Eugene Smith (1860-1944), a mathematician, educator, collector, publisher and historian of mathematics, appears as a ubiquitous protagonist in the historiography of ancient mathematics. His name is associated with many of the projects that were developed in the early 20th Century in the USA to popularize mathematical sources from China, Japan, India, Europe and Mesopotamia. He collaborated keenly with scholars from these different geographical areas, traveling to meet them, engaging in correspondence, and collecting mathematical documents and instruments from all over the world. The international scope of his network is abundantly documented by his diverse correspondence, articles, prefaces, books and archives.

However, D.E. Smith's historiography of mathematics and its worldwide impact have not, so far, been the topic of a systematic study. This conference aims to address these two issues. In particular, the different facets of D.E. Smith's works and activities related to history of mathematics, mathematics education, publishing houses and collections will be explored in relation to the ways in which these influenced his historiography.

The following questions, among others, could be addressed: What are the specific features of the histories of mathematics produced by D.E. Smith in the context of the early 20th century? How did the different international networks he belonged to (historians of mathematics, collectors, teachers of mathematics) shape the histories he wrote or participated in, and contribute to spreading his vision of the history of mathematics? Is there coherence in Smith's various engagements, and how does this explain his way of writing the history of mathematics? To what extent are D.E. Smith's views on the history of arithmetic influential on the current practices of historians and teachers of mathematics?

Speakers

BREARD, Andréa (*Université Paris-Sud, Paris-Saclay, France*)
CHEMLA, Karine (*SPHERE – CNRS & Université Paris Diderot, France*)
FRIEDMAN, Michael (*Humboldt Universität zu Berlin, Deutschland*)
HAN Qi (*Institute for the History of Natural Sciences, CAS, Beijing, China*)
KELLER, Agathe (*SPHERE – CNRS & Université Paris Diderot, France*)
MIZUNO Hiromi (*University of Minnesota, USA*)
MORICE-SINGH, Catherine (*SPHERE – Université Paris Diderot, France*)
PROUST, Christine (*SPHERE – CNRS & Université Paris Diderot, France*)
FREIMAN, Viktor (*Université de Moncton, Canada*)
VARENT, Charlotte de (*SPHERE – Université Paris Diderot, France*)
VOLKOV, Alexei (*National Tsing Hua University, Hsinchu, Taiwan*)

Programme

Wednesday, January 9th, 2019

Making the history of mathematics: the role of collectors, collections and publishing houses

11h15-11h30 – Introduction

11h30-13h – **Alexei Volkov** (Tsing Hua University, Taiwan) & **Viktor Freiman** (Université de Moncton, Canada)

13h-14h30 – Lunch

D.E. Smith and his study of mathematical textbooks published prior to 1601

14h30-16h – **Mizuno Hiromi** (University of Minnesota, USA) & **Karine Chemla** (SPHERE, CNRS et Université Paris Diderot, France)

The making of David Eugene Smith's and Mikami Yoshio's A History of Japanese Mathematics. An unequal practice of cooperation in the history of mathematics

16h-16h15 – Pause

16h15-17h45 – **Andrea Bréard** (Université Paris Sud, France) & **Michael Friedman** (Humboldt Universität zu Berlin, Deutschland)

The hidden role of the editor: The influence of D.E. Smith on the (history of the) mathematics of folding

Thursday, January 10th, 2019

D.E. Smith's international networks

9h30-11h – **Agathe Keller** (SPHERE, CNRS et Université Paris Diderot, France) & **Catherine Morice-Singh** (SPHERE, CNRS et Université Paris Diderot, France)

D.E. Smith, his Indian correspondents and the writing of the History of Mathematics in India.

11h-11h30 – Pause

11h30-13h – **Han Qi** (Institute for the History of Natural Sciences, Chinese Academy of Sciences, Beijing, China)

D.E. Smith and Li Yan: The Early Stage in the Study of History of Chinese Mathematics

13h-14h30 – Lunch

The impact of the history of mathematics in didactical innovations

14h30–16h00 – **Viktor Freiman** (Université de Moncton, Canada) & **Alexei Volkov** (National Tsing Hua University, Taiwan)

D.E. Smith as mathematics educator: his legacy and innovations as seen in connection with the teaching practices of the 19th century

16h00-16h15 – **Pause**

16h15-17h45 – **Charlotte de Varent** (SPHERE, CNRS et Université Paris Diderot, France) & **Christine Proust** (SPHERE, CNRS et Université Paris Diderot, France)

The history of mathematics in the context of the renewal of mathematical education in the early twentieth century in the USA and Europe

17h45 – **Discussion**

18h30 – **Cocktail**

Abstracts (by session)

Wednesday, January 9th, 2019

Making the history of mathematics: the role of collectors, collections and publishing houses

Volkov, Alexei (Tsing Hua University, Taiwan) & **Viktor Freiman** (Université de Moncton, Canada)

D.E. Smith and his study of mathematical textbooks published prior to 1601

Abstract – The present paper is devoted to the study of medieval and early Renaissance mathematical textbooks by David Eugene Smith (1860-1944) published in 1908 under the title *Rara Arithmetica: A Catalogue of the arithmetics written before the year 1601* with a description of those in the Library of George Arthur Plimpton of New York. As Smith himself mentions in his Preface, several other authors published descriptions of collections of mathematical textbooks before him; among them was, for instance, Augustus De Morgan (1806 – 1871) with his *Arithmetical Books from the Invention of Printing to the Present Time* (London, 1847). Interestingly enough, the length of the bibliographical notices of Smith varies considerably; some of them contain only basic bibliographical data, while some others provide rather detailed descriptions of the contents of the presented textbooks. Moreover, unlike De Morgan's work, the book of Smith is richly illustrated; virtually every other page of it contains a reproduction from an old mathematical manual. Some of these reproductions feature the front pages of the textbooks, while some others show those pages that drew particular attention of the author and arguably were provided to illustrate his descriptions of especially interesting elements of the textbooks under consideration. Another important feature is the author's attempts to discuss the filiation of the elements contained in the textbooks, and thus reconstruct, at least partly, the history of transmission of mathematical and didactical ideas. In our paper we will briefly present the results of our preliminary study of Smith's work, and discuss the elements of the mathematical textbooks that drew his special attention. It can be argued that in a number of cases

Smith especially focused upon the ways in which the arithmetical operations were performed; interestingly enough, De Morgan also manifested a similar interest in his work (see, e.g., De Morgan, op. cit., pp. 59-61).

Mizuno Hiromi (University of Minnesota, USA) & **Karine Chemla** (SPHERE, CNRS et Université Paris Diderot, France)

The making of David Eugene Smith's and Mikami Yoshio's A History of Japanese Mathematics. An unequal practice of cooperation in the history of mathematics

Abstract – In 1908, Paul Carus, the head of Open Court Publishing Company, contacted historian Mikami Yoshio (1875-1950), in relation to a project that he had formed. As a result, Carus succeeded in having Mikami and David Eugene Smith co-author what was to become Smith and Mikami's *A History of Japanese Mathematics* and was eventually published in 1914 by Open Court. The letters exchanged by Carus and Smith, on the one hand, and Smith and Mikami between 1909 and 1932, on the other, shed light on several facets of Smith's academic personality. They show his unequal way of cooperating in a context of this kind, which the order in which both authors signed the book (Smith appearing first and Mikami second) clearly bespeak. The correspondance further reveals Smith's ambition for the book, and the audiences he aimed to address. It also attests to the kind of historiography Smith intended to write to reach these audiences, and the tensions that this elicited between Mikami and Smith. The letters eventually show how Smith grasps the opportunity of this collaboration to rely on Mikami and extend his influence and his network, when needed, to Japan, and also to acquire new pieces for his book collection.

Bréard, Andrea (Université Paris Sud, France) & **Michael Friedman** (Humbolt Universität zu Berlin, Deutschland)

The hidden role of the editor: The influence of D.E. Smith on the (history of the) mathematics of folding

Abstract – Looking at the standard narrative concerning the history of the development of folding-based geometry, the book of Tandalam Sundara Row *Geometrical Exercises in Paper Folding* is considered as one of the seminal works at the turn of the 19th century. The book was published in India in 1893¹ and became well known in Germany due to Felix Klein, who mentioned it in his 1895 book *Vorlesungen über ausgewählte Fragen der Elementargeometrie*. When Klein's book was translated into English in 1897 by W.W. Beman and D.E. Smith, the two became curious regarding Row's book, and republished it in the USA in 1901 with only "slight modifications".² The book became a great success, had several editions, and more importantly, had a great influence on the development of folding-based geometry and mathematics within the western world.

However, this standard narrative leaves the editors – in this case Beman and Smith –

1Row, Sundara Tandalam, 1893, *Geometrical Exercises in Paper Folding*, Madras: Addison.

2Row, Sundara Tandalam, 1901, *Geometrical Exercises in Paper Folding* (eds.: Beman, Wooster W./Smith, David E.), Chicago: The Open Court., editors' preface.

and their goals and motives aside, and we aim with our proposed paper to take a closer look at the role Smith played in reshaping the history of mathematical paper-folding. First, taking a closer look at the 1901 edition of Row's book, one may note an abundance of references to Beman's and Smith's own books, references which did not appear in Row's book; moreover, minor but essential omissions and changes of terms are also to be found. Second, examining the correspondence between Smith and the publication house *Open Court*, which published the book in the USA, sheds a new light on the editorial process. Smith calls for making the book "more attractive, more real"³ and eventually proposes making photos of folded paper and including them in the book: in another letter Smith indicates that he is "very pleased at the outcome of the experiment"⁴ of photographing.

Moreover, two other events, happening several years later, clarify the role of Smith concerning the dissemination of Row's work. The first event was the publication by Row in India of a book called *Elementary Solid Geometry* (in three parts: in 1906, 1907 and 1907), which he considered as a continuation of his folding book, though the new book hardly contained any references to folding. Row offered in 1909 to Smith to republish the same work with *Open Court*. However, a series of letters between Row, Paul Carus (the editor of *Open Court*) and Smith in 1909 indicate that the publication of the work was eventually completely rejected by Smith, as the work would have needed a substantial revision. This editorial decision has certainly prompted situating Row's *Geometric Exercises in Paper Folding* as a one-time success story, which was not to occur again. The second event concerns the translation in 1930 of the book *Geometric Exercises in Paper Folding* to Chinese, published at the Commercial Press in Shanghai. The translator's preface by Chen Yuesheng 陳嶽生, underlines its close connection to Beman and Smith's translation of Klein's *Famous Problems of Elementary Geometry*, equally translated into Chinese in 1930.

We aim therefore to inquire how Smith's editorial strategies and tactics shaped the way the history of mathematical paper folding is told. How was his conception of the history of mathematics—and geometry in particular—reflected in his editorial decisions? Was this conception also transferred to or reflected in the Chinese translation, i.e. to "eastern" mathematics? And did Smith's decisions also operate partly as an obstacle with respect to how the mathematics of paper-folding was later considered?

Thursday, January 10th, 2019

D.E. Smith's international networks

Keller, Agathe (SPHERE) & Catherine Morice-Singh (SPHERE)

D.E. Smith, his Indian correspondents and the writing of the History of Mathematics in India

Abstract – This paper will first assess how D.E. Smith has played a more important role than previously imagined in publicising and encouraging publications on various aspects of the History of Mathematics in India: he thus showed great

³Letter from D.E. Smith to Thomas J. McCormack, 2nd April, 1900, in: Moris Library, Special Collections Research center, microfilm reel 38, Southern Illinois University, Carbondale, Illinois, USA.

⁴Letter from D.E. Smith to Thomas J. McCormack, 11th December, 1900, in: Moris Library, Special Collections Research center, microfilm reel 38, Southern Illinois University, Carbondale, Illinois, USA.

interest on the edition and translation into English of the *Gaṇitasārasaṃgrāha* published in 1912 by Rangacharya. As uncovered by his previously unpublished correspondence with B. Datta and S. Ganguly, he also persuaded them to provide him with information on the History of Mathematics in India, and then to write on specific topics, publishing articles they crafted notably in the *American Math Monthly* (AMM) in the late 1920s.

D.E. Smith thus published a certain number of articles/book chapters and book reviews concerning the history of mathematics in India. We will analyze examples of what he published, notably on the matter of algebra in the *Gaṇitasārasaṃgrāha*. We will also study what his correspondents wrote for instance on ideas of place-value and zero in India. Overall, our analysis will show that D.E. Smith was instrumental in publicising the History of Mathematics in India but also helped shape certain historiographical tropes that are still operative today.

Han Qi (Institute for the History of Natural Sciences, Chinese Academy of Sciences)
D.E. Smith and Li Yan: The Early Stage in the Study of History of Chinese Mathematics

Abstract – D.E. Smith and Li Yan were the two most influential historians of mathematics in the twentieth century. Smith took great interest in the history of non-Western mathematics. Through the reading of works written by Alexander Wylie, Louis van Hée, G. Schlegel and F. Hirth, he had a wide knowledge of Chinese ancient mathematics. During his visit in China, he also collected quite many Chinese mathematical books. Based on the correspondence of D. E. Smith and Li Yan, I will discuss their first contact and why their collaboration was not successful. In addition, based on the letters written to Li Yan, I will explain Li Yan's academic career in his early stages in the 1910s and 1930s.

Freiman, Viktor (Université de Moncton, Canada) & **Alexei Volkov** (National Tsing Hua University, Taiwan)
D.E. Smith as mathematics educator: his legacy and innovations as seen in connection with the teaching practices of the 19th century

Abstract – David Eugene Smith (1860-1944) studied to be a lawyer in accordance with his father's wish, but focused mainly on arts and humanities and was proficient in Latin, Greek, and Hebrew. After having accepted an instructorship in mathematics at Cortland Normal School, he switched his career plans to mathematics and mathematics education. Later he became professor of mathematics at the Teachers College at Columbia University, a position he held for almost a quarter of century (1901-1925).

Perhaps this unique combination of his background in humanities with first-hand experience of teaching mathematics led him to an in-depth study not only of the historical development of mathematics itself but also of the methods of teaching and learning. While looking closely into the issues of improving mathematics teaching in schools, beginning with elementary arithmetic, he conducted a critical examination of the innovational approaches of such renown European educators of the first part of the 19th century as Johann Heinrich Pestalozzi (1746-1827), August Wilhelm Grube (1816-1884) and Ernst Tillich (1780-1867).

When dealing with the history of arithmetic teaching, Smith considered the

transition from “object method” of calculations (that is, calculations using abaci and counting frame) to the use of Hindu numerals and written procedures problematic from the didactical perspective and found it not necessarily suitable for teaching elementary mathematics. However, the so-called formalism in educational practices associated with the way in which object teaching was integrated into elementary curriculum was also pointed out. Based on the Smith’s analysis on how arithmetic has been taught (Smith, 1902), we will analyze his views of the didactical innovations of the 19th century and discuss the complexity of the issues which he dealt with and which are still found at the center of today’s educational debates (Patman, 1996; Da Costa, 2014; Freiman and Volkov, 2018).

References

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Varent, Charlotte de (SPHERE, CNRS et Université Paris Diderot) & **Christine Proust** (SPHERE, CNRS et Université Paris Diderot)

The history of mathematics in the context of the renewal of mathematical education in the early twentieth century in the USA and Europe

Part I : D. E. Smith and the beginnings of the history of mathematics in the USA: a primitive accumulation of documentary capital for mathematics education

Abstract – The first part of the presentation focuses on the context of the early history of mathematics in the USA. Was Smith's particular profile - as a collector, a publisher of textbooks, a historian of mathematics and a teacher trainer - exceptional or was this profile common in the time in American universities? To answer this question, we focus on Smith's professional network in the USA, in particular on his relationships with the collector George Arthur Plimpton (1855-1936), and with the historians of mathematics Florian Cajori (1859-1930), and Raymond Clare Archibald (1875-1955). These relationships are partly documented by Smith's correspondence held at the Rare Book and Manuscript, Columbia University. One of the motivations expressed in the correspondences by the various actors, particularly those in charge of mathematics teaching, is the lack of textbooks and sources for research. We show how Smith, like most of his colleagues, was pursuing a primitive accumulation of documentary capital for mathematics education. Otherwise, beyond the initial institutional motivations for the

improvement of teaching, the history of mathematics was beginning to be studied for itself, as a prelude to the professionalization of the further generation of historians. We illustrate this trend with the example of Smith and Archibald's reactions to the spectacular emergence of cuneiform sources in the field of the history of mathematics.

Part II: The history of mathematics in the context of the first international conferences on mathematical education

Abstract - The second part of the presentation focuses on the role of history of mathematics in the emergence of the first "International Commissions on the Teaching of Mathematics" (ICTM). What arguments, according to D.E Smith, justified the introduction of history of mathematics into education? What is the specific approach of history by D.E Smith? How is it influenced by this context of international debates on the renovation of mathematics teaching? Where does this argumentation take place and what impact did it have? To begin addressing these questions, we investigate the part played by history in the journal on Mathematical Education ("l'Enseignement Mathématique", EM), and try to bring out D.E. Smith's specific approach of history among the other contributors to the section, for example C.A Laisant. By studying his historical introduction to The Teaching of Elementary Mathematics, we complement this approach with a focus on the relationship between the history of mathematics and the teaching of arithmetic according to Smith.
