DAVID EUGENE SMITH

AND THE

HISTORIOGRAPHY OF MATHEMATICS

January, 9-10, 2019, Paris

Conference organized by
Christine PROUST, Agathe KELLER, Karine CHEMLA,
(CNRS – University Paris Diderot, CHSA, SPHERE – UMR 7219)

Venue:
SPHERE, CNRS – University Paris Diderot,
Room 646A, Condorcet Building,
10 rue Alice Domon et Léonie Duquet,
75013 Paris, France

SPEAKERS

BRÉARD, ANDREA (University Paris Sud, France)

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FREIMAN, VIKTOR (University of Moncton, Canada)

FRIEDMAN, MICHAEL (Humbolt University, Berlin, Germany)

HAN, QI (Institute for the History of Natural Sciences,
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KELLER, AGATHE (CNRS, SPHERE, France)

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MORICE-SINGH, CATHERINE (University Paris Diderot, SPHERE, France)

PROUST, CHRISTINE (CNRS, SPHERE, France)

VARENT, DE, CHARLOTTE (University Paris Diderot, SPHERE, France)

VOLKOV, ALEXEI (National Tsing Hua University, Taiwan)

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 United States 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?

Program

WEDNESDAY, JANUARY 9, 2019

MAKING THE HISTORY OF MATHEMATICS: THE ROLE OF COLLECTORS, COLLECTIONS AND PUBLISHING HOUSES

11:15 am – 11:30 am

Introduction

11:30 am – 1:00 pm

Alexei Volkov & **Viktor Freiman**

(National Tsing Hua University, Taiwan) & (University of Moncton, Canada)

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

2:30 pm – 4:00 pm

Mizuno Hiromi & **Karine Chemla**

(University of Minnesota, USA) & (CNRS, SPHERE & University Paris Diderot)

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

Break

4:15 pm – 5:45 pm

Andrea Bréard & **Michael Friedman**

(University Paris Sud, France) & (Humbolt University, Berlin, Germany)

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

Program

THURSDAY, JANUARY 10, 2019

D.E. SMITH'S INTERNATIONAL NETWORKS

9:30 am – 11:00 am

Agathe Keller & **Catherine Morice-Singh**
(CNRS, SPHERE & University Paris Diderot, France)
D.E. Smith, his Indian correspondents and the writing of the History of Mathematics in India

Break

11:30 am – 1:00 pm

Han Qi
(Institute for the History of Natural Sciences, Chinese Academy of Sciences, China)
D.E. Smith and Li Yan: The early stage in the study of history of Chinese mathematics

THE IMPACT OF THE HISTORY OF MATHEMATICS IN DIDACTICAL INNOVATIONS

2:30 pm – 4:00 pm

Viktor Freiman & **Alexei Volkov**
(University of Moncton, Canada) & (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

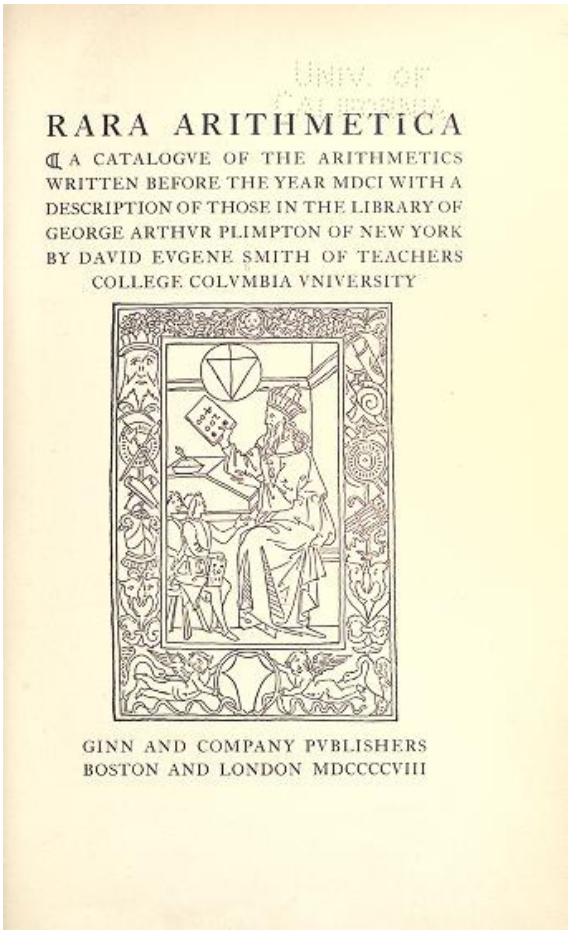
Break

4:15 pm – 5:45 pm

Charlotte de Varent & **Christine Proust**
(University Paris Diderot, & SPHERE, CNRS, France)
The history of mathematics in the context of the renewal of mathematical education in the early 20th century in the USA and Europe

5:45 – 6:30 pm **Discussion**

Abstracts



RARA ARITHMETICA

A CATALOGVE OF THE ARITHMETICS WRITTEN BEFORE THE YEAR MDCI WITH A DESCRIPTION OF THOSE IN THE LIBRARY OF GEORGE ARTHVR PLIMPTON OF NEW YORK BY DAVID EVGENE SMITH OF TEACHERS COLLEGE COLVMBIA VNIVERSITY

GINN AND COMPANY PVBLISHERS
BOSTON AND LONDON MDCCCCVIII

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

Bréard, Andrea & Friedman, Michael
University Paris Sud, France
& Humbolt University, Berlin, Germany

Looking at the standard narrative concerning the history of the development of folding-based geometry, the book of Tandalam Sundara Row *Geometric 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 1893 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". 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 – 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" 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" 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?

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

Freiman, Viktor & Volkov, Alexei

University of Moncton, Canada
& National Tsing Hua University, Taiwan

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).

D.E. Smith and Li Yan: The early stage in the study of history of Chinese mathematics

Han, Qi

Institute for the History of Natural Sciences, Chinese Academy of Sciences, China

D.E. Smith and Li Yan were the two most influential historians of mathematics in the 20th 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.

D.E. Smith, his Indian correspondents and the writing of the history of mathematics in India

Keller, Agathe & Morice-Singh, Catherine
CNRS, SPHERE & University Paris Diderot, France

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 interest on the edition and translation into English of the *Gaṇitasārasāmgrāha* 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 *Gaṇitasārasāmgrāha*. 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.

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

Mizuno, Hiromi & Chemla, Karine

University of Minnesota, USA
& SPHERE, CNRS, University Paris Diderot, France

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.

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

Varent, de, Charlotte & Proust, Christine
SPHERE, CNRS, University Paris Diderot, France

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

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

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.

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

Volkov, Alexei & Freiman, Viktor

Tsing Hua University, Taiwan
& University of Moncton, Canada

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).

Summary