Revue d'Histoire des Mathématiques

Sanskrit versus *Greek 'Proofs'*:
*History of Mathematics at the Crossroads
of Philology and Mathematics
in Nineteenth-Century Germany*

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SANSKRIT *VERSUS* GREEK 'PROOFS':
HISTORY OF MATHEMATICS AT THE CROSSROADS
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Abstract. — The present paper is intended as a contribution to a critical history of historiography of mathematics, in which history of mathematics is regarded as closely connected to cultural history as a whole. The focus is on analyzing the ways in which a contrast between Sanskrit and Greek mathematics was constructed in nineteenth-century Germany, as Colebrooke's English translations of Sanskrit mathematical sources spread in both philological and mathematical circles. By keeping track of the shifting significance which this contrast took on for different protagonists operating within different social contexts, one is also provided with a distinctive thread so as to unfold a more encompassing narrative. From a broader perspective, our purpose is to highlight the shaping of history of mathematics at the crossroads of philology and mathematics within nineteenth-century German academia.

Résumé (Les 'preuves' sanskrites comparées aux grecques : l'histoire des mathématiques au croisement de la philologie et des mathématiques en Allemagne du dix-neuvième siècle)
    Le présent article se propose de contribuer à une histoire critique de l'historiographie des mathématiques, dans laquelle l'histoire des mathématiques est envisagée en lien étroit avec l'ensemble de l'histoire culturelle. Nous analysons précisément comment une opposition entre mathématiques sanskrites et mathématiques grecques a été construite en Allemagne au dix-neuvième siècle, alors que les traductions par Colebrooke de sources mathématiques sanskrites

se diffusaient parmi les philologues et les mathématiciens. En retraçant comment cette opposition fut successivement investie de sens différents par des acteurs différents, opérant dans des contextes sociaux différents, nous disposerons d'un fil conducteur pour développer une histoire croisée de la philologie et des mathématiques en Allemagne au dix-neuvième siècle, mettant ainsi en lumière la formation de l'histoire des mathématiques au confluent de ces disciplines.

1. INTRODUCTION

Recent trends in the historiography of mathematical proof in ancient traditions combine a renewed approach to the sources with a reflective stance intent on carefully analyzing the historical processes through which previous historiographical frameworks were shaped.[1] In this regard, a growing awareness on the part of historians of mathematics, that long prevailing views might eventually prove inadequate, leads to the vindication that mathematical proofs should not be deemed the exclusive apanage of Greek mathematics, insofar as varieties of 'proofs' may also arguably occur in Akkadian, Chinese and Sanskrit sources. Correlatively, the grids through which these sources have been addressed by scholars at various times, in various historical settings, are subjected to historical scrutiny. The present paper purports to contribute to this critical history of historiography by investigating how and why a contrast between Sanskrit and Greek mathematics was suggested, elaborated and reframed in nineteenth-century Germany, as Colebrooke's translations of Sanskrit mathematical sources spread in both philological and mathematical circles. By keeping track of the shifting significance which this contrast took on for different protagonists operating within different social contexts, one will be provided with a distinctive thread so as to unfold a more encompassing narrative. From a broader perspective, the goal pursued in the following pages is to highlight the shaping of history of mathematics at the crossroads of philology and mathematics within nineteenth-century German academia. In this connection, emphasis will be laid on the momentous role played at this intersection by the mathematician and historian of mathematics, Hermann Hankel (1839–1873), who achieved an insightful reading of Sanskrit mathematical sources, owing to his conjoining philological rigour and mathematical expertise. Combining the habitus and skills of both fields

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[1]   See Chemla [2012b] for both a comprehensive overview of such historiographical trends and a unifying research program.

was not unprecedented among nineteenth-century German scholars, although it remained the privilege of a very few, such as Georg Heinrich Ferdinand Nesselmann (1811–1881) or Franz Woepcke (1826–1864). However, before Hankel, none had ever addressed Sanskrit mathematical sources from the standpoint of philology and mathematics. In so doing, he made the contrast between Sanskrit and Greek mathematics into a tool for self-understanding, intended to make sense of modern mathematics, over and above the main guideline for a rewritten history of mathematics. Still, Hankel drew on previous work. In the early 1850s already, Arthur Arneth (1802–1858), a professor of mathematics at the Heidelberg *Lyceum*, had articulated a stark contrast between Indian and Greek mathematics, although quite differently than Hankel would later think of it in the early 1870s. In return, Arneth's naturalistic history of mathematics owed much to the cultural history professed at about the same time by the Heidelberg philosopher Eduard Röth (1807–1858), whose untimely Creuzerian flavor then repelled mainstraim German philologists. Our reconstructed narrative aims at making clear the series of contextual shifts wich eventually made it possible for mathematics to meet philology. It will be shown along the way that history of mathematics came to be thoroughly reassessed, as those Sanskrit mathematical sources to which Colebrooke had first called the attention of European scholars, were being taken into account in significantly different ways at different stages of that historical process.

A colonial administrator of the East India Company and a Sanskrit scholar, Henry Thomas Colebrooke (1765–1837) marked a turning point in Western writing on India by setting high standards of accuracy, rigour and thoroughness, which fostered the making of Indology as a professional discipline.[2] The outstanding collection of Sanskrit manuscripts he brought back from India constituted a rich fund which he made available for further research.[3] Generations of German scholars who, from Franz Bopp, August Wilhelm Schlegel, Christian Lassen to Friedrich Rosen, established personal connections with him and benefitted from his advice and guidance on Indian matters, contributed in return to his

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[2] Our source here is the important work of Rosane and Ludo Rocher, cf. Rocher & Rocher [2012] and Rocher & Rocher [2013].

[3] Colebrooke's collection of Indian manuscripts on a wide variety of matters ranging from medecine, astronomy, grammar, law and Vedic literature was bequeathed to the library of the East India Company on April 15, 1819, which shifted the center of Western Orientalism from Paris to London, see [Rocher & Rocher 2012, pp. 139–140].