# Annals of the Canadian Society for History and Philosophy of Mathematics/ Société canadienne d'histoire et de philosophie des mathématiques



The books in the series contain selected papers writtten by members of the Canadian Society for History and Philosophy of Mathematics. Founded in 1974, this society promotes research and teaching in the history and philosophy of mathematics, as well as in the connection between the two. Volumes in this series cover a broad range of topics from a variety of time periods and cultures. They will be accessible to anyone who has had exposure to mathematics at the university level and will appeal to scholars of the history and/or philosophy of mathematics, graduate and undergraduate students undertaking research projects, and anyone with a general interest in mathematics.

Maria Zack • Dirk Schlimm
Editors

# Research in History and Philosophy of Mathematics

## The CSHPM 2019-2020 Volume

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# Preface

This volume contains 11 papers that have been complied by the Canadian Society for History and Philosophy of Mathematics. These papers provide some interesting insights into contemporary scholarship in the history and philosophy of mathematics, and the teaching of the history of mathematics.

The volume begins with Joel Silverberg's paper on Nathaniel Torporley (1564–1632), "The Most Obscure and Inconvenient Tables Ever Constructed?" In this paper, Silverberg describes both the astronomy and mathematics contained in Torporley's only published work *Diclides Coelometricae, seu valvae astronomicae universal*. Joel Silverberg died in August of 2019, making this paper the last in a long list of publications. Joel was an excellent scholar who was devoted to his family and his friends, and he is deeply missed.

The volume continues its exploration of seventeenth century mathematics with Duncan Melville's "Commercializing Arithmetic: The Case of Edward Hatton." For a period of roughly 40 years from 1695 onwards, more than 40,000 copies of Hatton's (ca. 1664–1733) arithmetic books were sold. In this paper, Melville offers a survey of Hatton's works with an emphasis on those that were key to his commercial success.

The next two papers focus on French mathematics in the nineteenth century. In "Leading to Poncelet: A Story of Collinear Points," Christopher Baltus discusses Jean-Victor Poncelet's (1788–1867) *Traité des propriétés projectives des figures*. Baltus examines the wide variety of mathematical work on collinear points that provided the foundation for Poncelet's 1822 treatise. This is followed by Roger Godard's paper "Cauchy, Le Verrier et Jacobi sur le problème algébrique des valeurs propres et les inégalités séculaires des mouvements des planets." Godard looks at the connections between work of three mathematicians Urbain Le Verrier (1811–1877), Carl Gustav Jacob Jacobi (1804–1851), and Augustin-Louis Cauchy (1789–1857) on the algebraic eigenvalue problem.

Amy Ackerberg-Hastings continues the focus on nineteenth century mathematics in the paper "Mathematics in Astronomy at Harvard College Before 1839 as a Case Study for Teaching Historical Writing in Mathematics Courses." In this paper, Ackerberg-Hastings considers how mathematics was employed in the teaching of

astronomy at Harvard before the college established an observatory in 1839. The author also uses this history at Harvard as a framework for considering how to engage current undergraduates in historical research. In "Lectures for Women and the Founding of Newnham College, Cambridge," James J. Tattersall and Shawnee L. McMurran study the opportunities for women to study mathematics at Cambridge on the late 1800s. In 1869, the Cambridge Examination for Women was established with the intent to certify a candidate's qualifications for teaching. To help women prepare for this exam, a lecture series was established and many of Cambridge's leading mathematicians participated. This paper highlights the first 10 years of those lectures.

Then next two papers focus on the philosophy of mathematics. David Waszek's paper "Are Euclid's Diagrams 'Representations'? On an Argument by Ken Manders," considers Ken Manders' (2008) argument against conceiving of the diagrams in Euclid's *Elements* in "semantic" terms (as representations). Waszek shows some of the limitations of Manders' argument while also suggesting that Manders makes a compelling case that semantic analyses ought to be relegated to a secondary role for the study of mathematical practices. Bernd Bult's paper "Abstraction by Embedding and Constraint Based Design," considers the traditional approach to concept formation via abstraction arguing that this approach does not provide an adequate model for concept formation in mathematics. Bult's paper contributes to the ongoing discussion about how the notion of concept formation can be brought into alignment with mathematical practice and experience.

The final three papers in the volume examine various aspects of undergraduate mathematical education. Walter Meyer's "The Birth of Undergraduate Modern Algebra in the United States," charts how courses in modern algebra slowly moved into the curriculum of American universities in the twentieth century. Meyer's paper considers some of the historical factors that may have contributed to slowing down the development of these courses.

In "History as a Source of Mathematical Narrative," Po-Hung Liu describes some of the ways that mathematical narrative can be used to help students understand mathematics. In this paper, Liu provides a detailed example of how mathematical narrative writing has been used in a mathematics course for students who were not earning a degree in mathematics. In "Thoughts on Using the History of Mathematics to Teach the Foundation of Mathematical Analysis," Fairouz Kamareddine and Jonathan Seldin discuss a strategy for avoiding the use of "formal definitions" in a transitional analysis course until after students have seen a number of examples. The paper is rich in examples that illuminate the authors' suggested approach to teaching analysis to third-year undergraduates.

This collection of papers contains several gems from the history and philosophy of mathematics, which will be enjoyed by a wide mathematical audience. Many of these papers were written after the global coronavirus pandemic began in late

2019. Each of the authors was dedicated to completing their work and providing some scholarly light in a time of global darkness. As editors, we are grateful to the authors and the referees who brought volume in being.

San Diego, CA, USA — Maria Zack
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