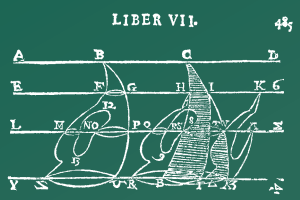
Proceedings of the Canadian Society for History
and Philosophy of Mathematics
La Société Canadienne d'Histoire
et de Philosophie des Mathématiques

Maria Zack
Elaine Landry
Editors

Research in History and Philosophy of Mathematics

The CSHPM 2014 Annual Meeting in St. Catharines, Ontario



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Introduction

This volume contains 13 papers that were presented at the 2014 Annual Meeting of the Canadian Society for History and Philosophy of Mathematics. The meeting was held on the campus of Brock University in lovely St. Catharines, Ontario, Canada in May 2014. The chapters in the book are arranged in roughly chronological order and contain an interesting variety of modern scholarship in both the history and philosophy of mathematics.

In the chapter "Falconer's Cryptology," Jr. Charles F. Rocca describes the contents of John Falconer's *Cryptomenysis Patefacta* (1685). Falconer's book is one of the very early English language texts written on cryptology and the mathematics underlying Falconer's ciphers is quite interesting. The chapter "Is Mathematics to Be Useful? The Case of de la Hire, Fontenelle, and the Epicycloid" contains Christopher Baltus' discussion of the 1694 work of Philippe de la Hire on the epicycloid. Baltus examines la Hire's mathematics together with some seventeenth century views on the relationship between science and mathematics.

The chapters "The Rise of "the Mathematicals": Placing Maths into the Hands of Practitioners—The Invention and Popularization of Sectors and Scales" and "Early Modern Computation on Sectors" focus on some physical tools used by mathematicians in the seventeenth century. In the chapter "The Rise of "the Mathematicals": Joel S. Silverberg discusses the invention and popularization of mathematical devices called sectors and scales". These carefully crafted instruments facilitated the rapid expansion of sophisticated mathematical problem solving among craftsmen and practitioners in areas as diverse as navigation, surveying, cartography, military engineering, astronomy, and the design of sundials. In the chapter "Early Modern Computation on Sectors," Amy Ackerberg-Hastings uses 27 sectors in the mathematics collection of Smithsonian's National Museum of American History to trace the history of the sector in the seventeenth century Italy, France, and England.

In the chapter "The Eighteenth-Century Origins of the Concept of Mixed-Strategy Equilibrium in Game Theory," Nicolas Fillion examines the circumstances surrounding the first historical appearance of the game-theoretical concept of mixed-strategy equilibrium. What is particularly intriguing is that this technique,

commonly associated with twentieth century mathematics, actually originated in the eighteenth century. In the chapter "Reassembling Humpty Dumpty: Putting George Washington's Cyphering Manuscript Back Together Again," Theodore J. Crackel, V. Frederick Rickey, and Joel S. Silverberg discuss the mathematical cyphering books of America's first president George Washington. This paper discusses the provenance of the Washington manuscript and the detective work done by the authors to locate some of the cyphering book's missing pages in other archival collections.

In the chapter "Natures of Curved Lines in the Early Modern Period and the Emergence of the Transcendental," Bruce J. Petrie examines the role of Euler and other mathematicians in the development of algebraic analysis. Euler's *Introductio in analysin infinitorum* (*Introduction to Analysis of the Infinite*, 1748) was part of a body of literature that developed the tools necessary for uncoupling the study of curves from geometry, greatly increasing the number of curves which can be understood and analyzed using functions and functional notation. This paper looks at the development of this uncoupling.

In the chapter "Origins of the Venn Diagram," Deborah Bennett examines the development of what we know today as the Venn diagram. Several mathematicians including Euler and Leibniz used drawings to illustrate logical arguments, and based on this work, the nineteenth century mathematician John Venn ingeniously altered what he called "Euler circles" to become the diagrams that are familiar to us today. In the chapter "Mathematics for the World: Publishing Mathematics and the International Book Trade, Macmillan and Co.," Sylvia M. Nickerson expands our knowledge of the nineteenth century mathematical community by carefully examining the influence that publishers had in developing mathematical pedagogy through the selection and printing of textbooks. This article studies the well-known publisher Macmillan and Company.

The next two chapters look at some interesting aspects of mathematics on the cusp of the twentieth century. In the chapter "The Influence Arthur Cayley and Alfred Kempe on Charles Peirce's Diagrammatic Logic," Francine F. Abeles provides information about the influence that Arthur Cayley and Alfred Kempe had on Charles Peirce's diagrammatic logic. This chapter is a combination of historical information with a carefully annotated bibliography of material found in archival collections. In the chapter "Émile Borel et Henri Lebesgue: HPM," Roger Godard looks at the relationships between Émile Borel's *Les fonctions de variables réelles et les développements en séries de polynômes* (*Functions of Real Variables and Expansions as Polynomial Series*, 1905) and Henri Lebesgue's *Leçons sur les séries trigonométriques* (*Lessons on Trigonometric Series*, 1906) in light of some correspondence between the two mathematicians. Godard says that he wrote this article in French "to reflect the Paris atmosphere at the beginning of the XXth century."

The last two chapters in this volume discuss twentieth century mathematics. In the chapter "The Judicial Analogy for Mathematical Publication," Robert S.D. Thomas examines mathematical analogies using a specific example. Thomas' analogy compares how the mathematical community accepts a new result put

forward by a mathematician with the proceedings in a court of law trying a civil suit that leads to a verdict. In the chapter "History and Philosophy of Mathematics at the 1924 International Mathematical Congress in Toronto," David Orenstein describes the International Mathematical Congress of 1924 held in Toronto, which was organized by J.C. Fields. This paper takes the form of a "narrated slide show" of the event using information from a number of artifacts to give the reader a feel for how the meeting progressed.

This collection of papers contains several gems from the history and philosophy of mathematics, which will be enjoyed by a wide mathematical audience. This collection was a pleasure to assemble and contains something of interest for everyone.

San Diego, CA, USA Maria Zack
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The editors wish to thank the following people who served on the editorial board for this volume:

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