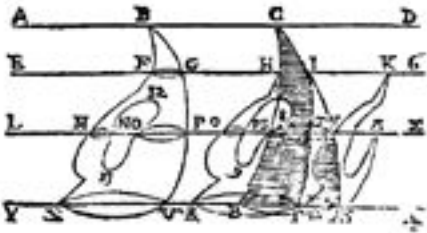


BULLETIN

CSHPM



SCHPM

May/Mai 2024

Number/le numéro 74

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

ISSN 0835-5924

ABOUT THE SOCIETY

Founded in 1974, the Canadian Society for History and Philosophy of Mathematics/Société canadienne d'histoire et philosophie des mathématiques (CSHPM/SCHPM) promotes research and teaching in the history and philosophy of mathematics. Officers of the Society are:

President: **Nicolas Fillion**, Simon Fraser University, Burnaby, BC V5A 1S6, CAN, nfillion@sfu.ca

Vice-President: **Robert Bradley**, Adelphi University, Garden City, NY 11530, USA, bradley@adelphi.edu

Secretary: **Patricia Allaire**, 14818 60th Ave., Flushing, NY 11355, USA, PatAllaire@gmail.com

Interim Treasurer & Past President: **Craig Fraser**, University of Toronto, Toronto, ON, M5S 1K7, CAN, craig.fraser@utoronto.ca

Members of Council

Marion (Wendy) Alexander, Houston Community Colleges, TX 77002, USA, marion.alexander@hccs.edu

Jemma Lorenat, Pitzer College, Claremont, CA 91711, USA, Jemma_Lorenat@pitzer.edu

Jean-Pierre Marquis, Université de Montréal, Montréal, QC, H3T 1J4, CAN, jean-pierre.marquis@umontreal.ca

Amy Shell-Gellasch, Eastern Michigan University, Ypsilanti, MI 48197, USA, ashellge@emich.edu

Volunteer Positions

The Society's Web Page (www.cshpm.org) is maintained by **Eisso Atzema**, University of Maine, Orono, ME 04469, USA, eisso.atzema@maine.edu; he also manages the Society's Archives. CSHPM *Annals* volumes are edited by **Maria Zack**, Point Loma Nazarene University, San Diego, CA 92106, USA, MariaZack@pointloma.edu, and **David Waszek**, Montréal, QC, H2H 2C9, CAN, david.waszek@posteo.net. The *Bulletin* is prepared by Interim Content Editor **Amy Ackerberg-Hastings**, Rockville, MD 20851, USA, aackerbe@verizon.net, Layout Editor **Eisso Atzema** (see above), and Production Editor **Maria Zack** (see above). **Amy Ackerberg-Hastings** (see above) and **vacant** edit the CSHPM Notes column for *Notes* of the Canadian Mathematical Society. **Nic Fillion** is temporarily serving as

CMS Liaison.

New Members are most cordially welcome; please contact the Secretary.

President's Message

With the Spring coming to save us from the gray haziness of Winter, we are set up to reconvene and let history and philosophy of mathematics serve its purpose of shedding light on all that is best in Academia. This time, it will happen as part of the Congress taking place at McGill University on June 15–17. At the time of writing, the program remains in its preliminary form, but we already have a tremendous lineup, including the best long-term pillars of the association as well as up-and-coming historians and philosophers of mathematics. The sustained engagement of long-term members as well as the enthusiastic enlistment of young scholars is an endearing sight!

This puts us in an optimistic position to celebrate the Society's 50 years of existence. The last few years have seen our membership grow both in terms of numbers and in terms of diversity of background, interest, and career stage. The sessions "Looking Back" and "Looking Ahead" at our upcoming annual conference, which cover a significant part of the program, make clear how rich and deep the research interests of our members are.

To those of you making the trip to Montréal, we very much look forward to seeing you all in person. The life of the Society is rooted in every member's engagement, and we strongly encourage all participants to join us for our Annual General Meeting on June 16 at noon. As this is an election year, you will have an opportunity to meet our new executive and council members. The nominations are currently being prepared by our nomination committee, composed of Tom Drucker, Greg Lavers, and Zoe Ashton. I wish to thank them for their work. As it will be the end of my term as president, I would also like take the opportunity to thank every executive and council member, and every volunteer serving as officer or committee member: Amy Ackerberg-Hastings, Marion Alexander, Patricia Allaire, Eisso Atzema, Robert Bradley, Craig Fraser, Jemma Lorenat, Jean-Pierre Marquis, Amy Shell-Gellasch, David Waszek, and Maria Zack. Although everybody is deserving of many, many thanks for their contributions, I wish to

give special thanks to Amy, Pat, and Craig for their constant support for the day-to-day affairs of the society. Without you, the Society wouldn't have the sunny condition and prospect it has!

Nic Fillion

2023 Financial Statements

The following financial statement covers the period 1/1/2023 through 12/31/2023.

TD Canada Trust CAN Funds	
Income	\$CAN
Dues by Cheque	451.00
Transferred from PayPal	9,287.66
CFHSS Net Receipts, 2022 and 2023	2,208.66
Total	11,947.32
Expenses	\$CAN
BSHM Memberships, 2022 and 2023	2,392.87
Office Expenses	30.00
Student Bursaries	1,000.00
Website Company	389.85
Total	3,812.72
Net Income	8,134.60
TD Canada Trust US Funds	
Income	\$US
Dues by Cheque	532.50
Total	532.50
Expenses	\$US
<i>Philosophia Mathematica</i>	814.02
<i>Historia Mathematica</i>	2,039.01
<i>Annals</i>	508.35
May Lecturer	1,088.00
Fees	36.00
Total	4,485.38
Net Expense	(3,952.88)
Paypal	
Income	\$CAN
Membership	9,669.50
Total	9,669.50
Expenses	\$CAN
Transfer to Canadian Account	9,287.66
PayPal Service Charges	381.84
Total	9,669.50
...continued in next column	

...continued from previous column	
Net Income	0.00
Assets in Canadian Funds	
Cash, TD Canada Trust Account	\$CAN
Balance (12/31/2023)	25,687.83
Net Income	8,134.60
Transfer from PayPal	1,440.61
Balance as of 12/31/2023	35,263.04
Cash, PayPal Account	\$CAN
Balance (12/31/2023)	1,440.61
Transfer to TD CAD Account (2022 receipts)	(1,440.61)
Net Income	0.00
Balance (12/31/2023)	0.00
Investments	
Meridian Credit Union (4.8%, matures 01/26)	10,000.00
Balance	10,000.00
Total Assets (CAD)	45,263.04
Assets in US Funds	
Cash	\$US
Balance (12/31/2022)	10,540.65
Net Expense	(3,952.88)
Balance (12/31/2023)	6,587.77
Total Assets (USD)	6,587.77
= \$CAN	8,725.52
Grand Total Assets (12/31/2023, \$CAN)	53,988.56

Comments: The Society has three accounts: a TD Canada Trust account for Canadian funds (CAD), a TD Canada Trust account for American funds (USD), and a PayPal account (CAD). The two bank accounts are used to deposit income or pay expenses in the appropriate currency. For example, journal subscriptions are paid in US dollars. Memberships paid by cheque can be in CAD or USD. The PayPal account is used to collect membership dues and journal subscriptions via the Internet; the PayPal account is kept in Canadian dollars. Seeing no rationale for holding funds in the PayPal account, the Treasurer instituted a policy of zeroing out those funds at the end of each calendar year. The December 31 exchange rate of 0.755 USD per CAD was used to convert USD assets to a CAD ballpark equivalent to make it easier for members to assess the Society's overall financial position.

CSHPM paid FHSS the annual society membership

of \$CAD1,870.63 in December 2023, but the payment was not processed and debited from the TD account until January 4, 2024. Hence it will be included in the 2024 financial statements. The reciprocal memberships that some CSHPM members have with the CSHPS entail a net payment from the CSHPM to the CSHPS. We are currently in discussion with CSHPS's treasurer concerning the amount.

Craig Fraser

50 Years of CSHPM: Officers

In celebration of CSHPM's 50th anniversary, the Bulletin reprints and updates the lists of Executive Council Officers, Councillors, and holders of Volunteer Positions that appeared between May 2019 and May 2020. These lists were reconstructed from previous Newsletters/Bulletins and meeting minutes. The editors welcome corrections.

President

1974–1975 Charles V. Jones
 1975–1977 Viktors Linis
 1977–1979 J. L. Berggren
 1979–1981 Gilbert de B. Robinson
 1982–1983 Wesley Stevens
 1983–1986 Edward J. Barbeau
 1986–1987 M. Walker
 1987–1988 Louis Charbonneau
 1988–1990 J. L. Berggren
 1990–1992 Craig Fraser
 1994–1996 Tom Archibald
 1996–1998 Robert Thomas
 1998–2000 Jim Tattersall
 2000–2002 Glen Van Brummelen
 2002–2004 J. L. Berggren
 2004–2006 Robert Bradley
 2006–2008 Alexander Jones
 2008–2010 Duncan J. Melville
 2010–2012 Jean-Pierre Marquis
 2012–2014 Glen Van Brummelen
 2014–2016 Elaine Landry
 2016–2018 Dirk Schlimm
 2018–2020 Maria Zack
 2020–2022 Craig Fraser
 2022–2024 Nicolas Fillion

Vice-President

1974–1975 Tom Settle
 1975–1979 Gilbert de B. Robinson
 1976–1979 Norman T. Gridgeman

1979–1980 H. Lehman
 1983–1985 M. Walker
 1986–1988 J. L. Berggren
 1988–1990 Craig Fraser
 1990–1992 Tom Archibald
 1996–1998 Jim Tattersall
 1998–2000 Jacques Lefebvre
 2000–2002 J. L. Berggren
 2002–2004 Robert Bradley
 2004–2006 Alexander Jones
 2006–2008 Duncan J. Melville
 2008–2010 Jean-Pierre Marquis
 2010–2012 Glen Van Brummelen
 2012–2014 Elaine Landry
 2014–2016 Dirk Schlimm
 2016–2018 Maria Zack
 2018–2020 Craig Fraser
 2020–2022 Nicolas Fillion
 2022–2024 Robert Bradley

Secretary-Treasurer

1974 J. L. Berggren
 1975–1976 Charles V. Jones
 1977 Kenneth O. May
 1978 Philip Enros (Treasurer), Charles V. Jones (Secretary)
 1979–1980 Philip Enros
 1983–1987 Louis Charbonneau
 1987–1992 M. A. Malik
 1994–2000 Glen Van Brummelen

(In 2000 members agreed that henceforth these offices would be separated.)

Secretary

2000–2024 Patricia Allaire

Treasurer

2000–2002 Robert Thomas
 2002–2004 Roger Godard
 2004–2006 David Bellhouse
 2006–2010 Nathan Sidoli
 2010–2014 Dirk Schlimm
 2014–2016 David Bellhouse
 2016–2021 Gregory Lavers
 2021–2023 David Orenstein
 2023–2024 Craig Fraser

50 Years of CSHPM: Councillors

Corrections are especially welcome here, since there are known gaps around 1982 and between 1992 and 1996. Careful readers may also notice that the Society has not always observed the two-term limit speci-

fied in the bylaws. For an alphabetized list of previous members of the Executive Council, see the May 2020 Bulletin.

1974–1975 William Crawford
 1974–1976 Norman Gridgeman
 1974–1975 Fred Ustina
 1975–1976 Kenneth O. May
 1975–1976 Gregory H. Moore
 1975–1976 William Higginson
 1976–1977 Maureen Flower
 1976–1977 Hugh Lehman
 1978 E. Nelson
 1978 J. Turgeon
 1978–1980 V. Byers
 1979–1981 M. Closs
 1979–1981 Louis Charbonneau
 1979–1981 Edward J. Barbeau
 1983–1984 J. L. Berggren
 1983–1984 John W. Berry
 1983–1984 B. A. Miller
 1983–1984 Ross D. Willard
 1985–1989 Tom Archibald
 1985–1987 Craig Fraser
 1985–1987 H. N. Gupta
 1985–1990 Roger Herz-Fishler
 1987–1991 Victor Katz
 1987–1988 Gregory H. Moore
 ca 1988 Francine Abeles
 1988–1990 Israel Kleiner
 1989–1991 Robert Thomas
 1989–1991 Charles V. Jones
 1990–1991 Norbert Schlomiuk
 1991–1992 Martin Muldoon
 1991–1992 Jim Tattersall
 1996–1998 Hardy Grant
 1996–1998 Israel Kleiner
 1996–1998 Sharon Kunoff
 1996–1998 Jacques Lefebvre
 1998–2002 Rebecca Adams
 1998–2000 John Fauvel
 1998–2000 Craig Fraser
 1998–2002 Alexander Jones
 2000–2002 Roger Godard
 2000–2004 Hardy Grant
 2002–2004 Israel Kleiner
 2002–2006 Amy Ackerberg-Hastings
 2002–2014 Adrian Rice
 2004–2014 Francine Abeles
 2004–2006 Roger Godard

2006–2008 Jean-Pierre Marquis
 2006–2014 Sylvia Svitak
 2008–2014 Gregory Lavers
 2014–2018 Craig Fraser
 2014–2018 Jean-Pierre Marquis
 2014–2018 Karen Hunger Parshall
 2014–2018 Joel Silverberg
 2018–2020 Elaine Landry
 2018–2022 Duncan J. Melville
 2018–2022 Andrew Perry
 2018–2022 Richard Zach
 2020–2024 Amy Shell-Gellasch
 2022–2024 Marion (Wendy) Alexander
 2022–2024 Jemma Lorenat
 2022–2024 Jean-Pierre Marquis

50 Years of CSHPM: Volunteers

Members who have held editorships and other positions not subject to election, as per the Society bylaws. Has your appetite been whetted for more historical material? Check out the extensive Archives section of the CSHPM website.

Newsletter/*Bulletin* Editors

1978 Maureen Flower
 1979–1983 Edward J. Barbeau
 1984–1986 Louis Charbonneau
 1986–1987 Roger Herz-Fischler, Marshall Walker
 1987–1990 Roger Herz-Fischler
 1990–1992 Craig Fraser
 1992–1995 *Bulletin* on hiatus
 1995–1997 Hardy Grant
 1997–1999 Hardy Grant, Sharon Kunoff
 1999–2002 Sharon Kunoff, Tom Drucker
 2002–2005 Tom Drucker, Eisso Atzema
 2005–2009 Amy Ackerberg-Hastings, Eisso Atzema
 2009–2020 Amy Ackerberg-Hastings, Eisso Atzema, Maria Zack
 2020–2023 Sylvia Nickerson, Eisso Atzema, Maria Zack
 2023–2024 Amy Ackerberg-Hastings, Eisso Atzema, Maria Zack

Proceedings/Annals Editors

1988–1989 Tasoula Berggren
 1990 Francine Abeles, Victor Katz, Robert Thomas
 1991 Hardy Grant, Israel Kleiner, Abe Shenitzer
 1992–1999 Jim Tattersall
 2000–2002 Michael Kinyon
 2002–2011 Antonella Cupillari
 2011–2013 Tom Archibald

2014–2015 Maria Zack, Elaine Landry
2016–2020 Maria Zack, Dirk Schlimm
2021–2023 Maria Zack, David Waszek

CSHPM Notes Editors

2014–2023 Hardy Grant, Amy Ackerberg-Hastings
2023–2024 Amy Ackerberg-Hastings

Webmaster

1995–2000 Glen Van Brummelen
2000–2005 Robert Bradley
2005–2022 Michael Molinsky
2022–2024 Eisso Atzema

Archivist

2002–2008 Amy Shell-Gellasch
2008–2017 Michael Molinsky
2017–2024 Eisso Atzema

CMS Liaison

2008–2014 Tom Archibald
2014–2016 vacant
2016–2023 Maritza Branker
2023–2024 Nicolas Fillion

Program Chairs

1979 Philip Enros, Louis Charbonneau, Hugh Lehman, Robert Thomas
1980 Louis Charbonneau
1981 Louis Charbonneau
1982 Edward J. Barbeau, Viktors Linis (local)
1983 Edward J. Barbeau, J. L. Berggren (local)
1984 John W. Berry
1985 Louis Charbonneau, Arthur Miller
1986 Ross Willard
1987 Tom Archibald, Albert Lewis (special)
1988 Roland H. Eddy, Francine Abeles (special)
1989 Roland H. Eddy, Craig Fraser (special)
1990 Francine Abeles, Victor Katz (special)
1991 Erwin Kreyszig
1992 Jerry Lenz
1993 Glen Van Brummelen, Craig Fraser (local), Michael Closs (local)
1994 Craig Fraser, Murry Burke (local)
1995 Jerry Lenz, Jim Tattersall, Tom Archibald (special), Louis Charbonneau (local)
1996 Tom Drucker
1997 Tom Drucker, Roland Eddy (local)
1998 Glen Van Brummelen, Francine Abeles (special)
1999 Craig Fraser
2000 Patricia Allaire, Robert Bradley, Tom Archibald (special)
2001 Amy Ackerberg-Hastings, Adrian Rice, Louis Charbonneau (special)

2002 Amy Shell-Gellasch, Roger Godard (special), Craig Fraser (special and local)
2003 Christopher Baltus, Tom Archibald (special), Daryn Lehoux (local)
2004 Adrian Rice, John Earle, Craig Fraser (special)
2005 Duncan J. Melville, Robert Bradley (special)
2006 Christopher Baltus, Sylvia Svitak (special), Trueman MacHenry (local)
2007 Patricia Allaire, Raymond Flood (special), Robert Bradley (special and local), Gregory Lavers (local)
2008 David Orenstein, Adrian Rice (special), Tom Archibald (local)
2009 Tom Drucker, Tom Archibald (special)
2010 Patricia Allaire, Sylvia Svitak (special), Gregory Lavers (local)
2011 Adrian Rice, Tony Mann
2012 Maria Zack, Sylvia Svitak (special), David De-Vidi (local)
2013 Rob Bradley, Maria Zack, Glen Van Brummelen (special), Tom Drucker (special)
2014 Lawrence D’Antonio, Christopher Baltus (special)
2015 Maria Zack, Amy Ackerberg-Hastings (local)
2016 Eisso Atzema, Tom Drucker (special), Richard Zach (local)
2017 Eisso Atzema, Patricia Allaire (special), Robert Bradley (special), Craig Fraser (local)
2018 Eisso Atzema, Dirk Schlimm (special)
2019 Eisso Atzema, Craig Fraser (special), Tom Archibald (local)
2020 no meeting held
2021 Isobel Falconer, Mark McCartney, Troy Astarte, Snezana Lawrence, Sarah Hart, Chris Pritchard, Maria Zack, Dirk Schlimm, Craig Fraser, Amy Shell-Gellasch
2022 Andrew Perry, Amy Ackerberg-Hastings (special)
2023 Andrew Perry, Amy Ackerberg-Hastings (special)
2024 Maria Zack, Conny Knieling (special)

Book Review: Sidoli and Thomas’s Theodosios

The Spherics of Theodosios, translated and edited by Nathan Sidoli and R.S.D. Thomas. London and New York: Routledge, 2023. 554 pp., 232 illus. US\$140.

The work under review, *The Spherics of Theodosios* is the result of a ten-year collaboration of two well-

known scholars working on one of the major mathematical texts of ancient Greece. This writer has the highest regard for each of them as well as pleasant memories of collaboration in the study and publication of ancient mathematical texts.

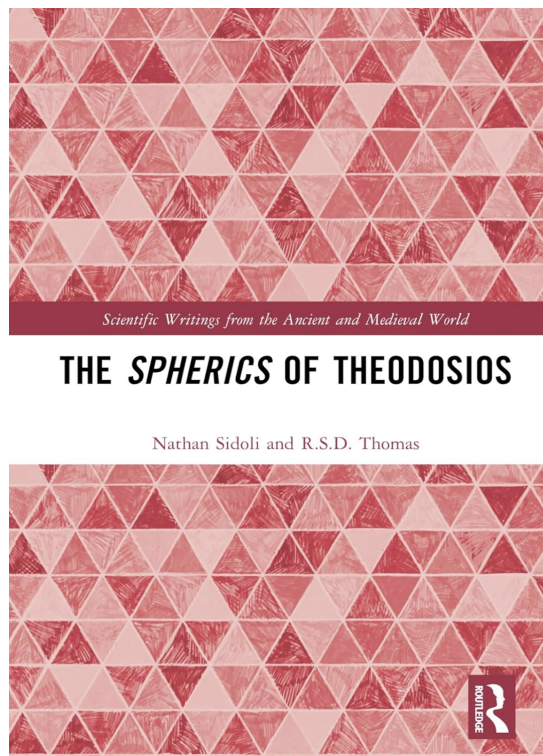


Figure 1: *The Spherics of Theodosios*.

The title of Theodosios’s book, “*ta sphairika*”, may be interpreted as “what concerns the sphere” and, in answer to the obvious question, the authors conclude that the “sphere” in question is an abstraction of the celestial sphere, which one can use to demonstrate geometrically the truth of what one has already learned about the motions of the sun, moon, and stars.

But it is not an introduction to astronomy. And although much of the material would not interest anyone who could not see the implications of its theorems to astronomy, there are only the slightest hints in a couple of places that the work has anything to do with astronomy. The authors deal with this disconnect between the mathematics and its astronomical implications in the Commentary (see below).

Spherics is divided into four main parts: (1) An **Introduction** to Theodosios and the significance of his *Spherics*, both in terms of earlier writings on the topic and the history of the work itself up to early modern times; (2) An English **Translation** of what is now

the standard version of the Greek text of the work by Claire Czinzenheim; (3) A **Commentary**, to be read along with the work itself; (4) A **Paraphrase** of the work in more modern language. We shall discuss them in turn.

(1) Although most modern sources date Theodosios somewhere in the first and second centuries BCE, the authors conclude (p. 5) that Theodosios’s writing should be dated to the early part of the first century BCE. This would mean that, to our knowledge, the title of Theodosios’s work marks the first appearance of the word ‘spherics’ as a technical term for a mathematical discipline. This does not mean, however, that there were no earlier works dealing with the celestial sphere, and there is a very good discussion of pre-Theodosian spherics on pp. 34–50. The authors point out that Euclid’s *Elements* and Theodosios’s *Spherics* are similar in origin, structure, and subsequent history. In particular, both are reworkings of earlier material and both are strictly mathematical. Both open with definitions and both consist of theorems and problems, which have the same structure as that described by Proclus (5th cent. CE) in his *Commentary on the First Book of Euclid*. As for the purpose of the texts, the authors quite reasonably urge caution in assuming that both were written as textbooks simply because in medieval and early modern times they were so used.

(2) As concerns the **translation** (pp. 91–185) this reviewer (who does not have access to Czinzenheim’s Greek text) can only say that the translation reads very smoothly. Further, the technical terms and phrases that appear in some ancient Greek geometrical works have been properly translated into modern terminology (e.g. “that which is from the center” becomes “radius” and “greater than similar to” is explained as saying that the degree measure of one of two arcs or angles is greater than that of the other.)

Also, the authors quite rightly consider their treatment of the geometrical diagrams in the work as part of the translation and they provide, so to speak, dual translations of the diagrams. The first is a representation of the diagrams as in the Greek text. The second type, however, which one meets in the Commentary and the Paraphrase, is a perspective rendering of the three-dimensional figures, which will be of considerable help to many readers. (As an example, Fig. 61 on p. 348 shows the striking difference between these

two renderings.) Their discussion on translation and diagrams shows the careful thought the authors have put into the rules they are going to follow in these activities. The authors have also included photos of Roman mosaics to illustrate something of the cultural context of the study of the celestial sphere.

One also notes, with pleasure, that the authors take seriously the evidence concerning both text and diagrams from Arabic sources, the oldest of which were created in the same century as the oldest extant Greek manuscript in Vat.gr.204.

There is, however, one point in the translation where this reviewer found himself confused. And that was in the Definition 6, which the authors translate as “A plane is said to incline similarly to a plane, one to another, when in each of the planes, straight lines being produced at an upright to the common section of the planes contain equal angles at the same points.” The problem for this reviewer is that the opening lines seem to be talking about one of two planes being similarly inclined to the other which, to this reviewer, does not seem to make sense. In fact, the Greek text of the edition found in the reviewer’s library (J. Hunt 1706) reads (in translation) as follows: “A plane is said to be inclined to a plane, and another to another, when the straight lines drawn to the common section at the same points contain equal angles.” This agrees with the Arabic version on p. 14 of the text established by Kunitzsch and Lorch (*Theodosius: Sphaerica*, Frans Steiner 2010).

(3) A number of the theorems, especially in the later books, are far from trivial. And, in the case of Books II and III, one finds theorems whose enunciation requires half a page and whose proof runs to three or four pages. To help the reader working through pages of technical mathematics, Sidoli and Thomas have written a **Commentary**, about twice as long as the text, explaining (among other things) what is going on in the arguments in terms of what previous results the argument uses, which subsequent results rely on the theorem in question, the main ideas of the proof, and, when appropriate, the implications of the theorem for astronomy.

The Commentary is divided into three sections, corresponding to the three books of the *Spherics*, and, within each book, the theorems are grouped into subdivisions that have a common theme. E.g., the first four divisions of the Commentary on Book I are:

- An Introduction that deals with analogies between the geometry of the *Spherics* and that of the *Elements*;
- The Six Definitions that begin Book I;
- Assumptions and procedures used in constructions, beginning with the extension of a straight line (in Theorem I.2);
- Propositions whose purpose is a construction, such as I.2: To find the center of a given sphere.

(4) The final section of the work, the **Paraphrase**, (pp. 363–473) is aimed at readers interested primarily in the mathematics of the book. It gives a translation of the text into modern, idiomatic English but although “it indicates what the treatise says ... it does not set out to say more than the treatise nor to explain it” (p. 363). The authors do, however, intersperse the text of the Paraphrase with introductory remarks to theorems or groups of theorems and occasional references to the Commentary. In addition, the diagrams have all been redrawn to give an impression of three-dimensional, solid spheres. (The exceptions to this practice of filling in spheres are, along with a number of helpful remarks, addressed in the General Introduction, pp. 363–364.)

The book closes with 23 pages of Bibliography, organized by nature of the source (Primary, Ancient and Medieval Works, Medieval Manuscripts, etc.), which is followed by a number of Indices, concluding with an Index of Greek Terminology.

This exemplary work of scholarship will be the standard translation and historical study of Theodosios’s *Spherics* for many generations to come. All of us interested in the history of mathematics owe both Nathan Sidoli and Robert Thomas our gratitude for the labor and devotion that have gone into the production of this splendid work.

J. Lennart Berggren

New AWM Journal

The flagship journal of the Association for Women in Mathematics, *La Matematica*, which was launched in March 2022, seeks original research articles in the history of mathematics. The journal aims to adopt equitable and feminist publication practices for scholarship in all areas of mathematics (including history), including seeking to deliver a timely and constructive review process. Many institutions have agreements

with Springer that allow open-access publishing with no fee.

Research on the history of women and gender in mathematics is of course welcome and encouraged, as are all other areas of historical research suitable for a general international mathematical journal. As one of the Associate Editors for history, I'm happy to talk with prospective authors via email at michael@mbarany.com. It would be great to see submissions from the CSHPM community!

Michael Barany

Call for Memories

We would like to continue celebrating the Society's 50th anniversary throughout the year, not only with the June CSHPM Notes column and our Annual Meeting at Congress 2024 (see the meeting programme elsewhere in this issue) but also with the November *Bulletin*. Thus, the editors ask members to write a few lines on **when you joined CSHPM and why you joined**. Send your recollections to the Content Editor at aackerbe@verizon.net, and they will be compiled and published. They need to be received by October 1, but go write an email right now, while the task is on your mind.



Figure 2: 1995 UQAM meeting room.

A sample submission: As I settled into the history of technology and science after leaving Iowa State's mathematics program, professors Alan I Marcus and David B. Wilson encouraged me to find my people. It was 1994, so I went to the library, read through volumes of *Historia Mathematica* in print, and discovered CSHPM. I probably found out from the History of Science Society Newsletter how to submit an abstract and register via postal mail for the 1995 Learned's at UQAM. My talk, drawn from a proseminar paper on

Euler and Newton's Second Law of Motion, was not great, and I gave it in a room mostly filled with men at least two decades older than me. But, everyone was gracious; I got invited to dinner; and I went home with a paper membership form that I soon completed and returned.

Enhance Your Teaching with *Convergence*

Now in its 21st year, *Convergence* is the MAA's refereed, online journal for using the history of mathematics in the teaching of mathematics. It contains materials suitable for the full range of courses in the K–16 curriculum, with a focus on grades 8–14. Check out our Classroom Resources Index, bit.ly/3NmjpYc, to find teaching suggestions, lessons, and informative background articles for the courses you are currently teaching. Here, we highlight some of our newest articles and features.



Figure 3: Clinkenbeard's students.

Practical suggestions for incorporating primary sources into mathematical classrooms can be found in "Pitfalls and Potential Solutions to Your Primary Source Problems," by Adam E. Parker, and "Primary Source Projects and Reading Apprenticeship in Mathematics History," by Jennifer Clinkenbeard. Jeff Suzuki's "The Theorem that Won the War" tells the story of the three Polish mathematicians (Marian Rejewski, Henryk Zygalski, and Jerzy Różycki) who first cracked the German encryption system known as Enigma and shares classroom activities suitable for abstract algebra courses. "A Selection of Problems from A.A. Markov's *Calculus of Probabilities*" provides excerpts from Alan Levine's full translation of this textbook

first published in 1900 alongside suggestions for classroom use. Meanwhile, Ximena Catepillán has translated Sandra Monteferrante’s 2007 *Convergence* article, “Maya Cycles of Time,” into Spanish as “Ciclos de Tiempo Maya.”

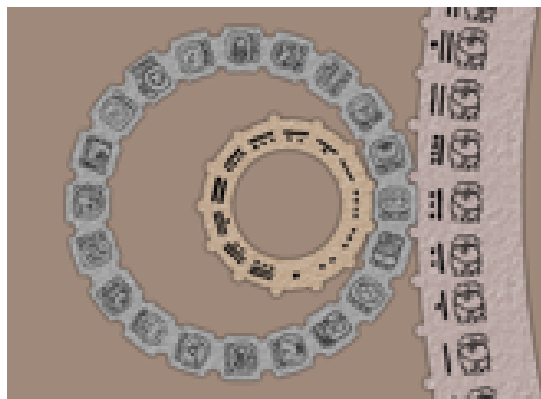


Figure 4: Maya Calendar Round.

Additions to *Convergence*’s article series include the classic “‘Large’ Roman Numerals,” by Phillip S. Jones, with new commentary by Victor J. Katz, in the “Historically Speaking” reprints from NCTM’s *Mathematics Teacher*. The “Keys to Mathematical Treasure Chests” offered by online collections databases have been enhanced by “Classroom Slide Rules,” by Amy Ackerberg-Hastings. In his “Quotations in Context” series, Mike Molinsky added entries for Robert Coveyou, Bernard Le Bovier de Fontenelle, Galileo Galilei, Henri Poincaré, and Leo Tolstoy.

Finally, the TRIUMPHS team has added three mini-Primary Source Projects (mini-PSPs) to the “Series of Mini-projects from **TR**ansforming **I**nstruction in **U**ndergraduate **M**athematics via **P**rimary **H**istorical **S**ources”:

- “Lagrange’s Work on Wilson’s Theorem: Three Mini-Primary Source Projects for Number Theory Students,” by Carl Lienert;
- “Three Hundred Years of Helping Others: Maria Gaetana Agnesi on the Product Rule – A Mini-Primary Source Project for Calculus 1 Students,” by Kenneth M Monks;
- “Solving First-Order Linear Differential Equations: Three Mini-Primary Source Projects for Differential Equations Students,” by Adam E. Parker.

Find all of these articles and much, much more at bit.ly/MAAConvergence.

Daniel E. Otero & Amy Ackerberg-Hastings



Figure 5: Agnesi’s *Instituzioni*.

2024 CSHPM Nominating Committee Report

In keeping with the bylaws of CSHPM/SCHPM, the Nominating Committee (comprising Tom Drucker, Greg Lavers, and Zoe Ashton) has contacted the following people who agreed to stand for the positions below. It is the recommendation of this committee that the following people should stand for election:

President: Robert Bradley, Adelphi University

Vice-President: Janet Heine Barnett, Colorado State University Pueblo

Secretary: Patricia Allaire, Queensborough Community College, CUNY

Treasurer: Craig Fraser, University of Toronto

Council:

Marion (Wendy) Alexander, Houston Community College (2nd term)

Cynthia Huffman, Pittsburg State University (1st term)

Jemma Lorenat, Pitzer College (2nd term)

Valerie Lynn Therrien, McGill University (1st term)

Members who wished to nominate themselves or another member for any of the offices were asked via email to notify a member of the committee before 16 May 2024. After that date, the Secretary will distribute a link to the electronic ballot. Please note that

only those who have paid membership for 2024 are eligible to vote. Results of the election will be communicated at the Annual General Meeting on June 16 at McGill University.

We thank the candidates for their willingness to serve the Society. Terms are two years and thus run from June 2024 to May 2026. The bylaws restrict Councillors to two consecutive terms. By tradition, the President serves one term and is succeeded by the Vice-President. The positions of Secretary and Treasurer are not term-limited. The other positions on the Executive Council (Past President, various editors, Webmaster, Archivist, CMS Liaison) do not require elections.

Respectfully submitted,

Thomas Drucker, Gregory Lavers, and Zoe Ashton

BSHM and Oxford Events

BSHM's Christmas meeting, organized online by Brigitte Stenhouse on December 9, 2023, went as follows:

- Mark McCartney (Ulster University), The Lion, the Witch & the maths graduate: Studying mathematics at Queen's College, Belfast in the 1880s
- Sayori Ghoshal (Krea University), Statistics and Colonialism
- Ciarán Mac an Bhaird (Maynooth University), The Elements in Gaelic: An incomplete Euclid
- Tom Briggs, Maths, Museums & Changing Mindsets
- Adrian Rice (Randolph-Macon College), "The Riddle of the Ages": James Joseph Sylvester and the transcendence of π
- Sarah Hart (outgoing BSHM President), Mathematicians and Poets

The programme of the BSHM Research in Progress Day on March 2, 2024, organized by Brigitte Stenhouse and Chris Hollings, was as follows:

- Jason Yip (Middlesex University), Cultural Echoes in Mathematical Discourse: The Unique Style of Ancient Chinese Treatises
- David Virgili (Universitat Politècnica de Catalunya), Antonio Hugo de Omerique, A Modern Geometer with Classical Roots
- Saša Popovic (University of Rijeka), Poincaré's Double Mistake and the Reception History of Veronese's *Fondamenti di Geometria*
- Paul-Emmanuel Timotei (SPHERE Université Paris

Cité), The Reduction of Singularities between Max Noether and Georges-Henri Halphen: What did a more geometric approach mean?

- Aoife Kearins (Independent Scholar), Place, Space, and the Mathematical Imagination: Resituating George Gabriel Stokes in Ireland
- Kate Hindle (University of St Andrews), Placing D'Arcy Thompson in the History of Mathematics
- Eleanor Brittain (University of Cambridge and BSHM Undergraduate Essay Prizewinner), Whipple Museum Object 1754: A Window into the Crossing of Mathematics, Religion and Art in the 17th Century
- Clément Bonvoisin (SPHERE Université Paris Cité), Across Disciplinary Boundaries and State Borders. How Restricted Mathematical Knowledge Traveled from New Jersey to Moscow through an Engineering Textbook (1953–1956)
- Frederike Lieven (Paris Sorbonne Université), "Shattering the Traditional Framework of Mathematical Instruction": Teaching "New Math" in a Modern Society
- Rebekah Higgitt (National Museums Scotland and Invited Lecturer), Metropolitan Science and Mathematical Practice

Challenging the Infinite: Debating the viability of potential infinity in the foundations of mathematics was a conference organized in Oxford March 11–12, 2024, by Daniel Rowe, a student at Birkbeck College, University of London. He invited the leading proponents of modal potentialism in mathematics to follow up a similar conference held last March. The talks were:

- James Studd (University of Oxford), Contingentist Sets as Potentialist Properties
- Joel David Hamkins (Notre Dame University and University of Oxford), What if your potentialism is implicitly actualist?
- Zeynep Soysal (University of Rochester, virtual), Why Be a Height Potentialist?
- Øystein Linnebo (University of Oslo) & Stewart Shapiro (Ohio State University), Intensional Classes and Strict Potentialism
- Tim Button (University College London), Why I am not a (Height-)Potentialist
- Sharon Berry (University of Indiana), Arbitrariness Worries and Motivating Potentialist Set Theory
- Boaz Laan (University of Oxford), A Paradox for Modal Potentialism
- Geoffrey Hellman (University of Minnesota, vir-

tual), Modal Set Theory and Modal-Structural Interpretation vis-à-vis Critics and then Each Other
With only eight talks over two days there was ample time for one-to-one chatting.

Robert Thomas

2024 CSHPM/SCHPM Meeting Programme

The Annual Meeting of the Canadian Society for History and Philosophy of Mathematics will be held at McGill University in Montréal, 15–17 June 2024, in conjunction with the HSSFC Congress. All sessions are in room 1104 of Burnside Hall. Except for the one-hour Panel Discussion, presentations are 20 minutes, with 5 minutes for discussion and 5 minutes of set-up before the next talk. Maria Zack is the meeting organizer, with assistance from Conny Knieling on the Looking Ahead special session.

SATURDAY, JUNE 15

8:45 President's Welcome (Nic Fillion)

Special Session: Looking Back

9:00 Panel Discussion: CSHPM at 50

10:00 Amy Ackerberg-Hastings (MAA *Convergence*): "The Communications of CSHPM"

10:30 Coffee Break

Special Session: Looking Ahead Part I

11:00 Alma McKown (Alberquerque Public Schools): "Creating a Prehistory and Future for Indigenous Mathematics in the American Southwest"

11:30 Conny Knieling (Pittsburgh): "The Emergence of Projective Geometry: Its methodological pillars and their historical origins"

12:00 Koray Akcaguner (Calgary): "On Mathematical Constructions and Construction Tools"

12:30 Lunch Break

Special Session: Looking Ahead Part II

14:00 Valérie Lynn Therrien (McGill): "The Pre-History of Model Theory: The Theory of Relatives from De Morgan to Lowenheim"

14:30 Dax Avery Hamouth (Concordia): "Twinned Necessities: On Carnap's non-distinction between Metaphysical and Logico-Mathematical Necessity"

15:00 Jared Ifland (UC Davis): "Metaontology in Light of the Frege-Hilbert Controversy"

15:30 Coffee Break

Special Session: Looking Ahead Part III

16:00 Francisco Martínez-Aviña (UC Davis): "Grothendieck's perspectival realism"

16:30 Bradley Dart (Memorial University of Newfoundland): "A Semantics and Pragmatics of Representation: Diagrams as Models"

17:00 Tessa Ng (Toronto): "How do mathematical models explain physical phenomena?"

17:30 Zoe Ashton (Ohio State): "Mathematical Rigor, Conviction, and Injustice"

SUNDAY, JUNE 16

Mathematics Before 1600

9:00 Stela Segev (Herzog College, Jerusalem): "Elijah Mizrahi – rabbi, mathematician, and teacher in Constantinople, at the beginning of the 16th century"

9:30 Glen Van Brummelen (Trinity Western): "Bianchini's reform of mathematical astrology"

10:00 Coffee Break

Primary Sources and Mathematics

10:30 Patrick Wallach (Queensborough Community College): "Researching Sixty Years of Department History and Student Diversity"

11:00 Diana White (University of Colorado, Denver): "Supporting Faculty in the Adoption of Curricular Modules to Teach Mathematics Using Primary Historical Sources"

11:30 CSHPM Annual General Meeting (Lunch Provided)

Philosophy

13:30 Nicolas Fillion (Simon Fraser): "Thinking about the validity of arguments involving partially indeterminate operators"

14:00 Elaine Landry (UC Davis): "Breaking Benacerraf"

14:30 Bernd Buldt (Purdue University, Fort Wayne): "Remarks on open sets"

15:00 Coffee Break

Mathematics in the Seventeenth and Eighteenth Centuries

15:30 Maria Zack (Point Loma Nazarene): "Searching for an Equation for the Cycloid"

16:00 Lawrence D'Antonio (Ramapo): "Richard Towneley, the forgotten scientist of Towneley Hall"

16:30 Marion Alexander (Houston Community College): “Some Eccentric 18th-Century Scots and Their Use of Continued Fractions”

17:00 Gregg De Young (American University in Cairo): “Translating John Bonnycastle’s *Elements of Geometry* into Ottoman Turkish”

MONDAY, JUNE 17

History of Mathematics Since 1700 Part I

9:00 Robert Bradley (Adelphi) and Reilly Fortune (CUNY York College): “Reflections on Euler’s Solution of the Wave Equation”

9:30 Craig Fraser (Toronto): “The Multiplier Rule in the Calculus of Variations”

10:00 Christopher Baltus (SUNY Oswego): “Moebius and the Moebius Transformation”

10:30 Coffee Break

History of Mathematics Since 1700 Part II

11:00 Andrew Perry (Springfield College): “Stefan Banach, Unique Mathematician”

11:30 Eisso Atzema (Maine, Orono): “Trisection in Context”

12:00 Lunch Break

Philosophy of Mathematics: Logic

13:30 Greg Lavers (Concordia): “Frege’s Three Definitions of Number in the Grundlagen”

14:00 Jean-Charles Pelland (Bergen) and Mathieu Marion (UQAM): “Wittgenstein on Surveyability: New Directions”

Philosophy of Mathematics: Applications

14:30 Patricia Marino (Waterloo): “Applied Mathematics and Idealization in the Economics Context”

15:00 Arezoo Islami (San Francisco State): “Applicability of Mathematics: Shortcomings of Philosophy”

15:30 Concluding Remarks

HoM Seminars

Numerous organizations hold regular presentations of interest to historians and philosophers of mathematics. For example, the Philadelphia Area Seminar on the History of Mathematics has been meeting at Villanova University one Thursday evening a month for more than 25 years. Most presentations during the 2023–2024 academic year were hybrid in format and included: Lawrence D’Antonio (Ramapo College), “Edmond Halley, Samuel Pepys, and the ‘Historia Pis-

cium’” on September 21; Benjamin B. Olshin (Bryn Mawr), “Leonardo da Vinci and the Deconstruction of Perpetual Motion” on October 19 and “Early Circular Maps: An Example of Perspectographic Imaging?” on November 16; Maryam Vulis (St John’s University, Norwalk Community College and CCNY) “The History of Markov Chains” on December 7; Jeffrey Oaks (Indianapolis), “How to Think Like a Medieval Algebratist” on January 18; Bonita Lawrence (Marshall), “Solving Dynamic Equations: Using Gifts from the Past” on February 15; Daniel Otero (Xavier), “Barrow’s ‘sum of secants’” on March 21; and David E. Dunning (Penn), “From Notations to Neurons: Mathematical Logic, AI, and the Act of Writing” on April 18.

The Frederick V. Pohle Colloquium Series in the History of Mathematics at Adelphi University usually meets on the first Wednesday of the month. Although the focus is on in-person attendance, a Zoom link is usually also available. Speakers for 2023–2024 included: Maria Zack (Point Loma Nazarene), “Blaise Pascal’s Cycloidal Contest” on November 1; Ximena Catepillán (Millersville), “Maya numbers and calendrical computations” on March 6; Larry D’Antonio (Ramapo), “Edmond Halley, not just comets, but so much more” on April 17; and William Dunham (Bryn Mawr), “The Math Matriarchs of Bryn Mawr” on May 1.

The Ohio River Early Sources in Mathematical Exposition (ORESME) Reading Group has been bringing together scholars interested in the history of mathematics from the Cincinnati tri-state area twice a year since 1998 to read original source materials in mathematics. The weekend of September 22–23, the group examined excerpts from Blaise Pascal’s *Traité du triangle arithmétique* (Paris, 1665) and *Treatise on the arithmetical triangle*. Selections for February 8–9 came from Euler’s and Lagrange’s contributions to the Law of Quadratic Reciprocity; this topic will be continued in the Fall 2024 session.

Are other regular seminars on the history of mathematics held around the world? Do you know of similar seminars in the philosophy of mathematics? Please send a brief description and annual schedule to the Content Editor.

HOM SIGMAA News

Throughout Fall 2023, the SIGMAA continued its

Virtual Speaker Series with talks by Amir Alexander (UCLA), Louis Beaugris (Kean University), Bernd Buldt (Purdue), Jessie Hall (University of Toronto), Colin McLarty (Case Western Reserve), Kris Palmieri (University of Chicago), and Julia Tomasson (Columbia University). We plan to re-launch the speaker series, continuing in partnership with the CSHPM Online Colloquium, in Fall 2024. Please reach out to Abe Edwards, aedwards@msu.edu, if you have suggestions for the series. Many thanks to Jemma Lorenat, our past Program Coordinator, for her first-rate service.

An article on HOM SIGMAA by the officers was published in the Spotlight on SIGMAAs section of the October/November 2023 *MAA FOCUS*, available from the Publications section of maa.org.

Mark your calendars for MathFest 2024 in Indianapolis, IN, August 7–10. Our invited speaker for the Annual HOM SIGMAA Business Meeting will be Jeffrey Oaks (University of Indianapolis). In addition, several MathFest sessions will highlight the history and philosophy of mathematics:

- Contributed Paper Session: “How My Philosophy of Mathematics Affects My Teaching,” organized by Bonnie Gold (Monmouth) and Jason Douma (Sioux Falls).
- History of Mathematics Trivia Event, sponsored by HOM SIGMAA and MAA CUS Committee on Undergraduate Students.
- MAA Invited Address: William Dunham (Bryn Mawr College), “Bryn Mawr Matriculation Exams from Days of Yore.”
- Special Mathematical Session: “Read the Masters! Cauchy’s *limits redux*” will feature a common reading experience from Augustin Louis Cauchy’s *Résumé des leçons données à l’École Royale Polytechnique, sur le calcul infinitesimal*. Organized by Daniel Otero (Xavier University) and co-sponsored by HOM SIGMAA, The Euler Society, the ORESME Reading Group, the ARITHMOS Reading Group, and the TRIUMPHS Society.
- Special Session: “Notable Events in the History of the Indiana Section of the MAA,” organized by Rick Gillman (Valparaiso University).
- Workshop: “Putting the Differential Back Into Calculus,” organized by Bob Rogers (SUNY Fredonia) and Bud Boman (Penn State Harrisburg).
- Workshop: “On the Shoulders of Giants: Teaching and Learning Mathematics from Primary Histor-

ical Sources,” organized by Abe Edwards (Michigan State University), Jennifer Clinkenbeard (CSU Monterey Bay), Ken Monks (College of Southern Nevada), Daniel Otero (Xavier University), Adam Parker (Wittenberg University), and Michael Saclolo (St. Edwards University).

We are pleased to announce the forthcoming (Fall 2024) launch of a new professional journal, *Annals of The TRIUMPHS Society*, which will promote the use of primary historical sources in the teaching of mathematics. Interested parties may contact the editors: Ken Monks, kenneth.monks@csn.edu, and Michael Saclolo, mikeps@stedwards.edu.

The 11th quadrennial meeting of the International Study Group on the Relations between the History and Pedagogy of Mathematics will occur at the University of New South Wales in Sydney, Australia, July 1–5, 2024. For more information, see the conference website: hpm2024.sciencesconf.org.

Submissions for the 21st Student Paper Contest on the History of Mathematics were due to Amy Shell-Gellasch, ashellge@emich.edu, by April 30, 2024. Student travel grants up to US\$250–350 for presenting papers or posters in the history of mathematics are available. Find more information, along with the February 2024 and previous newsletters, on the website, homsigmaa.net/.

Abe Edwards and Ximena Catepillán

POM SIGMAA at JMM 2024

At the Joint Mathematical Meetings in San Francisco in January 2024, a session of philosophical papers was sponsored by the Philosophy of Mathematics Special Interest Group of the Mathematical Association of America (POM SIGMAA) and organized by Bonnie Gold and Tom Morley. There were seven papers in the session, over which Bonnie presided. The speakers were as follows:

- Donald G. Palmer, arguing that a new dimensionality of numbers might be required to cover the entire scale of the universe;
- Theodore V. Theodosopoulos, who looked at what is required for sense to be made in mathematical disciplines;
- Thomas Drucker, on the light cast on Lewis Carroll’s philosophical attitudes by their use in Philip E.B. Jourdain’s ‘The Philosophy of Mr. B*rrr*nd

R*ss*ll' from 1918;

- Jared M. Iffland, arguing that the Frege-Hilbert controversy was about more than ontology;
- Martin E. Flashman, suggesting that ideas for the philosophy of geometry may emerge out of attempts to teach the material to would-be teachers;
- Chanwoo Lee, examining various attempts at providing a foundation for mathematics that is explanatory and not just justificatory; and
- Owen Biesel, seeing whether sheaf theory might be relevant to coming up with beliefs that change over time or from one individual to another.

Attendance at some of the talks was about 75, and there was generally lively discussion.

Tom Drucker

Off the Shelf: Goldstine's *Calculus of Variations*

A History of the Calculus of Variations from the 17th through the 19th Century, by Herman H. Goldstine. New York: Springer-Verlag, 1980.

Herman Goldstine (1913–2004) pursued a career in the United States in computer engineering and science and is regarded as a prominent figure in the computer revolution. A permanent member of the Princeton Institute for Advanced Study (IAS), he was not an academic and did not teach students. His engagement with history consisted of three books he wrote in the 1970s, on computers, numerical analysis, and the calculus of variations.

The calculus of variations is a branch of analysis with a venerable history. Goldstine composed his book some forty years after he carried out doctoral research in the field as a young man at the University of Chicago. He was motivated by a belief that older histories were what he termed “hopelessly archaic.” His approach was “to select those papers and authors whose works have played key roles in the classical calculus of variations as we understand the subject today” (Goldstine 1980, vii). The adjective “classical” referred to the subject that had taken form and was summarized in the writings of Chicago mathematicians Oskar Bolza and Gilbert Bliss. The most detailed statement was Bolza’s 700-page tome of 1909, *Vorlesungen über Variationsrechnung* (published by B. G. Teubner), a greatly expanded edition of an En-

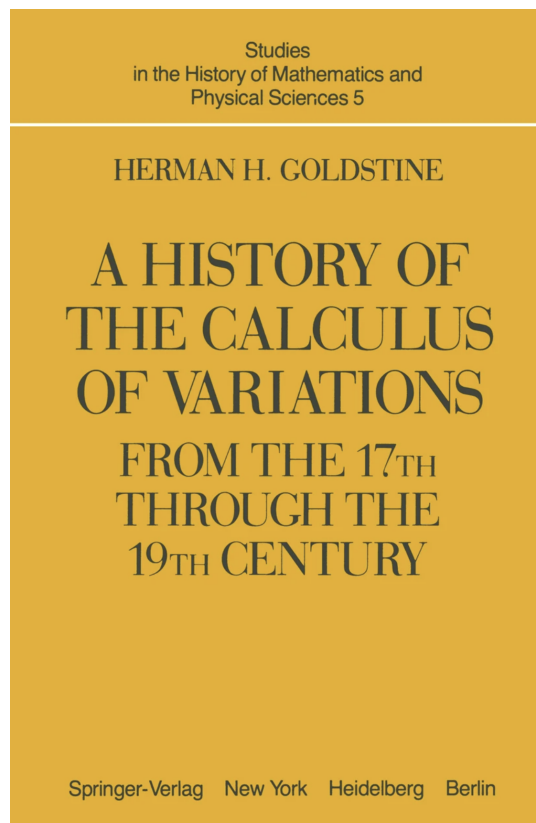


Figure 6: Goldstine’s *History*.

glish book Bolza wrote in 1904.

Goldstine’s book is presented in the form of a survey with particular emphasis on the period after 1800. He was adept at reading Latin, French, and German, and he wrote expository and generally readable accounts of original source material. He possessed an abiding and admirable interest in the mathematics itself. Astute insights into the historical nature of the mathematics were sometimes relegated to footnotes, although the main narrative also included occasional perceptive historical comments about the subject.

Although Goldstine wrote his book at the IAS he seems to have had little contact with historians of science at Princeton University. He did acknowledge discussions with Otto Neugebauer, but the latter’s work on ancient and early modern exact science would have offered only limited historiographical guidance for the study of the development of modern mathematics. Goldstine’s book on the history of the calculus of variations received critical reviews when it appeared. The assessment of historian of physics J. J. Cross was typical. Cross stated that the book was “a partial outline of the development of the pure mathematical aspects

VORLESUNGEN ÜBER VARIATIONSRECHNUNG

VON

Dr. OSKAR BOLZA

ORD. PROFESSOR DER MATHEMATIK AN DER UNIVERSITÄT CHICAGO

UMGEARBEITETE UND STARK VERMEHRTE DEUTSCHE AUSGABE
DER "LECTURES ON THE CALCULUS OF VARIATIONS"
DESSELBEN VERFASSERS

MIT 117 FIGUREN IM TEXT



LEIPZIG UND BERLIN
DRUCK UND VERLAG VON B.G. TEUBNER
1909

Figure 7: Bolza's 1909 book.

of this topic . . . since people, their backgrounds and their motivations are missing, as history this book is quite unsatisfactory in many respects" (*Annals of Science* 39 (1982): 519).

In defence of Goldstine, one might note that any historical study of past mathematics must be based on an exploration of the content of the subject. Still, even from the point of view of a mathematician looking at history there are some weaknesses in Goldstine's approach to the material. No notice is taken in his account of the range of nineteenth-century textbooks in the calculus of variations by authors in Europe and America. These writings are of interest in themselves and provide mathematical context to understand and assess discoveries in the research journals. Furthermore, the choice of noteworthy papers is subjective and, in some cases, does not lead to a proper mathematical or historical understanding of the work in question. An example is Jacobi's seminal 1837 article in Crelle's journal on the second variation, which was presented in a programmatic and incomplete form. As commentators of the period noted, Jacobi's discoveries came into focus when they were explicated in a doctoral memoir of 1841 by Charles Delaunay (not selected for consideration by Goldstine).

The last part of Goldstine's book is in fact of some historical interest itself as an indication of how the "classical" calculus of variations was understood by someone trained in this research tradition. The point of departure consisted of formulating a very general statement of the variational problem, something that was achieved by introducing constraints in the form of differential equations and applying a more abstract form of a multiplier rule. Within this setting, the main goal was investigating conditions that were sufficient to ensure a maximum or a minimum. This was established in one of two ways. The first was to examine the second variation, a project that was put in its modern form by Alfred Clebsch and Adolph Mayer at the middle of the century and continued around 1900 by Adolf Kneser and Gustav von Escherich. The second employed Weierstrassian field methods based on the fundamental concept of a field of extremals and was presented by researchers early in the twentieth century. Major figures here included Kneser, Ernst Zermelo, David Hilbert, and others. A prominent theme throughout work during this period involved questions of existence, which first arose in the 1860s and became a major concern by the new century.

It is necessary to also mention some novel developments that extend beyond the period covered in Goldstine's book but provide context for the mathematics he documented. There was a tendency to relate the subject to differential geometry which later in the century would give rise to calculus of variations in the large and Morse theory. New lines of research beyond what might be regarded as the classical subject occurred with the investigation of multiple integrals in the 1920s and 30s and the emergence of optimal control theory in the 1950s. There have been as well multiple lines of research examining the general problem of optimization. When *Mathematical Reviews* was founded in 1939, calculus of variations was an independent branch of analysis in the subject classification scheme. In today's *MSC* it is also grouped with optimal control and optimization, reflecting the post-classical evolution of the subject.

Craig Fraser

Quotations in Context

"As for everything else, so for a mathematical theory: beauty can be perceived but not explained."

At the 1883 meeting of the British Association for the Advancement of Science, held in the coastal town of Southport, England, the mathematician Arthur Cayley (1821–1895) began his term as President with an address to the society. After a few remarks highlighting the achievements of recently passed members, Cayley announced that, not surprisingly, his address would primarily be about mathematics. He noted the challenge of delving into abstract mathematics before an audience not entirely made up of mathematicians, saying that if “you should wish that you were now about to have, from a different President, a discourse on a different subject, I can very well sympathise with you in the feeling” [Cayley 1896, p. 430].

Cayley began by discussing the relationship of mathematics to experience, offering the views of philosophers such as Plato, Leibniz, Kant, and Mill. He then proceeded to an overview of the development of non-Euclidean geometries, together with geometries of four or more dimensions, commenting on their relationships to experience and observation. He also explored the importance of the imaginary constant i and the complex numbers, followed by a detailed consideration of possible connections between mathematics and time; for example, although Cayley admitted that he did not find the assertion persuasive, he nevertheless presented an argument made by William Rowan Hamilton that the study of time was, in some sense, identical with the study of algebra.

Following these philosophical inquiries, Cayley offered a very brief history of mathematics, including geometry, algebra, astronomy, trigonometry, logarithms, and much more; however, to fit it all in to only a few pages, Cayley offered few details and at times simply listed off the names of mathematicians responsible for progress in each field.

After the history, Cayley wished to move on to a discussion of more recent mathematics, and it was here that the subject quotation of this column appeared:

It is difficult to give an idea of the vast extent of modern mathematics. This word “extent” is not the right one: I mean extent crowded with beautiful detail—not an extent of mere uniformity such as an objectless plain, but of a tract of beautiful country seen at first in the distance, but which will bear to be rambled through and studied in every detail of hillside and valley, stream, rock, wood, and flower. But, as for anything else,

so for a mathematical theory—beauty can be perceived, but not explained [Cayley 1896, p. 449].

Cayley continued the address by providing a summary of more recent results in mathematics, including topics such as higher-order curves both in the plane and in space, elliptic functions, and number theory. He then ended with a brief general assessment of the discipline:

In conclusion I would say that mathematics have steadily advanced from the time of the Greek geometers. Nothing is lost or wasted; the achievements of Euclid, Archimedes, and Apollonius are as admirable now as they were in their own days. Descartes’ method of coordinates is a possession for ever. But mathematics have never been cultivated more zealously and diligently, or with greater success, than in this century—in the last half of it, or at the present time: the advances made have been enormous, the actual field is boundless, the future full of hope. In regard to pure mathematics we may most confidently say :—

Yet I doubt not through the ages one increasing purpose runs,

And the thoughts of men are widened with the process of the suns [Cayley 1896, p. 459].

The final two lines of Cayley’s address are a quotation from “Locksley Hall” by the English poet Alfred Tennyson. To read that quotation in its own context, please see [Tennyson 1842, pp. 92–111].

Mike Molinsky

References

- Cayley, Arthur. 1896. *The Collected Mathematical Papers of Arthur Cayley*. Vol. 11. Cambridge: Cambridge University Press.
- Tennyson, Alfred. 1842. *Poems*. Vol. 2. London: Edward Moxon.

New Members

Congratulations to the following new members who have joined the Society since our last Bulletin. We look forward to your contributions.

Koray Akcaguner
Calgary, AB
Canada

David Buckle
Surrey
UK

Carlo Calvi
Montreal, QC
Canada

Lesley Cormack
Kelowna, BC
Canada

E. M. Cunneen
Dublin
Ireland

Dax Hamouth
Montreal, QC
Canada

James Hendrikson
Bloomington, IN
USA

Jared Ifland
Odessa, FL
USA

Francisco Martinez-Avina
Davis, CA
USA

Tessa Ai-Lin Ng
Toronto, ON
Canada

Stela Segev
Israel

Chris Smeenk
London, ON
Canada

Yussif Yakubu
Hannon, ON
Canada

From the Editor

I hope to see many of you in Montreal in June to celebrate the Society's 50th anniversary. It is an achievement for any academic organization to reach the half-century mark, but reading through the lists of previous officers scattered throughout this issue should underscore that CSHPM has made many significant impacts on its dual disciplines—numerous giants in the history and philosophy of mathematics have helped create this home for quality scholarship and genuine

collegiality. I am excited for this milestone, and even if I have to resort to convenience store snack foods, I am determined that there will be cake at some point in our meeting.

As the *ad hoc* committee reviewing the future of the *Bulletin* announced last November, the Announcements column has been moved to the Society's Facebook page. I have not been keeping formal track, but I probably post 2–3 items per week; according to Facebook's metrics, each post is typically viewed by about 150 people, 10–20 of whom like or share the post and/or click on its link. You will notice in this issue that I did retain some of our members' activities; short articles on your conferences, seminars, publications, and the like are most welcome. I promised to keep a time sheet for this issue and then promptly forgot the promise, but I estimate I spent about an hour setting up this issue's to-do list and other documents last fall; 5–10 hours total over the past 6 months writing *Bulletin*-related emails; and about 15–20 hours writing and editing content over the past 2 weeks. There will be 1–2 hours of proofreading after Eisso sets up the first LaTeX draft.

For most of the last 20 years, I've served as the unofficial CSHPM financial auditor (and, I have the sense that Tom Drucker and Hardy Grant filled the same role before me)—if someone took over just that task, it would shave a couple of hours off of the Content Editor's work. Various departments of the *Bulletin* could also be spun off to volunteers who were interested in helping but did not want the full set of Content Editor responsibilities. For example, someone passionate about book reviews could take on contacting publishers, recruiting reviewers, and ensuring completed reviews are clear, thoughtful, and appropriate. (Even though Len's review of *Spherics* is lovely, my personal opinion is that the *Bulletin* should not be in the business of book reviews. I am happy to explain my reasoning during the AGM.) If there is a part of the *Bulletin* you would like to work on, please let me know. Even better, if you know of a member who might enjoy assuming the Content Editor role, please share with me whose arm to twist. New volunteers are part of the energy and action that will keep our Society healthy and moving forward into the future.

Thanks to Bruce Burdick for sharing the photo from the December 2007 joint AMS-NZMS conference in Wellington, New Zealand, that graces this column.



Figure 8: Hardy Grant, Paul Wolfson, Larry D'Antonio.

(Larry mentioned this meeting in his reminiscence of Hardy that appeared in the November 2023 issue.) Photographs always enhance the visual appeal of the *Bulletin* and add to the Society's historical record as well. The editors also welcome memorials of historians or philosophers of mathematics who have passed away and short yet substantive articles that are informative or thought-provoking as well as relevant to the practice of history or philosophy of mathematics. Other items of interest to historians and philosophers of mathematics can include reports on conferences attended, activities of other societies, or discussions of publications. Les soumissions en français sont les bienvenues. If you are interested in preparing an Off the Shelf column (re-examinations of classic or overlooked works in the philosophy or history of mathematics) or interviewing someone whose career is related to the history or philosophy of mathematics, please contact me. The preferred formats for submissions are Microsoft Word (please turn off its auto-formatting features such as "curly quotes") or LaTeX data files (not compiled PDFs). Please send images as separate files (JPG or PNG formats work well), not embedded in a Word document. Submissions may be sent to aackerbe@verizon.net; the next submission deadline for the *Bulletin* is October 1, 2024.

Amy Ackerberg-Hastings

