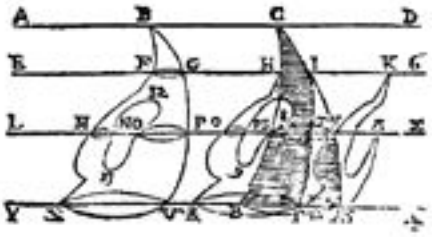
BULLETIN

CSHPM SCHPM



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Reports

Canadian Society for History and Philosophy of Mathematics

Société canadienne d'histoire et de philosophie des mathématiques

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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: **Maria Zack**, Point Loma Nazarene University, San Diego, CA 92106, USA, MariaZack@pointloma.edu
Vice-President: **Craig Fraser**, University of Toronto, Toronto, ON M5S 1K7, CAN, craig.fraser@utoronto.ca
Secretary: **Patricia Allaire**, 14818 60th Ave., Flushing, NY 11355, USA, PatAllaire@gmail.com
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Past President: **Dirk Schlimm**, McGill University, Montreal, QC H3A 2T7, CAN, dirk.schlimm@mcgill.ca

Members of Council

Elaine Landry, UC Davis, Davis, CA 95616, USA, emlandry@ucdavis.edu
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Andrew Perry, Springfield College, Springfield, MA 01109, USA, aperry@springfieldcollege.edu
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Volunteer Positions

The Society's Web Page (www.cshpm.org) is maintained by **Michael Molinsky**, University of Maine at Farmington, Farmington, ME 04938, USA, michael.molinsky@maine.edu. The Proceedings of the Annual Meeting are edited by **Maria Zack** and **Dirk Schlimm** (see above). The Society's Archives are managed by **Eisso Atzema**, University of Maine, Orono, ME 04469, USA, eisso.atzema@maine.edu. **Hardy Grant**, hardygrant@yahoo.com, and **Amy Ackerberg-Hastings**, aackerbe@verizon.net, edit the CSHPM Notes column for *Notes* of the Canadian Mathematical Society. **Maritza Branker**, Niagara University, Lewiston, NY 14109, USA, mbranker@niagara.edu, serves as CMS Liaison.

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

President's Message

As I reach the end of another academic year, I am reflecting on how quickly time passes (how can final exams be starting next week?) and how many students have passed through both my physical and virtual classrooms over the years. I find that I am very thankful that an academic life is one of working in community with students, faculty members and scholars around the globe. This issue of the *Bulletin* contains a wide variety of information about our scholarly community; I am grateful for the diligent work done by Amy Ackerberg-Hastings and Eisso Atzema to produce two informative issues of the *Bulletin* each year.

I am looking forward to the CSHPM community gathering in Vancouver in June and hope that many of you can come and enjoy the wonderfully diverse scholarly work that will be discussed as well as our annual business meeting. I am particularly thankful for the work of Eisso Atzema, Craig Fraser and Tom Archibald in planning an interesting meeting.

With gratitude for each of you and what you contribute to the CSHPM community,

Maria Zack

Announcements

David Zitarelli's family announces the establishment of a scholarship fund in his name at Temple University. (See the memorial by Karen Parshall in this issue.) Gifts may be made online (giving.temple.edu/givetocst) or by check (payable to Department of Mathematics, Temple University; mailed to Temple University Institutional Advancement, PO Box 827651, Philadelphia, PA 19182-7651, USA). Please designate gifts with the code D11006 and dedication "in memory of Dr. David Zitarelli", using the memo line or the text box for "Other" as appropriate.

Tom Drucker received the MAA Wisconsin Section Distinguished Teaching Award at the section's spring 2019 meeting.

Adrian Rice will receive the Paul Halmos-Lester Ford Award for outstanding expository papers published in the *American Mathematical Monthly*, for his article

"Partnership, Partition, and Proof: The Pathway to the Hardy-Ramanujan Partition Formula" (published January 2018), at this summer's MathFest.

Amy Shell-Gellasch was elected Vice-Chair of the MAA Michigan Section. She and Dick Jardine also collected descriptions of 33 history of mathematics classes for several different types of students and including both general courses and studies of special topics. *The Courses of History: Ideas for Developing a History of Mathematics Course* is in the MAA Notes series and so is free for every MAA member (click on "My Profile" and "Member Library").

Robert Moir is a contributor and Nic Fillion is an editor of the 2015–2016 conferences proceedings volume, *Algorithms and Complexity in Mathematics, Epistemology, and Science*. See `springer.com/gp/book/97814939990504`.

The 100th issue of the *HPM Newsletter* contains historical material, including a reminiscence from former chairs Ubiratan D'Ambrosio and Florrie Fasanelli. See `clab.edc.uoc.gr/HPM/NewsLetters.htm`.

The Fall 2019 Midwest Section meeting of the AMS will feature a special session on recent work in philosophy of mathematics, organized by Tom Drucker and Dan Sloughter, and a special session on relations between history and pedagogy of mathematics, organized by Brit Shields, Rebecca Vinsonhaler, and Emily Redman.

Fernando Gouvêa has passed the torch of MAA Reviews to Brian Borchers, but remains involved as associate editor for history of mathematics. To express interest in reviewing books, please contact Brian and CC: Fernando. Dominic Klyve is also soliciting book reviews for *The College Mathematics Journal*.

The NSF-funded TRIUMPHS project (TRansforming Instruction in Undergraduate Mathematics via Primary Historical Sources) has launched a **webinar** series for instructors interested in learning more about teaching with Primary Source Projects (PSPs). Each webinar features a different PSP in the TRIUMPHS collection of 28 full-length PSPs and 21 shorter "mini-PSPs." TRIUMPHS site testing also continues, with applications due by June 15 for Fall 2019 and by October 15 for Spring 2020. Videos of past webinars, schedule information for future webinars, site tester application information and the PSPs themselves are available on the project website:`blogs.ursinus.edu/triumphs/`.

HOMSIGMAA News: Amy Shell-Gellasch was reelected as President. Andy Perry began serving as interim Electronic Resources Coordinator. Secretary Cynthia Huffman is collecting images of "Found Math History" for the newsletter and website. A new "small grant" program for up to US$100 is available for items needed to teach history of mathematics.

At MathFest in Cincinnati, HOMSIGMAA, the Euler Society, ORESME, ARITHMOS, and TRIUMPHS are sponsoring a Primary Source Reading of Leonhard Euler's *Introduction to Analysis of the Infinite* on August 1. HOMSIGMAA and the SIGMAA on Math Circles are also sponsoring a contributed papers session on the theme History of Mathematics in a Math Circle. The Euler Society is sponsoring a contributed papers session on Understanding Mathematics Through its History.

BSHM News: The name of the *BSHM Bulletin* is changing to *British Journal for the History of Mathematics*. Upcoming meetings include History of Recreational Mathematics at Birkbeck College, London, on May 18, and Mathematics of Populations at Rewley House, Oxford, on June 22. The Stokes200 Symposium will be September 15–18 at Pembroke College, Cambridge. Volunteers are needed to organize a Christmas meeting in the Midlands and a 2020 meeting in the North of England.

HSS News: The History of Science Society is meeting in Utrecht, July 23–27. The Forum on the History of Mathematical Sciences is sponsoring the roundtable session, "Bourbaki Reconsidered: Origins, Operations, and Legacies." Other sessions related to the history of mathematics include: "Manuscripts, Instruments, Tables and Computation in Alphonsine Astronomy," "Negotiating Mathematical Intelligibility in the Exact Sciences, ca 1830–1920: Physical, Empirical, and Formal Conceptions," "Practical Mathematics in Early Modern Europe," "Mathematical Cultures," "Early Modern Astronomies and Cosmologies," and "Rhetorics of Rigor."

FedCan News: The Federation (the organization behind Congress) curates a YouTube channel with Big Thinking talks, Congress events, webinars, and the like: `youtube.com/user/IdeasIdees/`.

Seminars

The Claremont History and Philosophy Seminar, founded by Jemma Lorenat, welcomed the following speakers in 2018–2019: Bogdan Suceava (CSU-

Fullerton), "Followers of the Erlangen Program: The Birth of Affine Differential Geometry and the Development of the Bucharest School of Geometry," on September 10; Mordechai Feingold (Caltech), "Teaching Mathematics (and Natural Philosophy) in Early Modern Universities," on October 15; Michael Barany (Edinburgh), "Inclusion, Exclusion, and the Theory and Practice of 'Truly International' Mathematics," on November 5; Reviel Netz (Stanford), "Archimedes and Infinity," on November 19; Vincenzo De Risi (Paris), "Johann Lambert and Modern Axiomatics," on February 11; Deborah Kent (Drake), "'Glorious beyond description': The U.S. Naval Corps of Professors of Mathematics experience a total solar eclipse in 1869," on February 25; Jim Smith (San Francisco State), "Mario Pieri, Overloading, and Information Hiding in 1907," on April 1; and Sean Walsh (UCLA), "Infinitesimals, valued fields, and the orders of infinite smallness," on April 22. Reading discussions were held on October 1, December 10, March 11, and May 6. See `colleges.claremont.edu/ccms/` and follow the link to the seminar on the right.

Speakers on the 2018–2019 schedule for the Philadelphia Area Seminar on the History of Mathematics (PASHoM) included: Chris Rorres (Drexel, emeritus), "The Cattle of the Sun From Bablylonia to Homer to Archimedes," on September 20; Adrian Rice (Randolph-Macon), "Ada Lovelace: The Making of a Computer Scientist," on October 11; Mariya Boyko (Toronto), "Soviet Mathematics Education Reforms of the 1970s and Their Aftermath," on December 13; Harold Edwards (NYU, emeritus), "Are Complex Numbers as Important as Modern Mathematics Makes Them?" on February 21; Paul Wolfson (West Chester), "How Did Riemann Arrive at His Curvature?" on March 21; and John Dawson (Penn State, emeritus), "How Relevant Has Logic Been to Mathematical Practice?" on April 25. Alan Gluchoff seeks speakers for the 2019–2020 academic year.

The Frederick V. Pohle Colloquium on the History of Mathematics, hosted by the Department of Mathematics & Computer Science at Adelphi University, presented the following speakers in 2018–2019: Joseph Dauben (CUNY), "The Jesuits' Failure to Transmit Western Mathematics, Astronomy, and Mathematical Perspective to China: Reflections on Matteo Ricci, Giuseppe Castiglione, Andreas Pozzo, and the Needham Question," on October 3; Chris Rorres (Drexel), "The Count of the Cattle of the Sun: From Mesopotamia to Homer to Archimedes," on November 7; Rob Bradley (Adelphi), "Servois on Numerical Integration," on March 6; Inna Tokar (CC-NYU) , "History of Mathematics Education for Gifted Students in the former Soviet Union," on April 3; and Eisso Atzema (Maine), "Ferdinand Engel (1805–1866) and his Models of the Fresnel Wave Surface," on May 1.

The annual seminar on Epistemology and History of Mathematical Ideas, held Wednesdays at the Institut Henri Poincaré in Paris, welcomed the following speakers: Michèle Artigue (Paris-Diderot), "Identifier et comparer le lexique pédagogico-didactique des enseignants de mathématiques : le projet international Lexicon," on October 17; François Lê (Lyon), "La Reconnaissance et la constitution des théorèmes de clôture," on December 5; Patrick Dehornoy (Caen), "A propos de la théorie des ensembles," on December 12; Odile Kouteynikoff (SPHERE), "Les *Éléments* d'Euclide au service d'une algèbre de la Renaissance. Comment Guillaume Gosselin démontre-t-il 'la règle des signes'?" on February 6; Philippe Seguin (Nancy), "Pourquoi Dedekind voulait-il absolument créer les nombres?" on March 13; Bruno Gagneux (IREM), "Descartes : combine de divisions?" on April 10; Charlotte De Varent (SPHERE), "Expérimentation en classe utilisant l'histoire des mathématiques : enjeux et contraintes de la prise en compte de la discipline historique," on May 15; and Bruno Gagneux (IREM), "Introduction à la lecture de Michel Serfati," on May 29.

Additional Publications

Birkhäuser has issued Uta Merzbach's *Dirichlet: A Mathematical Biography* in hardback and eBook versions. See `springer.com/us/book/97830330010713`.

Volumes 53 and 54 of *Studia Leibnitiana* are *Leibniz and the Invention of Mathematical Transcendence*, by Michel Serfati, and *Leibniz und das Naturrecht*, edited by Luca Basso.

Notes and Records: The Royal Society Journal of the History of Science published a special issue on John Wallis at 400 in December 2018. For an online video, blog entry, and link to the table of contents, search `blogs.royalsociety.org/publishing/` for "A Mathematician and a Polymath."

Alexander Karp and Gert Schubring are editing a new series, International Studies in the History of Mathematics and its Teaching, for Springer. The first vol-

ume, *Interfaces between Mathematical Practices and Mathematical Education*, is now available.

In 2018, the AMS published Judith Goodstein's *Einstein's Italian Mathematicians: Ricci, Levi-Civita, and the Birth of General Relativity*.

Della Dumbaugh's students have put together the website `americanmathematics.org`, the first site of its kind to explore the people who create, the institutions that support and the cultures that influence American mathematics. A blog post about the site is on The Conversation US, `bit.ly/2HZLbMz`.

The Islamic Scientific Manuscripts Initiative, a database cataloguing authors and works written before 1350 CE, is online at `ismi.mpiwg-berlin.mpg.de`.

The Interactive Historical Atlas of the Disciplines, aimed at mapping the evolution of borders between scientific disciplines, contains some mathematicians and philosophers. See `atlas-disciplines.unige.ch`.

The George Mason Open Educational Resources Metafinder searches 19 repositories of textbooks and digitized materials. It claims to return more thorough results from sites like HathiTrust and the Internet Archive than those sites' own search engines. See `mom.gmu.edu`.

Jemma Lorenat's paper, "Certain Modern Ideas and Methods: 'Geometry Reality' in the Mathematics of Charlotte Angas Scott," received the 2018 Maria Gaetana Agnesi Third Centennial Prize from the Italian Society of History of Mathematics.

Edward MacKinnon published "The role of a posteriori mathematics in physics," *Studies in the History and Philosophy of Modern Physics* 62 (2018): 166–175.

The January 2019 issue of *Journal of Humanistic Mathematics* is available at `scholarship.claremont.edu/jhm/`.

Monthly issues of the *HPS&ST Note* are available via `www.hpsst.com/hpsst-note.html`.

A new journal on Greek philosophy, *Politeia* may be found at `www.pdcnet.org/politeia`. The first year is open-access.

The website for the International Commission on the History of Mathematics is `mathunion.org/ichm`. See `mathunion.org/organization/imu-net` to subscribe to the newsletter for the International Mathematics Union.

Other Meetings

The UK's National STEM Learning Centre held a conference on doing philosophy with children as they learn science on March 18–19.

The International Congress on the History of Science in Education will be May 30–June 1 in Vila Real, Portugal.

The Center for Philosophy of Science at the University of Pittsburgh will hold a summer program for underrepresented groups on July 15–19.

The 38th annual symposium of the Scientific Instrument Commission will be September 23–27 in Havana, Cuba.

The History of Education Society will meet October 31–November 3 in Columbus, OH.

The Eighth International Conference to Review Research in Science, Technology and Mathematics Education will be held January 3–6 in Mumbai. One of the four strands of the meeting is "Historical, philosophical and socio-cultural studies of STM: implications for education." See `epsteme8.hbcse.tifr.res.in`.

Funding Opportunities

Scholars who are no more than three years beyond receipt of the doctorate are eligible for the Hench Post-Dissertation Fellowship at the American Antiquarian Society, which carries a stipend of US$35,000. Applications are due October 15. See `www.americanantiquarian.org/hench.htm`.

Applications for next year's fellowship cohort of Rare Book School's Andrew W. Mellon Society of Fellows in Critical Bibliography are due November 1. Courses are held in Charlottesville, VA, and New York City. See `rarebookschool.org/admissions-awards/fellowships/`.

Elsevier invites applications for its Mathematical Sciences Sponsorship Fund; the annual deadline is January 31. See `www.elsevier.com/awards/mathematical-sciences-sponsorship-fund`.

See `rbsc.princeton.edu` for Princeton Library Research Grants. Applications are due January 31.

The American Philosophical Society invites applications for long-term fellowships by February 1 and short-term fellowships by March 1. See `www.amphilsoc.org/grants/fellowships`.

The 27 agencies of the New England Regional Fel-

lowship Consortium award US$5000 to at least 24 researchers. In 2016–2017, Rachel Knecht (Brown) explored "Inventing the Mathematical Economy in Nineteenth-Century America." Applications for the next round of grants are due February 1. See `masshist.org/fellowships/nerfc/`.

The Huntington Library and Caltech are launching the Caltech-Huntington Advanced Research Institute in the History of Science and Technology. Offerings will include a summer research institute for doctoral students, a resident senior research fellow, and visiting scholars. See `huntington.org/news/huntington-caltech-launch-new-institute` for a press release.

Book Review: Historical Approach to Entropy

A Historical Approach to Entropy: Collected papers of Eri Yagi and her coworkers, 2nd edition. Tokyo: Eri Yagi Institute for History of Science, 2018, 81 pp., figs., tables, biblio.

Eri Yagi is a well-known research worker in the history of 19th-century physics, mainly thermodynamics. Her warm-hearted personality and high ability as a researcher have attracted younger students throughout her career, some of whom now participate in the Eri Yagi Institute for History of Science.

Her early subject was Hantaro Nagaoka (1865–1950), a 19th-century Japanese physicist; her several articles on him are influential. She has also been interested in Rudolf Clausius since she was an undergraduate, and with Martin Klein's suggestions and encouragement, she began to focus on Clausius around 1980. By 1990, she was frequently collaborating with fellow Clausius specialists.

On the occasion of Yagi's retirement from Tokyo University in 2002, the team published *A Historical Approach to Entropy*, collected papers of their work. Reviews in *Isis* (96 (2005): 294) and *Centaurus* (46 (2004): 231) brought attention to the volume and the colleagues' continuing research program. In 2009, the Clausius Tower Project and Koszalin University of Technology hosted Yagi as the first speaker in their first conference in Clausius's birthplace in Poland.

These positive receptions led Yagi and her co-authors to prepare the second edition of *Historical Approach to Entropy* that is the subject of this review. The book mainly includes abstracts and slides from their talks at international and Japanese conferences in addition to abstracts of their published papers. After an introduction, Chapter II provides an overview of Yagi's presentation in Koszalin, where she examined Clausius's contributions to the first and second laws of thermodynamics and surveyed the accomplishments of her research group. Chapter III contains some of the group's approaches to Clausius, including discussions of his formation of entropy, noting his mathematical methods and treatments of experimental data; his concept of particles; his work on the theory of steam engines; and his influence on Nagaoka's development of atomic models.

The fourth and final chapter has two reference lists. The first is a bibliography of Clausius's articles, which adds titles from Eduard Riecke's *Rudolf Clausius* (1889) to the list of Clausius's works on the mechanical theory of heat that appeared in the first edition of *Entropy*. The second reference list updates Yagi's publications for the period between 2002 and 2018. See `clausius.main.jp/wp/publication-list/` for a bibliography from 1957 through 2014.

Since much of the volume consists of abstracts, it is difficult for readers to assess the quality of the research. Japanese speakers, though, can attest to the breadth and depth of the research group's publications. They chose seven papers from Clausius's *Abhandlungen über die Mechanische Wärmetheorie* (2 vols., 1864, 1867) to translate into Japanese, and published them with commentaries in 2013, under the title *Entoropi no kigen toshite no rikigakuteki neturiron* (Thermodynamics theory as an origin of entropy). These translations include Clausius's four papers on thermodynamics (1850, 1854, 1862, and 1865) and papers on steam engines (1856), heat radiation (1864), and electric theory (1853).

In *Entropy*, all titles of Clausius's papers in the *Abhandlungen* are translated with their bibliographic information; all English and French translations are noted. The authors also provide a table that shows the development of thermodynamics from Sadi Carnot to Clausius, and a chronology of Clausius's life alongside the work of other physicists, world events, and scientific developments in Japan. Another list contains all of the literature cited in the Japanese-language publications by Yagi's group.

There are only limited historical works on Clau-

sius. But thanks to Yagi's group, Japan has become the best-prepared country for Clausius studies. The whole body of their translations, commentaries, and historical analyses shows how they precisely examine his publications, how much energy and time they put into this work, and how much discussion has taken place among these scholars. While reading abstracts in translation provides an introduction to their research, only those who take up the group's publications can truly decide the extent to which their accomplishments are reliable and interesting. Unfortunately, the number of academics who can both understand Clausius's ideas and read Japanese is small. Publishing at least the full conference papers would be desirable.

Michiyo Nakane

2018 Financial Statements

The following financial statements cover the period 1/1/2018 through 31/12/2018.

Income	$Can
Dues/Subscriptions	12,007.54
TOTAL	12,007.54
Expenses	
Proceedings	2,885.55
Philosophia Mathematica	2,570.40
Historia Mathematica	6,350.35
SCIAMVS	820.00
BSHM reciprocal memberships	1,807.33
CFHSS dues for 2018	1,433.39
May Speaker	1,060.14
CSHPM Student Prize	1,000.00
Conference lunches	1,181.94
Postage, office expenses, *Bulletin*	241.36
PayPal service charge	369.38
Bank fees	228.79
Refund	95.50
TOTAL	20,044.13
NET	(8,036.59)
Bank balance, 12/31/18	35,188.24
PayPal balance, 12/31/18	5,667.89
TD Mortgage Corporation GIC	4,396.47
TD Mortgage Corporation GIC	4,620.03
TOTAL ASSETS	49,872.63

Comments:

The Society has three accounts: a TD Canada Trust account for Canadian funds (CDN), a TD Canada Trust account for American funds (USD), and a PayPal account (CDN). The two bank accounts are used to deposit income or pay expenses in the appropriate currency. For example, journal subscriptions are usually paid in US dollars. Memberships paid by cheque can be in CDN 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. At the request of the editors, we have combined the numbers for these accounts. The numbers given are in Canadian dollars. A conversion factor of 1.36 has been used to convert American dollars into Canadian ones.

The first GIC fund earns interest at 1,60% and matures 16 September 2019; the second has a 1,40% rate and matures 10 April 2021. Both funds automatically renew.

As I mentioned in my report last year, several 2017 expenses were paid in early 2018, such as BSHM reciprocal memberships. Also, our conference lunches were not offset by registration fees this year. Thus, after surpluses in 2016 and 2017, the statements for 2018 show a deficit. If deficits continue over the next few years, we may have to address the problem, but I don't believe there is reason to think they will.

Gregory Lavers

Quotations in Context

> "I never came across one of Laplace's 'Thus it plainly appears,' without feeling sure that I have hours of hard work before me to fill up the chasm and find out and show how it plainly appears."

While the American mathematician Nathaniel Bowditch (1773–1838) was almost entirely self-taught, he went on to build an international reputation for his accomplishments. One of his greatest projects was his English translation of the first four volumes of Pierre-Simon Laplace's *Traité de mécanique céleste*. While the translation itself was completed by 1817–1818, Bowditch continued to work on the project for many years, adding additional commentary and explanation. Bowditch funded the publication of the translation himself, with the first three volumes appearing in 1829, 1832 and 1834. The fourth volume was published posthumously in 1839.

I have not found the subject quotation of this column

directly in any of Bowditch's writings. In his introduction to the first volume, Bowditch does express a similar sentiment, although in a perhaps more careful and circumspect tone than that of the quotation above:

> The object of the author in composing this work, as stated by him in his preface, was to reduce all the known phenomena of the system of the world to the law of gravity by strict mathematical principles; and to complete the investigations of the motions of the planets, satellites, and comets, begun by Newton in his *Principia*. This he has accomplished, in a manner deserving the highest praise, for its symmetry and completeness; but from the abridged manner in which the analytical calculations have been made, it has been found difficult to be understood by many persons who have a strong and decided taste for mathematical studies, on account of the time and labour required to insert the intermediate steps of the demonstrations necessary to enable them easily to follow the author in his reasoning. To remedy, in some measure, this defect, has been the chief object of the translator in the notes.

The actual source of the quotation appears to be several memorials written briefly after Bowditch's death. The earliest example is the 1838 publication "A Discourse on the Life and Character of the Hon. Nathaniel Bowditch," which records a eulogy delivered by Boston clergyman Alexander Young. On pages 47–48, Young describes Laplace's work:

> It is a work of great genius and immense depth, and exceedingly difficult to be comprehended. This arises not merely from the intrinsic difficulty of the subject, and the medium of proof employed being the higher branches of the mathematics, but chiefly from the circumstance that the author, taking it for granted that the subject would be as plain and easy to others as to himself, very often omits the intermediate steps and connecting links in his demonstrations. He jumps over the interval, and grasps the conclusion as by intuition. Dr. Bowditch used to say, "I never come across one of La Place's '*Thus it plainly appears*,' without feeling sure that I have got hours of hard study before me to fill up the chasm, and find out and show *how* it plainly appears."

Bowditch's eldest son, Nathaniel Ingersoll Bowditch, also wrote a memoir which was included in the fourth volume of his father's translation in 1839. A variation of the quotation appears on page 62 of the memoir:

> Dr. Bowditch himself was accustomed to remark, "Whenever I meet in La Place with the words, 'This it plainly appears,' I am sure that hours, and perhaps days, of hard study will alone enable me to discover *how* it plainly appears." So important did he consider the object which he thus had in view, that every letter which he received, proving to his satisfaction the fact of some young man's having read his Translation and Commentary, afforded him much more pleasure than the favorable mention of it in popular journals, or even than the flattering approbation bestowed by competent judges; since, while the one would be but an opinion, the other would be *a proof*, that the great end of his labors had been accomplished.

Mike Molinsky

MAA Convergence News

MAA Convergence is both an online journal on the history of mathematics and its use in teaching, and an ever-expanding collection of online resources to help its readers teach mathematics using its history. Under the leadership of three well-known mathematics historians and educators, founding editors Victor Katz and Frank Swetz and their decade-long successor Janet Beery, *Convergence* has offered its readers high-quality scholarship and classroom resources since 2004. We highlight here some of our newest articles and resources for use in your classroom.

Richard Delaware's article, "**More than just a Grade: The HOM-SIGMAA Student Contest Fosters Writing Excellence at UMKC**," is a must-read for anyone who has students do some form of mathematical writing—or who does such writing themselves! Richard's advice on promoting excellent student research and writing about history of mathematics makes it clear why students in his History

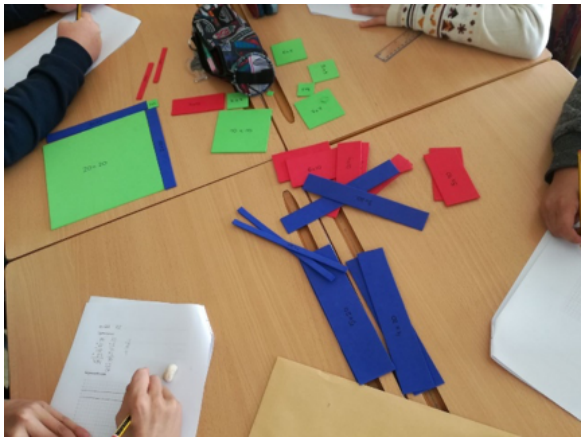

Figure 1: Kai Fang construction of $\sqrt{486}$

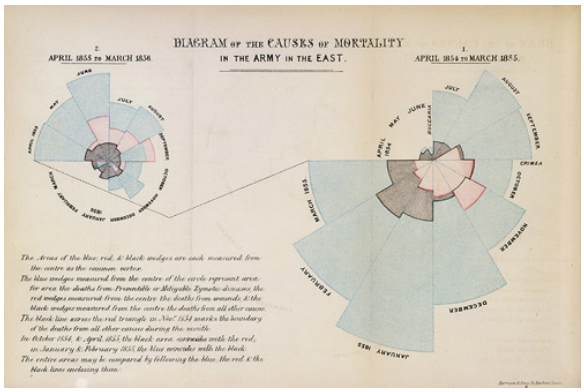

Figure 2: Florence Nightingale's statistical graph

of Mathematics course have one of the longest and strongest records of winning papers in the History of Mathematics–Special Interest Group of the Mathematical Association of America (HOM-SIGMAA) Annual Student Paper Contest.

Two articles provide examples for utilizing the landmark Chinese work, *Jiuzhang Suanshu* (Nine Chapters on the Art of Calculation). In "**A Classic from China: The Nine Chapters**," Randy K. Schwartz illustrates each of its chapters with problems that are accessible to most high school and college students. The authors of "**On Squares, Rectangles, and Square Roots**," María Burgos and Pablo Beltrán-Pellicer, describe how they used a particular algorithm from *Nine Chapters* with even younger students in a classroom activity that combines the use of manipulatives with the ancient Chinese *Kai Fang* method for extraction of square roots.

Adding to "A Series of Mini-projects from **TR**ansforming **I**nstruction in **U**ndergraduate **M**athematics via **P**rimary **H**istorical **S**ources," the TRIUMPHS team has introduced three mini-Primary Source Projects (mini-PSPs) so far this year:

- "Seeing and Understanding Data: A Mini-Primary Source Project for Students of Statistics," by Charlotte Bolch and Beverly Woods.
- "The Origin of the Prime Number Theorem: A Primary Source Project for Number Theory Students," by Dominic Klyve.
- "The Cantor Set Before Cantor: A Mini-Primary Source Project for Analysis and Topology Students," by Nicholas A. Scoville.

Watch for new projects in this series in *Convergence*!

Two recent articles on research tools and methods for teaching with primary sources are:

- "**Using the Publimath Database to Bring History into our Teaching**," by Hombeline Languereau and Anne Michel-Pajus, and
- "**Teaching Mathematics with Ephemera: John Playfair's Course Outline for Practical Mathematics**, which provides an alternative way of thinking about the pamphlet Amy Ackerberg-Hastings discussed in the 2017 CSHPM *Proceedings*.

Our "**Index to Mathematical Treasures**" includes hundreds of images for use in your classroom from dozens of libraries and archives. Our chief "treasure hunter" is *Convergence* founding editor Frank Swetz. See all of these articles and more at *MAA Convergence*: `www.maa.org/press/periodicals/convergence`.

Amy Ackerberg-Hastings & Janet Barnett

From the Archives: CSHPM Volunteer Positions

Members who have held editorships and other positions not subject to election, as per the Society bylaws.

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

Bulletin on hiatus, 1992–1995
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
2009–2019 Amy Ackerberg-Hastings, Eisso Atzema, Maria Zack

***Proceedings* 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
2016–2019 Maria Zack, Dirk Schlimm

CSHPM Notes Editors
2014–2019 Hardy Grant, Amy Ackerberg-Hastings

Webmaster
1995–2000 Glen Van Brummelen
2000–2005 Robert Bradley
2005–2019 Michael Molinsky

Archivist
2002–2008 Amy Shell-Gellasch
2008–2017 Michael Molinsky
2017–2019 Eisso Atzema

CMS Liaison
2008–2014 Tom Archibald
position vacant, 2014–2016
2016–2019 Maritza Branker

2019 CSHPM/SCHPM Meeting Programme

The Annual Meeting of the Canadian Society for History and Philosophy of Mathematics will be held at the University of British Columbia in Vancouver, 2–4 June 2019, in conjunction with the HSSFC Congress. Except for the one-hour May Lecture, presentations are 20 minutes, with 5 minutes for discussion and 5 minutes of set-up before the next talk. Many thanks to the program organizers, Eisso Atzema and Craig Fraser, and the local organizer, Tom Archibald.

Sunday, June 2

9:30 PRESIDENT'S WELCOME (Room: CHEM D213; Maria Zack)

SESSION 1: EARLY MODERN MATHEMATICS(Room: CHEM D213; Presiding: Pat Allaire)

9:45 Eisso Atzema (Maine): "Thomas Jefferson and the Shape of the Hyperbolic Paraboloid"

10:15 Duncan J. Melville (St. Lawrence): "Commercializing Arithmetic: Educating the Mercantile class in 18th-Century England"

10:45 Michael Molinsky (Maine–Farmington): "The Life (and Library) of Sir Charles Scarburgh"

11:15 Maria Zack (Point Loma Nazarene): "Mathematics in Daniele Barbaro's Vitruvius of 1567"

12:00 LUNCH BREAK & CSHPM EXECUTIVE COUNCIL MEETING (Room: ANGU 232)

SESSION 2: HISTORY OF MATHEMATICS IN THE CLASSROOM (Room: CHEM D213; Presiding: Amy Ackerberg-Hastings)

14:00 Jonathan Seldin (Lethbridge) & Fairouz Kamareddine (Heriot-Watt): "Using the History of Mathematics to Teach the Foundations of Mathematical Analysis"

14:30 Dominic Klyve (Central Washington): "Teaching Statistics from Primary Sources"

15:00 Po-Hung Liu (National Chin-Yi University of Technology, Taiwan): "History as a Source of Mathematical Narrative"

Monday, June 3

SESSION 3A: PROOFS & PERCEPTION (Room: CHEM D317; Presiding: Dirk Schlimm)

9:15 Zoe Ashton (Ohio State): "Proof Development, Presentation, and Particular Audiences"

9:45 Cornelia Knieling (Carnegie Mellon): "Towards a Feminist Philosophy of Mathematics"

SESSION 3B: 20TH-CENTURY MATHEMATICS (Room: CHEM D200; Presiding: Maria Zack)

9:15 Inna Tokar (CCNY): "History of Mathematics Education for Gifted Students in the Former Soviet Union. Student Selection Criteria. Diversity of Student Body"

9:45 Walter Meyer (Adelphi University): "The Silent Critics of Modernism"

10:15 COFFEE BREAK

SESSION 4: SPECIAL SESSION: HISTORY OF MATHEMATICAL ASTRONOMY (Part I) (Room: CHEM D200; Presiding: Craig Fraser)

10:30 ~~"Lawrence D'Antonio (Ramapo): "Clairaut Repeals the Inverse Square Law"~~ Cancelled

11:00 Amy Ackerberg-Hastings (Independent Scholar): "Mathematics in Astronomy at Harvard College Before 1839"

11:30 Craig Fraser (Toronto): "Hamilton-Jacobi Theory in Celestial Mechanics 1860–1910"

12:00 CSHPM ANNUAL GENERAL MEETING (Room: CHEM D200; LUNCH PROVIDED)

14:00 THE KENNETH O. MAY LECTURE, by Alexander Jones (NYU): "Sexagesimal Mathematics in Babylonian and Greek Mathematics and Astronomy"

SESSION 4: SPECIAL SESSION: HISTORY OF MATHEMATICAL ASTRONOMY (Part II) (Room: CHEM D200)

15:15 Glen Van Brummelen (Quest): "The End of an Error: Ptolemy, Bianchini, and Stellar Coordinates"

15:45 Kailyn Brooke Pritchard (Quest): "Determining the Sine Tables Underlying Early European Tangent Tables"

Tuesday, June 4

SESSION 5A: CONCEPTS & ABSTRACTIONS (Room: CHEM D317; Presiding: Greg Lavers)

9:15 Nicolas Fillion (Simon Fraser): "Concepts of Approximation and the Success of Numerical Methods"

9:45 Bernd Buldt (Purdue–Fort Wayne): "Abstraction by Parametrization and Embedding: A Contribution to Concept Formation in Modern and Contemporary Mathematics"

SESSION 5B: NEW IDEAS ABOUT VERY OLD MATHEMATICS (Room: CHEM D213; Presiding: Duncan Melville)

9:15 Daniel Mansfield (New South Wales): "Prototrigonometry and Old Babylonian Land Measurement"

10:15 COFFEE BREAK

SESSION 6A: HISTORY OF 19TH-CENTURY MATHEMATICS (Room: CHEM D213; Presiding: Eisso Atzema)

10:30 Roger Godard (Royal Military College): "Cauchy, Le Verrier and Jacobi on the Algebraic Eigenvalue Problem and the Secular Variation of Planets"

11:00 Brenda Davison (Simon Fraser): "Divergent Series near the Turn of the 20th Century"

11:30 Fernando Q. Gouvêa (Colby): "Fruitful Mistakes in Mathematics: The Case of Kurt Hensel"

SESSION 6B: REALISM & PARADOXES (Room: CHEM D317; Presiding: Greg Lavers)

10:30 David Rattray (Simon Fraser): "The Liar in Context: Revisiting Barwise & Etchemendy's Russellian Solution"

11:00 Joshua Mozersky (Queen's): "Human Inquiry, Presupposition, and Natural Structure"

12:00 LUNCH BREAK

SESSION 7: HISTORY OF PHILOSOPHY OF MATHEMATICS (Room: CHEM D317; Presiding: Nick Fillion)

14:00 Dirk Schlimm (McGill): "Historical Views on Good Representations"

14:30 Christopher Kaumeyer (Toronto): "The Three Pillars of Model Theory"

15:00 Greg Lavers (Condordia): "Modal Logic and Philosophy of Mathematics in the Mid-Twentieth Century: Carnap, Quine and Barcan Marcus"

15:30 Molly Kao (Université de Montréal): "Hosiasson-Lindenbaum on Inductive Logic and Analogy"

15:30 CONCLUDING REMARKS (Room: CHEM D317)

2019 Congress Local Information

Our 2019 Annual Meeting is a part of the Congress of the Canadian Federation for the Humanities and Social Sciences (formerly known as "the Learneds"), which is being held on the campus of the University of British Columbia in Vancouver. A campus map is available here: `www.congress2019.ca/plan-your-trip/maps`; our sessions are in the Chemistry building. Services and amenities are listed here: `www.congress2019.ca/local-amenities`. On-campus dining options may be explored here: `food.ubc.ca/feed-me/`. The Congress 2019 "Plan your trip" page also provides information on local transportation, sightseeing, and free daily expeditions for families. The "Program" tab introduces this year's *Big Thinking* speakers, who are charged with using the arts to engage with scholarship in the humanities and social sciences, as well as exhibitions and workshops organized by UBC.

Additionally, local organizer Tom Archibald shared

some of his favorites from among Vancouver's many attractions:

- The Museum of Anthropology (`moa.ubc.ca`) is a very unusual and interesting repository of artefacts from the northwest coast and elsewhere.
- Otherwise the best thing to do is spend some time enjoying the amazing wilderness. On the edges of town there are very nice accessible walks, for example on Mount Seymour (`www.vancouvertrails.com/trails/mount-seymour/`) or Dog Mountain (really easy), though getting to them from the UBC campus requires some planning.
- Attendees can simply walk along the seawall to witness urban life. (See `vancouver.ca/parks-recreation-culture/seawall.aspx`.)
- Rather than recommend individual restaurants, Tom noted for those who want to experience Asian Vancouver that the real Chinatown is Richmond, although it is spread out and not a good site for a walking tour.

He pointed out that tourists also enjoy the whale-watching, but he believes the whales could use a break on that, since they are basically in the process of dying out. He'd suggest a kayak rental instead, which visitors can do from a central site at Granville Island, though maybe what one will see kayaking from there in an hour is not so interesting. For those planning to spend time in Vancouver before or after the meeting, Tom notes that, "Some people like to go to either Vancouver Island or the Gulf Islands, e.g., Salt Spring, but this is not in my view a day trip—the waits for ferries are pretty long, and the travel to the ferry terminals is considerable. With planning you could go for a couple of days, and it is possible, for instance, to take a bike across, or get one on the other side." Similarly, the trip to Robert Langlands's birthplace in New Westminster would be mathematically illuminating, but it is quite a haul from the campus.

David E. Zitarelli (1941-2018)

David Zitarelli was born on 12 August 1941 in Chester, Pennsylvania and grew up in Holmes, both suburbs of the Philadelphia in which he lived and worked for most of his life and that formed the regional accent he never lost. (I cannot listen to

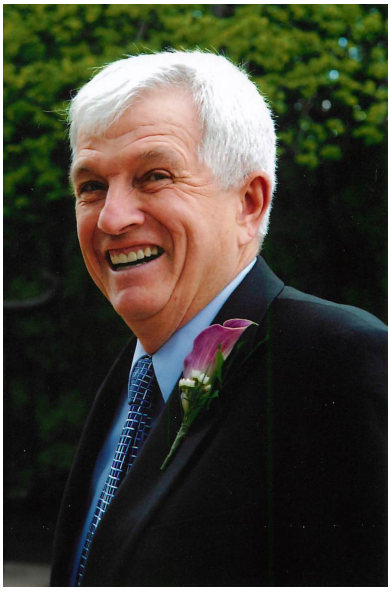

Figure 3: David E. Zitarelli

MSNBC commentator and Philadelphia native, Chris Matthews, speak about U.S. politics without hearing echoes of David speaking of his beloved "'Amurican' mathematical community.") After graduating from Ridley High School in 1959, David earned bachelor's and master's degrees at Temple University in 1963 and 1965, respectively, before moving on to Penn State University for the Ph.D. in mathematics that he earned in 1970 under the direction of Mario Petrich in the theory of algebraic semigroups.

Research in that area defined the next ten years of his career, which were the first ten of the forty-two years he spent on the faculty at his *alma mater*, Temple. Yet, as David himself explained, although his early career led to "intriguing contacts with Russian mathematicians, notably Boris Schein," he lost interest in the mathematics of his graduate school days—but not before earning tenure and promotion to Associate Professor of Mathematics in 1977—and began to focus increasingly on teaching.[1] This led to what he called his "second career—author" and to five textbooks with Raymond Coughlin—*The Ascent of Mathematics* (1984); *Finite Mathematics with Applications* (1989, 1992, 1997); *Finite Mathematics and Calculus with Applications* (1989, 1992); *Calcu-*

[1] See "David E. Zitarelli: An Autobiographical Sketch," p. 2 at `davidzitarelli.files.wordpress.com`, under Bio; 24 January 2018, accessed 8 March 2019. The quotes that follow are also from this sketch. The accompanying photograph is courtesy of David's daughter, Nicole Zitarelli Danielsen.

lus with Applications (1989, 1993); and *Brief Calculus* (1990, 1993)—and one, *Linear Algebra LABS with MATLAB* (1994, 1996, 2003), with David Hill. It also led to the finely honed skills in the classroom that would ultimately earn him a Great Teacher Award at Temple in 2005 and kudos as Honors Professor of the Year.

David's "first" and "second" careers were also characterized by the family life that he had built since their marriage in 1966 with his wife, Anita (née Paul), and their children, Paul (born in January 1978) and Nicole (born in April 1979). Theirs was a studious family—David the mathematician; Anita, the teacher of French; Paul, the Harvard-trained applied mathematician and then entrepreneur; and Nicole, the Cornell-trained engineer—that also knew how to play—running, basketball, and, especially for Nicole, softball as a Cornell all-star.

David's "third career—historian of mathematics" had gradually emerged by the close of the 1980s, although his interest had been piqued much earlier. In 1971, he was assigned to teach Temple's course in the history of mathematics and, as a result of grappling with that material, began "to understand its structure." Two years later, he attended a conference organized at Texas Tech University that focused the thoughts of Garrett Birkhoff, Salomon Bochner, Kenneth May, Dirk Struik, Marshall Stone, and others on the history of American mathematics *per se*. From that point on, David was "hooked on history, even though that meeting was held in the desert of West Texas." By 1988, he had succeeded Albert Lewis as Abstracts Editor of *Historia Mathematica*, the journal of the International Commission on the History of Mathematics, and had begun a serious immersion in the literature of the history of mathematics.

Although it seems as if I knew David my entire professional career, we only met sometime after 1990, the year in which I became *Historia*'s Book Review Editor and began my decade-long association with the journal. I am also not sure when David and I began the conversation on the history of American mathematics that would end only with his death of cardiac arrest on 3 December 2018 in Minneapolis, Minnesota. What I do know is that David Rowe and I published our book, *The Emergence of the American Mathematical Research Community (1876–1900): J. J. Sylvester, Felix Klein, and E. H. Moore*, in 1994, and by April 1998, DeZ and I (in our e-mail exchanges, he was always DeZ to my KvhP) had co-organized a special session on the history of American mathematics at the Philadelphia meeting of the AMS. David's active research interest in the history of American mathematics had begun. This would also be the first of many history of mathematics sessions that first David and I and then David and others would organize for joint AMS and MAA sponsorship.

David's first historical publications appeared in 2001: his book, *EPADEL: A Semisesquicentennial History, 1926–2000*, on the eastern Pennsylvania and Delaware Section of the Mathematical Association of America, and the article "Towering Figures in American Mathematics, 1890–1950." In a sense both shaped his subsequent research. It was also around this time (the spring of 2002) that David augmented his teaching repertoire of mathematics courses for his beloved students in both Temple's Honors College and its Mathematics Department with an actual course on the history of American mathematics, the first (and only?) such course ever offered.

David continued to publish research articles in the history of mathematics up to and following his retirement from Temple in 2013. That work had finally been recognized by his promotion to Full Professor in 2012. With his teaching career behind him, David and Anita both moved to Minneapolis to be near Nicole and her two children, Oliver (born in July 2009) and Zoey (born in May 2012), and then began splitting their time between Minneapolis and Bainbridge Island, Washington, after Paul's children, Lenna (born in January 2014) and Solomon (born in February 2016), arrived. When he died, David had finished volume one and was close to finishing the second and final volume of what he described as his "*magnum opus*," *A History of Mathematics in the U.S. and Canada*. To the end, David Zitarelli was committed to both his family and the history of the "Amurican" mathematics that he so loved.

Karen Hunger Parshall

Euclid in Greek and Arabic

A small seminar on Euclid in Greek and Arabic was held at Université Paris Diderot on 23 November 2018. Organized by Pascal Crozet and Erwan Penchevre, the seminar featured four papers on various aspects of medieval and early modern Euclidean

studies.

The program opened with a closely reasoned paper by David Rabouin (CNRS/Laboratoire SPHERE) on the notion of mathematical generality in Aristotle and its relation to Euclidean mathematics. Aristotle claims that alternation used to be demonstrated differently for numbers, lines, solids, and times, even though it could have been demonstrated for all of them in a single demonstration. Thus, Aristotle seems to claim that there is a general or universal approach applicable to different sorts of mathematical entities. But readers of Euclid are well aware that he repeatedly demonstrates the same principles in Book VII (for numbers) that he had earlier demonstrated in Book V (for magnitudes). And sometimes these apparently parallel demonstrations do not use the same mathematical arguments, suggesting that Euclid did not see numbers and extended magnitudes as fundamentally similar entities that could be treated by a single mathematical approach. On the other hand, in propositions 5 and 6 of Book X, Euclid suggests that the same kind of relation can hold between magnitudes and numbers. Although it may initially appear that this relation represents a kind of unity only in an analogical sense, further analysis ultimately reveals a deeper underlying universality. Euclid achieves a kind of generality in Book X by applying the same strategy used in Plato's *Theaetetus* (147d–148e) in which Plato seems to advocate dealing with incommensurable magnitudes by treating them through the surfaces that one can construct upon them. All magnitudes can be considered through a relation of "commensurability" but the precise meaning of this commensurability must be articulated for the kind of magnitude we are discussing (numbers, continuous magnitudes, squares built on irrational lines).

Gregg De Young (The American University in Cairo) presented a paper on the Epitome of the Euclidean *Elements* placed in Avicenna's philosophical compendium, *Kitāb al-Shifā'*. He argued that this summary, since it was not prepared primarily for a mathematical audience, offers a possible historical window into the current state of mathematics, and represents information about the state of the Ḥajjāj and Isḥāq-Thābit translations (as described by the 10th-century bookseller, al-Nadīm, in his *Fihrist*). Evidence preserved in the text suggests that Avicenna based his summary on a text significantly influenced by al-Ḥajjāj. The diagrams, however, seem to come from a text influenced by Thābit, producing a kind of hybrid version of Euclid. De Young then explored the evidence for the existence of two different recensions of the mathematical section of the *Kitāb al-Shifā'*. Most manuscripts place a summary of Ptolemy's *Almagest* immediately following the summary of Euclid's *Elements*, but a few place the summary of the *Almagest* last, following an arithmetical discussion and a discussion of music. Is there any linguistic evidence within the Euclidean summary itself of two (or more) recensions—patterns of common variants within the manuscripts, for example? Is it possible for such patterns of variants to support the hypothesis of two recensions of the Avicenna's mathematical section? This question can only be answered definitively as De Young's recently initiated project to produce a new Arabic edition of Avicenna's text moves forward.

Ofer Elior (Hebrew University of Jerusalem) presented a paper on "Diagrams in Ibn Tibbon's and Rabbi Jacob's Arabic-Hebrew Translations of Euclid's *Elements*". He began with a review of the current historiography on the medieval transmission of the *Elements*. Against this background, he considered the diagrams of two Hebrew translations of the *Elements*, one attributed to Ibn Tibbon, the other to Rabbi Jacob (who may have been Ibn Tibbon's uncle). Ibn Tibbon's translation represents a quite literal rendition of the Thābit version of the Arabic transmission. The recently studied text of Rabbi Jacob is interesting because, even though the enunciations appear to derive from an Arabic version of the Isḥāq-Thābit transmission, the demonstrations and diagrams are more closely related to transmission ascribed to al-Ḥajjāj. Whether this Hebrew version represents a hybrid Arabic version that is so far unattested in the Arabic manuscript tradition is an open question. Elior suggested that since the translation appears to be a literal rendering from the Arabic, it may be possible to reconstruct the Arabic text from which the Hebrew of Rabbi Jacob was translated.

The final paper, "Theory of intersections in the Euclidean tradition", was presented by Vincinzo de Risi (Max Planck Institute). In proposition 1 of Book I, Euclid constructs an equilateral triangle. Starting with a given finite line, Euclid constructs two circles, each centered on one of the two endpoints of the given line and with a radius equal to the given line. These two circles are claimed to intersect, and connecting the point of intersection to the endpoints of

the given line produces an equilateral triangle. But Euclid does not prove that these two circles intersect. Vincenzo drew a distinction between crossing and intersection, arguing that a theory of intersection would require an appeal to a principle of continuity, similar to that developed by Pasch. This principle of continuity is missing from the ancient and medieval discussion of Euclid, he suggested. The principle of continuity, even if not directly named, developed only in the post-Renaissance period.

Gregg De Young

CMS in Vancouver

The CSHPM has been working with the Canadian Mathematical Society for a number of years now to organize sessions related to the history and philosophy of mathematics. The 2018 CMS Winter Meeting, held in Vancouver last December 7–10, was another occasion to work with the CMS to raise the profile of history and philosophy of mathematics among professional mathematicians, as well as to get reacquainted, share our work with each other, and enjoy the many attractions the city has to offer.

This meeting's session was organized at a distance by Maritza Branker (Niagara University), with help from local organizers Nic Fillion (Simon Fraser University) and Glen Van Brummelen (Quest University). Some scheduling complications led to rearrangements; at one point I was scheduled to speak at 4:00 AM! I was not there to determine if anyone showed up. Nonetheless, the session was full to overflowing with talks, starting at 8:00 AM on December 9 and not concluding until 6:30 PM. A nice mix of philosophy and history kept things lively, and the room was full almost the entire day.

Six philosophical talks were given, by Jim Brown (University of Toronto), Conor Mayo-Wilson (University of Washington), John Mumma (CSU San Bernardino), Tom Donaldson (SFU), Derek Postnikoff (University of Saskatchewan), and Nic Fillion (SFU). The four historical presentations were given by Victor Katz (University of the District of Columbia), Len Berggren (SFU), Brenda Davison (SFU), and Glen Van Brummelen (Quest).

The abstracts of all the talks but one are available at `winter18.cms.math.ca/` under the Scientific Sessions tab. The reader is encouraged to participate vicariously in the exciting and diverse program by reading the abstracts, which can do a far better job of conveying the content than I can. The one missing abstract is mine. I presented on a plagiarism dispute over the invention of the secant function between 16th-century supporters of Georg Rheticus and of Francesco Maurolico. I demonstrated that the charge against Maurolico was false.

The relationship between the CMS and the CSHPM, through these sessions and the column in the *CMS Notes* edited by Amy Ackerberg-Hastings and Hardy Grant, continues to bear fruit for both organizations. Let us continue to promote these activities, so that mathematicians become further aware of what we have to offer, and so that we can benefit from contact with the professionals whose history and philosophy we study.

Glen Van Brummelen

Michel Serfati (1938–2018)

Michel Serfati was born 30 September 1938. He earned a doctorate in mathematics from Université Pierre-et-Marie-Curie in 1972, writing the thesis, "Contribution à l'étude des matrices booléennes et postiennes" (Contribution to the study of Boolean and postian matrices). At Université Panthéon-Sorbonne, he became a mathematics associate (1974) and doctor of philosophy (1997), completing the thesis, "La constitution de l'écriture symbolique mathématique" (The composition of mathematical symbolic writing). He was a professor or researcher at many institutions, including École nationale de la statistique et de l'administration économique, Lycée Carnot, Lycée Raspail, Université Panthéon-Sorbonne, Université Paris-Diderot, and École polytechnique. During the final stage of his career, he was Professeur honoraire de Chaire Supérieure de Mathématiques at the Institut de Recherche sur l'Enseignement des Mathématiques (IREM) of the Université Paris Diderot.

By the 1980s, Serfati had become interested in the history and philosophy of mathematics. He eventually developed thirteen research themes: the constitution of mathematical symbolic writing; symbolic aspects of 16th-century Italian mathematics; the mathematical thought of Descartes; the mathematical and symbolic thought of Leibniz; 17th- and 18th-century attempts at the quadrature of the circle and their relationship to irrational and transcendental numbers; the episte-

Figure 4: Michael Serfati

mology of Boole's logic; epistemology and history of algebra; Marshall Stone's influence on representations of Boolean algebras, distributive lattices, and spectral methods; epistemology, history, and philosophy of category theory; mathematical and epistemological aspects of Post's lattices; mathematical and philosophical aspects of the axiom of choice; the mathematical philosophy of Gaston Bachelard; and intersections of mathematics and literature. (His website is archived through his French *Wikipedia* page, `fr.wikipedia.org/wiki/Michel_Serfati`.)

Serfati wrote or edited at least ten book-length works and published around 70 articles. Especially notable are *De la méthode* (Besançon: Presses Universitaires Franc-Comtoises. 2002; reprinted in 2011); *La révolution symbolique. La constitution de l'écriture symbolique mathématique* (Paris: Pétra, 2005); and *Leibniz and the Invention of Mathematical Transcendence* (Studia Leibnitiana, 53) (Stuttgart: Franz Steiner Verlag, 2018). A long-time CSHPM member and meeting attendee, he published "Sur l'inventivitśymbolique dans les mathématiques de Leibniz" in the 2006 *Proceedings* of our conference at York. Over 50 items from his bibliography are available online: `www.researchgate.net/profile/Michel_Serfati`.

His most influential legacy, though, may be the seminar he founded in 1995, Séminaire d'Epistémologie et Histoire des Idées Mathématiques of IREM, held at the Institut Henri Poincaré on Wednesday afternoons, which hosted prominent French and foreign scholars. The aims of the colloquium are to present recent research in philosophy and intellectual history, balance theory with practice, and communicate at a level equally accessible to neophytes and specialists.[2] The last session of this year, on May 29, will be a tribute to Serfati.

Serfati passed away on his 80th birthday. His colleagues described him as "absolutely charming, greatly cultured, and totally passionate about his subject" and will miss "his energy, his kindness and his warm smile." Peace to his memory.

The Editors

Robert Leslie Ellis Conference

Robert Leslie Ellis (1817–1859)—pupil of George Peacock and William Hopkins, Senior Wrangler in 1840, Fellow of Trinity College, co-founder of the *Cambridge Mathematical Journal* and author of several major papers on functional and differential equations—was lauded by his contemporaries as a 'prodigy of universal genius' but is almost forgotten today. A conference dedicated to Ellis, held on 28 September 2018 in the Old Combination Room of Trinity College, Cambridge, brought together for the first time an international panel of scholars exploring the many different aspects of the fascinating life and work of this Victorian polymath.

The conference, titled "'A man of no ordinary attainments": the life and work of Robert Leslie Ellis', was officially opened by Boyd Hilton (Cambridge University), who shared a number of speculations about the reasons for Ellis having fallen into oblivion. One of the reasons mentioned concerned the somewhat surprising fact that Ellis was not a member of the Cambridge Apostles; another that the entry on Ellis found in the late 19th-century edition of the *Dictionary of National Biography* (DNB) did not really give any clues as to his intellectual reputation.

The first speaker, Jonathan Smith, Archivist and Modern Manuscript Cataloguer at Trinity College, gave a talk devoted to the history, content and organization of the Ellis papers, which, as he showed in detail, are inextricably linked with that of Ellis's brother-in-law, William Whewell. Smith admitted that from an archivist's point of view the Ellis papers are not as interesting as compositionally much more complex papers, such as those of Wittgenstein.

[2] For the Seminar's website, see `irem.univ-paris-diderot.fr/seminaire-depistemologie-et-dhistoire-des-idees-mathematiques`.

At the same time, he emphasized that, when duly transcribed, Ellis's correspondence, diaries and notes offer a very rich source for research into student days at Trinity College in the 1830s.

Christopher Stray (Swansea University), as if taking up this suggestion, showed that even a first look at the content of some of Ellis's early diaries provides ample material for what is still lacking: an intellectual biography of Ellis. Stray's talk focused on and put into context Ellis's classical education, both privately at home in Bath with a tutor, and in his first year at Cambridge. Before Stray, June Barrow-Green (Open University UK) had already sketched the contours of a historical contextualization of Ellis's education in mathematics: at home with T. S. Davies and at Cambridge, from his first two years with Peacock, his third year with Hopkins, and through to his Senior Wranglership.

The first part of the conference was brought to a close with reflections from two discussants (Arthur Gibson and David Palfrey, both University of Cambridge), followed by a plenary discussion with the speakers. The discussion revolved around several key issues: Ellis's views on education and examination at Cambridge, the significance of character formation in Ellis's intellectual development; and the scholarly challenges involved in coming to terms with Ellis's polymathy.

The second part of the conference opened with a talk by John Gibbins (University of Cambridge), who examined the Ellis-Whewell connection within the broader context of the so-called Cambridge Network. He sketched an intellectual biography focused on the period between the late 1830s and the 1840s: describing what Ellis brought to Cambridge—essentially a well-trained mind and a strong character—and how especially the informal side of Cambridge encouraged him in his many endeavors, ranging from pure mathematics to Bacon scholarship. This last element of his working life, the co-editorship of Bacon's collected works for which he is perhaps most remembered, was taken up by myself. Against the background of the nationwide debate about Bacon, the talk described the process of editing and interpreting that went into Ellis's philosophically-laden 'General Preface'. One of the main points, that of the justification of inductive inference, was further taken up from a mathematical point of view by Stephen Stigler (University of Chicago). Stigler discussed in detail Ellis's contributions to probability theory, with an emphasis on foundations and least squares; placing them in historical context and tracing which Continental literature Ellis had and had not read, Stigler touched upon philosophical assumptions and mathematical innovations.

Arthur Gibson and Joan Richards (Brown University) closed the second part of the conference with several reflections on the status and unity of Ellis's oeuvre. How did his wide-ranging contributions fit into the Cambridge intellectual landscape of the time? Was there a rationale underlying or connecting his forays into philosophy, mathematics, classics, etc.? If so, what were its sources and what were its main features?

The final discussion made it clear that much remains to be done, though the papers and commentaries together evidently took a valuable first step in the attempt to unearth Ellis's life and work. The present report can end on a happy note in this regard: many of the Ellis papers at Trinity College—including some forty quite fascinating diaries—are currently being transcribed, and preparations are underway for an edited volume based on the conference papers. Any further leads to Ellis-related archival material that the readers of the CSHPM *Bulletin* may have are more than welcome.

Lukas M. Verburgt

Off the Shelf: Concepts of the Calculus

The Concepts of the Calculus, A Critical and Historical Discussion of the Derivative and the Integral, by Carl B. Boyer. New York: Columbia University Press, 1939. Second edition in 1949 titled *The History of the Calculus and Its Conceptual Development.* A Dover paperback of the 1949 edition appeared in 1959 and remains in print today (US$16.95).

Carl Boyer's *The Concepts of the Calculus* (1939) was a substantial contribution to the history of mathematics and a significant signpost in the emergence of the history of science as a professional discipline in America. Note that Boyer was writing about "the calculus" and not "calculus": even at this late stage the subject was not yet regarded as a general part of mathematical knowledge, like algebra or arithmetic,

but a particular mathematical subject area with a definite historical identity and point of origin. The phrasing "a critical and historical discussion" echoed the title of Ernst Mach's classic 1883 *The Science of Mechanics: A Critical and Historical Account of Its Development*. This work in turn was emblematic of a positivist interest in history and the conviction that history could illuminate an understanding of foundations.

In researching his book Boyer drew on the impressive collection of the New York Public Library, a fact that is apparent in the extensive bibliography containing diverse sources in several languages. The work grew out of his PhD research in intellectual history at Columbia University and reflected the seriousness of the professional scholar. In his obituary of Boyer the historian Charles C. Gillispie (*Isis* 76 (1976): 610–614) comments on Boyer's determination, as a mathematics instructor in the 1930s, to carry out research in the history of the subject (p. 611): "What resolution it required to persevere in a discipline in which all the premium was on the creation of new pieces of mathematics—in which old mathematics was often denatured or patronized as childish—can begin to be appreciated only since sociological study has brought home the force and nature of scientific norms of behavior."

In his preface Boyer stated that his goal was to provide a "critical account of the filiation of the fundamental ideas of the subject." His book was a contribution to a genre of historical writing that was popular in the first half of the twentieth century but is less so today: a survey work focused on a specific concept or a few concepts. Other representatives of this genre were Duane Roller's *The Early Development of the Concepts of Temperature and Heat* (1950), Georges Canguilhem's *La formation du concept de réflexe aux XVIIe et XVIIIe siècles* (1955), and Max Jammer's *Concepts of Space: The History of Theories of Space in Physics* (1954). In 1940 Arthur O. Lovejoy founded the *Journal of the History of Ideas*, providing a formal publication venue for the atomistic conception of intellectual history that was current at the time.

Canguilhem was the most explicit in articulating a philosophical basis for looking at concepts. Cristina Chimisso in her book *Writing the History of the Mind: Philosophy and Science in France, 1900 to 1960s* (2008), observes (p. 158):

> Canguilhem's defence of a history of concepts partially independent of theories and indeed metaphysical assumptions introduces a new historiographical perspective. ... He not only believed that changes of worldviews took place in a slow and fragmentary manner, but also and crucially that concepts could survive within different worldviews, metaphysical assumptions and indeed theories. ... For him the scientificity of a concept, or its potential scientific value, does not appear to depend on his general assessment of theories, let alone worldviews and mentalities, in which it emerges.

The appeal of writing a history of a concept may also have been motivated by simple reasons of narrative. The concept stands as a proxy for the larger subject or theory. Accounts of the development of a concept are analogous to road-trip narratives in fiction, recounting the adventures of the hero on the road. The concept is the hero, the historical line of development is the road, and the modern concept is the hero at the destination. (Just two years earlier Oxford fellow J. R. R. Tolkien published *The Hobbit* with its tale of the eventful journey of Bilbo Baggins to the Lonely Mountain.)

The focus on the development of concepts through time may reflect as well an embrace of the metaphor of a plant or animal organism. The concept undergoes a progressive development, moving in a directed and pre-determined way from its origins to an adult and completed form. It is possible to identify modern characteristics of the subject in its earlier history, just as it is possible to identify incipient adult characteristics of an organism in its early formation and development. The possibility of introducing anachronisms is almost inevitable in such an approach, and to a certain degree this is true of Boyer's book. The chapter on the period from 1580 to 1680 is titled "A Century of Anticipation." The chapter on the eighteenth century is titled "The Period of Indecision." The nineteenth century is the quest finally realized: "The Rigorous Formulation."

Boyer's book is a modern classic, and remains today a stimulating and highly informative study of the history of analysis. Nevertheless, a large body of work on this subject has appeared since its publication, and parts of it need to be revised and supplemented. We will consider here only the chapter on the eigh-

teenth century. Boyer correctly identified the significant role played by Leonhard Euler and Joseph-Louis Lagrange in moving away from a conception of calculus as "fine geometry" to a mathematical subject in its own right. He wrote: "Most of his [Euler's] predecessors had considered the differential calculus as bound up with geometry, but Euler made the subject a formal theory of functions which had no need to revert to diagrams or geometrical conceptions." (p. 243 of the Dover edition). Nevertheless, he seemed to view the eighteenth-century work as exploratory or approximative as the subject moved inexorably in the direction of the arithmetical limit-based approach of Augustin-Louis Cauchy and Karl Weierstrass. Over the past several decades historians have documented in some detail the distinctive conception underpinning the work of the eighteenth-century formalists and the philosophical vision expressed therein. Another noteworthy development was the invention of non-Archimedean versions of analysis, beginning in the 1950s. This last development showed that logically and psychologically it was not necessary to perceive earlier work with infinitesimals as simply a naïve precursor to a modern rigorous formulation.

Acknowledgment. Thanks to Hardy Grant for reading a draft of this review and suggesting some edits.

Craig Fraser

New Members

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

James Crombie
Ponte-de-Iglise, NS
Canada

Brenda Davison
Vancouver, BC
Canada

Christopher Hollings
Oxford
UK

Christopher Kaumeyer
Toronto, ON
Canada

Cornelia Knieling
Pittsburgh, PA
USA

Po-Hung Liu
Taichung City
Taiwan

Daniel Mansfield
University of New South Wales
Sydney
Australia

Walter Meyer
Garden City, NY
USA

Amanda Nethington
Fenton, MO
USA

Kailyn Prichard
Gibson, BC
Canada

Jarren Ralf
Delta, BC
Canada

Theodora Varduli
Montreal, QC
Canada

From the Editor

This issue contains a mix of anticipation, celebration, and melancholy. We invite you to look forward to our upcoming meeting in Vancouver as well as to look back to our special session at the CMS 2018 Winter Meeting, which, in an unusual situation, was also in Vancouver. You will also find exciting news about a number of members and friends of the Society in the Announcements. Several favorite *Bulletin* features appear, including a book review, a revisiting of a classic work, Quotations in Context, and two additional reports on interesting meetings. Sadly, obituaries of two long-time members are provided.

Mike Molinsky and I have also talked for a long time about compiling lists of all of the people who have served as officers, Councillors, and in other capacities for CSHPM. I at last got around to this; you may rightfully suspect that I chose the first group of lists to print for somewhat selfish reasons. While I am not stepping down precipitately, recent changes in my professional responsibilities have left me open to the possibility of reducing my commitments. If you

have been contemplating increasing your contribution to the Society and think that contribution might include collecting content for the *Bulletin* and editing all of the pieces twice a year, please contact me for a job description. The role really is a nice excuse to correspond with a variety of delightful people.

The *Bulletin* reaches your hands or screen due to the continued efforts of Eisso Atzema, Layout Editor; Maria Zack, Production Editor; Pat Allaire, Secretary; and Mike Molinsky, Webmaster. The next submission deadline for the *Bulletin* is 1 October 2019. As always, the editors seek news items of interest to historians and philosophers of mathematics, reports on conferences attended, and personal and professional announcements. We also welcome suggestions for memorials, book and web reviews, and informative or thought-provoking column-style articles. Our ongoing column series include Off the Shelf, Models of Mathematics, and Mathematical Ephemera. Microsoft Word (please turn off its auto-formatting features such as "curly quotes") and LaTeX data files (not compiled PDFs) are easiest for the editors to deal with. Submissions may be sent to *aackerbe@verizon.net*.

Amy Ackerberg-Hastings

About the Bulletin

The *Bulletin* is published each May and November by a team of 3 volunteers: Content Editor Amy Ackerberg-Hastings (aackerbe@verizon.net), Layout Editor Eisso Atzema (eisso.atzema@maine.edu), and Production Editor Maria Zack (MariaZack@pointloma.edu). Material without a byline or other attribution has been written by the editors. Les pages sont chaleureusement ouvertes aux textes soumis en français. Comments and suggestions are welcome and can be directed to any of the editors; submissions should be sent to Amy Ackerberg-Hastings at the above email address, or by postal mail to 5908 Halsey Road, Rockville, MD 20851, USA.