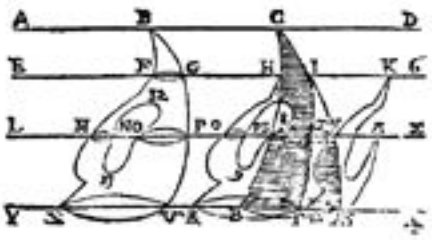
BULLETIN

CSHPM SCHPM



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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 the 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: **Elaine Landry**, UC Davis, Davis, CA 95616, USA, emlandry@ucdavis.edu
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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**, Point Loma Nazarene University, San Diego, CA 92106, USA, mzack@plnu.edu. The Society's Archives are managed by **Michael Molinsky** (see above). The position of CMS Liaison is vacant.

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

Announcements

Congratulations to Glen Van Brummelen, 2015 recipient of the MAA Pacific Northwest Section's Teaching Award. This section is the largest geographically in the MAA, comprising over 130 colleges and universities from Oregon to Alaska.

Umberto Bottazzini received the 2015 AMS Albert Leon Whiteman Memorial Prize at the Joint Mathematics Meetings in San Antonio for "his many works in the history of mathematics, notably on the rise of modern mathematics in Italy and on analysis in the 19th and early 20th centuries." Also in San Antonio, *Mathematical Reviews* celebrated its 75th anniversary.

Oxton House has issued a second edition of *Math through the Ages*, by William P. Berlinghoff and Fernando Q. Gouvêa. The first edition has been adopted as a text by more than 100 colleges and universities throughout the United States, and it has been translated into Portuguese, Chinese, and Slovenian. It was awarded the Mathematical Association of America's prestigious Beckenbach Book Prize in 2007.

Michel Serfati has published "Descartes et Schooten. Les aventures d'une division difficile", *Images des Mathématiques*, CNRS, 2014, images.math.cnrs.fr/Descartes-et-Schooten-Les.html; and "Order in Descartes. Harmony in Leibniz: Two regulative principles of mathematical analysis", *Studia Leibnitiana* 45, no. 1 (2013): 59–96.

Janet Barnett, Dominic Klyve, Jerry Lodder, Daniel Otero, Nicolas Scoville, and Diana White contributed "Using Primary Source Projects to Teach Mathematics" to the AMS Blog On Teaching and Learning Mathematics, 20 January 2015.

Peter L. Griffiths's article on Fermat's Last Theorem appeared in the April 2014 issue of *M500*, a magazine founded in 1973 by Open University mathematics students.

The inaugural Mahoney Prize, commemorating historian of science Michael S. Mahoney, will be awarded in 2015. See www.sigcis.org/mahoneyprize.

HOM SIGMAA News: Larry D'Antonio was elected Secretary/Treasurer. Toke Knudsen was elected Program Coordinator. HOM SIGMAA will sponsor a reception for Karen Parshall during MathFest, August 5–8, 2015, in Washington, DC. The reception will be held on August 7. MathFest will feature several History of Mathematics sessions.

Volume 5, issue 1 (January 2015) of the *Journal of Humanistic Mathematics* is now available at `scholarship.claremont.edu/jhm`. It includes an article on the Smithsonian's kinematic models by Amy Shell-Gellasch and first-day-of-class strategies for Calculus I by Marion Cohen. An upcoming special issue will be devoted to "The Nature and Experience of Mathematical Beauty." The journal is also seeking referees.

Issue 02 of the *Science Museum Group Journal* is available at `journal.sciencemuseum.ac.uk/issues/autumn-2014/`. The National Maritime Museum's exhibition, *Ships, Clocks & Stars* is reviewed.

See `www.erittenhouse.org/` for recent articles on the history of scientific instruments in *eRittenhouse*.

Princeton University Press, Tizra, Hebrew University of Jerusalem, and California Institute of Technology announce the launch of *The Digital Einstein Papers*. See `einsteinpapers.press.princeton.edu`.

Cambridge University Press and the British Society for the History of Science have launched a peer-reviewed open access journal for the history of science, *BJHS Themes*, edited by Jon Agar. Visit `www.journals.cambridge.org/BJHSThemes` for information and to submit a proposal.

Doctoral dissertations pertaining to the history of science and medicine are compiled at `www.hsls.pitt.edu/histmed/dissertations`.

In May 2014, Kostas Kampourakis, Ron Numbers, and Nicolaas Rupke organized a conference on "Newton's Apple and other Historical Myths about Science" at Washington & Lee University in Virginia. Twenty-six myths were "busted" during the presentations, and John L. Heilbron gave the keynote address. An essay collection aimed at teachers is available at `www.academia.edu/6412084/Newtons_Apple_and_other_Myths_about_Science`.

Speakers on the 2014–2015 schedule for the Philadelphia Area Seminar on the History of Mathematics (PASHoM) included: Peggy Kidwell (NMAH) on September 18; Victor Katz (UDC) on October 23; Shelley Costa (Swarthmore) on November 20; Stephanie Dick (Harvard) on December 4; William Noel (Penn) on January 22; Robert Bradley (Adelphi) on February 19; Robert Naugle (Shepherd) on March 19; and Marianna Bonanome (Manhattan CC) and Margaret H. Dean (CUNY) on April 16.

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 2014–2015: Harold Edwards (NYU) on October 8; William Dunham (Muhlenberg) on November 5; Jonathan Sondow on December 3; Michael J. Barany (Princeton) on March 4; Maria Zack (Point Loma Nazarene) on April 1; and Rob Bradley (Adelphi) on May 6.

Michel Serfati announces the second semester program for the annual seminar on Epistemology and History of Mathematical Ideas, held Wednesdays at 2:00 pm at the Institut Henri Poincaré in Paris: Bernard Leclerc (Caen), "Alain Lascoux: de la géométrie à la combinatoire" on February 4; Serge Grigorieff (Paris VII), "Émergence des modèles du concept de calculabilité" on March 11; Emily Grosholz (Penn State), "Le raisonnement ampliatif en théorie des nombres" on March 18; Jean-Paul Allouche (Inst. Math. Jussieu), "Quadrature et transcendance: Gregory et Leibniz", and Michel Serfati (IREM), "La Quadrature Arithmétique du Cercle de 1673. Les idées mathématiques de Leibniz" on March 25; Sigmund Probst (Archives Leibniz), "La discussion par Leibniz des mathématiques de Descartes au cours de son séjour à Paris (1673–1676)", and Michel Serfati (IREM), "De l'analyse mathématique. Ordre *versus* Harmonie. Descartes *versus* Leibniz" on April 8; Michel Serfati (IREM), "'Monsieur Descartes' et Élisabeth de Bohème. D'une correspondance mathématique à la naissance d'une amitié 'philosophique"' on May 20 (letter-reading to follow); and Bodo Lass (CNRS), "Démonstration de la conjecture de Dumont" on May 27.

Adrian Rice was the keynote speaker for BSHM's Research in Progress meeting at Queen's College Oxford on 21 February 2015. A BSHM/LMS joint celebration of Augustus de Morgan was held May 9; a meeting on Symmetry and Groups will be held at Birkbeck College on May 23; and a one-day conference on the history of the mathematics of space and relativity will be at Rewley House Oxford on June 20.

Jim Tattersall and Fred Rickey organized a special session on History and Philosophy of Mathematics for the AMS Eastern Section Spring Meeting at Georgetown University, March 7–8. Speakers included: Karen Parshall (Virginia); Andrew Fiss (Mich. Tech.); Amy Ackerberg-Hastings (UMUC); Duncan Melville (St. Lawrence); Chris Rorres (Penn); Peggy Kidwell (NMAH); Judy Green (Marymount); Lydia Patton

(Virginia Tech); Brit Shields (Penn); David L. Roberts (Prince George's CC); Paul Wolfson (West Chester); Larry D'Antonio (Ramapo); Jesse Elliott (Cal State-Channel Islands); Andrea Pedeferri (GWU); and Joe Mourad (Georgetown).

The MAA Seaway Section 2015 spring meeting was held April 17–18 at Colgate University and included a session on "Preserving and Writing the History of Mathematics Departments in US Colleges and Universities," organized by Gary Towsley and Toke Knudsen.

The Midwest Junto for the History of Science met April 17–19 at UW-Madison. See `midwestjunto.wordpress.com/`.

Satish C. Bhatnagar organized a special session on History of Mathematics for the AMS Western Section Spring Meeting at the University of Nevada, Las Vegas, on April 18. Speakers included: Alok Kumar (SUNY Oswego); Viktoria Savatorova (UNLV); Andrzej Lenard (indep. scholar); Satish Bhatnagar (UNLV); Dieudonne Phanord (UNLV); and David Fott (UNLV).

A workshop on preserving teaching materials in "university collections" will be held at Jena University, May 7–9. See `http://necs.org/node/104375`.

The 3rd Irish History of Mathematics Conference is May 15 in Belfast. Contact Mark McCartney to register, *m.mccartney@ulster.ac.uk*.

The Commission on Women and Gender Studies of the Division of History of Science and Technology of the International Union of History and Philosophy of Science and Technology is holding the conference, "Gendering Science: Women and Men Producing Knowledge," in Prague, June 4–6. See `en.zenyaveda.cz/218-gender-science/`. Also, DHST is offering a prize for up to five young scholars in the history of science or technology, to be awarded in 2017. The application deadline is August 31, 2016. See `hpdst.gr/youngscholarsprize`.

The 16th Annual Meeting of the European Academic Heritage Network UNIVERSEUM will be in Athens, Greece, June 11–13. A new meeting format will feature four sessions: University Heritage and Cultural Engagement of European Universities; The Most Crucial Issue(s) with University Heritage Today; University Heritage, Its Generators and Its Scholars; and a poster session. See `www.universeum2015.uoa.gr/`.

The Centre for the Arts, Social Sciences, and Humanities in Cambridge is hosting a conference on "Objects in Motion: Material Culture in Transition," June 18–20.

The Twelfth Biennial History of Astronomy Workshop will be held June 24–28 at the University of Notre Dame, with a side trip to the Adler Planetarium and Astronomy Museum. Michio Yano, chief editor of *SCIAMVS*, is the keynote speaker. See `www.nd.edu/~histast/`.

Peter Pesic, new director of the Science Institute at St. John's College in Santa Fe, NM is organizing week-long seminars for teachers and other scientific professionals on "A Tale of Two Geometries: Euclid and Lobachevsky" (June 29–July 3) and "Understanding Relativity: Texts by Albert Einstein" (July 6–10).

"Dresden Summer—International Academy for the Arts," August 22–29, will focus on globes in the collection of the Mathematisch-Physikalischer Salon. See `www.skd.museum/de/forschung/dresden-summer/`.

The theme of the 34th Symposium of the Scientific Instruments Commission is "Instruments in Conflict." The meeting is September 7–11 in Turin, Italy. See `www.sic.iuhps.org/`.

ARTEFACTS XX, on using objects in studies of the history of science and technology, will meet in Milan, September 20–22, to explore the theme, "Scientific Heritage at World Exhibitions and Beyond. The Long XXth Century." See `www.artefactsconsortium.org/`.

The Fourth International Conference on the History of Mathematics Education will meet in Turin, Italy, September 23–26. See `e20.unito.it/ICHME4/default.aspx`.

Lick Observatory, Mt. Hamilton, CA, will host the 24th Annual Convention of the Antique Telescope Society on October 9–12. Side trips include Ricard Observatory, Chabot Observatory, and UC Santa Cruz's Optical Shop, Mechanical Shop, and Center for Adaptive Optics. See `antiquetelescopesociety.net`.

The History of Education Society will meet in St. Louis, MO, November 5–8. See `www.historyofeducation.org/our-annual-meeting/`.

The UK History of Education Society will hold its annual conference, "Science, Technologies and Material Culture," in Liverpool, November 20–22. Scroll down at `historyofeducationsociety.blogspot.co.uk/` for more information.

A free exhibition, "*Philosophical Transactions*: 350 years of publishing at the Royal Society," runs at the Royal Society of London until July 2015. A conference on the journal's legacy was held March 19–21.

The 2016 HPM meeting will be in Montpellier, France, July 18–22.

The 13th International Congress on Mathematical Education will be held in Hamburg, Germany, July 24–31, 2016. See `www.icme13.org/`. Topic Study Groups will include "The history of the teaching and learning of mathematics."

The University of Glasgow and the Hunterian Museum and Art Gallery are jointly funding 5 PhD projects on the history of science and medicine in 2015–2016. The National Maritime Museum, Greenwich, and the University of Edinburgh are funding a PhD on "Chronometry and Chronometers on British Voyages of Exploration, ca 1815–ca 1872," beginning in fall 2015. SUNY-Oneonta is hiring a visiting assistant professor in Ethno-mathematics or History of Mathematics, beginning in fall 2015. Université Blaise Pascal is offering two post-doc positions for foreign philosophers.

Information on American Philosophical Society Grants and Fellowships may be found at `www.amphilsoc.org/grants/faq`.

Quotations in Context

> "Mathematicians are like lovers. ... Grant a mathematician the least principle, and he will draw from it a consequence which you must also grant him, and from this consequence another."

I think I first encountered the above quotation by the French author Fontenelle (1657–1757) in E. T. Bell's *Men of Mathematics* over twenty years ago. The origin of the quotation is Fontenelle's most famous work, *Entretiens sur la pluralité des mondes* (*Conversations on the Plurality of Worlds*), first published in 1686. The book was intended to explain selected topics in science and astronomy to a popular audience, and Fontenelle explains in the preface to the book that this is why he chose to write in French rather than Latin. The work is organized around conversations between a philosopher and a Marquise that take place over the course of six consecutive evenings.

The quotation is taken from the conversation on the fifth evening. The French text below comes from an edition published in 1701, and the translation by William Gardiner that follows was published in London in 1715:

> Ecoutez, Madame, répondis-je, puisque nous sommes en humeur de mesler toûjours des folies de galanterie à nos discourse les plus serieux, les raisonnemens de Mathematique sont faits comme l'Amour. Vous ne sçauriez accorder si peu de chose à un Amant, que bien-tost après il ne faille luy en accorder davantage, & puis encore davantage, & à la fin cela va loin. De mesme accordez à un Mathematicien le moindre principe, il va vous en tirer une consequence, qu'il faudra que vous luy accordiez aussi, & de cette consequence encore une autre, & malgré vous-mesme il vous mene si loin, qu'à peine le pouvez vous croire. Ces deux sortes de Gens-là prennent toûjours plus qu'on ne leur donne.

> Hear me, Madam, says I, since we are in the humour of mingling Amorous Follies with our most serious Discourse, I must tell you, that in Love and the Mathematicks, People reason alike: Allow never so little to a Lover, yet presently after you must grant him more; nay, more and more; which will at last go a great way. In like manner, grant but a Mathematician one little Principle, he immediately draws a Consequence from it, to which you must necessarily assent; and from this Consequence another, till he leads you so far (whether you will or no) that you have much ado to believe him. These two sorts of People, Lovers and Mathematicians, will always take more then [sic] you give 'em.

You might be surprised to learn that the context in which this quotation appears is a discussion of the likelihood of the existence of life on other planets. Here are the sentences that immediately follow in the English translation:

> You grant that when two things are like another in all visible respects, it is possible they may be like one another in those Respects that are not visible, if you have not some good reason to believe otherwise: Now this way of arguing have I made use of. The Moon, says I, is inhabited, because she is like the Earth; and the

other Planets are inhabited, because they are like the Moon; I find the fix'd Stars to be like our Sun, therefore I attribute to them what is proper to that: You are now gone too far to be able to retreat, therefore you must go forward with a good Grace.

Mike Molinsky

Off the Shelf: Horus

Horus: A Guide to the History of Science, A First Guide for the Study of the History of Science With Introductory Essays on Science and Tradition, by George Sarton, Waltham, MA: Chronica Botanica, 1952, xviii + 316 pp.

Our small downtown Toronto synagogue is liberal, progressive, egalitarian and gay positive. Yet, whether at Shabbat services or on the High Holy Days, we return to the sources: prayer in Hebrew and a Torah reading from a manuscript parchment scroll. Similarly, when I decided to return to the sources for history of mathematics and science, I sought out the writings of George Sarton (1884–1956), the founder of *Isis* and *Osiris*. One of my discoveries was his late work, *Horus: A Guide to the History of Science*.

Horus was the falcon-headed son of the ancient Egyptian gods Isis and Osiris, a fitting name for the offspring of Sarton's long years researching and promoting history of science. Here, there's insight into Sarton's approach to our field and its status more than half a century ago. It is also a research tool that can be used directly and analogous to its method.

The Essays

These original "lectures were delivered with a minimum of notes . . . [so] the text . . . does not reproduce them except in a general way. . . . The lectures . . . explain [why] to study the history of science . . . [and] the bibliography gives the means to do so."

Sarton felt "the history of science was slowly coming into its own", though its development had been hindered by unsympathetic but also uncomprehending administrators. They did not realize that "historians of science must know science **and** history. . . . There are but few historians of science completely qualified for the task of teaching it. . . . [But] that is simply a matter of training . . . different . . . but not more difficult."

The first essay examines "Science and Tradition," both in mutual opposition and in supporting each other. "Between a science ancillary to theology . . . and one aimed at discovering the truth irrespective of consequences, the distance is prodigious." The changes have been truly revolutionary. "The Ptolemaic world . . . is hopelessly dwarfed by astronomical theories of today." Sarton's Belgian compatriot, Adolphe Quetelet, enlarged the range of possible knowledge through his basic investigations of the statistical incidence of social ills in a given community.

Despite "the revolutionary nature of science . . . many of our traditions . . . are the accumulated goodness of centuries." Such rationalist errors as the short-lived Technocracy movement followed in Plato's fallacy of governance by an intellectual elite. Sarton suggests that part of the reason so many German scientists actively facilitated the Nazi programme of radical evil was their technical infatuation with helping to solve the regime's practical problems in achieving its criminal ends.

In "The Tradition of Ancient and Mediaeval Science", Sarton examines his own research speciality. He examines the vicissitudes of the transmission of the ancient Greek legacy, whether it's the survival and copying of manuscripts, or the various translation traditions in Arabic, Hebrew or Latin. Sarton takes pains to demonstrate that the science of the mediaeval Arab world was not just a passive heir of the Greeks but also creative and that its leaders included not just Muslims but also Jews such as Maimonides and Ishaq al-Israili. The Latin world learned from the Arabs and applied this learning to its own issues. The early giants of the Scientific Revolution built on their mediaeval roots.

The last essay asks, "Is It Possible to Teach the History of Science?" It's largely a plea for the establishment of history of science as a respectable academic discipline. Sarton asserts that history of science can be compared to other relatively recently established and evolving fields, such as history of art or history of religion. Historians of science need to learn the techniques of historical research and should be well-versed in at least one field of science, such as mathematics or geology.

The Bibliography

The bibliography is based on Sarton's own library, "a cause of strength and a cause of weakness." The struc-

ture reflects his recipe for the education of an historian of science who must know both history (six chapters) and science (seven chapters), then pursue history of science (seven chapters), and finally become active in the "Organization of the Study and Teaching of the History of Science" (six chapters).

There are many ways individual readers can approach the *Horus* bibliography. Mine starts with Canadian science and mathematics.

Only two books form the Canadian section in "History of Science in Special Countries". 1939's *A History of Science in Canada* is the proceedings of a symposium held by the History of Science section of the June 1938 Ottawa Meeting of the American Association for the Advancement of Science. The *Centennial Volume of the Royal Canadian Institute* (1949) celebrates the venerable institution that still presents popular science lectures in the Toronto area. Both volumes are collections of exploratory surveys of the different scientific fields. These "studies are still in the pioneer stage, they must necessarily suffer from pioneer imperfections and crudities."

Other Canadian scientists are present, though. Frank Dawson Adams (1859–1942), president of the 1913 International Geological Congress in Toronto, published his *Birth and Development of the Geological Sciences* in 1938. Of course Sarton notes it was reviewed by Michigan's William H. Hobbs in *Isis* 32, no. 1 (1940): 218–220. McGill University's Sir William Osler's Yale lectures on *The Evolution of Modern Medicine* were published posthumously in 1921, and his 1929 *Bilbotheca Osleriana* is "a catalogue of books illustrating the history of medicine and of science." Sarton himself reviewed Harvey Cushing's biography in *Isis* 8, no. 2 (1926): 358–361.

Chapter 25 tallies the date and location of 53 series of "International Congresses". They played "a great part in the organization of science and especially in the definition of new disciplines and the formulation of their methods." Sarton has certainly validated the choice of my current major research project: investigating the ramifications of the early international scientific congresses that took place in Canada. I've already studied the 1913 International Geological Congress and the 1924 International Mathematical Congress in Toronto. But from Sarton I've learned that the Americanists met in Quebec City in 1906 and the Physiologists in Montreal in 1953.

Horus also supports my Jewish studies. The new State of Israel was only 4 years old in 1952, so when Sarton talks about Israel in "History of Science in Special Cultural Groups", he means the millennial history of the Jewish people. General works include the two Jewish encyclopedias as well as Cecil Roth's 1938 *The Jewish Contribution to Civilisation* and Harry Friedenwald's *The Jews and Medicine* (1944). More specifically, William Moses Feldman looked at *Rabbinical Mathematics and Astronomy* in 1931; the following year, Solomon Gandz published *The Mishnat Ha-Middot*, the first Hebrew geometry of about 150 C.E. In addition to his appearance in Gandz's volume, Maimonides appears twice: *Un glossaire de matière médicale de Maimondide* (1940)—for the great philosopher and theologian earned his living as a physician—and the *Maimonides Bulletin*, "a journal of medical practice".

Conclusion

Horus: A Guide to the History of Science is one of the landmarks of our field. In it, Sarton was able to share some of his most evolved understanding of what history of science is about. He also gave us the tools to do our research and the direction to develop our methods and improve our results.

I'm looking forward to a more thorough exploration of the intellectual riches indicated in the bibliography. Using the resources of the University of Toronto Library and the internet, I'll be reading 17th-century encyclopaedias, histories of science in Belgium, and 19th-century German history of mathematics journals.

David Orenstein

PSA President's Lunch

On November 7, 2014, Helen Longino, president of the Philosophy of Science Association (PSA), organized a lunch with representatives of related societies at its joint meeting with the History of Science Society in Chicago. The main idea was to brainstorm about how we can better work together. Given all the related societies, there is a great deal of competition for membership money, attendance at conferences, etc. Though attendance at PSA is good and the submissions to the journal are back on track, membership in the society is down.

Half of what we discussed was more directly about how to help the PSA move forward and increase representation. (For example, they are considering detaching their conferences from HSS after the next two meetings. Helen wanted feedback on this as well as other ideas for strengthening PSA.) But many of the issues relate to us as well.

This year—to encourage more cooperation or visibility—PSA invited a number of other associations to host their own sessions. These sessions all took place on Sunday morning. The worry was over attendance. The tacked-on extra half day was not noticed by some folks in time to alter travel plans. There were no regular PSA sessions at this time, but with fewer bodies to start with, high competition among the societies and conference fatigue, the overall attendance was not great. However, the attendance at the Philosophy of Mathematics Association (PMA) joint session was standing room only (approximately 40–50 people).

The ideas generated during the brainstorming session covered several topics:

Conferences: 1. Encouraging joint membership agreements. How can we determine some general policy for joint membership? Which societies should be joined? (On this, perhaps CSHPM could survey our members to find out what other societies they belong to.) Another idea might be reduced conference fees for members of a few related societies. 2. It was pointed out that there could have been better notice and advertising of the Sunday special sessions. 3. The general idea of joint meetings may be especially useful to smaller societies. Another option: coordinating meetings so that they occur sequentially (in the same week) in the same area of the world. This works better for medium-sized summer meetings like CSHPM. 4. Add workshops and master classes? For example, a pre-conference morning of workshops by scientists for philosophers (or vice versa); particularly helpful to students or anyone wanting to get a primer on a new area. 5. Hold poster sessions for graduate students? 6. Have a mixer for early career and/or grad students based on a model such as speed dating. 7. Offer opportunities to give advice to grad students regarding non-academic careers.

Society Memberships: 1. PSA Membership down, but conference attendance is up dramatically. Worry: if we change to allowing membership for conferences only, (i) we will have to dramatically increase the registration fee for non-members; (ii) our membership will dip—given the increasing number of societies. 2. What are the advantages to membership; do the numbers matter? Response: the number of members does matter for NSF funding. Also, the prizes require membership.

Diversity: 1. PSA is currently gathering diversity data with respect to its editorial board and publications. 2. Could diversity be improved by more actively shaping the PSA program?

Journals: 1. Concerns about open access and the problem of package journal prices for library subscriptions.

The PSA Conference in Particular: 1. Relation with HSS in question; they are unsure whether to renegotiate their relationship (due to cost and size of conference) or to go solo. They have contracts to co-meet through 2018. 2. Would any of our societies be interesting in stepping up to fill the hole left by HSS? 3. Perhaps a university could host a smaller association before PSA that then meets jointly with PSA. 4. For the related society sessions, Thursday morning might work better than Sunday. 5. Someone asked whether PSA could move to lower-cost cities? Without HSS there would not be such a need for giant convention venues. But would enough people come to meetings if not in good cities? 6. One person recommended to Helen that PSA does not do both at once: detach from HSS and move to smaller cities or a different type of venue. Costs are high for hotel conferences and workload is huge; this is not a change to be undertaken lightly. It could involve a dramatic increase in fixed costs, but PSA already has lower/fluctuating membership. On the other hand, PSA does have fixed income from its journal (recently renegotiated with University of Chicago Press to "take home" more of the income).

Elaine Landry

HPM Americas Section at Wabash & DC

The Americas Section of the International Study Group on the Relations Between History and Pedagogy of Mathematics met jointly with the biennial Midwest History of Mathematics Conference at Wabash College in Crawfordsville, IN, October 17–19, 2014. Local organizer Colin McKinney ensured we were fed extremely well all weekend. Friday evening, Jeff Oaks gave a ple-

nary talk on "Algebraic notation in medieval Arabic."

Conference talks were given all day Saturday and Sunday morning. Those on the history of mathematics included: an examination of John Napier and computing by Pat Baggett and Andrzej Ehrenfeucht; Andrew Leahy's discussion of Archimedes and Torricelli on centers of gravity; Pierre Boulos's look at Newton's reasons for providing diagrams; and Chris Christensen's account of how US Navy codebreakers calculated Marshall Hall's "weights" during World War II.

Presentations dealing with the history of mathematics education included: David L. Roberts's study of the content and rhetoric in Daniel H. Hill's 1857 algebra textbook; Nerida Ellerton's discussion of the use of hornbooks in dame schools in the 17th and 18th centuries; and Ken Clements's look at cyphering books used in New Paltz, NY, between 1675 and 1850. On pedagogy in the present, Rebecca Vinsonhaler looked at the JAGUAR project's study of how two middle-school teachers presented justification in proof.

Talks that provided suggestions for using history in teaching mathematics included: John Curran, "Historical Role-Playing in the Mathematics Classroom"; classroom-tested sample problems from Adam Parker and Fred Rickey; Michael Todd Edwards's announcement of a new, student-run mathematics history journal at Miami University of Ohio; Jim Smith's report on how he used a 4-minute 1930 radio address by David Hilbert (now available on *MAA Convergence*); and ways to employ divergent series and sectors, respectively, in classrooms by Colin McKinney and Amy Ackerberg-Hastings.

The Americas Section also met March 13–15, 2015, at American University in Washington, DC. The highlight of the weekend was a tour of two temporary exhibitions at The Phillips Collection: "Man Ray—Human Equations: A Journey from Mathematics to Shakespeare" and "Hiroshi Sugimoto: Conceptual Forms and Mathematical Models," led by one of the curators. Before the tour, Peggy Kidwell explained some of the models on display, drawing on the Smithsonian collections. On Friday afternoon, the group also viewed rare mathematics books in the AU Archives.

Talks on the history of mathematics education included: David L. Roberts's examination of number theory proofs in some 19th-century American algebra textbooks; Walter Meyer's contemplation of whether Modernism can be observed in early 20th-century undergraduate curricula; Marina Vulis's discussion of historical roots of Common Core methods; a tracing of the Emerging Scholars Program, a program for increasing successful completion rates in first-year calculus courses, by Rebecca Vinsonhaler; and Amy Ackerberg-Hastings's look at how Jeremiah Day used the concepts of analysis and synthesis in his mensuration textbook.

On the use of history in the teaching of mathematics, William Rose explained a course he teaches at a local magnet high school on logic and the history of mathematical foundations, while Toke Knudsen showed how history of mathematics students at SUNY Oneonta undertake archival projects. Amy Shell-Gellasch suggested ways to use spherometers in classrooms. History of mathematics presentations included: Roman Sznajder on Euler's relationships with mathematicians from Gdansk, Poland; Ron Calinger on Euler's activities in the final decade of his life; and Ilhan Izmirli's discussion of the Mecca problem.

The section is currently exploring meeting sites for 2015, 2016, and beyond. The officers and other stalwarts who organize meetings also greatly desire to increase the section's emphasis on intersections of history and pedagogy and to engage with secondary and undergraduate teachers. If you can help with any of these objectives, please contact the chair, Dave Roberts, *robertsdl@aol.com*.

Amy Ackerberg-Hastings

MAA MathFest Centennial Events

The history and philosophy sessions organized by CSHPM, BSHM, POMSIGMAA, and HOMSIGMAA will feature over 60 scholarly presentations from Wednesday, August 5, to Saturday, August 8. But that's not all, as advertisers say, for attendees looking for academic and other ways to mark the 100th anniversary of the MAA's founding. In addition to the usual named lectures (delivered this year by Karen Smith, Jeffrey Lagarias, David Bressoud, Erica Walker, Joe Gallian (on 75 years of MAA mathematics competitions), Noam Elkies, and Terrence Blackman), six special Centennial lecturers have been recruited: Erik Demaine, Jennifer Chayes, Ingrid Daubechies, Carlos Castillo-Chavez, Karen Parshall (whose talk also serves as our May Lecture), and Manjul Bhargava. The POMSIGMAA guest lecture will be given by John Burgess on Thursday evening.

Special invited paper sessions include Wednesday afternoon's "Generations of *Monthly* Gems," highlighting significant papers published between 1894 and the present. Presenters include Karen Parshall, John Stillwell, Ron Graham, Bob Devaney, Paul Zorn, and Rebecca Goldin. Victor Katz and Jim Tattersall have lined up former MAA presidents to share reminiscences on Thursday and Friday afternoons: Henry O. Pollak, Lynn A. Steen, Lida K. Barrett, Kenneth Ross, Thomas F. Banchoff, Ann E. Watkins, Ronald L. Graham, Carl C. Cowen, Joseph A. Gallian, David M. Bressoud, Paul M. Zorn, and Robert L. Devaney.

Additional history on the program includes a Saturday afternoon session honoring Abdulalim A. Shabazz (1927–2014), a prolific mentor of African-American mathematicians; a session organized by the Association of Women in Mathematics on women's historical contributions to the discipline, also on Saturday afternoon; and a minicourse on spherical trigonometry by Glen Van Brummelen and Joel Silverberg.

Entertainment is also prominent on the schedule. The first night, Wednesday, August 5, will have a large reception as well as a mathematical carnival—with acts by Dominic Klyve, Susan Goldstine, Colm Mulcahy, Jason Rosenhouse, and Karl Schaffer—and performances by Colin Adams, Art Benjamin, Tanya and Tim Chartier, and Karl Schaffer. Thursday evening includes an opportunity to preview *The Man Who Knew Infinity*, a major feature film about Ramanujan starring Dev Patel and Jeremy Irons, and musical performances by Noam Elkies, Frank Farris, and others. Friday night, MAA members will perform Tom Stoppard's radio comedy, *Albert's Bridge*.

Other special events include James R. Olsen's Friday afternoon workshop on building polyhedra from everyday materials; a contributed paper session on Math Circle problems, also on Friday afternoon; and Saturday afternoon presentations by Richard Guy and John Conway on the geometry of triangles.

To warm up for these events, be sure to visit the Centennial webpage: `www.maa.org/aboutmaa/maa-history/celebrating-the-centennial`. Don't forget to register to attend MathFest as soon as possible for the lowest rate; remember to declare yourself a member of CSHPM. See you in DC!

2014 Financial Statements

The following financial statements cover the period 1/1/2014 through 31/12/2014.

	$ Can.
Income	
dues/subscriptions	9,831.00
exchange rate differential	53.20
TOTAL	9,884.99
Expenses	
Keynote speaker	1,187.69
CFHSS 2014 loss	201.72
CSHPM Student Prize	750.00
PIMS grad stud. conf.	300.00
CFHSS dues for 2014	1,851.46
Historia Mathematica	3,291.08
Philosophia Mathematica	2,443.31
Postage, office expenses, Bulletin	326.04
Bank fees	5.74
TOTAL	10,357.04
NET	(472.05)
Bank balance, 12/31/14	39,110.39
TD Mortgage Corporation GIC	4,194.75
TD Mortgage Corporation GIC	4,202.85
TOTAL ASSETS	47,507.99

Comments:

Because the Society has 2 accounts, one in US dollars, we keep two different accounting systems. 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 1.16 has been used to convert American dollars into Canadian ones.

The exchange rate differential is a profit earned in transferring $2,266.80 from the Canadian to the American account. The first GIC fund earns interest at 1,60% and matures 16 September 2016; the second has a 1,40% rate and matures 26 March 2017. Overall, the Society's assets increased $677.85 over last year.

David Bellhouse

2015 Meeting Outline

The 2015 annual meeting of the CSHPM is a joint meeting with the British Society for the History of Mathematics, the History of Mathematics Special Interest Group of the MAA (HOMSIGMAA) and the

Philosophy of Mathematics Special Interest Group of the MAA (POMSIGMAA). The meeting will be held August 5–8, 2015, in Washington, DC, and is part of the Centennial Celebration of the MAA (Mathematical Association of America). Over the course of the four days of the meeting, there will be roughly 70 talks split between general sessions and special sessions. Below is a brief description of the schedule:

Wednesday, August 5

8:30–17:30 General Sessions on the History and Philosophy of Mathematics
15:00–17:30 Session on the Mathematics of Euler, featuring talks given by: Sylvio Bistafa, Rob Bradley, Ronald Calinger, William Hackborn, and Dominic Klyve

Thursday, August 6

8:30–11:30 Special Session in Memory of Jackie Stedall, featuring talks given by: June Barrow-Green, Janet Beery, Rosie Cretney, Chris Hollings, Steve Russ, and Robin Wilson
11:30–13:00 Lunch Break (CSHPM Council Meeting)
13:00–14:30 General Sessions on the History and Philosophy of Mathematics
14:30–17:00 Special Session on the Philosophy of Mathematics, featuring talks given by: Elaine Landry, Jean-Pierre Marquis, Jeff Buechner, Alex Manafu, and Carl Behrens
5:00–6:00 The POMSIGMAA Lecture on Philosophy of Mathematics, given by John Burgess

Friday, August 7

8:00–10:30 Special Session on Mathematical Communities, featuring talks given by: Amy Ackerberg-Hastings, Janet Barnett, Lawrence D'Antonio, Jane Wess, and Diana White
10:30–11:30 The May Lecture, given by Karen Parshall (also one of the MAA Centennial Lectures)
11:30–12:30 Lunch
12:30–14:00 The CSHPM Annual General Meeting
14:00–17:00 Special Session in Honor of Karen Parshall, featuring talks by: Joe Dauben, Brittany Shields, David Zitarelli, Della Dumbaugh, Patti Hunter, and Deborah Kent
17:00–18:00 Reception in Honor of Karen Parshall, hosted by HOMSIGMAA

Saturday, August 8

8:30–11:30 General Sessions on the History and Philosophy of Mathematics
11:30–1:00 Lunch
13:00–15:30 Special Session in Memory of Ivor Grattan-Guinness, featuring talks by: Adrian Rice, Albert Lewis, John Dawson, Roger Cooke, and Joe Dauben
15:30–17:30 Closing General Sessions on the History and Philosophy of Mathematics

This is going to be a very rich four days featuring a wide variety of scholarship. The detailed schedule for the general sessions is not yet complete, but it will appear on the CSHPM website in due course. As you can see elsewhere in this issue, the evenings will include many special events organized by the MAA to celebrate its Centennial.

Maria Zack

Ivor Grattan-Guinness (1941–2014)

As disciplines go, the history of mathematics is relatively small. But in common with most academic pursuits, it is a wide and varied field of research, while the focus of most individual research in the subject is often necessarily narrow and specialised. There is nothing particularly unusual or objectionable in this, but a consequence is that it is entirely possible for one historian of mathematics to be completely unacquainted with the work of another scholar working outside his or her immediate area of interest. Indeed, small though our community may be, it is hard to think of a contemporary historian of mathematics whose name is familiar to *every* other scholar in our field. However, if such a distinction were ever possible, it is arguable that it was held by Ivor Grattan-Guinness.

The sheer enormity of Ivor's scholarly output is overwhelming. In a career spanning over four decades, he published 12 books and more than 250 research papers, as well as a staggering array of shorter articles, book chapters, book reviews, dictionary and encyclopedia entries, and other works. It was not just the volume of his productivity that was immense: the breadth and range of his contributions to the subject were also remarkable. Ivor wrote on everything from the use of number and magnitude in Euclid's *Elements* to the influence of Max Newman on Alan Turing. His writings encompassed not only the history of mathematics,

but related disciplines such as the history of science, the history and philosophy of logic, the history of numerology, the philosophy of mathematics, and the uses of history in mathematics education. His death from heart failure on 12 December 2014 brings a close to both a remarkable career and a formative chapter in the development of the modern discipline of the history of mathematics.

Ivor Owen Grattan-Guinness was born on 23 June 1941 in Bakewell, Derbyshire, the son of Henry Grattan-Guinness, a mathematics teacher in Bakewell and later Deputy Director of Education in Huddersfield, and his wife Helena (née Brown). Schooled at Huddersfield New College, Ivor entered Wadham College, Oxford as a mathematics scholar in 1959, graduating with a B.A. in 1962. After a brief career in industry, working as a research mathematician for E.M.I., he re-entered higher education in 1964, joining Enfield College of Technology in north London as a lecturer on the mathematics for business degree course. He had met Enid Neville in 1963 while a member of the BBC Choral Society, an amateur choir in which they both sang. Their shared love of music soon blossomed into romance, and they were married in January 1965. Enid would remain his best friend and constant companion for half a century.

It was Ivor's experience as a mathematics undergraduate at Oxford that initiated the curiosity which would ultimately lead to his entrée into the history of mathematics. While there, he had been frustrated by the lack of interest (and in some cases knowledge) on the part of the lecturers with regard to questions concerning both the theoretical motivation and historical development of the subject matter. In an attempt to begin to answer these questions, and simultaneous with the start of his teaching career, Ivor entered the London School of Economics (LSE) as a part-time student in the department of philosophy, logic and scientific method, founded and then run by Karl Popper. Although the departmental atmosphere was not quite as collegial as he might have wished, the intellectual effect on Ivor was both stimulating and influential, and included his first exposure to mathematical logic, sparking a fascination which was to reverberate throughout his work for the rest of his life. He graduated with an M.Sc. in the philosophy of science in 1966.

Equipped with a philosophical background against which to frame his unanswered questions, Ivor now

Figure 1: Ivor with cat

sought to focus on a particular area of mathematics in which his historical and educational concerns were prominent. Having already learnt of the connection between Fourier series and fundamental concepts in analysis and set theory, his attention was drawn to the foundational work of Fourier and Cauchy. New to the field, he sought guidance from a scholar who, at this time, was one of the only professional historians of mathematics in the country, then fully immersed in the publication of Newton's mathematical papers. From Tom Whiteside he received much valuable advice on matters concerning archival research, which would very soon become Ivor's forte; Whiteside also helped to establish a working relationship with another scholar who had done recent work on Fourier, Jerome Ravetz at the University of Leeds.

By 1967, Ivor was working on two complementary, but parallel, projects as a doctoral student in LSE's department of mathematics. Under the supervision of the analyst and head of department, Cyril Offord, with Ravetz serving as his external supervisor, the study of Cauchy became his eventual thesis, for which he received a Ph.D. from the University of London in 1969. With minor changes, this work was published as his first book, *The Development of the Foundations of Mathematical Analysis from Euler to Riemann*, in 1970. Meanwhile his collaboration with Ravetz on Fourier became a full-scale study, not only of the then

unpublished 1807 memoir on heat diffusion, but also of his life, with prodigious use of a large number of previously unpublished manuscript sources—a feature that would become a defining characteristic of much of Ivor's work.

At Ravetz's suggestion, the external examiner on Ivor's Ph.D. committee was Sir Edward Collingwood, a senior figure in British analysis at the time and shortly to become President of the London Mathematical Society. Collingwood had a deep interest in the history of mathematics in general, but was particularly fascinated by the work of Georg Cantor. The developmental connections between Cantorian set theory and the Weierstrassian mathematical analysis so closely related to Ivor's recent research now led him into a new, but related, area of research: the history of set theory. Collingwood had somehow learned that a key to finding more archival information lay in the former home of Weierstrass's Swedish disciple Gösta Mittag-Leffler, just outside Stockholm, and in 1968, Ivor was dispatched at Collingwood's own expense on a research trip to Sweden. What occurred there on that first visit and again in 1970 was to have a profound impact on Ivor's research: in the course of searching through the largely unsorted documents, he stumbled across literally hundreds of manuscripts not widely known to the history of mathematics community. These documents concerned not only Cantor and Weierstrass, but also many of their late-nineteenth-century contemporaries including Sofia Kovalevskaya, Henri Poincaré, Philip Jourdain and Bertrand Russell. The publication of his findings in 1971 helped establish for Ivor a reputation, both for his ability to locate archival sources and for his eagerness to share that knowledge with the wider scholarly community.

His association with Collingwood now led him to meet a woman who would influence his career for many years. Cecily Tanner was born in Göttingen in 1900 as Rosalind Cecilia Hildegard Young, the daughter of William and Grace Chisolm Young, the British mathematicians who had championed the new set and measure theory in the opening decades of the 20th century. Like her parents, she had studied mathematics at Cambridge and like them she was an analyst, receiving a Ph.D. on the theory of Stieltjes integration in 1929. She had collaborated with Collingwood when they were both working at the University College of Wales in Aberystwyth in the 1920s, and for much of her career she had been an active researcher in the history of mathematics, retiring from a lectureship in mathematics at Imperial College London in 1967. The Youngs had been good friends with Cantor, and Tanner was still in touch with his grandchildren; it was via this link that Ivor was granted access to Cantor's Nachlass, which involved taking a trip behind the Iron Curtain to Halle University in East Germany in 1969. Ivor's friendship with Tanner also led to his detailed study of the mathematical collaboration of her parents, the first of its kind in the history of mathematics.

The network of connections continued to grow wider, and more international. For many years, via her German connections, Tanner had been one of the few non-Germans invited to attend J. E. Hofmann's annual meetings on the history of mathematics at the Mathematisches Forschungsinstitut in Oberwolfach, which had been running since 1954. At her request, Ivor received an invitation to the meeting of 1969. His participation at that meeting marked the beginning of a new phase in his career: not only was he introduced to a whole new community of historically-minded mathematicians, able to impart advice on research and point him in new directions, but that community was also to be the source of a number of lifelong friendships, perhaps most notably with Christoph Scriba. The Oberwolfach meetings also marked the start of a truly international career, as Ivor soon became a familiar figure at conferences first in Europe, then America, then around the world. For most of the next forty years, Ivor circled the globe, visiting archives, attending conferences and giving over 500 invited lectures, or "gigs" as he often used to call them. As he later put it: "My research life has always centred largely on two kinds of journey: to the centre of London, to use the libraries; and to a station or airport, to travel abroad and tell foreigners about the findings and give lecture courses to their students." But throughout his career, it was the intellectual immersion, relaxed collegiality and breathtaking scenery of Oberwolfach that he always viewed with a special fondness, and he and Enid would be regular fixtures at the history of mathematics meetings there for over three decades.

Back home however, no such community of historians of mathematics existed. The British history of science community was largely apathetic—and indeed the very subject was still viewed by most practicing mathematicians in Britain merely as something to do in one's retirement. So when, at the beginning of the 1970s, John Dubbey and Arthur Morley proposed the

creation of a learned society specifically devoted to the history of mathematics, Ivor considered the idea to be "hopelessly optimistic". Nevertheless, on 2 July 1971, he was one of five speakers at a special meeting held at Thames Polytechnic (now the University of Greenwich) in London. This turned out to be the first meeting of the British Society for the History of Mathematics, now the oldest such society in the world. Elected its sixth president in 1986, he pushed through a formal constitution and forged stronger relationships with the international history of mathematics community, via invitations to speak at the society's meetings and active recruitment of members from overseas. As a result, by the end of his presidency in 1988, one quarter of the society's growing membership came from outside the United Kingdom.

Ivor's published output was so vast and so wide-ranging that it would take a monograph-length paper to provide a detailed survey; even the following summary of his contributions to the history of mathematics is necessarily incomplete.

Ivor's research began in an area that was to permeate much of his work, particularly in the first half of his career: the history of the foundations of mathematics. Initially, as seen above, this was motivated by a dissatisfaction with the presentation of mathematics in his own education, and this led to an early focus on the development of analysis with the work of Fourier and Cauchy. His first book, *The Development of the Foundations of Mathematical Analysis from Euler to Riemann* (1970), centred on an investigation of the mathematics of Cauchy and his contemporaries, including Abel and Dirichlet. It also contained a valuable appendix on the history of convergence tests, which still remains a useful resource. His joint work with Ravetz on Joseph Fourier appeared in 1972. Up to this point, Fourier's key 1807 memoir "Sur la propagation de la chaleur" only existed in manuscript form in Paris, so historical studies of Fourier had been forced to rely on the greatly expanded and amended published version, *Théorie analytique de la chaleur* (1822). Working in the Paris archives, Ivor studied over 6,000 pages of Fourier's manuscripts, including many in which the handwriting was barely legible, to come up with his annotated version. The previously unpublished 1807 memoir appeared in print for the first time in the collaborative book *Joseph Fourier, 1768–1830*, in which Ivor provided a detailed commentary on the paper and on related aspects of Fourier's life and work.

Ivor's consequent expertise, not only in the history of nineteenth-century analysis, but also in the history of post-revolutionary French mathematics, led to invitations to contribute several biographical studies to the *Dictionary of Scientific Biography* (*DSB*), then in the process of compilation by Charles Gillispie. In addition to the entries on Fourier, Laurent, Mathieu, Riesz and Stäckel, Ivor also wrote a section on the history of the Laplace transform for Gillispie's book-length biography of Laplace, first published in volume 15 of the *DSB* in 1978, and later re-published in book form by Princeton University Press.

Work on French mathematics continued through the 1980s, much of which was occupied by the preparation of what was arguably his magnum opus: the three-volume *Convolutions in French Mathematics, 1800–1840: From the Calculus and Mechanics to Mathematical Analysis and Mathematical Physics*, published in 1990. This 1,600-page work remains the most comprehensive study to date of early nineteenth-century French mathematics and is a veritable treasure trove of previously unpublished sources, biographical and institutional information and reference. It treated the development of the mathematical sciences in France not as a sequence of great leaps, or "revolutions", nor as a story of gradual progress, "evolution", but rather as a series of twists and turns; hence the "convolutions" of the title. Rejecting the one-dimensional internalist approach to the history of mathematics, Ivor situated the mathematical developments within the Parisian mathematical and broader French scientific milieu, so that publication venues, institutional histories, and developments in higher education were all integral to the main narrative. Consequently, since people like Cauchy, Fourier and Laplace did not operate in isolation, it was not just the famous names that featured; a plethora of minor (but significant) figures were also interwoven into the account to provide a fuller picture of the intellectual environment. Finally, Ivor avoided the common error of viewing mathematics as "pure mathematics" by treating developments in analysis, calculus, mechanics, heat diffusion, elasticity, electricity and magnetism, and optics as interrelated components of a cohesive field of study. This inclusive attitude to mathematics, or rather, "the mathematical sciences", was yet another characteristic feature of Ivor's work.

The path which had led from the history of analysis to set theory, via Georg Cantor, soon led to an interest in

the life and work of Bertrand Russell, to whom in later life Ivor developed a strong physical resemblance. He was one of the very few people who actually attempted to read Russell and Whitehead's *Principia Mathematica* and was not only familiar with its content, but he had also researched the tortuous process of its creation. Again, substantial archival research produced significant contributions to our understanding of Russell's mathematical work, including a reconstruction of the reasoning which led to Russell's 1901 discovery of his paradox, and an edition of his correspondence with Philip Jourdain, *Dear Russell–Dear Jourdain*, published in 1977. Ivor's *The Search for Mathematical Roots, 1870–1940: Logics, set theories and the foundation of mathematics from Cantor through Russell to Gödel*, which appeared in 2000, was the culmination of decades of immersion in the collections of the Russell archive. This book traced the development of a variety of logical systems in a wide range of national settings, with the work of Russell forming the centrepiece of the study. Key features included the de-emphasis on Frege as an influence on Russell, with more focus on the stimulus of the Peano school. Ivor also made an important distinction between practitioners of what he called "algebraic logic"—namely those who used mathematical notation to facilitate the study of logic (e.g. Boole, De Morgan, Schröder)—and those of "mathematical logic" (e.g. Frege, Russell, Whitehead)—who sought to use logic as a base for the study of mathematics—and remarked upon the distinct lack of communication between the two sides.

The second half of his career was dominated by work on edited volumes and works of reference. One of the first of these was his remarkable *Companion Encyclopedia of the History and Philosophy of the Mathematical Sciences* (1994). Featuring 175 contributions from no fewer than 134 authors, this two-volume work is a masterpiece of editorial organisation and a valuable source of articles on many topics completely ignored by other compendia. Ivor's general survey of the history of the mathematical sciences, *The Rainbow of Mathematics*, appeared as the sixth volume of the Fontana History of Science series in 1997. Like the *Encyclopedia*, this substantial work distinguished itself from many of its predecessors by its concentration on post-1800 mathematical developments, its inclusion of important but lesser-known figures, its consideration of national characteristics in the practice of mathematics, and its emphasis on the importance of mathematical applications as a stimulus of mathematical progress. A final *tour de force* was delivered in 2005 with the publication of his *Landmark Writings in Western Mathematics 1640–1940*, a thousand-page collection of 77 chapters by 65 authors surveying 89 important mathematical "writings", from Descartes' *Géométrie* to Hilbert and Bernays' *Grundlagen der Mathematik*. All these works codified vast amounts of information in accessible formats, combining first-rate scholarship with deft editorial skill to produce valuable and high quality works of reference.

This editorial skill had been honed over many years as a journal editor, for in addition to serving on the editorial board of *Historia Mathematica* and a number of other journals for much of his career, Ivor rescued the ailing *Annals of Science* from pending extinction in 1974, serving as its editor-in-chief until 1981. He also founded a new journal, *History and Philosophy of Logic* in 1979, which he edited until 1992. When the project to update the century-old *Dictionary of National Biography* was announced in 1994, Ivor was the obvious choice for the associate editor in charge of mathematics and statistics, and when the *Oxford DNB* finally appeared ten years later, the scores of articles on mathematicians and statisticians had all been commissioned, edited and, in some cases, written by him.

Ivor's work found many admirers, but it was not without controversy. His assertion that Cauchy had plagiarised key ideas in analysis from Bolzano's 1817 paper on the intermediate value theorem was hotly disputed, while a later claim that the substitutional theory of classes and relations formed the missing link between Russell's theory of denoting and the *Principia Mathematica* also proved contentious. But in truth, Ivor never intended his work to be the last word on any subject, and if he stirred up debate along the way, that would serve as the impetus for future research on the subject. Elements of his style may not have been to everyone's taste, but in his opinion it was far better for the discipline if his work was criticised than if it was ignored. Thus, whether they agreed with him or not, subsequent historians of mathematics were forced to engage with his work and respond to his conclusions.

His published output was characterised by the use of vast amounts of archival research, the meticulous study of primary sources, often in several languages, and the fusion of a wide range of mathematical ideas. Recurring themes included an intense belief in the use of the

history of mathematics in mathematics education—the influence of which has begun to appear in recent years; a conviction that the history of mathematics without reference to its applications is incomplete; and an insistence on the distinction between the notions of "history" and "heritage" when discussing mathematical developments. By the latter term he referred to a view of history held by many mathematicians, which centres on questions such as "how did we get here?" as opposed to the concern of most historians, which tends to focus more on asking "what happened in the past?" This distinction, as well as its many ramifications, was a subject of immense importance to Ivor and, after many years of gestation, formed the subject of one of his last major papers.

Institutionally, Ivor remained for his whole career at the Enfield College of Technology, although it underwent substantial changes in that time. In 1973, the college merged with two other north London schools to form Middlesex Polytechnic, which, as a new and growing institution, soon sought to improve its research profile. To complement his own research, Ivor was encouraged to supervise doctoral students. Beginning with Tony Crilly, Ivor went on to successfully supervise nine Ph.D. theses, from Crilly's study of the mathematics of Arthur Cayley to Abhilasha Aggarwal's survey of higher mathematics education in British India in 2007. The content of many of these theses, particularly that of Maria Panteki on the relationships between algebra, differential equations and logic in early nineteenth-century Britain, also influenced the course of his own research and the breadth of his publications spread still further.

As a research supervisor, Ivor was unparalleled. Despite what may have appeared to those who did not know him well as an intense and rather brusque persona, he was in fact a tremendously kind and generous man gifted with a powerful intellect and love of his subject. From the moment work began, the student would be showered with papers, articles, newspaper cuttings and other material relevant to their research. Ivor was a consummate professional and expected his students to be likewise, encouraging active participation in meetings, seminars and conferences, and fostering connections with others in the history of mathematics community. Regular weekly or fortnightly meetings with him, usually over lunch near an archive in central London, were the student's opportunity to discuss ideas with Ivor and occasionally reveal any discoveries he or she had made. Such revelations were frequently accompanied by Ivor's wide-eyed exclamations of "*Really??*" To the novice researcher, such expressions of excitement and interest, the free acknowledgement of gaps in his own knowledge and the willingness to learn from his students were the source of tremendous encouragement and inspiration. Beyond the Ph.D., Ivor continued to maintain close and friendly relationships with all of his former graduate students. Indeed, for Ivor, who had no children of his own, this small group of people came to form what was, for him and Enid, almost a surrogate family.

Ivor was a man of many eccentricities. In later years he was wont to appear to fall asleep in seminars and conference talks, particularly after lunch, only to wake up and ask a penetrating question at the end. An erratic driver, car journeys with Ivor were always memorable, not least for having survived them. Tony Crilly recalls being driven back by Ivor after a meeting in Oxford at high speed so that Ivor could get home in time for two editing sessions before bed! In written communications, Ivor's distinctive scrawl was a challenge even to those well trained in reading barely legible manuscripts, and the advent of e-mail only heightened the need for one's cryptographic skills to decipher his messages. One example (of many) was in reply to an earlier message and read simply:

> v god. tanks for rude. no way to get plan to pairs. iv Translation: "Very good. Thanks for the ride. On my way to get a plane to Paris. Ivor."

During a long and distinguished career, Ivor was accorded many honours. In 1978 the University of London bestowed the rare distinction of awarding him the prestigious D.Sc., its highest doctoral degree. Elected a *membre effectif* of the Académie internationale d'histoire des sciences in 1991, he also held visiting positions at the Institute for Advanced Study in Princeton, Monash University and the University of Western Australia. In 1992, Middlesex Polytechnic was granted university status and became Middlesex University. The following year, Ivor, who by this time had progressed from Senior Lecturer to Reader in Mathematics, was appointed Professor of the History of Mathematics and Logic at the university. He would hold this title until his retirement in 2002. The two honours that perhaps afforded him the most pleasure came late in life: in 2009 he received the Kenneth O.

May Prize and Medal from the International Commission for the History of Mathematics for "lifetime scholarly achievement and commitment to the field", followed by his election to honorary membership of the Bertrand Russell Society in 2010.

The first few years of retirement saw little change in Ivor's output as his research continued at its usual rapid pace. Only with the diagnosis of Parkinson's disease in 2007 and a heart bypass operation the following year did the number of meetings he could attend begin to decrease and the time taken to prepare his papers begin to increase. But he was as responsive as ever to requests for comments on first drafts, with work returned almost immediately with references and comments. His final research paper for *Historia Mathematica* appeared in February 2014, and his last paper was accepted for publication the week before he died. It was only in the last few weeks of his life that he began to find working at the computer too much of a strain. But his fascination with the history of mathematics was undiminished to the end.

In Britain he leaves the dual legacy of an established professional discipline and a learned society devoted to it, both non-existent at the start of his career and in both of which he played foundational roles. To the Archives of American Mathematics he leaves his Nachlass. And to scholars around the world, he leaves his vast array of publications—an oeuvre on which future generations of historians of mathematics will continue to build.

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Adrian Rice

MAA Ohio Section Centennial

The Ohio Section of the Mathematical Association of America came into being on December 31, 1915, along with the MAA itself. We have been anticipating the centennial of our section for the past five years, with "Centennial Notes" published in the *Ohio Focus* newsletter, "Centennial Minutes" presented at each Spring and Fall Ohio Section meeting, and tchotchkes distributed to all registrants featuring the message, "The Centennial Is Coming."

A Centennial History of the MAA Ohio Section will be published later this year. A 75-year history, *The Ohio Section: 1915-1990* is currently available on-line at `sections.maa.org/ohio/History/index.html`.

The first annual meeting of the Ohio Section was held at Ohio State University in April 1916. Because there was no annual meeting in 1945, due to wartime travel restrictions, our 100th annual meeting will occur next year, on April 8–9, 2016. We will meet at Ohio Northern University, where Benjamin F. Finkel, founder of *The American Mathematical Monthly*, earned a B.S. in 1888 and a M.S. in 1891. Then, the institution was called Ohio Normal University.

We welcome anyone interested in attending this meeting. As details become available, they will be posted on the Ohio section website, `sections.maa.org/ohio/`. Copies of "Centennial Notes" can also be found there, in archived issues of *Ohio Focus*.

David Kullman

Book Review

John Napier: Life, Logarithms, and Legacy, by Julian Havil, Princeton: Princeton University Press, 2014, 296 pp. 64 line illus. 48 tables. ISBN 978-0-691-15570-8,$US35.00 £22.95.

Julian Havil, retired master and long-time teacher of mathematics at Winchester College, England, [1] is the author of four successful books, published by Princeton University Press: *Gamma*, *Nonplussed!*, *Impossible?* and *The Irrationals*.

Havil's book opens with an overview of Napier's life and lineage, devotes a chapter to each of Napier's five published works, and concludes with a short chapter on Napier's legacies, supplemented by no fewer than twelve short appendices that provide many details of the historical, cultural, and mathematical contexts of the previous material.

The strength of this book is that it places each of Napier's works within the context of Napier's personal development and within the context of his family and the times and culture within which he lived. Havil gives us considerable insight into Napier's religious fervor, the demands and concerns of his aristocratic position, and his mathematical insights and contributions.

Napier's reputation rests primarily on three works:

[1] http://www.winchestercollege.org

The Plain Discovery, written around 1593, the *descriptio* and the *constructio,* each written before 1614. The influence of Napier's mathematical work was greatly aided through the efforts of his son Robert, Henry Briggs (1st Gresham Professor of Geometry, 1st Savilian Professor of Geometry at Oxford), Edmund Gunter (3rd Gresham Professor of Astronomy), and the mathematical practitioner Edward Wright.

Havil's book is unusual in that it devotes a full chapter to each of Napier's published works, mathematical and non-mathematical, published during his lifetime and published posthumously. Each of the five works is placed in its proper cultural context, and the content of each of the books, including the mathematical content, is examined in detail.

- *A Plaine Discovery of the Whole Revelation of St. John* (1593). A work of Calvinist theology, interpreting the book of Revelation as a prophecy of historical and current events.

  This massive tome of nearly 400 pages is organized into 36 Propositions, with arguments organized and laid out in charts of parallel prophecies and their interpretations in the style of Peter Ramus.

  This work was widely popular, published in four languages in over two dozen editions. It established Napier's reputation as theological scholar of Reformation Protestant doctrine.
- *Mirifici logarithmorum canonis descriptio* (1614). A description of the concept of logarithms, or ratio-numbers, based upon a kinetic model of proportional movement in comparison to movement at a constant velocity. A set of tables of the logarithms of sines is included, but no table of logarithms of numbers. First English edition, 1616.
- *Rabdologiae seu numerationis per virgulas libri duo* (1617). Published in the year of Napier's death. A description of mechanical aids to multiplication: Napier's Rods, a Promptuary of lightning multiplication, and local arithmetic—a method for manipulating markers on a checkerboard to perform binary arithmetic.
- *Mirifici logarithmorum canonis constructio* (1619). Likely written prior to the year in which the *descriptio* was published. This work details precisely how to produce a table of "artificial numbers" from which the table of "artificial sines" in the *descriptio* was drawn. Published from John Napier's manuscripts two years after Napier's death by his literary executor and son, Robert Napier.
- *De arte logistica* (1839). A collection of notes recording Napier's explorations and musings over two decades into the nature of number. They reveal Napier's investigations into natural numbers, negative integers, rational and irrational numbers, and even imaginary numbers, although not under those names. Probably written before 1594, but not intended for publication. A fair copy in Robert Napier's hand, intended to be given to Henry Briggs, survived among the Napier families' private papers. These papers were edited and published more than two centuries after Napier's death by historian Mark Napier, the grandson of the youngest son of John Napier's grandfather.

Havil excels in providing a rich context that brings the world of Napier to life for the modern reader. As a brief example, I include a few of the myriad details of Napier family history taken from Havil's introductory chapter — Life and Lineage.

John Napier, the 8th Laird and Baron of Merchiston, descended through a line of eldest sons from Alexander, Provost of Edinburgh (bef. 1403) and 1st Laird of Merchiston (a rank of minor nobility) (bef. 1438). Napier's father, the 7th Laird of Merchiston was made Master of the Mint, while his ancestors, relatives, and in-laws included an array of colorful characters, including several who were involved in alchemy, accused of sorcery, and involved in various crimes ranging from highway robbery, through witchcraft, to high treason. On the other hand, the 3rd, 4th, and 5th Lairds died in battle in the service of the King, several were knighted, and the 4th Laird became the first Baron of Merchiston, and thus Lord Napier.

Napier entered the University of St Andrews at the age of 13, leaving one year later to spend the next 7 years in Europe. No record survives from his European stay, but he returned to his home at age 21 in 1571, fully trained in Latin and Greek, and assumed his family duties, while carrying on the theological and mathematical researches that would occupy him for the next twenty-five years. In 1593, he initiated a series of publications which would earn him the admiration and appreciation of scholars and scientists across Britain and the Continent.

Importantly, in addition to providing the context of Napier's work, Havil presents the details of both

Napier's theological and mathematical contributions. He takes pains to point out the centrality of trigonometry, especially spherical trigonometry, to Napier's concerns in astronomy, navigation, and, to some extent, cartography. He also points out that Napier thought in terms of proportions and ratios and their solution by the "rule of three," as opposed to the solution of algebraic equations—which is to be expected since European algebra was still in its embryonic stages.

However, Havil repeatedly retreats from Napier's fifteenth- and sixteenth- century framework to translate Napier's accomplishments into modern mathematical terms—terms quite alien to Napier and his contemporaries—an approach which obscures the exposition and needlessly complicates it rather than clarifies it.

Further, when the reader is most in need of a guide to the intellectual and mathematical train of thought, Havil frequently retreats into a modern understanding, stating that such explanations are "best approached through modern notation" or are "best explained in modern terms." In recasting the situation into modern terms, any understanding of the originality and creativity of Napier, the man, working with the tools that he had at hand, is obscured, distorted, or lost.

When explaining Napier's more complex reasoning, Havil couches his explanations in anachronistic terms of a fully developed algebra, relying on modern notation, including exponents, subscripted variables, multipage sequences of inequalities leading to upper and lower bounds, and sections of Mathematica computer code. This reviewer is strongly of the opinion that a historical approach to explaining Napier's contributions would have been a better choice. More helpful would be a guide to the adaptations Napier made to the practices and methods of Regiomontanus, Rheticus, Pitiscus, or Remus—frameworks that Napier most likely encountered during his travels in Europe. An explanation of the doctrine of triangles or the importance of homogeneity in the pre-Eulerian concepts of trig functions, and the conflict between emerging ideas of algebra and the requirements of homogeneity in calculation arising from the Euclidean books on ratio and proportion, would do much to illuminate Napier's approach.

These caveats aside, there is much to enjoy and admire in this book. It is a welcome addition to the literature and provides a much-needed context into which to place Napier and his work. The richness of details of the politics, religious struggles, and the connections between Scotland, England, France, Holland and the central European continent brings the story to life. Furthermore, Havil considers all of Napier's output, not only a portion of it, and when discussing mathematical or technical matters, he does not shy away from attempting to present the mathematical details of Napier's work, including the use of logarithms, the mechanical inventions for automating arithmetic, and the development of logarithmic tables themselves. While intended for a general audience, *John Napier: Life, Logarithms, and Legacy* would also be of considerable value to the serious historian wishing a more in-depth understanding of Napier and his writings, but only if read together with Napier's original exposition, and not as a replacement or substitute.

Joel Silverberg

New Members

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

Valerie Allen
John Jay College, CUNY
USA

Fiona Ebbertt
Turnwater, WA
USA

Hueston Finlay
Windsor
UK

Enrico Jabara
Venezia
Italy

Siobhan Roberts
Toronto, ON
Canada

From the Editor

Preparations—some of which began a decade ago—are nearly complete for the MathFest marking the Mathematical Association of America's centennial, August 5–8, 2015. This event also serves as the annual meet-

ing for CSHPM and a joint meeting between CSHPM, BSHM, HOMSIGMAA, and POMSIGMAA. As you will see elsewhere in this issue, the four days of the meeting are absolutely packed with mathematics history, philosophy, and fun. The full program of our joint sessions will be available later this spring at `www.cshpm.org` and `www.maa.org`. For information on the pleasures and logistics of the wider Washington, DC, area, see our November 2014 issue.

The initiatives launched by the Society over the past couple of years, such as transferring production of our *Proceedings* to Birkhäuser, continue to move forward. If you enjoy the columns CSHPM is contributing to *Notes* of the Canadian Mathematical Society, `cms.math.ca/notes/`, please consider not only volunteering but actually composing a brief piece (about 1,200 words) for a general mathematics audience and submitting it to Hardy Grant, *hardygrant@yahoo.com*, and me. We are juggling enough other professional tasks that building a reservoir of completed columns would be very useful. The Council is also aiming to revitalize our presence at the CMS Winter Meeting; contact President Elaine Landry, *emlandry@ucdavis.edu*, if you can help.

Since last fall, we have sadly lost three historians well-known to our society: member Jim Kiernan and prominent BSHM figures Jackie Stedall and Ivor Grattan-Guinness. An obituary for Ivor appears here, with memorials for Jim and Jackie planned later. Peace to their memories.

The *Bulletin* reaches your hands or computer screen due to the continued efforts of Eisso Atzema, Layout Editor; Maria Zack, Production Editor; Pat Allaire, Secretary; and Mike Molinsky, Webmaster. I am thankful also for our officers, Councillors, and the volunteers who keep the Society's other functions operating smoothly. The next submission deadline for the *Bulletin* is 1 October 2015. 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. Plain text and LaTeX files are easiest for the editors to deal with, but we can (tediously) convert Word's special characters as well. 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 (atzema@math.umaine.edu), and Production Editor Maria Zack (Maria-Zack@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.