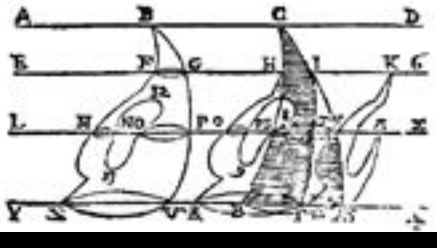
BULLETIN

CSHPM  SCHPM

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WHAT'S INSIDE

President's Message [Duncan Melville] . . . . . page 2

Articles

Announcements . . . . . page 3
Al-Qamus Resource Online [Tom Archibald & Nathan Sidoli] . . . . . page 7
May Book on Sale . . . . . page 9
Joint AMS/MAA Meetings in Washington, DC [Amy Shell-Gellasch] . . . . . page 11
AMS Section Meetings . . . . . page 12
CMS Winter Meeting [Tom Archibald] . . . . . page 12
Help Wanted . . . . . page 15
Joint Meeting in Rio de Janeiro [Hardy Grant] . . . . . page 16
Letters to the Editors . . . . . page 17
HPM Americas Section in Washington, DC [Amy Ackerberg-Hastings] . . . . . page 17
Quotations in Context [Mike Molinsky] . . . . . page 18
Michael Mahoney (1939-2008) [Tom Drucker] . . . . . page 19
New Bulletin Format Available . . . . . page 22
Web Review: HOM Podcasts [Mike Molinsky] . . . . . page 22
Book Review Corner [Adrian Rice, Amy Ackerberg-Hastings] . . . . . pages 7, 20, 23

Reports

2009 Call for Papers . . . . . page 9
CSHPM Executive Council Meeting . . . . . page 11
Annual General Meeting CSHPM . . . . . page 13
Proposed Constitutional Amendment . . . . . page 15
2009 Meeting Registration . . . . . page 16
New Members . . . . . page 26
From the Editor . . . . . page 26

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 de philosophie des mathématiques (CSHPM/SCHPM) promotes research and teaching in the history and philosophy of mathematics. Officers of the Society are:

President: **Duncan J. Melville**, St. Lawrence Univ., Canton, NY 13617, USA, dmelville@stlawu.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 **Antonella Cupillari**, Penn State Erie, The Behrend College, Erie, PA 16563, USA, axc5@psu.edu. The Society's Archives are managed by **Michael Molinsky** (see above).

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

From the President

My thanks to all who participated in the election this year. I am honored to have been chosen as President of the Society. An organization is only as strong as its members and from professional activity to commitment to internal support, the society is in robust health. On the organizational side, we have benefitted from the energy and dedication of many individuals. Our Past-President, Alexander Jones, has worked diligently and successfully to negotiate the complex relations with HSSFC and the CMS and now takes those skills to the high-profile position of Professor at the burgeoning Institute for the Study of the Ancient World at NYU. Congratulations, Alex. With the turning of the cycle, the tireless and energetic Rob Bradley completes his formal six-year presidential cycle, although I don't suppose this will in any way diminish his dynamic support. Thanks, Rob. The core day-to-day activities involved in running an organization fall largely on the shoulders of the Secretary and the Treasurer, and I am very grateful for the continued willingness of Pat Allaire and Nathan Sidoli to perform these tasks. Council members Francine Abeles, Sylvia Svitak and Adrian Rice continue to provide counsel and support and, with the election of Jean-Pierre Marquis to Vice-President and Gregory Lavers to Council, we have a strengthening of the philosophy wing of our society. Thank you all for your willingness to serve.

Communication, both among ourselves and between the Society and the wider world is of vital importance and again requires the selfless devotion of numerous members. Our society has three main venues of communication: the *Bulletin* you are reading; our annual *Proceedings*, and the society's website. Mike Molinsky has steadily expanded and improved the web site, and, in addition to taking over as archivist, has created an archives section, fundamental to an historical society. Revisit those meetings of the 1980s and 90s at www.cshpm.org. Antonella Cupillari continues the role of editor of the *Proceedings*. It is a large task–if you are a contributor, please do all you can to ensure your submission works as smoothly as possible for her. As detailed elsewhere, the *Bulletin* has a tripartite editorship: Content Editor (Amy Ackerberg-Hastings), Layout Editor (Eisso Atzema) and Production Editor (currently shared by Pat Allaire and Rob Bradley).

We are looking for someone to take over as Production Editor. This is a great way to get involved and support the Society.

This past June, our annual meeting was held at the University of British Columbia under the auspices of the Congress of the Humanities and Social Sciences (the former 'Learneds'). A strong program over three days saw a joint session with the Canadian Society of the History and Philosophy of Science (CSHPS/SCHPS) on Infinitesimals, our first ever joint session with the Canadian Society for the History of Medicine (CSHM/SCHM), a special session on Trigonometry with the keynote May Lecture by Glen Van Brummelen, and numerous additional talks reflecting the wide diversity of interests of our members. A great advantage of meeting with the CFHSS is interacting with historians of other disciplines and we made good use of the opportunity. I thank all the speakers and listeners, session chairs and organizers, especially Tom Archibald, the local organizer, and program chairs David Orenstein and Adrian Rice. It was a successful meeting in a beautiful location, and I hope it left you eager for the next meeting.

From historians on the West Coast to mathematicians on the East Coast. In 2009, we will meet jointly with the Canadian Mathematical Society at Memorial University in St. John's, Newfoundland. The program chairs are Tom Archibald and Tom Drucker. 2009 is an International Year of Astronomy, and our special session will be on Mathematics, Astronomy, and Physics. Mathematicians are the producers of our raw material and we provide them with much-needed perspective, so it is particularly useful when we can meet jointly with the CMS. I encourage you all to attend and to take some time to explore Newfoundland as many of us get few excuses to visit this remote, rugged and exotic area. When we meet with CMS, we work with their deadlines, which can be different from those when we meet with the CHSS or BSHM. Please keep an eye on the website and listserv for updates.

While the annual meeting is the only one where the CSHPM formally comes together as a whole society, our individual members are very active both in organizing and speaking at many other conferences sponsored by other societies. In October, Shawnee McMurran and Jim Tattersall are running a special session on History and Philosophy of Mathematics at the AMS meeting in Vancouver, while on the other side of the continent, Rob Bradley, Lawrence D'Antonio and Lee Stemkoski are organizing a special session on History of Mathematics at the AMS meeting at Wesleyan University in Connecticut. In December and on behalf of CSHPM, Tom Archibald and Alex Jones are organizing a session on History of Mathematics at the CMS Winter Meeting in Ottawa. January brings the Joint Mathematics Meetings with a full complement of historical activities: an AMS-MAA Special Session on History of Mathematics organized by Joe Dauben, Karen Parshall, Patti Hunter and Deborah Kent; the HOM-SIGMAA meeting, guest lecture and panel discussion; and an MAA minicourse on Teaching a course in the history of mathematics. This list is only a sample; links to these conferences and many more can be found on the Calendar page of the web site. The range and variety of activities attests to the strength of our field. We are steadily developing and promoting the history of mathematics to both historians and mathematicians. Keep up the good work, everybody.

Duncan Melville

Announcements

SCHPM member Paul-Émile Réthier died on June 15, 2007. He lived in Ste Foy, QC, taught in a CEGEP, and belonged to the Grand Rallye Vélo Plaisirs bicycle club. Réthier wrote his MSc thesis on automated proofs ("Une procédure systèmatique de démonstration de théorèmes par ordinateurs") under W. S. Hatcher in the Department of Mathematics and Statistics at Université Laval in 1979. A death notice may be viewed at www.lepinecloutier.com. Memorials were directed to the Société canadienne du cancer, www.cancer.ca. Peace to his memory.

Adrian Rice reports that Daniel Isaac Rice was born on Friday, August 15, 2008, weighing 7 lb, 7.5 oz, and measuring 19 inches. Mother, baby, and father are all doing well.

Patricia Allaire retired from Queensborough Community College, CUNY, at the end of the Spring 2008

Figure 1: Daniel Rice

semester. Pat was not at loose ends for long, as Henry Wyatt Zeder-Allaire, her first grandchild, arrived at 8:15 am on June 14, weighing in at 7 lbs, 13 oz.

Figure 2: Henry Wyatt Zeder Allaire

Fran Abeles welcomed her second grandson, Aidan, on Memorial Day 2008, and the size of Robert Thomas's family increased by a granddaughter born in April. While the Editors took these arrivals as evidence of a CSHPM baby boom, Robert wryly responded, "I'm not particularly proud of my part in the production!"

Sloan and Michael Despeaux, along with big brother Abel, welcomed Angus Miles Despeaux on November 19, 2008. Angus was 9.3 lbs and 20 inches long at birth and is reported to be "beautiful, healthy, and hungry." Not satisfied to study history, Sloan also made some history by being the first mother at Harris Regional Hospital to watch her son's arrival by C-section in a big mirror. Mom and baby are both doing great.

Nathan Sidoli was awarded a Postdoctoral Fellowship by the Japan Society for the Promotion of Science for 2007-2009. He is currently living in Osaka, Japan, and working at Osaka Prefecture University with Professor Ken Saito on Greek mathematical sciences and with Professor Takanori Kusuba on Arabic mathematical sciences.

Sylvia Svitak announced that her son, Joe, is now officially Dr. Joe. He earned a PhD in Computer Science from Queens College, CUNY, on May 22, 2008. Sylvia notes, "I am so proud especially because he persevered for so long through many obstacles."

Two of the 23 MAA 2008 Award Winners for Distinguished Teaching were CSHPMers: Jason Douma (Sioux Falls) in the North Central Section and Antonella Cupillari (Penn State Erie) in the Allegheny Mountain Section. Bravo!

Springer has published *Fibonacci's De Practica Geometrie* by Barnabas Hughes. His translation offers a reconstruction of the text as Hughes judged Fibonacci wrote it. In order to appreciate what Fibonacci created, he considered Fibonacci's command of Arabic, his schooling, and the resources available to him. To these are added Hughes' own view on translations. He notes too that the positions of the numbers 16 and 10 at the bottom of page 58 should be switched, and on pages 59-60 in Figures 3a and 3c the top row of numbers should be 9 6 5 and the bottom row ought to read 16 10. As Fibonacci remarked, "Only the Divine is without fault."

Bonnie Gold and Roger A. Simons edited *Proof and Other Dilemmas: Mathematics and Philosophy*, MAA, 2008. This is the first book on the philosophy of mathematics to explore the breadth of current issues of interest to mathematicians, using language accessible to non-philosophers and aiming at any professional or layperson curious about the nature of mathematics. The book could serve as the text for a course on the philosophy of mathematics as well as a non-technical primer on current thinking in the philosophy of mathematics. The book's

four sections are "Proof and How it is Changing", "Social Constructivist Views of Mathematics", "The Nature of Mathematical Objects and Mathematical Knowledge", and "The Nature of Mathematics and its Applications". In addition to Gold, CSHPM contributors to the project include: Julian Cole, "Mathematical Domains: Social Constructs?"; and Robert Thomas, "Extreme Science: Mathematics as the Science of Relations as Such".

With Peggy Kidwell and David L. Roberts, Amy Ackerberg-Hastings published *Tools of American Mathematics Teaching, 1800-2000*, The Johns Hopkins University Press, 2008. Chapters explore individual objects, such as the textbook, slide rule, and cube root block, but the volume also provides a perspective on the overall history of American mathematics education. A 20% discount is available by calling 800-537-5487 or visiting www.press.jhu.edu and mentioning the code NAF.

Nathan Sidoli and Robert Thomas are working on a translation of the *Spherics* of Theodosios with commentary. Although it was written later than Euclid's and Autolykos's books in the *Little Astronomy*, it is the main window that we have on the mathematics they used.

Tom Archibald reports that History of Mathematics continues to be healthy at Simon Fraser University, where he is joined in the Department of Mathematics by Len Berggren and by Glen Van Brummelen (Quest University), who holds an honorary appointment as Adjunct Professor. Two MSc degrees were completed last year (Marcus Barnes on J. C. Fields and Laura Turner on G. Mittag-Leffler). Turner continues at Aarhus University with Kirsti Andersen and Henrik Kragh Sørensen. There are two students currently working on the MSc degree, Brenda Davison doing work on G. H. Hardy and Menolly Lysne on Laplace. Additionally, a project to produce an "historical assessment" of mathematics in Canada is currently in progress with support from the Canada Museum of Science and Technology and MITACS. Other ongoing research concerns the history of the relations between France and Germany in mathematics and the history of integral equations. Students with solid backgrounds in mathematics and a strong interest in history are encouraged to contact Tom Archibald (tarchi@sfu.ca) for information concerning graduate study, for which some financial support may be available.

Ubiratan d'Ambrosio (Pontificia Universidade, Catolica de Sao Paulo), Karen Hunger Parshall (UVA), and Glen Van Brummelen (Quest) were among the invited speakers at the History and Pedagogy of Mathematics (HPM) Satellite Meeting of ICME 11, held 14-18 July 2008 in Mexico City. Bob Stein ("The Math Workshop for Children: Too Good to Succeed, Too Good to Die"), Janet Beery ("Formulating Figurate Numbers"), Snezana Lawrence ("Teachers Thinking Dynamically"), Leo Rogers ("The Rise of Mathematical Practitioners in England, 1530-1662"), and Roger Godard ("Carl Runge: A Professor of Applied Mathematics at Göttingen University") also appeared on the program.

A consortium of cultural and educational institutions have established the Philadelphia Area Center for History of Science (www.pachs.net) to make their extensive scholarly resources more accessible to in-person and Web visitors. Fellowship programs and partnerships with teachers are also available. There are several public lectures each week. In addition to PASHoM's activities (see below), history of mathematics speakers in October included Paul Pasles (Villanova), "Benjamin Franklin's Numbers: An Unsung Mathematical Odyssey"; and William Noel (Walters Art Museum), "Archimedes in Bits: The Digital Presentation of a Write-Off." Executive Director Babak Ashrafi invites anyone interested in receiving notification of Center activities to write to him at ba@pachs.net.

The Web site for the Philadelphia Area Seminar on the History of Mathematics (PASHoM) has a new URL and a new look. Please update your bookmarked favorites to http://www.villanova.edu/artsci/mathematics/pashom/. The 2008-2009 schedule includes: Patricia Kenschaft (Montclair State), "Minority Mathematicians" on 18 September 2008; Steven Weintraub (Lehigh), "Cayley Documents in Lehigh's Possession" on 16 October 2008; George M. Rosenstein (Franklin & Marshall), " How Did Gibbs Discover the Gibbs Phenomena? A Speculation" on 20 November 2008; Thomas L. Bartlow (Villanova), "Edward V. Huntington and Engineering Education" on 11 December 2008; TBA on 15 January 2009; Paul Wolfson (West Chester) on 19 February 2009; Marina Vulis

(New Haven), "Russian Mathematics Textbooks" on 19 March 2009; and John Bukowski (Juniata), "Christiaan Huygens and the Hanging Chain" on 16 April 2009. Each talk is preceded by a light supper ($10.00) at 6:00 pm. Contact thomas.bartlow@villanova.edu for directions or further information.

Upcoming BSHM meetings include: Jim Bennett's BSHM-Gresham Lecture, "Mathematics and the Medici: Instruments from Late Renaissance Florence and a British Connection" on 27 November 2008; "Maths in View" (in film and on TV) at the University of Greenwich on 15 December 2008; and "Fiction in Mathematics" at Oxford on 30-31 May 2009. See www.bshm.ac.uk for more information. (To receive BSHM's News Sheets and *Bulletin* by postal mail, sign up for a joint membership when you renew your status in CSHPM on the membership form inserted in this issue.)

Kim Plofker (Union), John Hannah (Canterbury, NZ), and Clemency Montelle (Canterbury, NZ) organized a special session on History of Mathematics for the annual joint Australia-New Zealand Mathematics Colloquium, hosted by the University of Canterbury, Christchurch, on 8-12 December 2008. Projected speakers included Toke Knudsen (Canterbury) and Karen Parshall (UVA).

The Americas Section of the International Study Group on History and Pedagogy of Mathematics (HPM-Americas), chartered under the International Mathematical Union, will hold its Second Annual Carriage House Meeting at the headquarters of the MAA, 1781 Church St. NW, Washington, DC, on 13-14 March 2009. Those interested in speaking should notify Bob Stein (bstein@csusb.edu), describing the subject of the proposed talk and giving contact information (name, affiliation, postal address, e-mail address, and phone number).

Amy Shell-Gellasch reports that the MAA MathFest history of mathematics sessions announced in our previous issue were packed, while a good time along with milk and cupcakes was had by all who attended the reception to debut the posters "Women in Mathematics" (created by Stan Burris and distributed to mathematics departments) and "Ethnomathematics" (created by Amy Shell-Gellasch and distributed in the MAA's September *Focus*). These events were sponsored by the History of Mathematics Special Interest Group of the MAA, which was founded several years ago by CSHPM members at a CSHPM meeting. HOMSIGMAA has added a new executive office, Prize Coordinator, in anticipation of soon offering a book prize in the history of mathematics. In addition to the upcoming Joint Meetings (see separate article below), HOMSIGMAA and the Philosophy of Mathematics SIGMAA are beginning to plan joint paper sessions at the 2009 MathFest in Portland, OR.

This is year 6 of the HOMSIGMAA Student Writing Contest! The deadline for submissions is 31 March 2009. Please contact Amy Shell-Gellasch (shellgae@plu.edu) or visit www.homsigmaa.org for more information.

ARITHMOS, a 24-hour workshop on reading classics in the history of mathematics, last met 6-7 September 2008 at Western Connecticut State University to continue a study of Cauchy's *Cours d'analyse*. Rob Bradley, Ed Sandifer, and Chuck Rocca are the group organizers. Analysis of content, context, and significance is used to discuss about a dozen pages of mathematics per session. Next up is Bernoulli's *Ars Conjectandi* on 24-25 January 2009, again in Danbury, CT. The seminar's Web site is www.arithmos.org.

If you prefer to read original sources in Ohio, contact Dan Curtin or Danny Otero, organizers of the Ohio River Early Sources in Mathematical Exposition (ORESME) Reading Group. The Web site is www.nku.edu/ curtin/oresme.html.

The International Astronomical Union and INAF, the Astronomical Observatory of Padova will hold the joint symposium, "Astronomy and Its Instruments Before and After Galileo", at San Servolo Isle in Venice, Italy, from 28 September to 3 October 2009. Invited talks, contributed talks, and poster papers are solicited. Information and pre-registration may be found at http://web.oapd.inaf.it/venice2009/.

Sense Publishers (www.sensepublishers.com) is providing a free electronic preview of the first two chapters of each of the four paperback volumes in *The International Handbook of Mathematics Teacher Education*, edited by Terry Wood (Purdue). Volume 1 is titled "Knowledge and Beliefs in Mathematics Teaching and Teaching Development", Volume 2 "Tools and

Processes in Mathematics Teacher Education", Volume 3 "Participants in Mathematics Teacher Education: Individuals, Teams, Communities and Networks", and Volume 4 "The Mathematics Teacher Educator as a Developing Professional". Please email edwinbakker@sensepublishers.com to obtain desk copies.

Nathalie Des Rosiers, Dean of the Civil Law Section at the Faculty of Law of the University of Ottawa, is the new President of the Canadian Federation for the Humanities and Social Sciences. She began her two-year term at a meeting of the Federations Board held in Ottawa in late October. Professor Des Rosiers succeeds Dr. Noreen Golfman, Dean of graduate studies and professor of English at Memorial University of Newfoundland. Golfman commented, "Professor Des Rosiers brings an invaluable experience as a legal scholar, academic administrator and proponent of law reform to the position.Her leadership on issues such as gender equality, ethics and the impact of research has helped raise awareness of the significant contribution of the humanities and social sciences to every aspect of a modern, democratic and competitive society."

The Royal Society Digital Journal Archive, dating back to 1665 and containing around 65,000 articles, is completely FREE to access until 1 February 2009. Visit http://journals.royalsociety.org. The archive contains many seminal papers in the history of mathematics, including Isaac Newton's invention of the reflecting telescope, Halley's description of "his comet" in 1705, accounts of Michael Faraday's groundbreaking series of electrical experiments, the first research paper published by Stephen Hawking, and papers documenting the discovery of new planets.

A first call for papers has been issued for the Hugh MacColl Centenary Conference, to be held in Boulogne sur Mer on 9-10 October 2009. MacColl (1837-1909), the Scottish mathematician, philosopher, and novelist, completed the greater part of his work in France. He introduced pluralism to modern logic and wrote several works of fiction and essays on Victorian issues and religious thoughts. Organizers are Jacques Dubucs (Paris), Shahid Rahman and Juan Redmond (Lille), and Gerhard Heinzmann and Amirouche Moktefi (Nancy). Contributions to this workshop are invited on any aspect of MacColl's life and work, including his relationship with his contemporaries. Interested presenters should send a short abstract before 15 March 2009 to Professor Moktefi at amirouche.moktefi@gersulp.u-strasbg.fr.

Kristin Bjarnadóttir, Fulvia Furinghetti, and Gert Schubring are organizing a conference on On-going Research in the History of Mathematics Education, to be held at the University of Iceland in Reykjavik, 20-24 June 2009. Social outings will include a trip to Thingvellir (a site for the parliament in 9301800, a historical but also a geologically magnificent place on the world heritage list) for dinner and a historical walk in the light subarctic night and a visit to Bessastaoir, the presidential residence. Proceedings may be published in the new journal devoted to research in this field, *International Journal for the History of Mathematics Education*.

The faculty of humanities at the California Institute of Technology, in collaboration with the Huntington Library, invites applications for the annual Eleanor Searle Visiting Professor in the field of history of science. The position is for a full academic year (September 2009–June 2010) and is a half-time teaching position (two one-quarter courses) at Caltech and a half-time research position at the Huntington Library. Interested candidates should have demonstrated superb teaching and research skills.All applicants must currently hold a Ph.D. and a full-time tenure-track appointment at another university. In your application please include a statement detailing the research you wish to carry out at the Huntington Library, send a CV, a recent sample of writing, copies of teaching evaluations, and a list of references. Applications will be accepted until the position is filled. Caltech is an Equal Opportunity/ Affirmative Action Employer. Women, minorities, veterans, and disabled persons are encouraged to apply. Contact Sabrina Boschetti, administrative assistant for the Eleanor Searle Visiting Professorship, Division of the Humanities and Social Sciences, MC 228-77, California Institute of Technology, Pasadena, CA 91125. E-mail: sabrina@hss.caltech.edu

The Women of Mathematics and Ethnomathematics posters described above are now available for order from the MAA by visiting www.maa.org/news/-102108poster.html.

Al-Qamus Resource Online

The Department of Mathematics at Simon Fraser University is pleased to announce that a new resource for scholars working in the history of exact sciences in medieval Islam is now available on the web, at http://alqamus.irmacs.sfu.ca/.

The project is a web site devoted to the technical terminology of the exact sciences in the Islamic world. The format of the web site is flexible, allowing scholars to create new entries, comment on existing entries, and upload content such as text files or images of manuscripts. It is our hope that this site will become a meeting place for scholars to share ideas and information about medieval technical terminology that is not well represented in the standard reference works.

The project's core data set is taken from the working cards that Professor E.S. Kennedy had made during his long and active career in reading manuscripts and printed works of medieval Arabic and Persian astronomy, mathematics, and mathematical geography.

Prof. Kennedy and Mary Helen Kennedy made this material available in the spring of 2007. Since then, Len Berggren and Nathan Sidoli have worked with a student, Mr. Hooman Jarollahi (who has done all the data entry), to create a web-based database. Kennedy's 3x5 cards were electronically scanned, uploaded as images, and arranged alphabetically under the first letter of the root (in the case of Arabic) or under the first letter of the word (in the case of Farsi). The project has benefited from generous financial support from the Chair's Grant distributed by Tom Archibald, department chair.

A typical card contains the main lexical entry, its meaning (or meanings), and one or more citations of the appearance of the word in the medieval literature to illustrate its usage. The citations, as one would expect with a scholar's working notes, are brief, but–for scholars in the area–usually quite understandable. In addition, a number of the cards contain illustrations that Prof. Kennedy drew to illustrate the meaning of words in astronomy.

The creators of the website are aware of certain problems that need to be addressed but felt that it was better to make the material available now, as it is, and address corrections and improvements as time and resources allow. Ultimately, it is our wish that individual scholars will contribute to this project by adding new items based on their study of Arabic and Farsi manuscripts in the exact sciences. Everyone is encouraged to visit the site and to contribute to the project. Please send any suggestions for improvement to either nathan.sidoli@utoronto.ca or berggren@sfu.ca.

Tom Archibald and Nathan Sidoli

Book Review: A History of Abstract Algebra

A History of Abstract Algebra by Israel Kleiner (Boston, Basel, Berlin: Birkhäuser, 2007), xvi + 168 pp. ISBN: 978-0-8176-4684-4. US$49.95.

Almost anyone can be expected to have some idea of what algebra is and thus to provide a definition when asked. However, any two people are unlikely to provide the same definition of "algebra"; their answers could range from "the study and solution of polynomial equations" to "the investigation of abstract mathematical structures, satisfying certain specified axioms". Just as there are a number of possible definitions of the subject, the history of algebra has a variety of possible starting points. It is quite hard to pinpoint where a book on the history of algebra should actually begin.

Should we start with word problems from Mesopotamian cuneiform texts of the second millennium BCE, or with the more abstract material found in Diophantus's *Arithmetic*a from the third century CE? Does algebra really begin with Al-Khwarizmi's *Al-kitab al-muhtasar fi hisab al-jabr wa-l-muqabala* (which, after all, eventually gave us the word 'algebra') or with the birth of fully symbolic notation in the 16th and 17th centuries? For practicing algebraists of today, does the heart of the subject really lie in the growth of abstraction and axiomatization of the 19th century, or can modern treatments of algebra be said to have originated in van der Waerden's groundbreaking *Moderne Algebra* of 1930? In the book under review, Israel Kleiner is able to sidestep such difficulties by presenting a history of *abstract* algebra from the work of

Lagrange in the 1770s to the contributions of Emmy Noether, Emil Artin and Bartel van der Waerden in the 1930s.

Kleiner's *History of Abstract Algebra* is intended for college- or university-level teachers of abstract algebra courses, their students, and historically-minded mathematicians in general. There are eight chapters in this work, based on six previous articles on the subject by the author, which were published between 1986 and 2002. The introductory first chapter sets the scene for the rest of the book by giving a brief history of "classical algebra", namely the principal developments in the theory of polynomial equations from the Babylonians to the early 19th century. This provides the motivation for Chapter 2, which looks at the development of group theory, not just from its roots in the theory of equations, but also from other sources such as number theory, geometry and analysis. Chapter 3 covers both commutative and non-commutative ring theory, the latter originating essentially from Hamilton's discovery of quaternions in 1843. The commutative story is treated in slightly more depth—from Kummer, via Dedekind, to Hilbert—with both paths culminating in the abstract work of Fraenkel, Noether and Artin.

Chapter 4 traces the development of field theory from Galois through the ideas of Dedekind and Kronecker, before the more general studies by Weber at the end of the 19th century and Steinitz at the beginning of the 20th. Chapter 5 discusses the history of linear algebra, beginning with the study of systems of equations, and also treating determinants, matrices, linear independence, and abstract vector spaces. The sixth chapter surveys Noether's contributions to the advent of abstract algebra, with special reference to invariant theory, commutative and noncommutative algebra, and representation theory. The final chapter of the book (Chapter 8) is devoted to biographical studies of six major contributors to the development of abstract algebra: Arthur Cayley, Richard Dedekind, Evariste Galois, Carl Friedrich Gauss, William Rowan Hamilton, and Emmy Noether.

For this reviewer, and I suspect many readers of this review, the most interesting—and perhaps most original—chapter of the book is Chapter 7. In this section, Kleiner presents an outline of a historically-motivated course he gave on abstract algebra to high school mathematics teachers, and in particular, five sample "problems" from that course. The first problem, "Why is $(-1)(-1) = 1$?" focuses on George Peacock's *Principle of Permanence of Equivalent Forms* of 1830, dealing with issues of proof, axiomatization, and consistency. The second, "What are the integer solutions of $x^2 + 2 = y^3$?" gives rise to issues concerning unique factorization domains and Euclidean domains, and highlights links between algebra and number theory. Problem III concerns the classical problem of trisecting an angle using just a straightedge and compass. Kleiner uses it as an introduction to the subject of fields, bringing in important concepts such as constructible numbers and field extensions.

The fourth problem, "Can we solve $x^3 - 6x + 3 = 0$ by radicals?" touches on the relationship between classical algebra and Galois theory. Finally, Problem V, "Papa, can you multiply triples?" examines Hamilton's famous discovery of quaternions and brings in matters concerning hypercomplex numbers, division rings, and the question of what a number actually is. These five problems are rich in potential subtopics and further questions, and serve to give the reader an idea of the sort of historically-based, yet mathematical, questions that can be introduced into a university-level mathematics course. Indeed, as Kleiner says: "History points to the sources of abstract algebra, hence to some of its central ideas; it provides motivation; and it makes the subject come to life" (p. 103).

This is not a book that was designed to be read from cover to cover. Because of the interdependence of the subject matter and because each chapter is supposed to be self-contained, there is inevitably a fair amount of repetition in this book. For example, Hamilton's discovery of quaternions in 1843 is mentioned at least six times (on pp. 42, 45, 87, 97, 108-9, 152-6), with the work of Emmy Noether also (re-)appearing quite frequently. But this is perhaps to be expected, and in any case results in a pleasing number of links and cross-references between the chapters, which give a satisfying unity and coherence to the book.

The author has also employed an impressive array of sources throughout the text, with each chapter containing a generous section of references. Furthermore, the sources consulted range from an 1837 paper in Liouville's *Journal* to an article in the *Bulletin of the*

British Society for the History of Mathematics from 2005. Unfortunately, in the case of the books that he cites, Kleiner does not give page references. However, his ample bibliographies provide excellent role models for students using the book, since, "To read independently in the mathematical literature, and to *write* about what they have read, are tasks which mathematics students are not—but should become—accustomed to" (p. 110).

Such errors or minor mistakes that do occur in the book are relatively few, the most noticeable to this reviewer being the conflation (pp. 20-21) of Felix Klein's published Erlangen Program of 1872 with the lecture he gave at his professorial inauguration in the same year (on which see [2]). But these are more than compensated by the concise and straightforward accounts Kleiner gives of various matters in the history of algebra. For example, his elucidation of Lagrange's work on permutations of the roots of equations (p. 19) and the account of Cayley's relation of 2×2 matrices to quaternions (p. 118) helped explain to this reviewer just *what* it was that the two men had done to warrant the attachment of their names to Lagrange's theorem and the Cayley-Hamilton theorem, respectively.

This book would serve as a good accompaniment to a first course on abstract algebra or a history of mathematics course. Since it does not give a continuous narrative, it would not work (nor was it intended) as a straightforward history of the subject. It can, however, be read alongside works such as [1], which devotes more attention to the role of indeterminate equations in the development of algebra, or [3], which offers an introductory abstract algebra course by tracing its historical development. Thus, while a more accurate title for the present work might have been "A Primer in" or "Companion to the History of Abstract Algebra", I have no doubt it will be found tremendously helpful if it is used as such.

References

1. I. Bashmakova and G. Smirnova, *The Beginnings and Evolution of Algebra*, trans. Abe Shenitzer (Mathematical Association of America, 2000).
2. D. E. Rowe, A forgotten chapter in the history of Klein's Erlanger Programm, *Historia Mathematica* 10 (1983), 448-454.
3. S. Stahl, *Introductory Modern Algebra. A Historical Approach* (John Wiley and Sons, 1997).

Adrian Rice

May Book on Sale

Springer has placed *Mathematics and the Historian's Craft* (ISBN 978-0-387-25284-1) within its Yellow Sale, meaning that the book is now available for $49.50 US, rather than the original $89.95 list price. This is the volume of our previous May Lectures that was edited in 2005 by Glen Van Brummelen and Michael Kinyon. (See the release announcement in the May 2005 *Bulletin*.) Please scurry to www.springer.com/math/book/978-0-387-25284-1 or your local academic bookseller and get a jump on your holiday shopping!

2009 Call for Papers

The Canadian Society for the History and Philosophy of Mathematics will be meeting together with the Canadian Mathematical Society at Memorial University in St. John's, Newfoundland, June 6-8, 2009. There will be two sessions specifically for the work of our members. One is being organized by Tom Archibald and is devoted to the history of the relationship between mathematics and the physical sciences. The K. O. May lecturer will be Jeremy J. Gray of the Open University and the University of Warwick, subject to final confirmation. The other session is being organized by Tom Drucker and is intended for talks on any subject in the history and philosophy of mathematics.

If you are interested in speaking in either session, please send an electronic message to the appropriate organizer (tarchi@sfu.ca, or druckert@uww.edu, respectively). You should furnish a title and an abstract for your talk, and the message should arrive by the 1st of March 2009. St. John's is a remarkable spot and definitely worth a visit. Early June is still iceberg season.

Executive Council Meeting CSHPM/SCHPM

The meeting of the Executive Council of CSHPM/-SCHPM took place at the University of British Columbia, Vancouver, BC, on June 1, 2008. The following members were present: Patricia Allaire, Rob Bradley, Greg Lavers, Jean-Pierre Marquis, Duncan Melville, Mike Molinsky, and Sylvia Svitak. Duncan Melville, Vice-President, called the meeting to order at 12:05 pm.

Secretary's Report: Patricia Allaire reported that the decision made last year to set a cut-off date of March 1 for journal subscriptions was very successful; renewals arrived in a much more timely fashion.

Pat provided comparative data for 2007 and 2008 memberships:

	2007	2008
Total Members	201	193
Members By Pay Method		
$Can	52	42
$US	102	103
BSHM	43	42
Complimentary	3	1
CSHPS	1	5
Members By Status		
Active	148	159
Retiree	40	35
Student	6	6
Developing nation	4	3
Student Associate	3	0
Reciprocal Memberships		
To BSHM	49	51
To CSHPS	26	22
Journal Subscriptions		
Historia	86	81
Philosophia	44	42
Proceedings	78	84
Paid	52	56
Complimentary	25	27
Federation	1	1
Donations		
No. Donors	23	23
Amount	$529	$702

The reciprocal memberships include complimentary memberships for the Secretary. Donations sometimes come in the form of retirees and students preferring to pay for their complimentary *Proceedings*. Fewer retirees did this in 2008 than did so in 2007. Pat also noted that "payment method" is a rough approximation of nationality. However, members from outside the US and Canada usually pay in $US.

Treasurer's Report: Nathan sent a note referring the Council to the May 2008 *Bulletin* for the Treasurer's Report.

***Proceedings* Editor's Report:** Antonella Cupillari sent her report to the Secretary. 1) The deadline for contributions to the 2008 *Proceedings* will be September 30, 2008. 2) The Editor suggested that contributors be asked to limit their submissions to roughly correspond to the paper presented. The large size of the 2007 volume was in part a result of the many contributors, but also a result of some contributors submitting extremely lengthy articles. This large volume was very expensive to print and mail. In addition, for each copy that was mailed to an address outside the US, a separate customs form was required. The Council agreed to suggest restraint to the membership and to authorize the *Proceedings* editor to be the arbiter of article length. 3) The Council voted to suggest a price increase for the *Proceedings* to the membership. The suggested price will be $US11. 4) The Council will suggest to the Editor that she delete "camera ready" as one of the submission options.

***Bulletin* Editor's Report:** Amy Ackerberg-Hastings sent an update to the cshpmcouncil email list. She reported successes in that many members are now submitting or suggesting items throughout the year so that the Content Editor has been able to build an ongoing file of material to draw upon. The Layout and Production Editors are executing their duties so smoothly that their contributions are invisible to most members. The editors are starting to receive feedback from readers after each issue appears. More challenging is that larger issues require more editing time, which pushes back layout and production. Several reports and articles were submitted late and incomplete, with information trickling in up to 2 weeks after the submission deadline. Even if the deadline were earlier or adhered to more strictly, it is not possible to meet the constitutional requirements for distributing ballots because it takes several weeks to firm up the meeting programme (in other words, these two

mainstays of the May issue in even-numbered years work at cross purposes).

Amy thus recommended the development of a constitutional amendment to permit electronic voting for Council members (as was proposed by the Secretary on the CSHPM council email discussion list). It may also help if we try to get in the habit of disseminating constitutional and other issues that need to be handled at the AGM in November, then remind members in May that they need to be prepared to discuss these matters. Amy will continue to send out additional reminders, but in turn asks all members of Council to remember that communicating with the membership is a vital part of their duties and to ask her in advance if they need assistance with their reports.

The Council agreed that it is crucial for contributors to the *Bulletin* to observe deadlines. In addition, the Council will propose the idea of a constitutional amendment to permit electronic voting to the membership. The current Production Editors, Pat and Rob, noted that they have taken on the printing, stuffing, and mailing of the *Bulletin* as a favor to CSHPM. In the interest of future secretaries and past-presidents, they wish to make it clear that these duties are not in the job description of either office.

Webmaster's Report: Mike Molinsky noted that he has made changes to the website that should thwart spammers. A calendar of meetings of interest to our membership is on the website. Mike is working on making the archives searchable.

Archivist's Report: Mike Molinsky has received boxes containing the archives from Amy Shell-Gellasch. He noted that a non-member sent a request for a copy of an article from the *Proceedings*. The response to any such request is that the author retains the copyright and, therefore, must be contacted directly for copies of any article.

2009 Meeting: In June 2009, we will meet jointly with Canadian Mathematical Society at Memorial University of Newfoundland in St. John's. CMS has not announced the exact dates of the meeting. Suggestions for topics for the special session included Mathematics and the History of Computer Science, Mathematics and the Liberal Arts, Mathematical Physics. The discussion of a topic and a keynote speaker will continue at the AGM. Organizer for both the special session and general session will be solicited at the AGM. Pat noted that, unlike meeting during the Canadian Federation for the Humanities and Social Sciences Congress, meeting with CMS requires that we notify members of the meeting and do other organizational work ourselves.

Future Meetings: In 2010, we will be meeting with CFHSS (the "Learneds") at Concordia University, Montreal, QC. In 2011, we will meet jointly with BSHM at Trinity College, Dublin, Ireland on July 15-17. In 2012, we will most likely again meet with the Learneds at Waterloo.

The agenda for the Annual General Meeting was planned.

The meeting was adjourned at 1:05 pm.

Patricia Allaire, Secretary

Joint AMS/MAA Meetings

A number of events in history and philosophy of mathematics have been planned for the Joint Mathematics Meetings, to be held in Washington, DC, January 5-8, 2009. More information can be found on the MAA or AMS websites: http://www.maa.org or http://www.ams.org.

- Monday, 5 January, 17:30-18:30: HOM SIGMAA Business Meeting and Reception.
- Monday, 5 January, 17:30-18:30: POM SIGMAA Business Meeting and Reception.
- Monday, 5 January, 18:30-19:30: HOM and POM SIGMAA Guest Lecture by Chandler Davis, "The Role of the Untrue in Mathematics."
- Tuesday, 6 January, 10:45-12:05: HOM and POM SIGMAA Panel Discussion on "The Intersection of the History and Philosophy of Mathematics," with panelists Tom Drucker, Kenneth Manders, and Daniel Sloughter; organized by Bonnie Gold and Amy Shell-Gellasch.
- Tuesday, 6 January, 13:00-15:00, and Thursday, 8 January, 13:00-15:00: MAA Minicourse on "Teaching a Course in the History of Mathematics," organized by Fred Rickey and Victor Katz. (NOTE: You must preregister for this course.)

- Tuesday, 6 January, 14:15-15:05: AMS Invited Address, "Unearthing the Visions of a Master: The Web of Ramanujan's Mock Theta Functions," by Ken Ono.
- Tuesday, 6 January, 15:00-16:00, and Wednesday, 7 January, 15:00-16:00: MAA Special Film Presentation, "The Story of Maths" (in 2 parts), by Robin Wilson.
- Tuesday, 6 January, 18:00-19:30: MAA Special Dramatic Presentation, "Lewis Carroll in Numberland," directed by Robin Wilson.
- Wednesday, 7 January, 8:00-10:55 and 13:00-17:55, and Thursday, 8 January, 8:00-10:55 and 13:00-17:55: AMS-MAA Special Session on History of Mathematics, organized by Joseph W. Dauben, Karen Parshall, Patti Hunter, and Deborah Kent.
- Wednesday, 7 January, 14:30-16:00: MAA Presentations by Teaching Awards Recipients, including David Pengelley.

Amy Shell-Gellasch

CSHPM at the Canadian Mathematical Society

The CSHPM has been organizing regular sessions in the history of mathematics in conjunction with the Canadian Mathematical Society Winter Meetings over the past few years. CMS has generously agreed to give us this regular slot and the result has been the provision of a forum for historical and philosophical research on mathematics. The structure of the meetings, which are arranged into special sessions and plenaries on the themes of those sessions, doesn't encourage crossover, but nevertheless we do get interested drop-ins from the broader mathematics community.

The next such meeting will be in Ottawa from Dec. 6-8. At this writing, abstracts are not complete, but scheduled speakers include: Tom Archibald (SFU), David Bellhouse (UWO), Stanley Burris (Waterloo), Lawrence D'Antonio (Ramapo Coll.), Brenda Davison (SFU), Robert Dawson (St. Mary's), Florin Diacu (Victoria), Craig Fraser (Toronto), Deborah Kent (Hillsdale Coll.), Duncan Melville (St. Lawrence Univ.), Kim Plofker (Union Coll.) V. Frederick Rickey (US Military Academy), Paul Rusnock (Ottawa), Ed Sandifer (W. Conn.), and Dirk Schlimm (McGill).

The Winter Meeting in 2009 will be in Windsor, Ontario.

Tom Archibald

AMS Fall Section Meetings

Shawnee McMurran and Jim Tattersall organized a special session on history and philosophy of mathematics at the American Mathematical Society Western Section meeting at the University of British Columbia in Vancouver on October 4, 2008. Speakers included: Tom Archibald (Simon Fraser), "Integral equations: A 'Revolution' in mathematics in the early 20th century?"; Len Berggren (Simon Fraser), "Geometry and architectural design in medieval Islam"; Brenda Davison (Simon Fraser), "The impact of G.H. Hardy and *A Course of Pure Mathematics*"; Ron Graham (UC - San Diego), "The Erdös-Szekeres Theorem"; Richard K. Guy (Calgary), "Farey series, Ford circles, and much more"; Deborah Kent (Hillsdale), "The catenary on a cone in Peirce's *System of Analytic Mechanics*"; Shawnee McMurran (Cal State - Santa Barbara), "Advances in the study of air resistance in projectile motion during the early 18th century"; Robert Stein (Cal State -San Bernardino), "The math wars: A cultural perspective"; John Stillwell, (San Francisco), "The long flirtation between logic and combinatorics"; Jim Tattersall (Providence), "The mathematical department of *The Yates County Chronicle* (1872-1880)"; and Glen Van Brummelen (Quest), "Trigonometry on the edge: Interpolating your way to medieval astronomical success".

Robert E. Bradley, Lawrence D'Antonio, and Lee J. Stemkoski organized a special session on history of mathematics at the AMS Eastern Section meeting at Wesleyan University in Middletown, CT, on October 11-12, 2008. Speakers included: Francine Abeles (Kean), "The early history of quasideterminants in the nineteenth century": Rob Bradley (Adelphi), "The transition from Euler to Cauchy: The case of recurrent series"; Larry D'Antonio (Ramapo), "How Euler solved the problem of the virgins";

Thomas Drucker (Wisc. - Whitewater), "Nationality and the mathematical community"; Hardy Grant (York), "Eighteenth-century mathematics in cultural context"; Brian Hopkins (St. Peter's), "Fleury and Hierholzer on Euler Paths"; Andrew Perry (Springfield), "Warren Colburn and his influence on American mathematics textbooks"; C. Edward Sandifer (W. Conn.), "The transition from Euler to Cauchy: the case of infinite products"; Timothy Smith (Embry Riddle), "Jean Baptiste Joseph Fourier"; Jeff Suzuki (Brooklyn), "The rise (and fall?) of factoring in college mathematics"; Jim Tattersall (Providence), "Samuel Hart Wright and *The Yates County Chronicle*"; Marina Vulis (Bridgeport), "History of put-call parity"; and Paul Wolfson (West Chester), "How Boole, Eisenstein, and Cayley solved the cubic equation".

AGM of CSHPM/SCHPM

The Annual General Meeting of the Canadian Society for History and Philosophy of Mathematics took place at the University of British Columbia, Vancouver, BC, on June 2, 2008. The meeting, with approximately 30 members in attendance, was called to order at 11:05 am by Duncan Melville, Vice-President.

The representatives of FedCan (CFHSS) addressed the members. The representatives solicited participation in the organization's advocacy programs dealing with public and social policy, the Federal budget, and ethics issues, as well as FedCan's program on research and peer review.

David Bellhouse asked about cuts in research funding by SHRCC. The response was that the total funding is unchanged; rather, it is the distribution that has changed.

Agenda for the General Meeting

- Approval of agenda
- Approval of minutes of 2007 AGM
- Treasurer's report
- Secretary's report, including report of Election Committee
- *Proceedings* Editor's report
- *Bulletin* Editor's report
- Webmaster's report
- 2009 meeting
- Future meetings
- Other business

1. Motion: To approve the minutes of the July 2007 Annual General Meeting as printed in the November 2007 *Bulletin*. Carried unanimously.
2. a) Nathan Sidoli sent word referring the membership to the May 2008 *Bulletin* for the Treasurer's Report. b) Roger Godard asked that we consider how to best use excess funds. Robert Thomas suggested that more be invested. David Bellhouse noted that the issue of investing is not a simple one, given our tax exempt/legal status as a Canadian organization. c) Duncan noted that several payments reflected in the Treasurer's report were made anomalously. Hence, the report does not fully reflect our financial state. d) We have had institutional support, both formal and informal, some of which will definitely end as Pat Allaire retires, and some of which (e.g., mailing of *Proceedings*) is on a year-to-year basis. e) Pat has claim forms (sent from and to be returned to Nathan) for travel reimbursement for speakers and session organizers.
3. The Secretary, Patricia Allaire, reported that the decision made last year to set a cut-off date of March 1 for journal subscriptions was very successful; renewals arrived in a much more timely fashion. She showed comparative membership data for 2007 and 2008 (see the minutes of the Executive Council). Pat noted that we no longer have any Student Associate members. Amy Shell-Gellasch suggested that winners of the HOMSIG-MAA writing contest be awarded such a membership.
4. The Secretary reported for the Nominating Committee (Rob Bradley, Robert Thomas, and Glen Van Brummelen) that 36 ballots were cast in the 2008 Council election. Elected were:
   President: Duncan Melville (36)
   Vice-President: Jean-Pierre Marquis (36)
   Secretary: Patricia Allaire (36)
   Treasurer: Nathan Sidoli (35)
   Councilor: Francine Abeles (35)
   Councilor: Greg Lavers (35)
   Councilor: Adrian Rice (35)
   Councilor: Sylvia Svitak (34)

The membership agreed that we should amend the Constitution to permit electronic balloting. The proposed amendment will be published in the November *Bulletin* to be voted upon at the 2009 AGM.

5. a) *Proceedings* Editor, Antonella Cupillari, sent word that the deadline for contributions to the 2008 volume will be September 30, 2008. Conference speakers must be members of CSHPM to publish in the 2008 *Proceedings*. b) The Editor suggested that contributors be requested to limit their submissions to roughly correspond to the paper presented. The large size of the 2007 volume was in part a result of the many contributors, but also a result of some contributors submitting extremely lengthy articles. This large volume was very expensive to print and mail. In addition, for each copy that was mailed to an address outside the US, a separate customs form was required. Members are requested to exercise restraint as to the length of their submissions. The *Proceedings* editor will be the arbiter of article length. c) The Council will suggest to the Editor that she delete "camera ready" as one of the submission options. d) A motion was made to increase the price of the *Proceedings* to $11 US. The motion was amended to make the price $15 and amended again to $13. The final version of the motion was carried unanimously. e) The membership voted a thank you to Antonella for her excellent and most timely execution of a Herculean task and her willingness to continue as editor.
6. a) Amy Ackerberg-Hastings, *Bulletin* Content Editor, sent word encouraging all members to submit material for the *Bulletin* so as to maximize participation and requesting those submitting to write carefully and proofread scrupulously to minimize editing by Amy. b) It was suggested that production of the *Bulletin* be formally divided into three parts–editing (now done by Amy Ackerberg-Hastings), formatting and typesetting (now done by Eisso Atzema), and printing, stuffing and mailing (now done on an ad hoc basis by Pat Allaire and Rob Bradley). Pat explained the last component and suggested that a member might like to assume this responsibility. The only requirement is that the member's institution would do the printing and mailing–with CSHPM paying for either or both items, if necessary. c) At the suggestion of Tom Drucker (former editor), the membership voted congratulations Amy for the fine job of editing each issue. d) Janet Beery suggested that the *Bulletin* become paper-optional. After discussion, it was decided that members will make a selection on the next renewal as to whether they wish to receive the *Bulletin* in electronic format only or to receive a hard copy, the default being the former. Members will receive an e-mail message containing the link, when the *Bulletin* is available on the website.
7. Webmaster Mike Molinsky requested feedback from the membership on the web site and noted that he has made changes to the website that should thwart spammers. A calendar of meetings of interest to our membership is on the website. Mike is working on making the archives searchable.
8. In 2009, we will meet jointly with Canadian Mathematical Society at Memorial University of Newfoundland in St. John's, in June 2009. CMS has not announced the exact dates of the meeting. Information will be in the November *Bulletin* and on the web page. Members are encouraged to join the e-mail discussion list to further facilitate dissemination of meeting information. (CMS has since posted the dates of June 6-8, 2009, on their web page.)

   The suggestions for topics for the special session brought forth from the Council meeting (Mathematics and the History of Computer Science, Mathematics and the Liberal Arts, Mathematical Physics) were supplemented by Mathematics and Astronomy in view of the fact that 2009 is a Year of Astronomy. After discussion, it was decided that the topic will be Mathematics, Astronomy, and Physics. Tom Archibald will organize the special session, find a Ken May speaker, and coordinate with CMS. Tom Drucker will organize the general session.

   Pat noted that CMS will not notify CSHPM members of the meeting, housing, etc. Therefore our members must look to the *Bulletin*, web page, and e-mail list for information.
9. Plans for future meetings were also updated. In 2010, we will be meeting with Canadian Federation for the Humanities and Social Sciences (the "Learneds") at Concordia University, Montréal,

QC. In 2011, we will meet jointly with BSHM at Trinity College, Dublin, Ireland, on July 15-17. In 2012, we will most likely again meet with the Learneds at Waterloo. It was noted that History of Mathematics and Computer Science might be an especially appropriate special session topic for this meeting.

10. Tom Archibald, as liaison to CMS, noted that a History session has now become a regular component of the CMS winter meeting and that it is important that we continue to supply organizers of those sessions. The next winter meeting of CMS is in Ottawa, Dec. 6-8, 2008. Glen Van Brummelen noted that thanks are due to Tom Archibald for continuing to work with CMS on our behalf.
11. Rob Bradley offered thanks to the session organizers for the present meeting, David Orenstein and Adrian Rice.

The meeting was adjourned at 12:45 pm.

Patricia Allaire, Secretary

Help Wanted

No experience required, no salary paid...

The *Bulletin* you are presently reading results from the labor of 3 people: Content Editor, Layout Editor, and Production Editor. We are looking for someone to take on the position of Production Editor, who is responsible for the printing, stuffing, and mailing of the *Bulletin*. Assuming this position is a wonderful way to assist CSHPM without having to work throughout the year. If you think you might be able to help, read on.

Here are the details of the job:

- Twice a year, the Layout Editor will send you the *Bulletin* in PDF form.
- Perhaps your institution will be willing to print the *Bulletin*. If not, you can check out the cost at Staples, Kinko's or some such. CSHPM will pay for the printing, regardless of where it is done.
- You will need to purchase envelopes and will be reimbursed.
- The Secretary will send a set of mailing labels and return address labels.
- The mail room of your institution is the easiest way to handle the mailing, although it may be possible to use a mailing service. For an individual to purchase and affix appropriate postage to each envelope is not practical. Once again, CSHPM will pay the cost.

Some colleges and universities are willing to absorb the cost of the printing and/or the mailing. If you can persuade your administration to help out, our appreciation to them can be acknowledged in the *Bulletin*.

Although we currently mail out about 200 copies, that number will drop considerably because we are going to offer electronic delivery of the *Bulletin* as an option.

If you would like additional information or would like to volunteer, please contact Pat Allaire (pallaire@qcc.cuny.edu) or Rob Bradley (Bradley@adelphi.edu)

Proposed Amendment

While we have accepted e-mail ballots in some of our past biennial Council elections, that acceptance has been in emergency situations. The CSHPM Constitution in fact requires that elections be conducted by paper. (The full text of the Constitution is available in French and in English at www.cshpm.org.) So that ballots may be provided in a more timely fashion and members may vote by e-mail if they prefer, the Council presents the following amendment to be voted on at the 2009 AGM. (Two-thirds approval is required for adoption.) The Secretary will arrange for members without e-mail addresses to receive paper ballots, should the amendment be passed.

Robert Thomas, who prepared the amendment, suggests that we modify Article IV, Section 4 as follows by adding the text IN CAPS:

Section 4 The officers and Council Members shall be elected by ELECTRONIC OR mail ballot in even-numbered years. The ballots shall be returned to the Secretary ELECTRONICALLY WITHIN TWO WEEKS, OR IF ON PAPER by mail or in person on

or before the hour of the next meeting of the Society, or any other election date set by the Executive Council, which date shall not be less than thirty days after the distribution of ballots. The officers shall serve for two years or until their successors are elected and Council Members shall serve for two years or until their successors are elected. The members of the Executive Council shall begin their terms of office at the close of the election.

2009 Meeting Registration

As you have seen elsewhere in this *Bulletin*, in 2009 we will have a joint meeting with the Canadian Mathematical Society in St. John's, Newfoundland, at Memorial University. As with our last joint meeting, at Waterloo in 2005, registration and housing will be handled through CMS. Please monitor their web site, www.cms.math.ca, for the meeting page to go "live," probably in early 2009.

To speak at St. John's, please submit your title and abstract to our special and general session organizers, Tom Archibald and Tom Drucker. As in 2005, when you register for the meeting through CMS, you will probably have to again provide your title and abstract as part of the registration process. However, in accordance with our usual practices, the Toms will be scheduling our talks and will therefore need your information by 1 March 2009.

HOM at Joint Meeting in Rio de Janeiro

Early in June the first-ever joint meeting of the AMS and the Sociedade Brasileira de Mátematica lured several Society members to one of the world's most exotic and beautiful cities. The history session was co-organized for the AMS, with his usual energy and efficiency, by long-time CSHPMer Jim Tattersall; his Brazilian counterparts were Sergio Nobre and Carlos Gonçalves. The hospitality of our hosts was warm and gracious.

The following talks were given: Fran Abeles, "The Historical and Mathematical Development of Dodgson Condensation as an Experimental Method"; Harry Coonce, "The History of Mathematics in Brazil and the Mathematics Genealogy Project"; John Fossa, "The Doubly Divided Line and Plato's Material Elements"; Carlos Gonçalves, "Similar Figures in Mesopotamian Mathematics"; Fernando Gouvea, "Emilia's Arithmetic: A Brazilian Intellectual Tackles Mathematics Education"; Hardy Grant, "Episodes from the Career of the Riemann Hypothesis"; Itala Loffredo D'Ottaviano, "On the development of paraconsistent logic and da Costa's work"; Sergio Nobre, "The birth of the research in mathematics inside the state of Sao Paolo"; Adrian Rice, "What is the 'birthday' of elliptic functions?"; and Jim Tattersall, "The Remarkable Arthur Porges". A talk prepared by Newton da Costa, "On the history of quasi-truth", was given in his stead by Itala Loffredo D'Ottaviano. The visitors from North America savoured Rio's charms to the full. The setting is gorgeous, the weather was sublime, the people are friendly, the streets (when and where we wanted to be on them) are vibrant and safe, the buses run on time, the subway is superb. All the famous attractions lived up to the hype: the astonishing Christ statue that looks down on the city, the cable-car ride to the top of the hill called "Sugarloaf", the historic "Centro" with its churches and museums and galleries, legendary Ipanema Beach.... Fernando Gouvea led most of our little band to a fabulous meal in the kind of restaurant ("churrascaria") where the waiters keep coming with scrumptious meats on big skewers until you can eat no more. Rio calls itself the "cidade maravilhosa"–and one came away understanding why.

Figure 3: HOM in Rio (Photo by Roger Behling)

Hardy Grant

Letters to the Editors

I just read Tom Drucker's "A Warning to the Curious" in the [May 2008] CSHPM *Bulletin*. Everything Tom says is perfectly true. I'm not sure whether he read my review of *History of Mathematics: A Supplement by Craig Smorynski* or saw some Springer promotional material that quoted from it. Since, however, he says that the book comes with my "warm endorsement", I would like to point CSHPM members to my review of Smorynski's book for *MAA Reviews*. (Go to http://mathdl.maa.org/mathDL/19/ and search for "Supplement".)

I thought my review made it completely clear how opinionated and eccentric the book is. I certainly did enjoy the book, but, to quote the review, "I wouldn't recommend giving it to your students to read." Grown-ups with fully developed critical abilities, however, may well enjoy arguing with it, as I did.

Fernando Gouvea

Thanks for your note... My attribution of a favorable evaluation of the book to you had been based, not on your review, but the use Springer made of that review in an advertisement. I'm trying to dig up the text that they used, but I'm certainly reassured that your judgment of the book itself paid heed to its oddities. My haste in getting something into the Newsletter was just to warn prospective purchasers of the need to be cautious, and you had been there before me.

Tom Drucker

[Editor's Note: Indeed, the Springer advertisement that appeared around April in the AMS Notices and MAA Monthly pulled Fernando's comments rather out of context: "... This is a very personal book, full of personal asides and footnotes that reveal the author's thought process... The style allows us to 'follow along' and share the excitement (or, sometimes, frustration) of discovery (or, sometimes, lack of). It's all great fun... anyone who teaches history of mathematics can find useful things here..." Tom, meanwhile, has good-naturedly accepted a C in my Introduction to Historical Writing class for not going back to the original source in the first place.]

That's what I thought. I've been surprised, sometimes, with the way that publishers can selectively quote from reviews... sometimes even from quite negative reviews. In this case, I did like the book, but I have a high tolerance for eccentricity. As I said, not a book to give to students! So your cautionary note is useful.

Fernando Gouvea

Mathematical Ephemera

This issue's excerpt from items that may have been lost to history for a reason comes from the "more advanced geometry" section of "Selected Problems in Mathematics and Mechanics: 1914-1915," issued by the Franklin Institute School of Mechanic Arts in Philadelphia. (To forestall the editors from reverting to more pamphlets by circle squarers in the future, readers are encouraged to submit typescripts from ephemeral materials in the history or philosophy of mathematics that they have encountered.)

D1 If a is the side of an equilateral triangle, show that its area is $a^2\sqrt{3}/4$.

D2 A tower 95.6 feet high is situated on the edge of a river. The angle of depression of an object on the opposite bank is 30 degrees. What is the breadth of the river?

D3 With a protractor construct a triangle having each of its angles adjacent to the base double the third angle. Measure the third angle.

D4 What are *complementary* and *supplementary* angles? What do you mean by an angle of 540^o?

D5 What is the *circular measure* of an angle? What is a *radian*?

D6 Express in radians: 60^o; 2 right angles; $2n$ right angles, where n is any positive whole number.

D7 Show how to construct a regular octagon. What is the magnitude of its angle?

D8 If the difference in longitude of two points on the equator is 1^o, what is the distance between them in miles?

D9 Make diagrams to show the ratios of the sides of 45^o right angles and of $30-60^o$ right angles.

D10 Regarding the circle as the limit of the sum of triangles radiating out from its centre, the altitude of each triangle being the radius of the circle, prove that the area of a circle $= \pi r^2$.

D11 Find the total area of a cone whose height is 4 centimeters and whose base is a circle of radius 3 centimeters.

D12 Define *ellipse*, *parabola*, *hyperbola*.

D13 The cross section of a macadam road is in the form of a parabolic curve. The width of a roadway excluding gutters is 80 feet; the middle ordinate is 4 feet. Compute the ordinates for points 10 feet, 20 feet, and 30 feet from the centre.

D14 What is the area of an ellipse whose major axis is 4 inches and whose minor axis is 3 inches?

D15 What are *vector* and *scalar* quantities?

D16 Represent two forces of 10 pounds and 8 pounds acting at the same point and at right angles to each other by vectors and find their resultant.

D17 $\vec{P}$ is a vector of magnitude 225 and direction northwest; $\vec{Q}$ is a vector of magnitude 400 and direction east. Evaluate $\vec{P}+\vec{Q}$.

D18 Set off on paper six lines representing forces acting on a point in various directions. Find the resultant of the forces in direction and magnitude.

D19 A ship is sailing at the rate of 20 miles an hour in a northeasterly direction. A man is walking straight across its deck at a velocity of 3 miles per hour. In what direction and with what velocity is the man moving in space?

D20 One end of a localized vector (rotor) is travelling in a straight line at a speed of 20 feet per second and the vector is making one rotation per second. Trace the path of the free end in space.

HPM Americas Section in Washington, DC

The Americas Section of the HPM held its annual meeting at the MAA Carriage House in Washington, DC, on April 19, 2008. Peggy Kidwell and I shamelessly promoted our new book (see the Announcements), including in my talk based upon the first chapter, the American version of the evolution of the mathematics textbook into a commercialized teaching tool. Alain Touwaide, representing both the Washington Academy of Sciences and the Smithsonian's National Museum of Natural History, presented "Leafing through History: An Imaginary Walk through an Ancient Library". Florence Fasanelli discussed her joint work with Fred Rickey that was published in Ubi d'Ambrosio's festschrift in her talk, "Some Frontispieces in the [Karen] Michalowicz Collection at American University". The Americas Section was one of Karen's passions, so it was especially appropriate to spend some time reviewing various depictions of Aristippus finding geometrical diagrams on Rhodes and concluding civilization was nearby.

Figure 4: Emanuela Appetiti, Mia Abeles, Florie Fasanelli, and Alain Touwaide

A brief business meeting took place over a simple but sumptuous catered lunch—just the way this picky eater likes it. Then, Peggy Kidwell shared preliminary results from her new project with "The Chinese Tangram, Mathematical Recreations, and Mathematics Education in the United States". Betty Mayfield of Hood College described how she and Kimber Tysdal facilitated undergraduate research experiences for four students connected by the theme of "Women and

Mathematics in the Time of Euler". Maryam Vulis (New Haven) spoke on the "History of Arab Cryptanalysis". Ilhan Izmirli of American University traced the changing subjects of proofs from Euclid to Gödel and Frege. Bob Stein, president of the Americas Section, closed the day with his first effort to place into historical context his own experiences with developing mathematics standards in California. Throughout the conference, the MAA staff provided cheerful technical and logistical assistance.

This was my first Americas Section meeting, and it could not have been more enjoyable or in a more convenient location. It was a collegial day spent with friends old and new. I also learned that the Americas Section is a non-organization in the sense that no membership list exists and no dues are collected. Rather, scholars are welcome to drop by for intellectual stimulation once or on an ongoing basis. We had such a good time that Bob has booked the Carriage House again for next year—please check out his call for papers in the Announcements column.

Amy Ackerberg-Hastings

Quotations in Context

> Everything of importance has been said before by somebody who did not discover it. - Alfred North Whitehead

Last year, the subject of this column was a quotation from J. J. Sylvester's Presidential Address in 1869 to the Mathematical and Physical Sciences Section of the British Association for the Advancement of Science. In 1916, Alfred North Whitehead gave his own Presidential Address to this same institution. The topic of his speech was, "The Organisation of Thought."

The first half of his address was about the nature of science. Whitehead discussed both the practical and the theoretical sides of science, its use of inductive reasoning and experience, and its foundation in common sense. In the end, he concluded:

> Science is essentially logical. The nexus between its concepts is a logical nexus, and the grounds for its detailed assertions are logical grounds. King James said, 'No bishops, no king.' With greater confidence we can say, 'No logic, no science.'

The speech briefly turned to those who viewed logical thought as "barren" or sterile. He mentioned the belief that deductive reasoning could not create new ideas, since any conclusions came part and parcel with the premises with which one began. Whitehead offered a brief rebuttal to this characterization and moved on, although he would return to address this topic again.

Whitehead gave a brief overview of modern logic, dividing it into four general sections, which he termed arithmetic, algebra, general-function theory, and analytic. The arithmetic section involved general propositions, while the algebra section introduced propositional functions. The general-function theory section then considered classes of propositional functions. The final section, the analytic stage, Whitehead concluded as being the "whole of mathematics... neither more nor less."

The quotation in question for this column appeared immediately following this summary and categorization of logical thought, when Whitehead returned to the idea of the barrenness and "sterility" of logic:

> The question arises, How many forms of propositions are there? The answer is, an unending number. The reason for the supposed sterility of logical science can thus be discerned. Aristotle founded the science by conceiving the idea of the form of a proposition, and by conceiving deduction as taking place in virtue of the forms. But he confined propositions to four forms, now named A, I, E, O. So long as logicians were obsessed by this unfortunate restriction, real progress was impossible. Again, in their theory of form, both Aristotle and subsequent logicians came very near to the theory of the logical variable. But to come very near to a true theory, and to grasp its precise application, are two very different things, as the history of science teaches us. Everything of importance has been said before by somebody who did not discover it.

I have occasionally found Whitehead's quotation be-

ing misinterpreted as equivalent to Stephen Stigler's "law of eponymy." But in the context of the original address, it clearly seems to be saying the exact opposite: that the first person to state a result or make a claim is rarely the first person to truly understand the idea precisely and completely.

If you are interested in reading the entire address, it can be found in the book *The Aims of Education and Other Essays*, as well as on the MacTutor website.

Mike Molinsky

Memories of Mike Mahoney

I learned just a couple of days before the deadline for this issue of the *Bulletin* that Michael Sean Mahoney of Princeton had died over the summer. There are going to be plenty of éloges and obituaries, but I thought this might be a reasonable place for some memories. After all, it's not clear that I would have ended up in the history of mathematics without his influence. In line with former editor Sharon Kunoff's regular request for articles about how one came to like the field, I can attribute more than the usual share of responsibility (or blame) to Mike.

As a Princeton freshman in 1971 I took a course on mediaeval Latin from the late J. Arthur Hanson. Every student was supposed to do an independent project, and I thought I could try tackling something connected with mathematics. Hanson directed me to a member of the program in History and Philosophy of Science named Mahoney, and I still remember the first occasion on which I went into the latter's office in Palmer Hall (formerly the physics building). Mahoney welcomed me and treated my request for a project with serious consideration. In particular, he talked to Marshall Clagett at the Institute for Advanced Study about a text that might be worth working on, and I started in on it. Of course, since it was a manuscript, one had to learn something about Latin handwriting, and Mike made sure that I knew where to pick up a reference work on how to decipher it. I also had to learn something about the mediaeval traditions of Euclid, with which I was completely unfamiliar. While he could have just sent me off to read something, he was happy expatiating on the subject, and I remember the readiness with which he would lean back in his chair and undertake the task of enlightening me. While I'm not sure that the result made much of a splash in the history of mediaeval mathematics, it did get me to realize the importance of confronting primary sources immediately.

After I returned from Oxford, I signed up for a course Mahoney offered on ancient and mediaeval science. I had figured that his ability to lecture in his office would be carried over into the classroom, and I was not disappointed. While aspects of the history of technology were not so much to my taste as other parts of the curriculum, I still owe a good deal of my perspective on broader issues in the history of science to listening to those lectures. He gave the course over many years, and I am sure that others may have found their sense of scholarly direction from it.

Princeton in those days (and perhaps even now) offered the opportunity for 'Student Initiated Seminars'. I figured, by the time I was a senior, that it was worth trying to take something on history of mathematics in particular, and I approached Mike on the subject. He was willing to make the effort, and he even recruited a couple of graduate students (including Kathryn Olesko, a pillar of the History of Science Society's publications these days) to make up the requisite number. The course met from 7:30 to 10:30 in the evening, and those who know me might wonder how I managed to overcome my usual inability to remain awake at that hour. The discussion that Mahoney encouraged kept my eyelids from shutting, although I might have contributed a bit more if the hour had been earlier. My younger sister also took the seminar and ended up with Mahoney as her adviser when she did her thesis in the History Department.

I did not have any very good idea of where to go for graduate school, but Mike made sure that I was aware of the programme at the Institute for the History and Philosophy of Science and Technology at the University of Toronto, where Ken May presided over the history of mathematics. I went up and visited, and Mike's letter on my behalf may have had some effect. At any rate, I could arrive at Toronto feeling that I had been better trained than many undergraduates. During the course of my two years at Toronto, I made it back regularly to Princeton and even ran into Mahoney on a brief trip to München over the summer of

1976. I would have been lost in the streets, regardless of the German I had learned in the classroom, without his ability to handle the south German pronunciation.

One of the characteristics of Mike Mahoney as a historian of mathematics was that he found very little in the kingdom of learning irrelevant to that subject. One needed to know a good deal of mathematics, but one also needed a grounding in history and foreign languages in order to make sense of what had originally been written. His own background was formidable in all these respects (he was one of Harvard's conspicuously successful products) and made me wish I had another language or two in my quiver. He was well equipped to write the biography of Fermat that came out in 1973, of which I have made regular use over the years. Its coming out in a new edition more recently is a tribute to others also finding it of lasting value.

It was that biography that led to some change in his direction of research. André Weil wrote a notorious review which assailed the book's merits on almost every front. So far as I know, it wasn't any particular animus on Weil's part toward Mahoney, but just his way of expressing doubt about the history of mathematics being done by those who weren't professional mathematicians. While colleagues and other scholars rallied to Mahoney's defense, he also looked for new fields to pursue, and the rapidly emerging area of the history of computer science and technology benefitted from his attention for decades to come. Again, Mahoney brought the historian's close eye for detail even to reading manuals for machines and finding there what was invisible to the more casual reader.

In addition to Mahoney's gifts as teacher and scholar, he was also a warm human being who could make parents outside of academia feel at home. At a time of personal loss within my family, his handwritten notes went to all the survivors with expressions of sympathy and remembrance. His concern for matters outside the classroom extended to health and welfare. My taste in those days was not to worry about wearing heavy coats, even in winter, as they had never been necessary in California. On one particularly frosty morning in Princeton when I went to visit Mahoney in his office, he saw that I was coatless and expressed some surprise at my not wearing a winter coat. He then added, 'Tom, you do have a winter coat, don't you?' While my parents were mortified when I reported the conversation to them, I still hear that question in my mind when I go outdoors into Wisconsin winters.

Mike was a devoted swimmer and supporter of the Princeton University swimming team. The heart attack that led to his death came while he was swimming, but it would have been hard to imagine him without swimming. It is also hard to imagine the campus of Princeton University without his zeal for teaching and for encouraging students to start down the trail that leads to a scholarly career. While I may never have lived up to the standards of his scholarship, I owe a great deal to Mike Mahoney as a person and as a scholar. At the time I heard of his death, I had a note to myself to ask him for help in starting on a project connected with seventeenth-century mathematics. Now I'll just have to hope that some of the enthusiasm I bring to the history of mathematics will be fitting memorial to him whom I shall always regard, of all the historians of mathematics whom I have known, as the wisest and the best and the most just.

Thomas Drucker

Book Review: Benjamin Peirce (1809-1880)

Of the Human Heart: A Biography of Benjamin Peirce by Edward R. Hogan (Bethlehem, PA: Lehigh University Press, 2008), 429 pp. ISBN: 978-0-934223-93-5. US$80.00.

Please join me in a word association game: what comes to mind with the name of "Benjamin Peirce"? If you thought of "founding father of American research mathematics", you are in good company. The sense of that phrase, if not the exact wording, was a central theme in Helena Pycior's and Ivor Grattan-Guinness's articles on Peirce's 1870 *Linear Associative Algebra* (*Isis* 70 (1979): 537-551 and *Annals of Science* 54 (1997): 597-606, respectively) and in Karen Parshall and David Rowe's *The Emergence of the American Mathematical Research Community* (AMS, 1994).

Yet, historical accounts so far have only hinted at the depth behind the breadth of Peirce's contributions. Born in 1809, he had an early association with Harvard College as his father's employer after the family business failed, although the assistance he provided Nathaniel Bowditch with the translation and editing of Pierre-Simon Laplace's *Mécanique Céleste* (1829-1839) proved more influential on his mathematical development. He wrote a series of mathematics textbooks in the 1830s and helped found the Lawrence Scientific School in 1847. He served as director of longitude determination and then superintendent of the U.S. Coast Survey (1852-1874). He involved himself in his own and others' priority disputes, most notoriously the discovery of Neptune. He was associated with several short-lived mathematics journals. He helped organize the Smithsonian Institution and found the National Academy of Sciences. He fathered the logician, Charles Sanders Peirce. This laundry list could go on for quite some time before we reached Peirce's death in 1880.

We are fortunate, therefore, to have two scholars currently working to flesh out Peirce's biography and to place his accomplishments in the context of the history of mathematics, along with the history of science in the American government. In her Ph.D. dissertation, "Benjamin Peirce and the Promotion of Research-Level Mathematics in America: 1830-1880" (Virginia, 2005), Deborah Kent systematically worked through Peirce's mathematical publications. Ned Hogan has tracked down an impressive amount of correspondence to, from, and about Peirce held by at least eleven repositories. These letters have enabled him to construct a narrative that analyzes Peirce's formative relationships as well as the various positions he held during his career. (Full disclosure: Kent and Hogan have both acknowledged relying on my own work on mathematics education at early nineteenth-century Harvard; they have confirmed my suspicion that Peirce learned little from John Farrar and held little respect for the older man's intellect.)

Hogan and Kent are each doing quality research that provides intriguing and essential reading for any student of mathematics and science in the nineteenth-century United States. It may already be clear that their approaches differ significantly but well complement each other. Similarly, there are differences in content. For example, Hogan devotes considerable attention to Peirce's personal and professional relationship with Southerner and physicist John Le Conte, a figure not discussed in Kent's dissertation, while Hogan noted all of Peirce's organizational leadership except his directorship of the American Social Science Association that appears in Kent's sixth chapter. One instance of a difference in interpretation is that Kent follows Joseph Brent's 1993 biography of Charles Sanders Peirce in concluding that Peirce senior suffered from trigeminal neuralgia, while Hogan contends that the illness was kidney stones.

The book under review does an excellent job of conveying the lively personalities who attempted to construct astronomical observatories, map the coast of the United States, explore its interior, popularize scientific activities, and the like, including Louis Agassiz, George Bond, Charles Gill, and Joseph Henry. Hogan is meticulous at tracking the myriad ways in which lives intersected within this relatively small, professionalizing community. He even brings in another of my own frequent persons of interest, Charles Davies, by explaining that the Lazzaroni's participation in a failed attempt to secure a professorship for Wolcott Gibbs at Columbia helped lead to William Chauvenet losing the job in "pure mathematics" to Davies. Indeed, Hogan's extensive use of correspondence permits him to include a large number of new details about all these men. Peirce's friendships with his wife, Sarah, and other women are also treated extensively. There are a few ways in which Hogan's biography could be more user-friendly. The chapters unfold thematically, so that one occasionally gets lost in their overlapping chronology. Sections within chapters are separated by "Φ^n"; Hogan appears not to explain until page 178 that this character was Alexander Bache's nickname for Peirce.

Overall, *Of the Human Heart* greatly expands the information known about Peirce and opens up routes for further conversation about his accomplishments and influence. Since Peirce joins Abraham Lincoln and Charles Darwin in celebrating his bicentennial next year, he deserves extra attention from historians and philosophers of mathematics.

Amy Ackerberg-Hastings

Web Review: History of Mathematics Podcasts

Podcasts are yet another example of how the Internet has changed the way ideas and information can be shared, making it relatively simple and inexpensive to record audio programs and make them available to people around the world. Podcasts can be found on almost any topic, including the history of mathematics. Of course, because the formulas and symbolism of mathematics are difficult to communicate effectively in a wholly verbal medium, most podcasts emphasize biographical and cultural details instead. Listed below is a small sampling of available podcasts which feature at least a few episodes in the history of mathematics.

The Engines of Our Ingenuity (http://www.uh.edu/-engines/engines.htm)

This program began in 1988 and is heard nationally on NPR as well as being available as a podcast. The web site includes a searchable list of over 2000 episodes. Each episode is only about four minutes long, and they usually contain little or no actual mathematics; for example, the episode entitled "Hypatia's Mathematics" contains no mathematics at all. Other episode topics include the historical inaccuracies of E.T. Bell's *Men of Mathematics*, the Witch of Agnesi, and an 1824 textbook entitled *A Short View of the First Principles of the Differential Calculus*.

Lit2Go: Audio Files for 12th Graders (http://www.-learnoutloud.com/Free-Audio-Video/Literature/Short-Stories/Lit2Go-Audio-Files-for-12th-Graders/23881)

This "podcast" is really just a collection of audio books. The collection includes *Lectures on Ten British Mathematicians of the Nineteenth Century* by Alexander MacFarlane, *A Short Account of the History of Mathematics* by W. W. Rouse Ball, *History of Modern Mathematics* by David Eugene Smith, and *Flatland* by Edwin A. Abbott.

The Missing Link: A Podcast on the History of Science, Medicine, and Technology (http://missinglink-podcast.wordpress.com/)

The history of mathematics is by no means the primary topic of this monthly podcast, but it is highlighted in several episodes. The topics include a presentation on the influence of statistical thinking on the development of modern science, European and African concepts of numbers and counting in the context of cattle farming in colonial South Africa, and the life of Mary Somerville.

Maths on the Move (http://plus.maths.org/podcasts/)

The free online magazine *Plus* sponsors this monthly podcast. Each episode is approximately 30 minutes in length. One episode talks in detail about how the Enigma machine works and how to compute the number of different possible settings for coding. Another program talks about Leonhard Euler, his 300th birthday, and some of his work, such as the zeta function and the formula $e^{i\pi} + 1 = 0$.

Women in Science: The Sounds of Progress, Part II (http://www.womeninscience.org/Sounds2ProfMod.-htm)

This collection of audio files contains 26 extremely brief biographies, each only two minutes long, narrated by actress Kate Mulgrew. The biographies cover all areas of science and engineering, including a few mathematicians such as Maria Agnesi and Emmy Noether.

Mike Molinsky

New Bulletin Format Available

In order to ensure that constitutional matters reach members on time while allowing for the dissemination of late-developing news, members at the 2008 AGM agreed to make the *Bulletin*paper-optional. (Moving to a more "virtual" *Bulletin* may also help us become a greener Society.) This November 2008 issue is the last that will be distributed as a hard copy to everyone, with the PDF file posted in the Archives section of the web site 6 months later. Instead, the **default** for 2009 and beyond will be the **electronic format**, although members will still be able to elect to receive the paper version as well. For instance, when the *Bulletin* is available on the web site in May 2009, you will receive an e-mail message containing the link. If you additionally want the hard copy postal mailed to you, please make sure

TO CHECK THE BOX INDICATING SO WHEN YOU FILL OUT THE MEMBERSHIP RENEWAL INSERTED IN THIS ISSUE.

Book Review: The Indian Clerk

The Indian Clerk by David Leavitt (London: Bloomsbury, 2007), 490 pp. ISBN: 978-0-7475-8168-0. US$24.95/16.00 (paperback).

Recently, few figures in the history of mathematics have excited the public imagination as much as Srinivasa Ramanujan. The last few years have seen books, plays and even films devoted to this fascinating man and his mathematics, or at least his obsession with mathematics. Robert Kanigel's 1991 biography, *The Man Who Knew Infinity* [1], has been followed by at least three plays—*Partition* by Ira Hauptman, Simon McBurney's *A Disappearing Number*, and *A First Class Man* by David Freeman—while no fewer than two film projects are apparently underway, one of them directed by the British actor Stephen Fry and India's Dev Benegal. Then, of course, there are the academic works, of which two of the most prominent are Bruce Berndt and Robert Rankin's *Ramanujan: Letters and Commentary* [2] and *Ramanujan: Essays and Surveys* [3], both of which are invaluable sources of information and scholarship.

Ramanujan was born in 1887 in a small village about 250 miles southwest of Madras. Although an able scholar in most areas, during his teenage years his growing interest in mathematics eventually led him to disregard all other subjects, resulting in a failure to acquire the necessary qualifications to enter university. As a result, his knowledge of higher mathematics was essentially either self-taught or derived from an out-of-date compendium of mathematical results published in the 1880s [4]. He was already suffering from poor health by his early twenties when, in 1909, he entered an arranged marriage with a distant relative, then aged only nine, further necessitating the need to find financial support. By the early 1910s, his mathematical abilities were beginning to become known in the Madras area, and indirectly led to his appointment to a clerkship in the accounts section of the Madras Port Trust in 1912. By this time, he was carrying out independent research on hypergeometric series, definite integrals and the Bernoulli numbers, but he realised that he needed a more suitable environment in which to continue his studies.

Having previously written unsuccessfully to three other prominent British mathematicians, on 16 January 1913 Ramanujan addressed an eleven-page letter to G. H. Hardy at Trinity College, Cambridge, containing a multitude of unproved theorems and formulae he claimed to have derived himself. Hardy's interests and publications were numerous, being largely in the fields of analysis and number theory. Perhaps his most significant single result was a proof in 1914 that the Riemann zeta function has infinitely many zeroes on $\mathrm{Re}(z) = 1/2$. But of all of Hardy's publications, it is his *Mathematician's Apology* of 1940 that gives the greatest insights into his personality, and is the work through which he is probably best known today. Described by C. P. Snow as "a book of haunting sadness" [5, p. 50], it remains a deeply moving and profound testament of a man who had devoted his whole life to mathematics, who never married, and, as his creative powers were dwindling, faced the end of his career and his life, alone.

Intrigued at the possibility that they might have "discovered a second Newton" [2, p. 44], in the words of Bertrand Russell, Hardy and his long-time collaborator, J. E. Littlewood, arranged for Ramanujan to come to Cambridge and to receive adequate funding to support both him in England and his family in India. Of course, within months of his arrival, the First World War broke out and the Cambridge colleges were quickly emptied as students and fellows left to help the war effort. Fortunately, Ramanujan and Hardy were able to meet regularly during this period, and their daily meetings in Hardy's rooms at Trinity resulted in one of the most celebrated mathematical collaborations of the last hundred years. Sadly, the cold British weather, the scarcity of vegetarian food during wartime, and Ramanujan's delicate constitution led to prolonged periods of illness between 1917 and his eventual return to India in 1919. He continued to work on his mathematics and to correspond with Hardy, but his health declined still further until he died on 26 April 1920, just over a year after he arrived back home.

Ramanujan's five-year stay in England and his relationship with Hardy comprise the key focus in all of

the projects mentioned above. It was only a matter of time before the events of Ramanujan's short but eventful life served to inspire a novel as well. David Leavitt's *The Indian Clerk* is a vividly imagined work of historical fiction in which ninety percent of the characters are (or rather, were) real people, and several of the events that occur apparently took place. The book opens with, and is loosely structured around, an invited lecture given by Hardy at the Harvard tercentenary celebrations in 1936 on the life and work of his protégé, the text of which was published in [6]. This is highly appropriate because, although this novel is nominally about Ramanujan, it is more about the effect that he had on those he met while in England, and Hardy in particular.

Apart from Hardy, Littlewood, and Ramanujan, Eric and Alice Neville, Bertrand Russell, Lytton Strachey, Rupert Brooke, D. H. Lawrence and Ludwig Wittgenstein all appear as characters in the book, and in many cases, in leading roles. Many of the principal figures, of course, were present in Cambridge when Ramanujan was there and, in some cases, interacted with him. The characterisations are, for the most part, believable, and Leavitt's attention to detail is excellent, with not even Russell's "acute halitosis" (p. 10) escaping his notice. Hardy is accurately portrayed as a shy, cricket-loving, anti-theistic, technophobic and heliotropic creature of habit, while Littlewood is a far more personable and gregarious example of a Cambridge bachelor. The working relationship between the two men is well-depicted, although at times it is hard to imagine certain lines leaving their mouths. I find it difficult to believe, for example, that Littlewood, shell-shocked at having just been told that his mistress is pregnant, would have exclaimed, "Oh, Hardy, what am I to do? ... I love her" (p. 304) in the presence of his reserved and emotionally distant colleague.

Other characterisations are even more fanciful, however. While the portrayal of Eric Neville is good and, as far as I have been able to judge, fairly accurate, the depiction of his wife Alice is far from satisfactory. There is no evidence to suggest that she had "a morbid erotic obsession" (p.159) with Ramanujan, and it would appear that her amorous feelings towards him were merely created by the author to try to develop an intriguing subplot. But, if that was the case, the attempt fails miserably, as the reader feels no sympathy for Alice whatsoever, and as time moves on her (unfulfilled) sexual longings and behaviour towards Ramanujan become both baffling and a pointless distraction from the main story.

Equally sexually charged, if not more so, is Leavitt's description of Hardy's private life. Indeed, if there is one thing for which David Leavitt has been both praised and criticised, it is for the sexual content of some of his work; certainly those who might not wish to be confronted with explicit details of Hardy's love life should probably read another book. But, whether or not one is interested in such details, it has to be said that one of the great achievements of this work is that it sheds a great deal of light on attitudes to homosexuality in early twentieth-century Britain. In particular, the scenes set during the meetings of the famous "Apostles" club in Cambridge, populated by geniuses at once both gifted and childish, are among the most vividly created. The importance of the Apostles—where "it was common knowledge that most of the members of 'that' society are 'that' way" (p. 16)—to Hardy's life in Cambridge cannot be overstated. Indeed, at one point, Leavitt draws a mathematical analogy, giving the "four quadrants" of Hardy's Cambridge life: mathematics, the Apostles, cricket and his (secret) homosexuality. Needless to say, those who might balk at such conjectural details of the inner workings of Hardy's mind, or who might think such things irrelevant to the story of his relationship with Ramanujan, must be reminded that *The Indian Clerk* is primarily a work of fiction, not of historical scholarship.

Of course, the question in which the majority of readers of this review will be interested is: how is the presentation of the mathematics? Well, on the whole the answer is: surprisingly good. In fact, one of the first things that struck me about this novel was how, despite the daunting nature of much of Ramanujan's mathematics, Leavitt appears not to have been too intimidated by the technical details (see p. 322, for example). Furthermore, he manages to express them in a way that, while conveying the essence to the non-specialist, also gives the mathematically literate reader a reasonable idea of what was going on. There are brief but clear explanatory passages on combinatorics, partition theory and, of course, the Riemann

Hypothesis. Plus, Leavitt is not shy of slipping in references to other mathematical subjects of interest to Ramanujan, such as definite integrals, Diophantine approximation and elliptic functions. In short, for a non-mathematician, Mr. Leavitt does a remarkably able job of conveying the fascination, excitement and beauty of mathematics to a lay audience.

This isn't to say that the book is error-free. Indeed, pages 21-24 are riddled with mistakes, both mathematical and historical. On page 21, Fermat's Last Theorem is stated incorrectly ("for the equation $x^n + y^n = z^n$, there could be no whole number solutions greater than 2"). On page 22 it is wrongly asserted that "on the continent it had long since been agreed that Leibniz had made the discovery [of calculus] first", and on pages 22-23, we are told that Cambridge students were still using Newton's fluxional notation at the beginning of the twentieth century, when in fact it had been replaced by the Leibnizian d/dx notation in the first third of the nineteenth. Furthermore, we find on page 24 that the Battle of Hastings took place in 1064, whereas I am sure that the date I learnt at school was 1066. And, although most formulae are presented correctly, the mathematical typesetting is occasionally erratic (for example on pp. 12, 215 and 272). That said, this is the only novel I have come across that is brave enough to present a full (and correct) mathematical proof (p.169)—the proof in question being Euclid's argument regarding the infinitude of primes—even if it is essentially lifted straight out of Hardy's *Apology*.

Leavitt makes widespread use of detached observations of everyday minutiae, enabling him to create vividly detailed characters, who, by the end of the book, one feels one really knows well. But one of the consequences of this style is that the pace is far from rapid. Indeed, *The Indian Clerk* is more a study of relationships and characters than an exciting narrative. Set against a background of contemporary events, including the struggle for Indian independence, female suffrage, home rule in Ireland, and World War I, the book gives a good feel for what it must have been like to live in those times. Well-written and thoroughly researched, it includes a very atmospheric evocation of life in Cambridge during the war. One passage which particularly made me smile also gives an indication of how frustrating it must have been to be a mathematician during the First World War. Ramanujan and Hardy are discussing a result by Littlewood: "This discovery is of vast importance to about twenty people. Unfortunately, half of those people are in Germany." (p. 177)

In the end, it is simultaneously exciting and mildly disconcerting to have the everyday activities of our relatively recent predecessors portrayed in a novel, with certain aspects of their lives fictionalised so graphically. Indeed, it is tantalizing to imagine what Ramanujan, Hardy, and Littlewood would have thought of such an idea, had something so utterly improbable as a novel based on the everyday lives of mathematicians ever occurred to them. One can only wonder whether any current CSHPM members will inspire a novel to be written about them a hundred years from now!

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Adrian Rice

New Members

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

Elizabeth Burns
Toronto, ON

Canada

Brenda Davison
West Vancouver, BC
Canada

Shigheru Masuda
Tokyo
Japan

From the Editor

As many of you have heard, while CSHPMers were making their way home from Vancouver, one of the "production" projects to which I alluded in the May 2008 issue was prematurely moving into the next stage of development. Peter Nelson Hastings was born on June 6, 2008, slightly more than 11 weeks before his due date. Twenty years ago, the odds would not have been in his favor. The amazing staff at Holy Cross Hospital in Silver Spring, MD, brought all of their up-to-date knowledge and technology to bear on his behalf, though, and our 6 weeks in the Neonatal Intensive Care Unit were as much of a breeze as an extended hospital stay can be. At 4 months chronological age (8 weeks corrected age, in preemie lingo), Peter has almost quadrupled his birth weight of 3 lb, 2 oz, and increased his birth length of 15 inches by 50%. Frankly, he is ridiculously healthy. You will also have

Figure 5: Peter & Bear

already read that my household was not the only one blessed with new life this year. Among the other most important items in this issue is our plea for an official Production Editor(s). Pat Allaire and Rob Bradley have printed, stuffed, and mailed several issues on an *ad hoc* basis now, and they are eager to allow others to support the Society through this vital duty.

The November issue typically contains our membership renewal form. As you decide which journals to subscribe to in 2009, please refer back to the descriptions of *Historia Mathematica* and *Philosophia Mathematica* which ran in the May 2008 issue. Please also note that, for the first time, you are being asked whether you prefer to receive this *Bulletin* in electronic or paper format.

Finally, I so appreciate the feedback you are providing on our newsletter. We depend on your suggestions for announcements and articles, while the correspondence of Fernando Gouvea and Tom Drucker has provided a model for prompt and collegial resolution of a need for clarification. My e-mail box is always open to comments. Your news (of publications, professional and personal milestones, meetings, and the like), photos, short research articles, teaching notes, feature pieces, and contributions to our ongoing columns need to arrive no later than 1 April 2009.

Amy Ackerberg-Hastings

About the Bulletin

The *Bulletin* is published each May and November, and is co-edited by Amy Ackerberg-Hastings (aackerbe@verizon.net) and Eisso Atzema (atzema@math.umaine.edu). Material without a byline or other attribution has been written by the editors. Les pages sont chaleureusement ouvertes aux textes soumis en français. Comment and suggestions are welcome, and can be directed to either of the editors; submissions should be sent to Amy Ackerberg-Hastings and Eisso Atzema at the above e-mail address, or by snail mail to Amy Ackerberg-Hastings, 5908 Halsey Road, Rockville, MD 20851.