See Whole and Relational Rods (mathies.ca)

See Technology Corner: Number Talks

See Book Review: Open Questions for the Three-Part Lesson: Number Sense and Numeration

See The Good Luck Paper Crane: Paper Folding and Mathematics Activities

See What’s the Problem? Nifty Number Nine

OAME Wins NCTM Affiliate Journal Publication Award 2016!

See In the Middle: Starbucks Math – Part Two
Submission of Articles

The Ontario Mathematics Gazette (OMG) is looking for news items, articles, and good ideas that are useful to mathematics teachers and mathematics teacher education. We are seeking submissions, preferably from mathematics teachers K–12 and other mathematics education professionals, that describe innovative and creative approaches to mathematics teaching.

Please keep in mind the following criteria when making submissions to the OMG:

• The ideas/activities must be of interest to the readership.
• The ideas/activities must be fresh and innovative.
• The mathematics content must be appropriate for the readership.
• The mathematics content must be accurate.
• The article must be well written and easily understood.
• The article and its ideas must be free of sexual, ethnic, racial, or other bias.
• The article must not have been previously published, nor should it be out for review by other publications.
• The article must be original.

Articles must be word-processed in MS Word, double-spaced with wide margins, not exceeding 10 numbered pages of text, and prepared according to the Publication Manual of the American Psychological Association, Sixth Edition. Figures and diagrams should be drawn by computer, if possible, or drawn in black ink in camera-ready form. Embedded images must also be submitted separately in .jpg or .tif format. Proof of the photographer’s permission is required, and for photos of students under the age of 18, the written permission of a parent or guardian is required.

You must submit one complete copy of your article, embedded with any tables, figures, and captioned photographs or graphics, to the Editor, Dan Jarvis, along with separate files for each of the text, graphics, and/or photographs. Please email all files to Dan Jarvis at dan.jarvis@oame.on.ca.

Your name should not appear anywhere in your article, including websites, so that your article can be sent out for blind review. Your name, full mailing address, and email address must be included on a separate sheet. Upon review, you will be notified as to whether your article has been accepted for publication (as is, or pending minor or major revisions) or rejected.

The Editor reserves the right to edit manuscripts prior to publication. Once an article is published, it becomes the property of OAME.

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Advertisements for publication in the Ontario Mathematics Gazette should be sent to Robert Sherk at the above address. Courier is recommended to avoid possible delays. Deadlines for advertisements are January 23 for the March issue, April 1 for the June issue, July 1 for the September issue, and October 1 for the December issue.

Full-page advertisements are to be on 8.5" by 11" paper with a minimum of 0.5" margins and single sided. Each advertisement should be print ready, and colour advertisements should have no bleeds.

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Editor’s Message

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Mathematics and mathematics education both possess rich, lengthy, and oft overlapping histories, in which those of us involved in mathematics teaching and math education research continue to play an ongoing part. Indeed, the Gazette originally began, and still remains, a publication that celebrates both areas.

Some of you will perhaps be familiar with the work of the late American mathematician, mathematics historian, and New York lawyer, James Roy Newman (1907–1966). During and after World War II, Newman held several positions in the United States government, including Chief Intelligence Officer at the U.S. Embassy in London, Special Assistant to the Undersecretary of War, and Counsel to the U.S. Senate Committee on Atomic Energy (during which time he helped draft the Atomic Energy Act of 1946).

In 1940 Newman co-authored (with Edward Kasner) Mathematics and the Imagination, in which they identified the mathematical concept of a very large but finite number called a “googol” (10^{100}, or a 1 followed by 100 zeroes), a term apparently coined by Kasner’s 9-year-old nephew Milton Sirotta when asked to think of a word that would adequately represent such a large number. When asked about an even larger number, the “googolplex” (10 raised to the power of a googol, or a 1 followed by a googol of zeroes), the young boy aptly described it as a “one, followed by writing zeroes until you get tired.” More recently, we’ve seen the addition of an even greater number to the contemporary lexicon, namely the “googolplexian” (10 raised to the power of a googolplex, or a 1 followed by a googolplex of zeroes).

The Google Company (note the spelling modification of “googol” that the founders chose for general ease of use) headquarters, which were moved to Mountain View,
In 2004, Googleplex was built in California, and which looks more like an amusement park than an office complex, is affectionately known by employees as the “Googleplex.”

In 1942, Newman wrote *The Tools of War*, which was an illustrated examination of warfare. In 1948, he published *The Control of Atomic Energy*. In 1955, he wrote *What Is Science?*, and in 1956, he published *The World of Mathematics* (attractive original boxed set shown here), a 4-volume series covering many branches of mathematics and representing a 15-year effort by Newman to collect what he felt were the most important essays in the field of mathematics. Newman referred to his expansive collection as “a small library of the literature of mathematics from A’hmose the Scribe to Albert Einstein.”

This classic series includes fascinating essays by Descartes (Cartesian coordinates), Whitehead (mathematical logic), Weyl (symmetry), Dedekind (irrational numbers), Heisenberg (uncertainty principle), Turing (computer intelligence), Boole (set theory), Eddington (group theory), Turnbull (great mathematicians), Huxley (young Archimedes), Jeans (mathematics of music), Clifford (exactness of mathematical laws), Poincaré (mathematical creation), Birkhoff (mathematics of aesthetics), Newman (Gödel’s proof), Russell (mathematical creativity), Von Neumann (*The Mathematician*), Leacock (*Common Sense and the Universe*), Morse/Kimball (*How to Hunt a Submarine*), Warner (*Geometry in the South Pacific*), Carroll (*What the Tortoise Said to Achilles and Other Riddles*), and Hardy (*A Mathematician’s Apology*). The set is often praised as being suitable for any level of mathematical skill, and, owing to its popularity, has been reprinted several times, and is now freely and fully available for reading online at the [Internet Archive](https://archive.org). Newman also wrote *Gödel’s Proof* (1958), with co-author Ernest Nagel, presenting the main results of Gödel’s incompleteness theorem. This book inspired Douglas Hofstadter to take up the study of mathematical logic, and to write his famous work *Gödel, Escher, Bach: Eternal Golden Braid* (1979). The prolific polymath, Newman, also penned *Science and Sensibility* (1961), *The Rule of Folly* (1962), and *The Harper Encyclopedia of Science* (1963).

Fast forward six decades, and three other math-related works that I’ve been enjoying recently are perhaps worth sharing. For the elementary teacher of mathematics, Jo Boaler’s newly released book, *Mathematical Mindsets: Unleashing Students’ Potential Through Creative Math, Inspiring Messages and Innovative Teaching* (2016), presents her philosophy of teaching, based on extensive research with children, and dealing with topics such as brain research, growth mindsets, rich mathematical tasks, equity, the power of mistakes and struggle, and assessment.

Secondary school teachers will no doubt be challenged by Bennett’s eye-opening text, *Math for Life: Crucial Ideas You Didn’t Learn in School* (2012), which includes chapters such as *Statistical Thinking*, *Managing Your Money*, *Understanding Taxes*, *Energy Math*, *The Mathematics of Growth*, and *Getting ‘Good at Math.’* His poignant Chapter 3 epigraph attributed to the “father of Futurism,” H.G. Wells, certainly caught my attention: “Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write.” Wide-ranging and thought provoking, this unique book helps educators to recognize the kinds of practical mathematical perspectives and critical-thinking skills needed in everyday life, and from which any informed citizen can benefit.

Tertiary-level educators (or any math enthusiast who is enamoured by the Newman volumes mentioned above) may find the edited collection by Anna Kepes Szemerédi, *Art in the Life of Mathematicians* (2015), to be of particular interest. In highlighting over 20 colourful stories of mathematicians who are also accomplished artists (e.g., musicians, photographers, painters, dancers, writers, filmmakers), Szemerédi explores the perceived roles that mathematics and the arts have played in the diverse lives of these multi-talented individuals.

The March 2016 issue (Volume 54 Number 3) of the *Gazette* includes three articles, ten regular columns, the
Betty Long and Deborah Crocker in their article, *The Good Luck Paper Crane: Paper Folding and Mathematics Activities*, provide directions for folding paper cranes, and ideas for mathematics activities using the paper cranes and children’s literature. Specifically, the authors highlight the touching story of Sadako Sasaki, the Japanese girl who was exposed to radiation from the atomic bomb dropped on Hiroshima during World War II, and who subsequently attempted to fold 1000 paper cranes in order to obtain her secret wish (Coerr, 2004).

In *Mathematics and Special Education: Two Teachers in One Classroom*, Jacob Speijer, Connie Gray, Sandra Peirce, and Gail Doherty present the results of a board-wide professional learning project, for which the primary goal was to leverage the complementary instructional strengths of the regular classroom teacher (RCT) and the special education resource teacher (SERT) within the classroom context. Anticipated benefits (reduced stigmatization, mathematics program integrity, increased opportunities for individual help, and greater differentiated instruction and assessment) and observed program results are discussed at length, as are recommendations for future implementation of similar programming, based on their co-teaching experiences.

Meth Devendra, building upon one of his previous and related *Gazette* articles (exponential functions and tangents, V54N1), provides algebraic, geometric, and practical examples of *Orthogonal Curves*, i.e., the situation where the tangent lines to two curves at the point of intersection are perpendicular.

Regular columns include the following highlights: OAME President, Tim Sibbald (President’s Message) discusses the numeracy–literacy connection, and draws attention to two new books by authors Roberts (regarding Conway’s mathematical contributions) and Angus (regarding Attawapiskat and social-justice issues, including education); Todd Romiens (OAME/NCTM Report) addresses the controversy surrounding the American Common Core State Standards for Mathematics (CCSSM), specifically highlighting the mathematical content standards and mathematical practices (process standards); Shawn Godin (What’s the Problem?) explores the “nifty number 9,” including finger multiplication; Assessment Abby (eponymous) focuses on assessment of the Mathematical Process expectations; and Markus Wolski, Agnes Grafton, Ross Isenegger, Greg Clarke, and Kathleen Corrigan (Provincial Digital Learning Resources) describe the “Whole and Relational Rods” tool, designed to help students explore number concepts, develop reasoning for various operations, and foster proportional reasoning skills.

Ann Kajander (MB4T) looks at teaching and learning strategies for introducing the first two of the four possible cases of dividing integers; Lynda Colgan (Hey, It’s Elementary) discusses rich tasks, big ideas, and a classroom activity in which students analyzed Northern Ontario bear family composition statistics as compared with those of humans; Mary Bourassa (Technology Corner) explores Number Talks, introducing two rich online resources created by Tranchmontagne (Number Talk Images) and Nguyen (Math Talk); and Carly Ziniuk (In the Middle) presents the second part of “Starbucks” Math, in which she focuses on data-analysis activities using technology. In the *Abacus* insert, co-editors Mary Lou Kestell and Kathy Kubota-Zarivnij continue their Volume 54 focus on relational thinking, here focusing on multiplication.

Volume 54 Issue 3 also includes several special features: (i) two letters to the editor, one from Louis Lim in which he pays personal tribute to the late Frances Schatz, and a second by Jack Weiner in which he thanks the co-author of the Schatz tribute; (ii) a review of the 2-volume book set entitled *Open Questions for the Three-Part Lesson: Number Sense and Numeralation* (2015) by author Marian Small; (iii) three Ontario mathematics education researcher profile highlights; and (iv) further excerpts from Lerman’s *Encyclopedia of Mathematics Education* (2014) regarding a variety of contemporary math education issues.

As Editor, I am very pleased to here announce to the OAME membership that the Ontario Mathematics Gazette has been awarded the National Council of Teachers of Mathematics (NCTM) Affiliate Member Publication Award 2016 for outstanding journal publication. Founded in 1920, NCTM is the world’s largest mathematics education organization, with 80 000 members and more than 230 Affiliates throughout the United States and Canada. This will be the sixth time that the annual Journal Publication Award has been given out, and the first time that a Canadian Affiliate member has won the award. NCTM describes the award criteria as follows:

The Affiliate Services Committee wishes to recognize the outstanding work of NCTM Affiliates in producing excellent journals (a peer-reviewed periodical in which scholarship relating to mathematics education is published) and newsletters... to keep their membership informed. These publications should keep their membership apprised of the latest happenings in mathematics education, provide great ideas for improving the teaching and learning of mathematics, and provide networking opportunities for members. Judging will be based on content, accessibility, and relevance.
Owing to its unique structure, the Gazette represents a truly team effort by a large group of committed mathematics educators and enthusiasts in Ontario. I would specifically like to thank our Abacus co-editors, Mary Lou Kestell and Kathy Kubota-Zarivnij; our two Associate Editors, Anne Yeager and Marilyn Hurrell; our copy editor, Gitta Berg; our graphic designer, Penny Clemens; our advertising manager, Robert Sherk; and our printers at Pole Printing. I would be remiss if I did not also recognize the dedicated service of all the past editors of the Gazette and Abacus; the many contributors of regular columns, articles, and special features; our dedicated team of reviewers; and you, the OAME member, whose ongoing financial support for, and interest in, our journal ultimately made this distinction possible. I am very pleased to be able to accept this award on behalf of the organization at the upcoming NCTM annual conference, “Building a Bridge to Student Success,” to be held in San Francisco, California in April 2016.

P.S. Although I am not among those who identify as die-hard “Trekker” fans, I would nonetheless like to correct a mistake that was made in the December issue where I most unforgivably referred to the Star Trek “tricoder,” rather than using the proper term, “tricorder” (i.e., an abbreviation of the device’s full name, the “TRI-function reCORDER,” referring to the device’s primary functions of sensing, computing, and recording). How very terrestrial of me.

References

MATHEMATICS EDUCATION RESEARCHER HIGHLIGHTS

Math Education Researcher: Dr. Luis Radford, Laurentian University

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Projects: Dr. Radford’s research interests cover both theoretical and practical aspects of mathematics thinking, teaching, and learning. An over-arching emphasis of his work is a sustained commitment to being involved with classroom teachers and students. As a sociocultural theorist, he draws upon Vygotsky’s historical–cultural school of thought and the epistemology of Ilyenkov, and his current work focuses on the elaboration of an approach in which the problem of teaching and learning is formulated around the concept of “alterity” by Lévinas and Bakhtin. In such an approach, he notes that “learning is conceptualized as a social, political, and transformative process through which the students critically encounter other (historical and contemporary) voices and perspectives. The formulation of learning as a cultural and historical process, where knowing and being are mutually constitutive, leads to a non-utilitarian and a non-instrumentalist conception of the classroom and education. Entrenched in unerasable ethical concerns, the classroom appears as a space for the growth of intersubjectivity and the nurturing of what I call the communal self.” He has served as Chair of École des sciences de l’éducation de l’Université Laurentienne, and is also the Chair of the International Study Group on the Relations Between the History and Pedagogy of Mathematics. In 2011, Dr. Radford was the recipient of the Hans Freudenthal Medal, awarded by the International Commission on Mathematical Instruction (ICMI), recognizing a major cumulative program of research.

Selected Publications: