CMS NOTES de la SMC

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FROM THE VICE-PRESIDENT'S DESK

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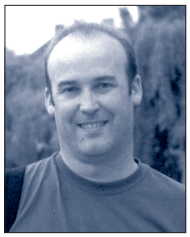

"Simple things are never problems. Unfortunate, maybe, but if it isn't complicated, it isn't really a problem."
-Steven Brust (Issola)

The global economy is on life support. Banks are insolvent, major corporations are requiring massive government bailouts, unemployment is rising and stock markets are dropping. And who is to blame for this crisis? Dishonest mortgage brokers? Greedy bankers? Disinterested government regulators? Well, according to some commentators and columnists (and former US Deputy Treasury Secretary Roger Altman on 60 Minutes) it is the fault of the mathematicians.

The nutshell argument is that the economic system became so complex, that few people could actually understand it, let alone manage it. And who built in this complexity? ... Mathematicians.

Our hunter-gatherer forebears didn't have to deal with such complexity. They had it much harder than we do, but they also had it simpler. When looking for the necessities of life: food, water, warmth and shelter; they took life as they found it. The only part of their world that they had to manage was getting along with their fellow homo sapiens.

A Complexity Theory

Ironically, Keith Devlin (in *The Math Gene*) posits that it was this ability to manage societal systems (which was a survival trait and so naturally selected) which accounts for our present day ability to handle the abstract relationships of mathematics, which allows us to build and/or manage more complex systems.

Eventually, humanity developed agrarian societies and added management of the local environment to the list of duties. Trading evolved into rudimentary economies that had to be managed. As humanity advanced, we had to manage progressively more complicated social structures, environments and economies; and we developed mathematics to help us manage. Curiosity drove some individuals to explore mathematics beyond what was needed at hand. Often, this new mathematics was co-opted to help manage other complex systems.

In modern society we manage many complex systems: social systems, economic systems, information systems, environmental systems, etc. Soon it seems we will be managing the atmospheric system, (with carbon sequestering, cloud seeding and ocean iron enrichment on the horizon); biological systems, (with genetic manipulation of plants and animals becoming commonplace); and molecular systems (with nanotechnology). Mathematics isn't creating the complexity, but it has proved to be remarkably useful in describing it.

Consider the case of Major League Baseball. There has always been a fringe group of "sabermetricians" who advocated a more mathematical/statistical approach to evaluation of talent. Recently, this has moved to the mainstream, and teams which adopted the "sabermetric" approach have thrived. Billy Beane, manager and co-owner of the Oakland A's, was an early adopter of the "sabermetric" principles and his team has consistently been one of the best in baseball despite having one of the lowest payrolls. Last Fall, Billy Beane, Newt Gingrich and John Kerry co-wrote an Op-Ed piece to the NY Times advocating for similar mathematical/statistical management philosophy for the US Health Care system.

My question is: Even with mathematics, is humanity capable of managing the

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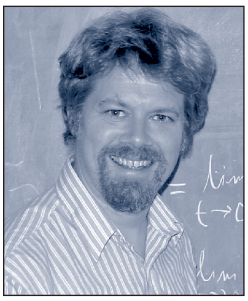
EDITORIAL / ÉDITORIAL

by/par Robert Dawson
Dalhousie University, Halifax



Unreasonable People

Bernard Shaw once wrote: "Reasonable people adapt themselves to the world. Unreasonable people attempt to adapt the world to themselves. All progress, therefore, depends on unreasonable people."*

This is certainly as true in mathematics as anywhere. Comparing other people's reminiscences with my own, it seems that it was once a rite of passage to be sent to the principal's office for telling the teacher that yes, you could so subtract a bigger number from a smaller one. No doubt we should all have phrased this revelation more politely.

But for sheer audacity, this is nothing compared to the step taken by various anonymous mathematicians in different cultures down the ages.

Without ever having seen a larger number subtracted from a smaller number, they decided for themselves that they were going to do so, even if they had to invent a new set of numbers to do it with.

Unreasonable? No doubt. So were their successors, who decided at various times that negative numbers ought to have square roots, that there might be many (or no) parallels to a given line through a given point, or that the law of the excluded middle ought to be repealed. Numbers to count infinite sets? Sure, would you like ordering with that?

All of these innovations, of course, managed to upset a certain number of people who thought that a reasonable person would adapt to the existing rules of mathematics. But, while perhaps the first big idea in mathematics was that a consistent set of rules could be used to derive arbitrarily complicated results, the second big idea is surely that the rules themselves can be changed if this makes them more interesting. To give the floor back to Shaw:

"Some see things as they are and ask why. Others dream things that never were and ask, why not?"

*While both this quotation and the one closing the editorial are generally attributed to Shaw, they appear in various forms.

Déraison

Bernard Shaw a écrit : « L'homme raisonnable s'adapte au monde; l'homme déraisonnable s'obstine à essayer d'adapter le monde à lui-même. Tout progrès dépend donc de l'homme déraisonnable. »*

Voilà qui est certainement aussi vrai en mathématiques que dans tout autre domaine. En discutant avec des collègues, j'ai constaté qu'à une certaine époque, c'était presque un rite de passage que de se faire envoyer au bureau du directeur pour avoir contredit son enseignant en affirmant que oui, il était possible de soustraire un nombre d'un nombre plus petit. Nous aurions sûrement tous dû formuler cette révélation plus poliment…

Pour ce qui est de l'audace, toutefois, cela n'est rien comparativement aux moyens qu'ont pris certains mathématiciens anonymes de cultures différentes au fil du temps. Sans n'avoir jamais vu un nombre soustrait d'un plus petit, ils ont décidé d'eux-mêmes de le faire malgré tout, même s'il fallait pour cela inventer tout un nouvel ensemble de nombres.

Déraisonnable, dites-vous? Absolument. Tout comme leurs successeurs, qui ont décidé à diverses époques que les nombres négatifs devaient avoir des racines carrées, qu'il était possible qu'une droite ait plusieurs parallèles (ou n'en ait aucun) passant par un point donné, ou qu'il fallait rejeter le principe du tiers exclu. Des nombres pour compter des ensembles infinis? Bien sûr. Avec ordonnancement peut-être?

Toutes ces innovations ont évidemment dérangé des gens selon qui toute personne raisonnable doit plutôt s'adapter aux règles mathématiques existantes. Toutefois, si l'on considère que la première idée révolutionnaire en mathématiques est qu'un ensemble cohérent de règles pourrait servir à dériver arbitrairement des résultats complexes, la seconde est sûrement qu'il est possible de changer les règles si c'est pour les rendre plus intéressantes. Je conclurai en revenant à Bernard Shaw :

« Vous voyez les choses; et vous demandez "pourquoi?" Mais je rêve de choses qui n'existent pas encore; et je demande "pourquoi pas?" »

*Cette citation et la dernière sont généralement attribuées à Shaw, mais elles se présentent sous diverses formes.

Strange Attractors: Poems of Love and Mathematics

by Sarah Glaz and JoAnne Growney, Editors, A.K. Peters Ltd. Wellesley, MA, USA 2008
250 pp. (cloth), ISBN 978-1-56881-341-7, $39.00(US)

and

The Shape of Content: Creative Writing in Mathematics and Science

by Chandler Davis, Marjorie Wikler Senechal, Jan Zwicky, Editors, A.K. Peters Ltd. Wellesley, MA, USA 2008
216 pp. (cloth), ISBN 978-1-56881-444-5 $39.00(US)

Reviewed by Keith Johnson, Dalhousie University, Dept. of Mathematics.

These two books from A.K.Peters explore the connection between mathematics and literature. That there is such a connection is not widely acknowledged although anyone who has taught a course with a title like "math for liberal arts students" or something similar knows that the popular textbooks available for such courses take a stab at describing one, with a few examples. The topic deserves a more careful treatment than that and these two books go a long way towards filling that role.

The first of the books is about poetry and mathematics, a collection of 150 poems involving both love in one of its many forms and mathematics. Within literature poetry might be the part nearest to mathematics. The imposed structure of rhyme scheme and meter is an error correcting code and is probably at the root of poetry's evolution in pre-literate societies (remembering a well written poem is easy, but just try and remember exactly a prose paragraph of the same length). Similarly, proving theorems and composing poems seem to be abilities with about the same degree of rarity. The poems in this collection encompass a wide range both in topics and in time. They are grouped into 3 sections – romantic love, encircling love (of family, nature, etc.) and unbounded love (of mathematics) – and span more than 20 centuries. The romantic poems provide many of the classical examples familiar from school ("how do I love thee, let me count the ways…") or college (Catalus, Donne, Dickenson). With some of these the connection with mathematics is tenuous, involving little more than counting, but there are also some excellent contemporary representatives using deeper mathematical ideas as metaphors (Miriam Hammel's *Entropy* is one example). The encircling love section is more diverse, including some extremely funny poems, such as Tony Hoagland's *Self Improvement* and some bitter sweet ones such as Robin Chapman's *Nonlinear Functions* making an analogy between the functions of the title and a child's perception of divorce. It also includes part of the last Canto of Dante's *Divine Comedy*, one of the most beautiful of poems, with its allusion to squaring the circle. The final section, poems directly about mathematics and mathematicians will be the one most of us will find most entertaining. There are poems about all sorts of mathematical ideas – infinite series, fractals, calculus ("give me an epsilon and I will treat it well"), computability ("when a P-man loves an NP-woman") and Alexander's horned sphere. No matter what your field, there is a poem here about some topic dear to your heart. There are also a couple of clever poems suitable for Valentine's day, one of which (by Michael Stueben) is:

> You are the fairest of your sex,
> Let me be your hero.
> I love you as one over x,
> As x approaches 0.

The second book, *The Shape of Content,* is both wider ranging in form, including poetry, short stories, humor, essays, metafiction, nonfiction, and drama, and more restricted in content in that the works represented are all products of a series of workshops put on jointly by the Banff Centre for the Arts and the Banff International Research Station for Mathematical Innovation and Discovery. The list of topics is also much wider. While some of the works are mathematical there is also much here about the sciences, including astronomy, chemistry, elementary science education and veterinary science. Two of the most successful pieces are short biographies, one of Newton, the other of the lesser known E. H. Neville, by Florin Diacu and Marjorie Wikler Senechal respectively. The basic facts of Newton's biography are familiar to almost everyone but here they are presented very clearly emphasizing the central role of celestial mechanics and allowing his discoveries to be seen as natural consequences of directed research. Eric Neville was professor at the University of Reading in the first half of the 20th century. He was second wrangler and Smith's prize winner at Cambridge and Senechal's biography is in part about how his career was diverted by his moral beliefs (he was a staunch pacifist) and by his involvement, both professional and romantic, with the controversial chemist Dorothy Wrinch. One of the short stories included in this collection, the *Tolman Trick* by Manil Suri, is set at Oberwolfach. It touches on the nature and fleetingness of mathematical reputation and is quite haunting. The *Humor Essay*, by Colin Adams, manages to turn the difference between the Euclidean and L^1 metrics in the plane into a very funny story involving as characters the members of the US Supreme Court.

As the preceding summaries may suggest, I think these are two splendid books but they do have minor flaws, although it feels

churlish to mention them. For the Glaz/Growney volume it is a matter of what isn't included rather than what is there. The selection of classical poets is fine and the contemporary ones more than fine but the early and mid 20th century selection seems uneven. On the one hand it strains a bit to include some famous poets (the Larkin poem included is not one of his best and Auden appears only as a translator) and skips some others. Of those, the most obvious (and the one usually mentioned in "math for liberal arts" texts) would be Wallace Stevens, some of whose titles are mathematical (*13 Ways of Looking at a Blackbird*) and whose poems have contributed the titles of books about mathematics (*The Nothing That Is*). In the Davis/Senechel/Zwicky volume the selection of 23 poems included also seems uneven. Since this is a relatively more difficult form and since these were drawn from a much more restricted pool, perhaps that is inevitable. These are minor quibbles. Of course both books would be excellent references for the appropriate undergraduate mathematics class but you should buy your own copies too. Each of them is a pleasure to read.

Letters to the Editors
Lettres aux Rédacteurs

The Editors of the NOTES welcome letters in English or French on any subject of mathematical interest but reserve the right to condense them. Those accepted for publication will appear in the language of submission. Readers may reach us at notes-letters@cms.math.ca or at the Executive Office.

Les rédacteurs des NOTES acceptent les lettres en français ou anglais portant sur un sujet d'intérêt mathématique, mais ils se réservent le droit de les comprimer. Les lettres acceptées paraîtront dans la langue soumise. Les lecteurs peuvent nous joindre au bureau administratif de la SMC ou à l'addresse suivante : notes-lettres@smc.math.ca.

BOOK REVIEW Taming the Infinite

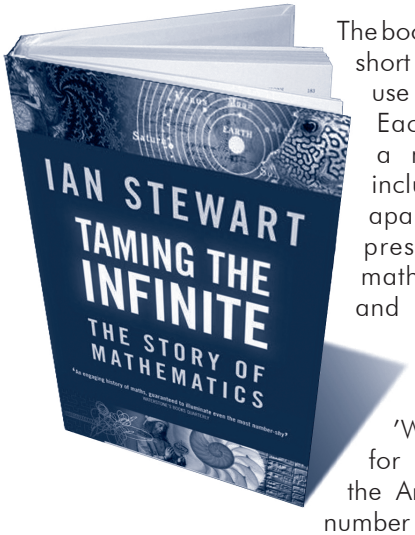
Taming the Infinite: The Story of Mathematics

by Ian Stewart, Quercus Publishing, 2008,
272 pp paper, $28.76 (US) ISBN 978-1-84724-181-8

Reviewed by Colva Roney-Dougal
St Andrews University.

Ian Stewart's latest volume looks at first sight like a coffee-table book. It's extremely glossy and packed with pictures, with the page layout and style of a good quality textbook. However, reading it reveals that it is in fact an expansive and exhilarating history of mathematics.

We start with the earliest beginnings of mathematics, from the Lebombo bone with its 37,000-year-old markings, through the Babylonians and Egyptians at breakneck pace, reaching Pythagoras by page 22! After this the book is ordered more by topic than by chronology, and early chapters include the development of the Hindu–Arabic number system and its eventual transmission to Europe, the slow beginnings of abstract algebra as it emerged from roots both verbal and geometric, and the history of trigonometry and logarithms from Aristarchus to Napier. The birth of calculus is covered in some detail, including various of its immediate precursors, with an intriguing discussion of the wide-ranging applicability of differential equations to the physical world. Approaching the present day, the book becomes even more impressive in its spread. Amongst many other subjects, we look at the invention of complex analysis, non-euclidean geometry, group theory and Lie algebras. There's a whirlwind overview of topology, finishing with Perelman's proof of the Poincaré conjecture. We look at the foundations of mathematics, starting with Dedekind's construction of the reals, via axioms for the natural numbers and on to Gödel's theorems, and finish with a chapter on chaos and complexity.



The book is structured in extremely short chapters, perhaps with use as a textbook in mind. Each chapter discusses a mathematical topic and includes various boxes set apart from the main text, presenting biographies, mathematical background, and practical applications. As a representative example, the chapter on number theory includes: 'What number theory did for them' (a discussion of the Antikythera device); 'What number theory does for us' (RSA encryption); a short piece on Mersenne primes and the current largest known prime; an introduction to the Goldbach and Twin Primes Conjectures; and short biographies of Gauss, Fermat and Germain – all in addition to the main sweep of history from Euclid to Wiles.

This book will appeal to mathematicians, lay readers and teachers of the history of mathematics. It gradually becomes more technical as it progresses, so that even the expert should find something that fascinates them. I might quibble with the lack of a timeline anywhere in the book – the justification for the study of mathematics by topic rather than chronology is fully accepted, but it would still be nice to be able to see the relative progression of different areas more clearly – but this is a minor fault in a work of such scope. Most importantly, and as you would expect from Ian Stewart, this book is a thoroughly good read!

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BRIEF BOOK REVIEWS

by S. Swaminathan
Dalhousie University, Halifax

Research papers, expository articles and problems and their solutions, which are published regularly in various mathematical journals and magazines are not ephemeral. They may be perused more when they are relatively new by researchers and teachers and some may find their way into books and other publications but as time goes by they just remain in the volumes in a library. From time to time a collection of papers in a particular subject or topic may be published. The three books under review belong to this last category.

Biscuits of Number Theory

Edited by Arthur T. Benjamin and Ezra Brown

xiii + 311 pp, Mathematical Association of America 2009

If you are probably wondering, 'What exactly are the biscuits of number theory?' the authors explain: "In this book we have an assortment of articles and notes on number theory, where each item is not too big, easily digested, and makes you feel all warm and fuzzy when you're through. We hope they will whet your appetite for more! Overall, we felt that the biscuit analogy hit the spot (in addition one of the editors bakes biscuits for his students)."

The articles in this collection are selected from different journals and are arranged according to subjects in seven parts as follows: Arithmetic, Primes, Irrationality and Continued Fractions, Sums of squares and Polygonal numbers, Fibonacci Numbers, Number-Theoretic Functions, 'Elliptic Curves, Cubes and Fermat's Last Theorem'.

The book could be used as a textbook supplement for a number theory course, especially one that requires students to write papers or do outside reading.

Problems from Murray Klamkin, The Canadian Collection

Edited by Andy Liu and Bruce Shawyer

xvi + 249 pp, Mathematical Association of America 2009

Murray Klamkin (1921-2004) was highly successful in everything he attempted. He will be remembered the most for his involvement in mathematical problem-solving and competitions. He authored or edited four problem books, and left his mark in the problem section of every major journal. He was famous for his Quickies: problems that have quick and neat solutions. After working in industry and academe in the U.S., he spent the last 30 years of his life in Canada.

The book under review presents all the problems that he had proposed for Crux Mathematicorum (now called Crux Mathematicorum with Mathematical Mayhem). They cover a very wide range. The first part contains problems arranged according to 15 different topics. Besides Quickies there is a section called 'The Klamkin Tribute Problems - 2005'. The second part consists of solutions to all the Quickies and all the problems. This book also could be used as a textbook supplement for a number theory course, especially one that requires students to write papers or do outside reading.

The Harmony of the World, 75 Years of Mathematics Magazine

Edited by Gerald L. Alexanderson, assisted by Peter Ross

xiii + 287 pp, Mathematical Association of America 2007

"The Harmony of the World" contains a collection of those articles in the Mathematics Magazine that are considered "best" by the editors over its 75 years of publication. The articles are arranged in five parts, the first of which covers the first fifteen years and the others cover the decades from 1940s to the 1980s. Each article is reprinted with an editor's preface highlighting its importance. For example, the story of the Stone-Weierstrass theorem (one of the great theorems in analysis, which first appeared in the revived 1947/48-issue of the Mathematics Magazine) is mentioned in the editorial note. A brief history of the journal itself follows the 'Introduction'.

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Technology Use in Post-Secondary Mathematics Instruction

Report of a CMS Winter 2008 Meeting Session

Daniel Jarvis, Nipissing University;
Chantel Buteau, Brock University;
Zsolt Lavicza, University of Cambridge, UK

Don't ask how I use technology in my discipline; ask what is my discipline now that I use it.
(William Higginson, CMESG 2008 Meeting, Sherbrooke)

As a university mathematics instructor, you would recently have received an invitation to take part in an on-line Canadian survey of the use of technologies in post-secondary mathematics instruction. We believe that research based on this topic is vital and that it could potentially provide significant insight into some of the difficult issues surrounding Science/Technology/Engineering/Mathematics (STEM) education. At the recent International Congress on Mathematical Education (ICME 11, Monterrey, 2008) conference, the results of a pre-conference Survey Team highlighted concerns about the international trend of disinterest in university mathematics programs (Holton, 2009; Holton et al., 2008). Departments of mathematics have a responsibility to question the current curriculum and related delivery strategies. We contend that part of this responsibiity includes the careful consideration of the role and relevance of technology within the 21st-century curriculum and classroom.

There has been a growing number of recent international discussions on this topic: among them, ICMI Study 17 (Vietnam, 2006) entitled *Digital Technologies in Mathematics Education – Rethinking the Terrain*, discussion and topic study groups at ICME-11 (Mexico, 2008), and also here in Canada at events such as the Canadian Computer Algebra and Dynamic Geometry in Mathematics Education (CCADGME) Conference (North Bay, 2007), A Canadian Mathematics Education Study Group (CMESG) working group (Sherbrooke, 2008), and a scientific session at the Canadian Mathematical Society (CMS) Winter Meeting (Ottawa, 2008). To continue promoting discussion within the Canadian mathematical community surrounding the integration of technology in university mathematics education, two workshops, among other events, will be hosted at the Fields Institute for Research in Mathematical Science (Toronto) and at the Centre de recherches mathématiques (CRM, Montréal) in April, 2010. Results of the Canadian online survey, in which you have been invited to take part by email, will be communicated at these events, along with continuing discussion of these issues. In what follows, we briefly report on the sessions that we organized for the CMS Winter 2008 Meeting in December.

CMS Winter 2008 Meeting Technology Session.

Perhaps one of the most recent discussions relating to the use of technology in university mathematics instruction took place at the CMS Winter Meeting held in Ottawa in December 2008. The session entitled, *Technology Use in Post-Secondary Mathematics Instruction*, involved both mathematicians and mathematics educators. There were nine papers contributed from both the university and CÉGEP (QC) levels, culminating in a one-hour four-person panel discussion focussing on the provocative and timely question: Can we still teach university mathematics without the use of technology in mathematics instruction?

We report on the papers that were presented at the session and some of the ideas/concepts that emerged from both the general and the panel discussions. On Sunday, December 7, Buteau (Brock, ON) began by discussing her involvement with the Mathematics Integrated with Computers and Applications (MICA) core undergraduate program, specifically dealing with the ideas of student mathematical creativity and intellectual independence through their design implementation and use of interactive computer environments. Jarvis (Nipissing, ON), Buteau (Brock, ON), Lavicza (Cambridge, UK) and Marshall (Brock, ON) presented preliminary results from their research study, focussing on a pilot study literature review of technology use in university teaching-related papers. Weiner and Balka (Guelph, ON) described how they had implemented Maple software in the classroom, some related research plans, and particularly how Weiner had successfully incorporated Maple TA Online testing into his large-enrolment teaching. Kondratieva and Radu (Memorial, NL) focussed on learning pre-calculus with an interactive, computer-based technology. Saint-Aubin (Montréal, QC) presented the group with a variety of engaging animations that he developed/collected and uses for demonstration purposes in his own mathematics teaching. Caron (Montréal, QC) and Pineau (École de Technologie Supérieure, QC) highlighted issues surrounding representation registers and communication when teaching mathematics with symbolic calculators. Finally, Etchecopar and Villeneuve (CÉGEP de Rimouski, QC) discussed a modelling-simulating method of problem-solving and its impacts on teaching and student learning. Monday, December 8, featured two further speakers prior to the panel discussion. Bilinski (Montmorency, QC) provided computer laboratory examples to underscore questions surrounding objectives, performance, and student learning with technology. Lavicza (Cambridge, UK) then shared his comparative (UK/US/HU) doctoral research results dealing with mathematicians' conceptions of technology use in university-level mathematics teaching.

Panel discussion summary.

Our one-hour panel was comprised of two mathematicians, Yvan Saint-Aubin (Montréal, QC) and Keith Taylor (Dalhousie, NS), and two mathematics educators, Zsolt Lavicza (Cambridge, UK) and France Caron (Montréal, QC). Beginning with the example of Socrates's argument against the writing of mathematics (versus oral tradition) in that he feared it would negatively affect thinking ability. Taylor proceeded to provide several other examples of how certain technologies were first opposed within the marketplace of contemporary mathematical ideas. He highlighted the sacred quest for "deeper things" which he feels has been a significant part of the development of mathematics over time. He described four interconnected

systems – environment, energy, economy, education – and how mathematics can and must play a vital role within these complex systems. From a philosophical perspective, one might say he focussed on ***the purpose of technological integration*** within the post-secondary curriculum – the power of mathematical computation and modelling in terms of a contemporary analysis of these complex systems. Taylor posed his own insightful question to the audience; How should Departments of Mathematics and Statistics continuously improve programs to move mathematical thinking back to the mainstream of science?

Lavicza and Caron both explored the ***parameters of technological integration***, probing further into what kinds of mathematical inquiry and related pedagogy might benefit from, or be hindered by, technological approaches to curriculum. For example, although Caron admits that a "yes" answer to the main panel question is somewhat rhetorical – we can teach university mathematics without technology – she maintains that perhaps a more pertinent question would be "*may* we teach . . . ". In other words, although technology is often used to simply expedite lengthy calculations or to check answers. Caron posits that not only do professors owe it to their students to incorporate the technological tools that will be part of, for many graduates, their working lives, but that the curriculum and assessment pieces must be altered in significant and meaningful ways to allow students to model, manipulate, and explore mathematical ideas heretofore inaccessible. She summarizes these thoughts with a powerful new question. "Instead of trying to teach {mathematics} with technology, could we consider teaching {mathematics with technology}? Lavica maintained that we cannot simply "add more to the existing curriculum", in light of technology, but must in effect change the boundaries of curriculum and assessment to reflect the landscape of possibilities.

It was with a pragmatic focus on ***preparation for technological integration*** that Saint-Aubin addressed the audience during the panel discussion. Understanding the learning curve necessary in establishing student comfort with software packages, he posed the following two-part question: "Should the learning of computer software be introduced within existing courses, for example, in calculus or linear algebra? Or should it stand alone as in many courses on specific programming languages, e.g., C++ or Java?" If the former, what kind of baseline professional learning is necessary for instructors to incorporate those tools into their own teaching? Does the use of these technologies within one's research agenda – as argued by Lavicza from his doctoral study – contribute highly to one's choice or ability to incorporate? If the software skills are to be presented within some form of project-based introductory course – something which the Brock MICA program has implemented – who would ultimately teach this within mathematics departments – an expert from outside or someone from within, perhaps collaboratively? These and other practial questions must be addressed within the technological conversation.

Animated discussion with the audience followed the panel presentations. Many different questions and points of view on the topic were expressed, some questioning the relevance of technology, when should it be introduced, to whom, to what purpose. The larger question, "What is doing mathematics?", was also debated, in terms of related questions such as, "Is writing proofs the only legitimate activity of 'doing mathematics' ?", and "Does 'doing mathematics' also include thinking, using and developing different visual representations with (or without) technology?"

Concluding thoughts.

The two days provided ample opportunity for interesting agreements and disagreements surrounding these and other related topics (such as formal proof, overdependency, lack of mental calculation ability, costs, availabaility, advantages). Clearly the implementation of technology within twenty-first century mathematics departments is not only a question of relevance, resources and recruitment, but the presence or absence of technology, however strictly or broadly defined, arguably addresses a much deeper and substantive question, "What is mathematics?" How we answer this question, both individually and as a team of post-secondary instructors, will no doubt influence the type and extent of technology to be implemented within mathematics classrooms in Canada. Whatever the path forward may entail for individuals and the larger group, it is with related research and with open fora such as those experienced during the Winter Meeting session that we can continue to discuss these important issues together. We would once again like to thank our participants, the four panelists, and the Canadian Mathematical Society for hosting this well-organized event.

References

Ben-El-Mechaiekh, H., Buteau, c. & Ralph, W. (2007): MICA: a novel direction in undergraduate teaching CMS Notes 39:6 (October), 9-11

Buteau, C., Etchecopar, P., & Gadanidis. G. (2009): New mathematical and information technology use in postsecondary education. Working group report in the Proceedings for the CMESG (Canadian Mathematics Education Study Group) Annual Meeting, Sherbrooke (Canada), May, 2008, 10 pp.

Buteau, C., Jarvis, D. & Lavicza, Z. (2008): Technology Use in Post-Secondary Mathematics Instruction Scientific Session. CMS Winter Meeting, Ottawa, ON
http://www.smc.math.ca/Events/winter08/abs/tec.html#pa

Holton, D. (2009): Recruitment, Entrance and Retention of Students to University Mathematics Studies in Different Countries. International Journal of Mathematical Education in Science and Technology 40 (1)

Holton, D., Zizhao, R., Muller, E. & Oikkonen, J. (2008): Recruitment, entrance and retention of students in university mathematics studies in different countries. Survey Team 1, ICME-11 conference, Mexico.
http://st.icme11.org/tsg/show/2

Hoyles, C. & J.-B. Lagrange (2009): Mathematics Education and Technology – Rethinking the Terrain. The 17th ICMI Studies Series: New ICMI Study Series, Vol. 13

complexity that we are building into modern society?

Our track record isn't that great, and with expanding population and diminishing resources, we don't have the leeway to make many more mistakes. If mathematics worked in baseball, why didn't it work in economics? Maybe the mathematics was more complex, but blaming the mathematicians for that is like blaming Kepler because planets move in elliptical orbits.

I would suggest that the problem was a disconnect between those who have the best understanding of the system, and those who actually made the management decisions.

We have seen this for the past twenty years on the climate change issue. While the consensus among the experts (those who actually studied and modeled climate change) was that serious carbon reduction strategies must be implemented, governments took little or no action. I know that many would say that George Bush was an obstructionist in this area due to his ties to Big Oil, but if Bush didn't believe that climate change was overblown, he would have had to be a monster to allow his do-nothing policy to continue at the expense of future generations. His disconnect from the experts led to poor decision making.

With the recent economic crisis the situation is similar. The experts designed financial instruments which were complex, but necessary. These derivative securities allowed companies to manage risk, hedge currencies, etc. These derivatives or options aren't even new. What is new is the mathematical models for determining their value. According to Steven Shreve (an expert in Financial Mathematics currently at Carnegie Mellon), many mathematicians working in the financial sector warned that the complexity of the mortgage-backed derivatives exceeded the limitations of their models, but the managers brushed these warnings aside in the rush for higher profits. Again a disconnect between the experts and the decision makers.

What can we do in the future to ensure our complex systems don't go critical?

First of all, we should insist that managers have specialized knowledge of the system they are managing. Perhaps more business schools should offer specialized MBAs and accept more persons from specialized (non-business) backgrounds into these programs.

But in a democracy, we are all responsible for managing. We are the Board of Directors which puts an executive (the government) in place to manage society's affairs. We need citizens who have enough mathematical/statistical sophistication to be able to make informed decisions on policy directions.

After decades of experiments, discussions and curriculum reforms in an effort to improve the mathematical proficiency of the populace, we seem to have reached a plateau, and not a high plateau. The systems we manage have gotten so complex that the majority of people cannot even understand the most basic mathematics underpinning them. I think sometimes we mathematicians forget how mathematically inept the average person is. We see our first-year Calculus class and despair at the lack of mathematical understanding of many students. But those students in a first-year Calculus class have been skimmed off the top. They are the cream of the high school mathematical crop. What about the 80% or so we never see?

Surveys show that roughly 25% of North Americans are functionally innumerate (that is unable to do anything beyond the most trivial mathematics), 40% believe in Astrology and 20% believe the Sun revolves around the Earth. Can we afford to have so many people sharing the mathematical competencies and superstitious beliefs of our hunter-gatherer ancestors, when we have to live in a complex modern world?

Let me finish with a story of the managerial/mathematical issue in microcosm:

A couple of years ago, my wife and two sons and I went on a family outing to a new Maple Syrup operation on PEI. They collected the sap, distilled and bottled the syrup and had a pancake restaurant on the premises. Part of the tour was a hay ride through the sugar bush, and every so often we would stop and the guide (who on this day happened to be the owner/manager) would tell us about some part of the process. At the end of our first stop, an American tourist asked: "Is it true that it takes forty gallons of sap to make one gallon of syrup?" The owner replied that he didn't know.
We all thought this was strange, but the American tourist was persistent. At the next stop he rephrased the question: "Is it true that the ratio of sap to syrup is forty to one?", he asked.
Again the owner replied: "I don't know."
The third stop was in the Sugar Shack, where the sap is boiled to reduce it to syrup.
The American tourist tried one last time, "How can you not know the proportion of sap to syrup? Don't you run the place!"
Our guide thought for a moment then said, "Well ... I do know that it takes forty litres of sap to make one litre of syrup."

The company went out of business soon after.

Gordon MacDonald
Université de l'Île-du-Prince-Édouard, à Charlottetown

Théorie de la complexité

« Les choses simples ne posent jamais problème. C'est peut-être malheureux, mais si ce n'est pas compliqué, ce n'est pas vraiment un problème. » [Traduction libre]
-Steven Brust *(Issola)*

L'économie mondiale est sur respirateur artificiel. Les banques sont insolvables, les grandes entreprises ont besoin de l'appui financier massif des gouvernements pour éviter la faillite, le chômage est en hausse et les marchés boursiers sont en chute libre. Mais à qui la faute? À des courtiers immobiliers malhonnêtes? À des banquiers avares? À des décideurs gouvernementaux désintéressés? Eh bien, selon certains critiques et chroniqueurs (et l'ex-secrétaire au Trésor américain Roger Altman à l'émission *60 Minutes*), ce serait la faute des mathématiciens.

Pour faire court, on dit que le système économique est devenu trop complexe, et que trop peu de gens sont en mesure de le comprendre vraiment, et encore moins de le gérer. Et qui à engendré cette complexité? Les mathématiciens bien sûr.

Nos ancêtres dont la survie dépendait de la chasse ou de la cueillette n'avaient pas à se préoccuper de choses si complexes. Leur vie était beaucoup plus difficile que la nôtre, mais aussi beaucoup plus simple. En quête des éléments essentiels à leur survie (nourriture, eau, chaleur, abri), ils faisaient avec ce qui se présentait à eux. Les relations avec les autres *homo sapiens* étaient le seul élément qu'ils devaient gérer.

Ironiquement, Keith Devlin (dans son ouvrage *The Math Gene*) affirme que c'est cette capacité de gérer les systèmes sociétaux (trait de survie résultant de la sélection naturelle) qui nous permet aujourd'hui d'établir des rapports mathématiques abstraits, et ainsi de construire ou de gérer des systèmes complexes.

L'humanité en est venue à s'organiser en sociétés agraires, ajoutant la gestion du milieu à la liste des tâches humaines. Le commerce a évolué en économies rudimentaires qu'il a fallu gérer. Au fil des progrès, il a donc fallu gérer des structures, des économies et des environnements sociaux plus complexes. Les mathématiques ont donc évolué de façon à nous faciliter cette gestion. La curiosité a mené certains individus à étudier les mathématiques au-delà de ce qui était nécessaire a priori. Bien souvent, ces découvertes mathématiques ont facilité la gestion d'autres systèmes complexes.

La société moderne comporte de nombreux systèmes complexes : des systèmes sociaux, des systèmes économiques, des systèmes d'information, des systèmes environnementaux, etc. Le jour ne semble pas loin où nous arriverons même à gérer le système atmosphérique (la séquestration du carbone, l'ensemencement de nuages et l'enrichissement en fer des océans n'étant pas si lointains), les systèmes biologiques (la manipulation génétique des plantes et des animaux devenant courante) et les systèmes moléculaires (nanotechnologie). Les mathématiques ne complexifient pas les choses, mais elles sont utiles pour décrire les choses complexes.

Prenons l'exemple de la ligue majeure de baseball. Un groupe marginal de « sabermétriciens » s'intéresse depuis un certain temps à une approche plus mathématique ou statistique de l'évaluation du talent. Dernièrement, cette approche a gagné en popularité, et les équipes qui l'ont l'adoptée ont connu du succès. Billy Beane, gérant et copropriétaire des A's d'Oakland, a été l'un des premiers adeptes de la sabermétrie. Son équipe a toujours été l'une des meilleures du baseball majeur malgré une moyenne salariale parmi les plus basses. L'automne dernier, Billy Beane, Newt Gingrich et John Kerry ont cosigné un article du *NY Times* pour l'adoption d'une approche mathématico-statistique semblable pour gérer le système de santé américain.

Ma question est la suivante : même avec l'aide des mathématiques, l'humanité est-elle capable de gérer la complexité qui caractérise la société moderne?

À ce jour, notre feuille de route n'est pas très reluisante. Notre population continue de croitre, nos ressources, de diminuer, et nous ne pouvons pas nous permettre de commettre beaucoup d'autres erreurs. Si les mathématiques fonctionnent pour le baseball, pourquoi pas pour l'économie? Certes, les problèmes mathématiques sont sans doute plus complexes, mais blâmer les mathématiciens pour cela serait comme de blâmer Kepler parce que l'orbite des planètes n'est pas elliptique.

À mon avis, le problème tient à l'écart entre ceux qui comprennent le mieux le système et ceux qui prennent les décisions de gestion.

Nous assistons à un phénomène semblable depuis vingt ans sur la question des changements climatiques. Si les spécialistes (ceux qui ont véritablement étudié et créé les modèles de changement climatique) s'entendaient pour dire qu'il fallait adopter des mesures draconiennes de réduction des gaz à effets de serre, les gouvernements, eux, ont à peine bougé. Nombreux sont les gens pour qui George Bush était obstructionniste dans ce domaine en raison de ses liens avec les sociétés pétrolières. Toutefois, si Bush avait que cru que la question des changements climatiques était si critique, il aurait été un monstre de poursuivre sa politique d'immobilisme aux dépens des générations futures. Son éloignement des spécialistes l'a amené à prendre de très mauvaises décisions.

La crise économique actuelle est une situation semblable. Les experts ont conçu des instruments financiers complexes, mais nécessaires. Ces titres dérivés ont permis aux entreprises de gérer les risques, de protéger les devises, etc. Ces titres ou ces options n'ont rien de nouveau. La nouveauté, ce sont les modèles mathématiques qui servent à établir leur valeur. Selon Steven

Shreve (spécialiste des mathématiques financières à l'Université Carnegie Mellon), de nombreux mathématiciens qui travaillent dans le secteur financier ont déjà servi des mises en garde comme quoi la complexité des titres adossés à des créances hypothécaires avait dépassé les limites de leurs modèles. Les gestionnaires ont toutefois balayé ces avertissements du revers de la main, trop pressés d'engranger les profits. Là encore, le fossé s'est creusé entre experts et décideurs.

Que pouvons-nous faire alors pour protéger nos systèmes complexes?

D'abord, il faudrait insister pour que les gestionnaires soient des spécialistes des systèmes qu'ils gèrent. Peut-être que les écoles de gestion devraient offrir plus de maîtrises en administration des affaires (MBA) spécialisées et accepter dans ces programmes plus d'étudiants venant de domaines spécialisés (dans des domaines autres que l'administration).

Dans une démocratie, toutefois, la gestion revient à tout le monde. Nous sommes le conseil d'administration qui élit un comité exécutif (le gouvernement) pour gérer les affaires de la société. Nous avons besoin de citoyens qui possèdent des connaissances mathématiques et statistiques suffisantes pour prendre des décisions éclairées quant à nos orientations politiques.

Après des décennies d'expériences, de discussions et de réformes des programmes visant à rehausser la culture mathématique de la population, nous semblons avoir atteint un plateau, mais pas un plateau très élevé. Les systèmes que nous gérons sont devenus si complexes que la majorité des gens ne peuvent même pas comprendre les mathématiques les plus de base qui les soutiennent. Nous, les mathématiciens, avons tendance, je crois, à sous-estimer l'ignorance mathématique du citoyen moyen. Nous sommes exaspérés par les lacunes mathématiques d'un bon nombre de nos étudiants des cours de calcul de première année. Mais ces étudiants de première année sont la crème de nos élèves du secondaire en mathématiques. Qu'en est-il alors des 80 % d'étudiants que nous ne voyons jamais?

Selon certains sondages, environ 25 % des Nord-Américains ont une incapacité fonctionnelle de calculer (leur capacité se limite aux opérations mathématiques les plus simples), 40 % croient en l'astrologie et 20 % croient que le Soleil tourne autour de la Terre. Dans une société moderne et complexe comme la nôtre, pouvons-nous nous permettre qu'une proportion si élevée de la population partage les connaissances mathématiques et les superstitions de nos ancêtres chasseurs-cueilleurs?

Je terminerai sur une petite histoire mettant en relief le rapport entre la gestion et les mathématiques, dans un contexte microcosmique :

Il y a quelques années, mon épouse, mes deux fils et moi avons visité l'entreprise d'un nouvel acériculteur à l'Île-du-Prince-Édouard. Bien sûr, l'entreprise recueillait l'eau d'érable, la faisait bouillir et embouteillait le sirop, et exploitait aussi une petite crêperie. Une partie de journée consistait en une visite de l'érablière en voiture à chevaux, ponctuée çà et là de commentaires de notre guide (qui était aussi le propriétaire-exploitant) nous expliquant le processus. À la fin du premier arrêt, un touriste américain a demandé : « Est-il vrai qu'il faut 40 gallons d'eau d'érable pour produire un gallon de sirop? » Le propriétaire a répondu qu'il ne le savait pas.
Nous avons tous trouvé cela étrange, mais le touriste américain n'a pas lâché prise. À l'arrêt suivant, il a reformulé sa question : « Est-il vrai que le ratio eau-sirop est de 40 pour 1? »
Ce à quoi le propriétaire a encore répondu qu'il ne le savait pas.
Le troisième arrêt était à la cabane à sucre, à l'endroit où l'on fait bouillir l'eau pour la transformer en sirop.
Le touriste américain est revenu à la charge une dernière fois : « Comment pouvez-vous ne pas connaître la proportion d'eau d'érable par qu'il faut faire du sirop? N'êtes-vous pas propriétaire de l'entreprise? »
Après un moment de réflexion, notre guide a répondu : « Eh bien… je sais qu'il faut 40 litres d'eau d'érable pour faire un litre de sirop. »

L'entreprise a fait faillite peu de temps après.

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The CMS Research Committee is inviting nominations for three prize lectureships. These prize lectureships are intended to recognize members of the Canadian mathematical community.

Le Comité de recherche de la SMC lance un appel de mises en candidatures pour trois de ses prix de conférence. Ces prix ont tous pour objectif de souligner l'excellence de membres de la communauté mathématique canadienne.

Prix Coxeter-James Prize Lectureship — 2010

The Coxeter-James Prize Lectureship recognizes young mathematicians who have made outstanding contributions to mathematical research. The selected candidate will deliver the prize lecture at the Winter Meeting.

The recipient shall be a member of the Canadian mathematical community. Nominations may be made up to ten years from the candidate's Ph.D: researchers having their PhD degrees conferred in 1999 or later will be eligible for nomination in 2009 for the 2010 Coxeter-James prize. A nomination can be updated and will remain active for a second year unless the original nomination is made in the tenth year from the candidate's Ph.D.

Le prix Coxeter-James rend hommage aux jeunes mathématiciens qui se sont distingués par l'excellence de leur contribution à la recherche mathématique. La personne choisie prononcera sa conférence à la Réunion d'hiver.

Cette personne doit être membre de la communauté mathématique canadienne. Les candidats sont admissibles jusqu'à dix ans après l'obtention de leur doctorat : ceux qui ont obtenu leur doctorat en 1999 ou après seront admissibles en 2009 pour le prix Coxeter-James 2010. Toute mise en candidature est modifiable et demeurera active l'année suivante, à moins que la mise en candidature originale ait été faite la 10e année suivant l'obtention du doctorat.

Prix Jeffery-Williams Prize Lectureship — 2011

The Jeffery-Williams Prize Lectureship recognizes mathematicians who have made outstanding contributions to mathematical research. The prize lecture will be delivered at the Summer Meeting. The recipient shall be a member of the Canadian mathematical community. A nomination can be updated and will remain active for three years.

Le prix Jeffery-Williams rend hommage aux mathématiciens ayant fait une contribution exceptionnelle à la recherche mathématique. La personne choisie prononcera sa conférence à la Réunion d'été. Cette personne doit être membre de la communauté mathématique canadienne. Toute mise en candidature est modifiable et demeurera active pendant trois ans.

Prix Krieger-Nelson Prize Lectureship — 2011

The Krieger-Nelson Prize Lectureship recognizes outstanding research by a female mathematician. The prize lecture will be delivered at the Summer Meeting. The recipient shall be a member of the Canadian mathematical community. A nomination can be updated and will remain active for two years.

Le prix Krieger-Nelson rend hommage aux mathématiciennes qui se sont distinguées par l'excellence de leur contribution à la recherche mathématique. La lauréate prononcera sa conférence à la Réunion d'été. La lauréate doit être membre de la communauté mathématique canadienne. Toute mise en candidature est modifiable et demeurera active pendant deux ans.

The deadline for nominations is **June 30, 2009**. Nominations and reference letters should be submitted electronically, preferably in PDF format, by the appropriate deadline, to **research-prizes@cms.math.ca**.

Nominators should ask at least three referees to submit letters directly to the Chair of the CMS Research Committee by September 30, 2009. Some arms length referees are strongly encouraged. Nomination letters should list the chosen referees, and should include a recent curriculum vitae for the nominee, if available.

La date limite de mises en candidature est le **30 juin 2009**. Veuillez faire parvenir les mises en candidature et lettres de référence par voie électronique, de préférence en format PDF, avant la date limite à : **prix-recherche@smc.math.ca**.

Les proposants doivent faire parvenir trois lettres de référence au président du Comité de recherche de la SMC au plus tard le 30 septembre 2009. Nous vous incitons fortement à fournir des références indépendantes. Le dossier de candidature doit comprendre le nom des personnes données à titre de référence ainsi qu'un curriculum vitae récent du candidat ou de la candidate, dans la mesure du possible.

Prof. Edward Bierstone
Chair, Research Committee / Président, comité de recherches
CMS Prize Lectureships / Prix de conférence de la SMC
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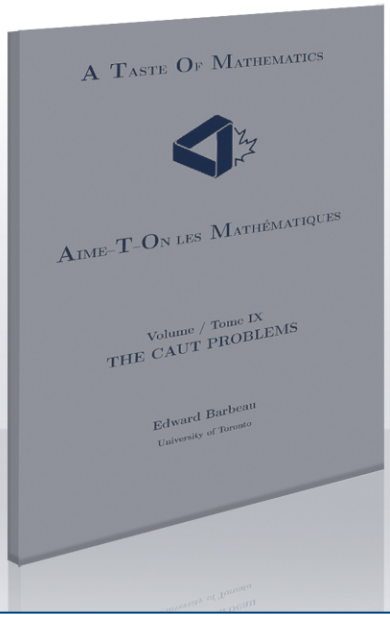
CMS/CSHPM SUMMER MEETING 2009
RÉUNION D'ÉTÉ 2009 SMC/SCHPM

THURSDAY/JEUDI June 4 juin	SATURDAY/SAMEDI June 6 juin	SUNDAY/DIMANCHE June 7 juin	MONDAY/LUNDI June 8 juin
18:00-22:00 Executive Committee Meeting Réunion du Comité exécutif	8:00 – 16:30 **Registration/Inscription** 9:30 – 16:30 **Exhibits/Expositions**	8:00 – 16:30 **Registration/Inscription** 9:30 – 16:30 **Exhibits/Expositions**	8:00 – 16:00 **Registration/Inscription**
	8:30 – 9:00 **Opening/Ouverture**	8:00 – 10:00 **Scientific Sessions**	8:00 – 9:30 **Scientific Sessions**
	9:00 – 9:45 **Susan Montgomery** **Plenary Lecture**		9:30 - 10:15 **Gaoyong Zhang** **Plenary Lecture**
	Break / Pause		
	10:30 – 12:00 **Scientific Sessions**	10:30 – 11:15 **Jeremy Gray** **CSHPM Plenary Lecture**	10:30 – 11:15 **Michael Mackey** **Plenary Lecture**
	12:00 – 12:30 **Teaching Award Lecture** **David Poole**	11:30 – 12:15 **Stephen Kudla** **Jeffery-Williams Lecture**	11:30 – 12:15 **Yael Karshon** **Krieger-Nelson Lecture**
FRIDAY/VENDREDI June 5 juin	**CMS AGM** **CSHPM AGM**	12:30 – 14:00 Lunch Break	
11:00 AM – 13:00 Development Group Luncheon Lunch du groupe de développement (Junior Common Room, MUN) 13:30 – 18:30 Board of Directors Meeting Réunion du conseil d'administration (Junior Common Room, MUN)	14:00-15:00 **Scientific Sessions**	14:00-15:00 **Scientific Sessions**	14:00-16:30 **Scientific Sessions**
	15:00 – 15:45 **Michael Sigal** **Plenary Lecture**	15:00 – 15:45 **Elizabeth Billington** **Plenary Lecture**	
	Break/Pause		
	16:15 – 17:45 **Scientific Sessions**	16:15 – 17:15 **Scientific Sessions**	
18:30 -20:00 **Welcome Reception** **Réception d'accueil**	18:00 –19:00 **Helaman Ferguson** **Public Lecture**	18:30 Buses depart for banquet 19:00 - 19:30 **Reception (cash bar)** **Réception (bar payant)**	
	19:00 – 20:00 **Reception**	19:30 – 22:30 **Banquet** **(Woodstock Colonial Restaurant, Paradise, NL)**	

(as of April 6, 2009)



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DEDUCING THE BLUES

by Jason I. Brown
Dalhousie University, Halifax

Abstract

The blues progression is undoubtedly the most famous chord progression in modern music. But why is this harmonic sequence so perfect? This paper suggests an answer to the universal and eternal thrill of the blues via roller coasters and a special vertex colouring of the seven cycle.

There is no chord progression quite like the 12 bar blues. It forms the basis of what is classic rock n roll. Chuck Berry's *Johnny B. Goode*, Elvis Presley's *Hound Dog*, Little Richard's *Lucille and Long Tall Sally*, The Beatles' *The Word*, Led Zeppelin's *Rock n Roll*, Loggins and Messina's *Your Mama Don't Dance*, and classics like *Rock Around the Clock*, *Dizzie Miss Lizzie*, *Bad Boy* and *Kansas City* are all, at heart, blues. And songs like *Day Tripper* jump out in the way they break out of the blues that they set up so carefully.

Here is the blues chord progression that I have most often come across, and the one I find as the most compelling: the *tonic* chord (that is, chord I in the key) lasts for four bars (each consisting of four beats), followed by chord IV (the *subdominant*, on the fourth of the key) for two bars, followed by chord I for two bars, and then chords V (the *dominant*, on the fifth of the key), IV, I and V, each for one bar:

I / / / | / / / / | / / / / | / / / / |
IV / / / | / / / / | **I** / / / | / / / / |
V / / / | **IV** / / / | **I** / / / | **V** / / / |

The blues progression has a variety of minor modifications, with sevenths (or ninths) often added to chords to increase tension, and occasionally, the chord in bar 12 staying on the tonic I (though I find such blues lacks the drive to repeat that those ending on the dominant V do). Here is what a basic blues in E (a common key for guitarists) might look like in music notation:

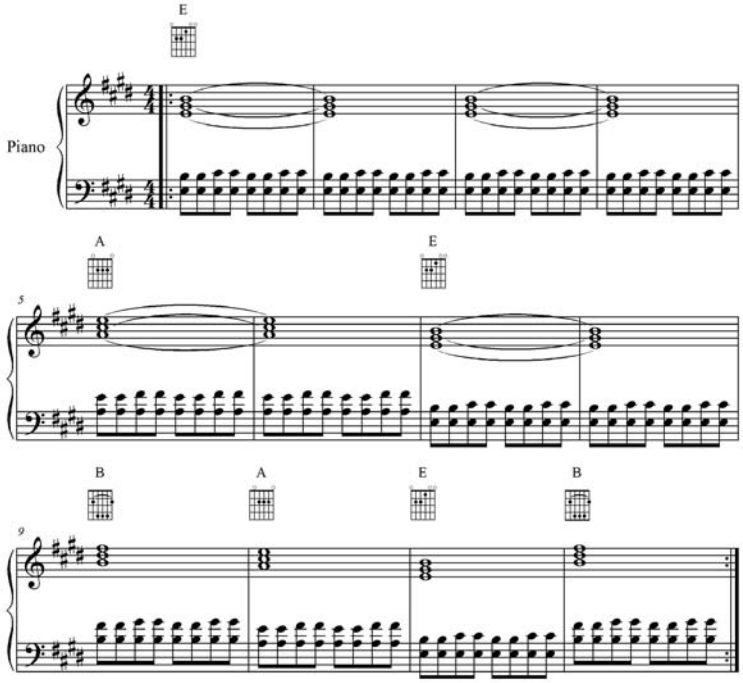

Figure 1: A Basic Blues in E

Like its masters, the blues just gets better with age. To paraphrase B.B. King, the thrill is never gone. I have yet to see any reasoning why the blues are the way they are: Why are they 12 bars long? Why do they have the chords they have? Why do the chords last as long as they do? And why can the chord progression be cycled seemingly endlessly without losing listener interest? The feeling that the blues chord progression generates is so powerful, so eternal, so right, that I sensed that there must be some underlying mathematics. And here is what I think is the mathematics behind the beauty of the blues.

Remember how exciting it was to go on a roller coaster? Up and down, peak to valley to peak again. The tracks were laid out to maximize the tension and release. Now, how can I create a chord progression, that is, a sequence of chords, that matches the thrill of a ride on a roller coaster?

In constructing a roller coaster, I would want to have three equal sections for the ride - the beginning, middle and end. I also want the excitement to build from one section to the next. The easiest way to accelerate is to double the sense of movement from one section to the next. So if the chord progression

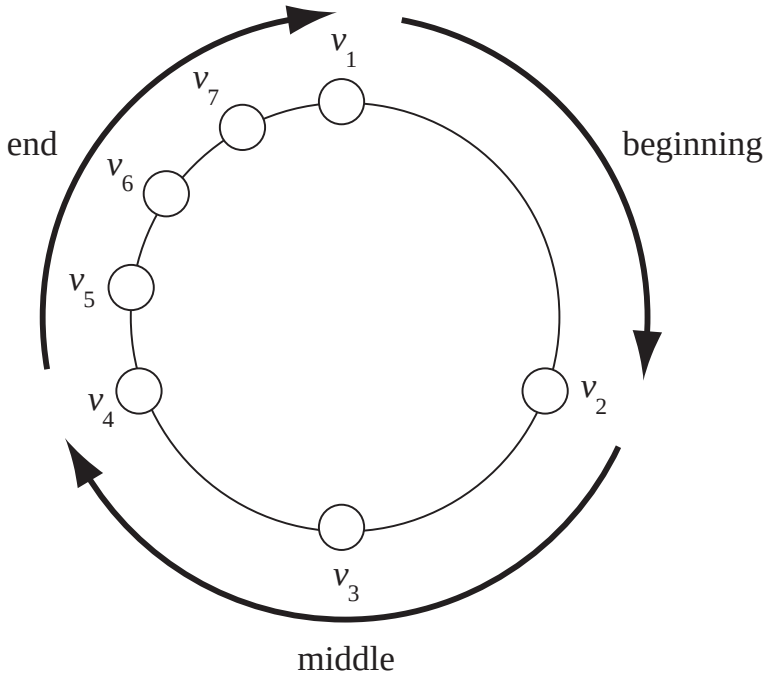

Figure 2: The Roller Coaster

stays on one chord for the beginning section, it should have two chords equally spaced for the middle and four equally spaced chords for the finish. Working backwards, if we take the smallest segment for a chord change to be one bar, then we should make the finish four bars, each with a different chord, the middle with two chords, each lasting two bars, and the beginning part with just one chord lasting for four bars.

What do we have in total? Twelve bars for our musical roller coaster. The sequence of seven chords in the harmonic progression that cycle around can be viewed as the graph C_7. Any assignment of chords to the progression correspond to a vertex colouring of the graph, as adjacent chords in the progression need to be different. Thus we see immediately from the fact that the seven cycle C_7 has chromatic number 3 that we will need at least three chords in our roller coaster chord progression, and indeed three chords (our "colours") will suffice. The most basic chords in any key are the I, IV and V chords, so we take these as our colours for our C_7 chord progression. We note that tension-wise, the I chord provides the least tension (it is the root chord of the key), while the V chord provides the most – not all colours are created equal here.

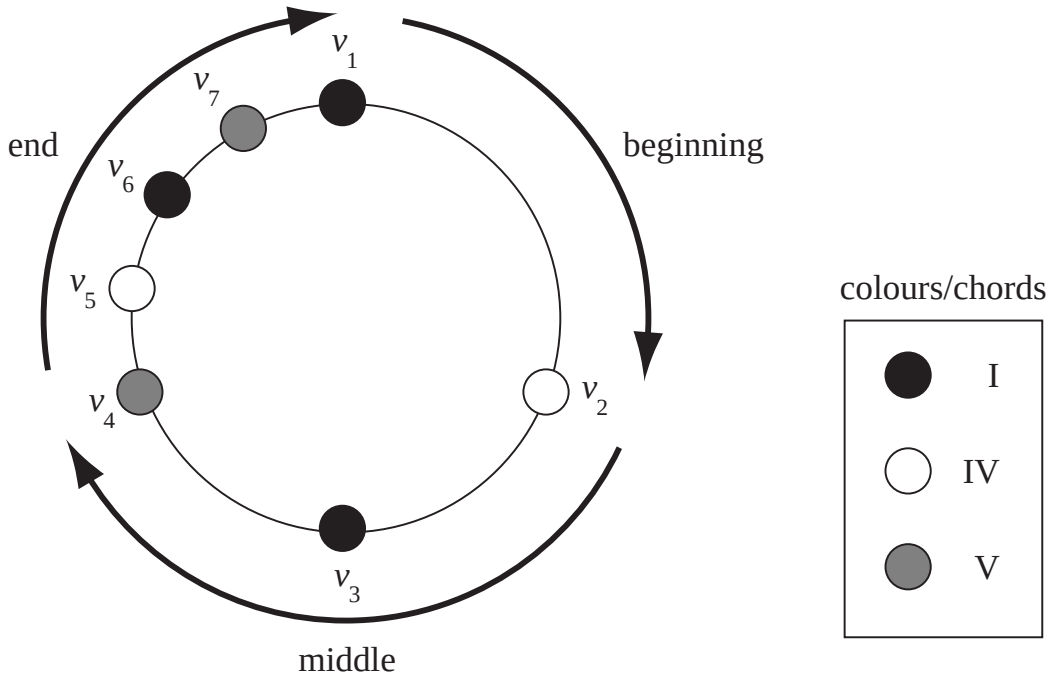

Figure 3: The Roller Coaster 3-Colouring of C_7

Now let's talk more about the shape of the roller coaster. We'll start off at base level; musically, this would be the tonic chord, that is, the major chord that defines the key. Thus vertex v_1 gets colour I. Vertex v_2 is our first climb (in the middle section of the roller coaster), and we should save the most exciting colour (V) for the end of the ride. That means v_2 and v_3 must be coloured IV and I, respectively.

Now for the finish. We save our biggest climb for the beginning of the finish, where we jump up to chord V from chord 4, that is, we use our most exciting colour, V, for v_4. A good roller coaster would prolong our descent back down to earth, so chord 5 should not be the tonic I, which leaves v_5 to be coloured with IV. Dropping down to the ground, we see that v_6 should be coloured with the tonic chord, I. We save one great thrill for the end, by climbing back up to the top, with chord 7, so that the final vertex, v_7, of our seven cycle chord progression, coloured with V. Our unique roller coaster colouring of C_7 is indeed the standard 12 bar blues, and having completed the ride, another can begin!

There are, of course, various alterations of the blues, such as inserting chord IV in bar 2, or removing the V chord in bar 12, but I view these as minor modifications of the basic roller coaster. Now of course there is more to a 12 bar blues than just the chords. The melody and instrumental parts all add to shape the roller coaster. I remember reading once that Paul McCartney's and John Lennon's goal was to write a simple rock song as good as Little Richard's *Long Tall Sally*. This song has always been one of my favourites, and it just throbs with excitement. If you look through the melody, you'll see how Little Richard, both by choice of notes and rhythm, increases the thrill of the roller coaster ride. During the first four bars of the verse, the chord remains the same. But Little Richard accelerates through these opening four bars by (almost) singing straight quarter notes for the first 2 bars, then doubling the feel by singing straight eighth notes for the next two bars: This gives us a mathematically defined "rush" to the first four bars (the long flat part of the initial part of the ride). If you look at the remaining melody, you see how the intervals for "baby" grow larger and larger, increasing the acceleration as we pass through to the highest point of the roller coaster in bar 9. It's interesting to note that in the Beatles' rendition of the song, Paul McCartney's bass line at the end of bar 12 of the verse climbs rather than falls back down to the tonic. This gives the illusion that we are climbing to yet a higher level, a seemingly "higher" tonic chord, even though we get back to where we start – an aural paradox within the roller coaster of the blues.

Acknowledgement

This article was partially supported by a grant from the Natural Sciences and Engineering Research Council of Canada.

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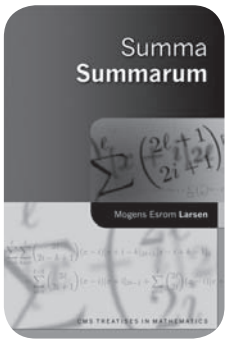

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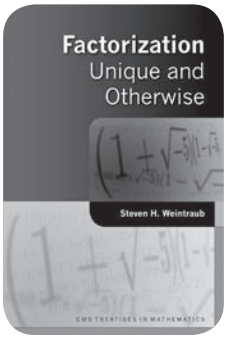

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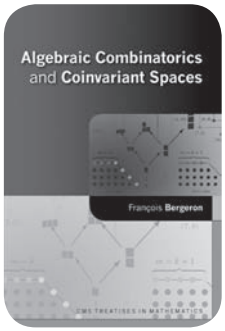

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2009 CMS WINTER MEETING
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Host / Hôte :
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Hilton Hotel Windsor
Windsor, Ontario
December 5-7 décembre
www.cms.math.ca/Events

Meeting Director / Directeur de la Réunion
Dr. Daniel Britten
Tel: (519) 253-3000 Ext. 3013
britten@uwindsor.ca

Local Arrangments / Logistique locale
Dr. Ejaz Ahmed
Telephone (519) 253-3000 Ext. 3015
seahmed@uwindsor.ca

University of Windsor
Department of Mathematics & Statistics
Lambton Tower, 10th Floor
Windsor, ON N9B 3P4

SESSIONS

The following sessions have been confirmed for this conference:
Les sessions suivantes ont été confirmées :

Algebraic Geometry
Géométrie algébrique
Org: Mike Roth (Queen's)

Banach Algebras and Abstract Harmonic Analysis
Algèbres de Banach et analyse harmonique abstraite
Org : Zhiguo Hu, Mehdi Monfared (Windsor)

Convex and Variational Analysis
Analyse convexe et variationnelle
Org : Heinz Bauschke, Shawn Wang (UBC Okanagan)

Exact and Approximate Methods for Nonlinear Differential Equations
Méthodes exactes et approximatives pour la résolution des équations différentielles non-linéaires
Org : Alexei F. Cheviakov, George W. Patrick (Saskatchewan)

History and Philosophy of Mathematics
Histoire et philosophie des mathématiques
Org : Tom Archibald (SFU)

Lie Algebras and Representation Theory
Algèbres de Lie et théorie des représentations
Org: Nicolas Guay (Alberta), Michael Lau (Windsor)

Lie Groups and Automorphic Forms
Groupes de Lie et formes automorphiques
Org : Hadi Salmasian, Wai Ling Yee (Windsor)

Mathematical Models in Environmental Sciences
Modèles mathématiques en sciences environnementales
Org : Rick Caron (Windsor)

Mathematical Statistics
Statistiques mathématiques
Org : Jiahua Chen (UBC), Chi Song Wong (Windsor)

Mathematics Education
Éducation mathématique
Org : Dragana Martinovic (Windsor)

Matrix Theory and Statistics
Théorie matricielle et les statistiques
Org : Ejaz Ahmed, Abdul Hussein (Windsor)

Measure, Probability, and Stochastic Processes
Mesure, probabilité et processus stochastique
Org : Severien Nkurunziza, Tim Traynor (Windsor)

Non-Linear Control Theory
Théorie de contrôle non-linéaire
Org : Andrew Lewis, Abdol-Reza Mansouri (Queen's)

Number Theory
Théorie des nombres
Org : Kevin Hare (Waterloo), Soroosh Yazdani (McMaster)

Operator Algebras
Algèbres d'operateurs
Org : Mitja Mastnak (Saint Mary's), Dilian Yang (Windsor)

Real and Complex Singularities
Singularités en analyse réelle et complexe
Org : Janusz A. Adamus (Western)

CMS-SMM-2009 SCHEDULE
SMC-SMM-2009 HORAIRE

Thursday | jeudi | jueves August 13 août | agosto	Friday | vendredi | viernes August 14 août | agosto	Saturday | samedi | sábado August 15 août | agosto
8:30 – 16:00 Registration/Inscription	8:30 – 16:00 Registration/Inscription	8:30 – 16:00 Registration/Inscription
9:00 - 9:30 Opening / Ouverture	9:00 – 10:30 Scientific Sessions	9:00 – 10:30 Scientific Sessions
9:30 – 10:30 Plenary Lecture		
Break / Pause		
11:00 – 12:30 Scientific Sessions	11:00 - 12:00 Plenary Lecture	11:00 - 12:00 Plenary Lecture
Break / Pause		
14:00 - 15:30 Scientific Sessions	13:30-15:00 Scientific Sessions	13:30-15:00 Scientific Sessions
Break / Pause		15:00 - 16:00 Plenary Lecture
15:45 - 16:45 Plenary Lecture	15:15 - 16:15 Plenary Lecture	16:00 - 16:15 Closing
	16:30 - 17:30 Canada-Mexico Mathematics Forum	
17:00 - 18:30 Reception	19:00 Dinnner	

(as of April 14, 2009)

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for post-secondary undergraduate teaching in Mathematics

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Pour les détails sur la procédure de mise en candidature voir
www.cms.math.ca/prix
ou
http://hed.nelson.com

Date limite pour soumettre une candidature : **15 novembre 2009**

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CMS-SMM-2009
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Second Joint Meeting of the Canadian Mathematical Society and the Sociedad Matemática Mexicana
Deuxième réunion conjointe de la Société mathématique du Canada et de la Sociedad Matemática Mexicana

UBC, Vancouver August 13-15 août
Host / Hôte : Pacific Institute for the Mathematical Sciences (PIMS)
www.cms.math.ca/Events

Scientific Committee / Comité scientifique:

Canada:
Alejandro Adem (UBC)
Walter Craig (McMaster)
Andrew Granville (Montréal)

Mexico:
Fernando Brambila (SMM; UNAM)
Isidoro Gitler (CINVESTAV)
Jose Seade (UNAM)

Plenary Speakers / Conférenciers pléniers :
James Arthur (Toronto)
Xavier Gomez-Mont (CIMAT)
Onesimo Hernandez-Lerma (CINVESTAV)
Niky Kamran (McGill)
Rachel Kuske (UBC)
Alberto Verjovsky (UNAM-Cuernavaca)

SESSIONS

Algebra
Algèbre
Org: Christoff Geiss (UNAM), Arturo Pianzola (Alberta)

Algebraic Geometry and Singularity Theory
Géométrie algébrique et théorie des singularités
Org: Ed Bierstone (Toronto), Leticia Brambila (CIMAT), Jacques Hurtubise (McGill), Jose Seade (UNAM)

Analysis
Analyse
Org: Salvador Pérez-Esteva (UNAM), Malabika Pramanik (UBC)

Combinatorics and Graph Theory
Combinatoire et théorie des graphes
Org: Hortensia Galeana (IMATE-UNAM), Luis Goddyn (SFU), Miguel Pizaña (UAM-I)

Differential Geometry
Géométie differentielle
Org: Niky Kamran (McGill), Oscar Palmas (UNAM), Adolfo Sanchez Valenzuela (CIMAT)

Dynamical Systems
Systèmes dynamiques
Org: Florin Diacu (Victoria), Renato Iturriaga (CIMAT), Ernesto Pérez-Chavela (UAM)

Optimization and Approximation
Optimisation et approximation
Org: Michael Friedlander (UBC), Pedro Gonzalez Casanova (DGSCA; UNAM), Luis Verde-Star (UAM-Itzapalapa)

Partial Differential Equations
Equations aux dérivées partielles
Org: Monica Clapp (UNAM), Nassif Ghoussoub (UBC), Pablo Padilla (UNAM)

Probability
Probabilité
Org: Ana Meda (UNAM), Edwin Perkins (UBC)

Topology
Topologie
Org: Ian Hambleton (McMaster), Jose Luis Cisneros-Molina (UNAM), Miguel Xicotencatl (CINVESTAV)

CMS Winter Meeting 2009
Host: University of Windsor
December 5-7, 2009, Windsor, Ontario

CMS Summer Meeting 2010
Host: University of New Brunswick - Fredericton
June 4 - 6, 2010, Fredericton, New Brunswick

CMS Winter Meeting 2010
Host: University of British Columbia
December, 2010, Vancouver, British Columbia

Réunion d'hiver 2009 de la SMC
Hôte : Université Windsor
5 - 7 décembre 2009, Windsor (Ontario)

Réunion d'été 2010 de la SMC
Hôte : Université de Nouveau-Brunswick
4 - 6 juin 2010, Fredericton (Nouveau-Brunswick)

Réunion d'hiver 2010 de la SMC
Hôte : Université de Colombie-Britannique (UBC)
décembre 2010, Vancouver (Colombie-Britannique)

The 2008 reports are in the language provided by the chair. All other reports appear in the April issue of the CMS Notes.

Les rapports sont livrés dans la langue de rédaction d'origine; les autres rapports paraîssent dans le numéro d'avril des Notes de la SMC

REPORT OF THE PRESIDENT AND THE ADVANCEMENT OF MATHEMATICS COMMITTEE (AMC)

Anthony To-Ming Lau (Alberta)

Mathematics in 2008

The CMS seeks to advance and support all aspects of mathematics in Canada, in both research and education.

Our research meetings and publications are vital to the flourishing Canadian mathematical community. As the national organization that represents our profession, we speak on behalf of mathematics to industry and government. Our Math Camps and Math Competitions programs support mathematics education across Canada, as do our problem-solving publications. These and related efforts aim to stimulate students mathematically, an activity critical to Canada's increasingly knowledge-based economy. Our Endowment Grants program enables mathematically rooted projects that would not exist otherwise. Our prestigious prizes celebrate excellence in research, education, teaching and service. The community is connected through electronic services and the CMS Notes, which include conference announcements, and employment opportunities. Our success in sustaining a broad range of activities is due to the engagement of our community, and to the generosity of our supporters. The Society is immensely grateful to all our volunteers and sponsors for their commitment to building and strengthening mathematics in Canada. The detailed descriptions of the year's CMS activities, to be found throughout the pages of the annual report, attest to the health of our discipline and to the energy of our members.

In October, 2008 the CMS delegates Alejandro Adem, Roland Speicher, Nicole Tomczak-Jaegermann and Anthony Lau were invited to Jeju, Korea to attend the 2008 Global KMS International Conference.

In 2009, the CMS Summer Meeting will be held in St. John's Newfoundland, June 6 to 8. There will be a special joint session with the Korean Mathematical Society organized by Alejandro Adem (UBC) and Jong Hae Keum (KIAS) in Algebraic Geometry and Topology. The 2009 Winter Meeting will be hosted by University of Windsor. We look forward to visiting St. John's in June and Windsor in December for the 2009 meetings.

The Canadian mathematical community continues to plan for upcoming major meetings, including the 2009 Canadian Mathematics Education Forum (May 2009), the CMS's second meeting with the Sociedad Matemática Mexicana in Vancouver (August 2009), and the large 2011 International Congress of Applied and Industrial Mathematics. The reports of the Executive Director and the Research Committee contain details about the Second Canada-France Mathematics Congress in Montreal held in June and the CMS Winter meeting in Ottawa in December.

Prizes

In June 2008, during the Second Canada-France Congress, the CMS Excellence in Teaching Award lecture was given by Edward Bierstone (Toronto); the CMS Krieger-Nelson Prize lecture by Izabella Laba (UBC) and the CMS Jeffery-Williams Prize lecture was given by Martin Barlow (UBC). In December 2008, the Coxeter-James Prize lecture was given by Ravi Vakil (Stanford); the Doctoral Prize lecture by Matthew Greenberg (Calgary) , the Adrien Pouliot Award lecture was given by Harley Weston (Regina), the second David Borwein Distinguished Career Award was given to Hermann Brunner (Memorial); the first renamed Graham Wright Award for Distinguished Service was given to Bill Sands (Calgary) and the G. de B. Robinson Award was given to Dmitry Jakobson (McGill), Nikolai Nadirashvili (CNRS Marseille) and Iosif Polterovich (Montréal).

The achievements recognized by the CMS Prizes are truly outstanding. But this high standard relies on a continuing flow of excellent nominations. Please give serious consideration to nominating a deserving colleague.

Advancement of Mathematics

The CMS discontinued the use of a professional fund raiser in early 2008, due in part to budgetary reasons. We were pleased that NSERC-Promo Science renewed its support for our MathCamps for three years (2008-2010), and that new funding was received from the Crabtree Foundation, TD Financial and the RBC Foundation. We thank CRM, Fields, PIMS, MITACS, BIRS and AARMS for their continuing support. Many provincial ministries of education continued to support our important educational activities. We would like to thank Sun Life Financial and the Imperial Oil Foundation for their long-term and ongoing support of our educational activities. Sun Life Financial is the Title Sponsor of the "Open", our largest mathematics competition. I was delighted that Nelson Education renewed its support of the CMS Excellence in Teaching Award. We are indeed very grateful to our many individual donors and friends of the CMS in the United States for their contributions.

At the end of 2008, the CMS had 868 members, up from 795 in 2007. Among them, about 160 are retirees and 80 graduate students. However, in some major departments there are many faculty members who are not CMS members. We will begin in early 2009 to focus on a "Membership Campaign". We will

have representatives in each department talk to colleagues to encourage them to join CMS. As graduate students are very important for the future of mathematics, we will also try to have student representatives talk to graduate students on membership.

If you are not a member of CMS, please consider joining. If you are a member, please ask a colleague, a student or a friend to join.

Executive

As usual, the Executive Committee met four times in 2008; at the semi-annual meetings of the Society, and again in April and October, at the Fields Institute. It is a great pleasure working with our Vice-Presidents Michael Bennett, Gordon MacDonald, Yvan Saint-Aubin, and Catherine Sulem.

Joseph Khoury informed the Executive Committee and the Board of Directors that, for personal reasons, he would be unable to assume the position of Executive Director effective January 1, 2009, as had been planned. Graham Wright offered to remain as Executive Director, but on a slightly reduced basis (approximately 75%) until June 30, 2009. During this period, Khoury agreed to continue in his role as the Associate Executive Director (on a part-time basis) and provide assistance to Graham. A search for a new director has started again.

Other Issues

The NSERC Liaison committee continues to monitor the process of NSERC grant selection on our behalf. A formal bid for the 2014 ICM to be held in Montreal has now been submitted.

The CMS had to relocate its Executive Office on the campus of the University of Ottawa because of structural problems with the building on King Edward Avenue to a temporary space in Vanier Hall. The University informed the CMS in November 2008, that we had to vacate the temporary space by December 31, 2008. Graham Wright and Joseph Khoury explored various options and, taking into account the current situation and the recommendations by the Executive Committee, the Board of Directors, at its meeting in December, approved that the CMS Executive Office move to 1785 Alta Vista Drive (Suite 105), in Ottawa. This will give the CMS the opportunity to consider other options in the short- or long-term. The University of Ottawa has indicated that in few years the current space shortage should be resolved and it may then be possible to re-locate back on campus. A letter was sent to the President of the University of Ottawa to arrange a meeting to discuss future plans and possible options for the CMS. The rental cost off campus is considerably more than what the CMS was paying. But, taking into account the savings from not filling one vacant staff position, there should be minimal impact on the porposed 2009 Budget.

Thanks

I would like to thank Tom Salisbury for his outstanding contribution to the Canadian Mathematical Society as President to June 30, 2008, and his generosity in delaying his sabbatical for six months to allow a smooth transition during my learning period.

The Society is also extremely grateful to its many partners, sponsors, supporters, and volunteers — including meeting organizers, editors, committee members, and the champions of our targeted activities. Special thanks go to the very hard working staff at the CMS Executive and Publications Offices, whose excellent work makes our programs possible. We must particularly thank Graham Wright for the support he provided the President through 2008 and for his outstanding service to the Society for 30 years.

RAPPORT DU PRÉSIDENT ET DU COMITÉ POUR L'AVANCEMENT DES MATHÉMATIQUES

Anthony To-Ming Lau (Alberta)

Les mathématiques en 2008

La SMC s'attache à promouvoir tous les domaines des mathématiques au Canada, en recherche comme en éducation.

Nos réunions scientifiques et nos publications sont essentielles à l'essor de la communauté mathématique canadienne. En tant qu'organisme national qui représente notre profession, la SMC se fait le porte-parole de la communauté mathématique auprès de l'industrie et des gouvernements. Nos camps et concours mathématiques renforcent l'enseignement des mathématiques dans tout le Canada, tout comme nos revues de résolution de problèmes. Ces activités et autres initiatives connexes visent à stimuler l'intérêt des jeunes pour les mathématiques. C'est là une préoccupation de plus en plus importante pour le Canada dans le contexte de l'économie du savoir. Notre programme de bourses du fonds de dotation permet la réalisation de projets mathématiques qui ne verraient pas le jour autrement. Nos prestigieux prix soulignent en outre l'excellence en recherche, en éducation, en enseignement et en service à la communauté.

Nous maintenons par ailleurs les liens entre les membres de la communauté grâce à nos services électroniques et aux Notes de la SMC, où nous diffusons des annonces de congrès et des offres d'emplois. Notre capacité d'offrir une gamme si vaste d'activités est largement attribuable à l'engagement de la communauté et à la générosité de nos partenaires. La Société doit une fière chandelle à tous ses bénévoles et commanditaires pour leur engagement envers l'essor des mathématiques au Canada. La description détaillée des activités de cette année à la SMC, que vous lirez dans le rapport annuel, témoigne de la vitalité de notre discipline et de l'énergie de nos membres.

En octobre 2008, les représentants de la SMC, Alejandro Adem, Roland Speicher, Nicole Tomczak-Jaegermann et Anthony Lau, ont été invités à Jeju, en Corée, au congrès international 2008 de la Société coréenne de mathématiques (2008 Global KMS International Conference).

La Réunion d'été 2009 de la SMC se déroulera à St. John's (Terre-Neuve) du 6 au 8 juin et comprendra une session commune avec la Société coréenne de mathématiques organisée par Alejandro Adem (UBC) et Jong Hae Keum (KIAS) en géométrie et topologie algébriques. L'Université de Windsor sera l'hôte de la Réunion d'hiver 2009. Ce sera avec grand plaisir que nous nous réunirons à St. John's en juin et à Windsor en decembre 2009 pour les prochaines réunions d'hiver.

La communauté mathématique canadienne poursuit sa planification de grands congrès, notamment le Forum canadien sur l'enseignement des mathématiques (mai 2009), le second congrès SMC-Sociedad Matemática Mexicana à Vancouver (août 2009), ainsi que l'imposant Congrès international de mathématiques appliquées et industrielles de 2011. Les rapports du directeur administratif et du Comité de la recherche contiennent des détails au sujet du Deuxième congrès Canada-France de mathématiques tenu à Montréal en juin et de la Réunion d'hiver de la SMC tenue à Ottawa en décembre.

Prix

En juin 2008, au Deuxième congrès Canada-France, Edward Bierstone (Toronto) a prononcé la conférence du Prix d'excellence en enseignement de la SMC; Izabella Laba (UBC), la conférence du prix Krieger-Nelson, et Martin Barlow (UBC), la conférence du prix Jeffery-Williams. En décembre 2008, la conférence Coxeter-James a été prononcée par Ravi Vakil (Stanford) et la conférence du Prix de doctorat, par Matthew Greenberg (Calgary), le prix Adrien-Pouliot a été remis à Harley Weston (Regina) et le second prix David-Borwein de mathématicien émérite pour l'ensemble d'une carrière est allé à Hermann Brunner (Memorial). Le premier prix Graham-Wright pour service méritoire, sous ce nouveau nom, a été décerné à Bill Sands (Calgary), et Dmitry Jakobson (McGill), Nikolai Nadirashvili (CNRS Marseille) et Iosif Polterovich (Montréal) ont reçu le prix G. de B. Robinson.

Les réalisations soulignées par les prix de la SMC sont véritablement hors du commun. Pour maintenir ce niveau élevé, nous avons toutefois besoin d'un riche bassin de nominations. Nous vous incitons à proposer la candidature de collègues méritants.

Avancement des mathématiques

La SMC n'a plus recours aux services d'un professionnel du financement depuis le début de 2008, en partie pour des raisons financières. Nous sommes heureux que le programme PromoScience du CRSNG ait renouvelé son appui à nos camps mathématiques pour trois ans (2008-2010), et d'avoir reçu du financement neuf de la fondation Crabtree, du Groupe financier TD et de la Fondation RBC. Merci au Centre de recherches mathématiques, à l'Institut Fields, à l'Institut PIMS, au Réseau MITACS, à la Station de recherche internationale de Banff et à l'Association pour l'avancement de la recherche mathématique en Atlantique de leur appui continu. Bon nombre de ministères de l'Éducation provinciaux continuent en outre de financer nos importantes activités éducatives. Nous souhaitons également remercier la Financière Sun Life et la Fondation Pétrolière Impériale de leur soutien financier continu et à long terme de nos activités éducatives. Soulignons que la Financière Sun Life est commanditaire en titre de notre principal concours mathématique, le Défi ouvert canadien de mathématiques. J'ai aussi été ravi d'apprendre que Nelson Educational Ltd. avait en outre renouvelé son appui au Prix d'excellence en enseignement de la SMC. Nous sommes également très reconnaissants à nos nombreux donateurs particuliers et aux amis de la SMC aux États-Unis de leurs contributions.

À la fin de 2008, la SMC comptait 868 membres, comparativement à 795 en 2007. De ce nombre, 160 sont à la retraite et 80, des étudiants aux cycles supérieurs. Certains grands départements comptent toutefois de nombreux professeurs qui ne sont pas membres de la SMC. Nous lancerons au début 2009 une vaste campagne de recrutement. Nous demanderons à des représentants de chaque département d'inciter leurs collègues à se joindre à la SMC. Comme les étudiants aux cycles supérieurs sont très importants pour l'avenir des mathématiques, nous demanderons à nos représentants d'inviter aussi ces étudiants à devenir membres.

Si vous n'êtes pas encore membre de la SMC, songez à vous inscrire! Si vous l'êtes déjà, incitez vos collègues, étudiants ou amis à faire comme vous.

Comité exécutif

Comme d'habitude, le Comité exécutif s'est réuni quatre fois en 2008 : lors des deux Réunions semestrielles de la Société, puis en avril et en octobre, à l'Institut Fields. Ce fut un réel plaisir de travailler avec les vice-présidents Michael Bennett, Gordon MacDonald, Yvan Saint-Aubin et Catherine Sulem.

Joseph Khoury a informé le Comité exécutif et le Conseil d'administration qu'il ne pourrait assumer comme prévu les fonctions de directeur administratif le 1er janvier 2009 pour des raisons personnelles. Graham Wright a offert de rester en poste mais à charge réduite (environ 75 %) jusqu'au 30 juin 2009, et Joseph Khoury a accepté de continuer à titre de directeur administratif adjoint (à temps partiel) et d'épauler Graham durant cette période. Nous sommes donc à nouveau à la recherche d'un directeur.

Autres dossiers

Le Comité de liaison avec le CRSNG continue de suivre le processus de sélection des subventions du CRSNG pour nous. Dans un autre ordre d'idées, la candidature de Montréal pour accueillir le Congrès international des mathématiciens 2014 a maintenant été déposée.

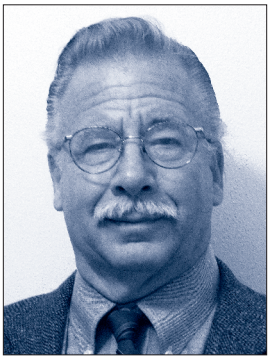
La SMC a dû déménager son bureau administratif du campus de l'Université d'Ottawa, en raison de problèmes structuraux du bâtiment de l'avenue King-Edward, à des bureaux temporaires au pavillon Vanier. En novembre 2008, l'Université a informé la SMC qu'elle devrait quitter ces lieux à la fin de l'année civile. Graham Wright et Joseph Khoury ont étudié diverses options et,

compte tenu de la situation actuelle et des recommandations du Comité exécutif, le Conseil d'administration a approuvé le déménagement du bureau administratif au 1785, avenue Alta Vista (bureau 105) à Ottawa, à sa rencontre de décembre. La SMC aura ainsi l'occasion d'étudier d'autres options à court ou à long terme, l'Université d'Ottawa ayant indiqué que son manque d'espace devrait être résolu d'ici quelques années, et qu'il pourrait alors être possible de ramener la SMC sur le campus. Nous avons demandé une rencontre avec le recteur de l'Université d'Ottawa pour discuter de nos projets et des options qui s'offrent à la SMC. Le loyer actuel est beaucoup plus élevé que celui que payait la SMC sur campus. Toutefois, compte tenu du non-remplacement d'un membre du personnel administratif, l'impact sur le budget 2009 devrait être minimal.

Remerciements

J'aimerais remercier Tom Salisbury de sa contribution exceptionnelle à la présidence de la Société mathématique du Canada jusqu'au 30 juin 2008 et de sa générosité à reporter son congé sabbatique de six mois pour permettre une transition en douceur durant ma période d'apprentissage.

La Société est aussi extrêmement reconnaissante envers ses nombreux partenaires, commanditaires et bénévoles, notamment les organisateurs de congrès, rédacteurs, membres de comités et maîtres d'œuvre de nos activités phares. Un merci tout spécial au personnel ultra dévoué et travaillant du bureau administratif et des bureaux des publications, dont l'excellent travail assure la continuité de nos programmes. Nous devons remercier tout particulièrement Graham Wright de son aide précieuse envers le président en 2008, et de sa contribution exceptionnelle envers la Société au cours des 30 dernières années.



2008 TREASURER'S REPORT

David L. Rodgers, CMS Treasurer

The CMS operating deficit for 2008 is $24,399, much less than the $54,586 deficit in the 2008 Budget approved by the Board of Directors, and dramatically reduced from the year-end projection of $106,106 in the Fall. This was made possible by a very successful Winter Meeting (480 delegates), adjustments in expenses from the 2008 Summer Meeting, significantly increased end-of-year donations by CMS members, several unanticipated donations from the public and private sectors, and still lower than projected administrative and committee costs.

While operating deficits are never cause for celebration, a great deal of effort by many people went into managing 2008 CMS resources and risk to yield a reasonable outcome in VERY bad times, often involving moving targets. The whole CMS organization and its membership are to be commended.

The global financial situation going forward seems to assure that the Society will need to continue to find new sources of revenue through individual and other donations, if the CMS is to continue to support the current portfolio of activities. Leaving the Society to the mercy of currency exchange is not prudent.

2009 Budget

The 2009 Operations Fund Budget approved by the Board of Directors in December 2008, projects a deficit of $61,208 and includes:

- only committed donations and grants so that the impact on the 2009 finances of not raising additional funds is clearly visible;
- rent for the Executive Office at $47,550 at the new location;
- compensation for the Executive Director position is based on a 75% - 25% split between Graham Wright as Executive Director and Joseph Khoury as Associate Executive Director through June 30, and a new full-time Executive Director from April 1;
- foreign exchange revenue projected at $18, 067 based on a $US0.97 Canadian dollar for CJM and CMB subscription revenue and some from membership and general administration;
- no foreign exchange income projected for other publications and services.

The good news is that 2009 subscription money received is much higher than originally projected due to the lower Canadian dollar relative to the US dollar (about $US0.08, where it has hovered since October). The majority of subscription revenue is received in the months November through April.

CJM and CMB together represent the bulk of CMS subscription revenue, with smaller (but not insignificant) revenues from CRUX with MAYHEM, the various book series, and membership fees. Hence, for 2009, foreign exchange revenue should more than offset the projected deficit.

Electronic-Only Subscriptions and Model for Consortium Pricing

Looking ahead, the Board of Directors approved a 15% discount for electronic-only subscription rates for 2009; $864 for both the CJM and CMB and $906 including CRUX with MAYHEM.

The Board also approved a *consortium pricing model* that can be implemented on a case-by-case basis, under the principle that subscribers get discounted subscriptions when the CMS gets increased revenues.

Factors that informed the decision were:

- Libraries want electronic-only pricing options to provide their users with better service (e.g., desktop delivery, electronic search capability) while also saving on storage/re-shelving costs.

- The 2009 packaged price for the CJM and CMB ($1,017) for print and electronic formats is already a discounted price.
- A 15% discount for *electronic-only* is the low-end of what is likely to trigger the kind of subscriber attention that will naturally cascade to considerations of end-user benefits and library savings.
- Presently, 160 subscribers take both the CJM and CMB so even a 100% conversion to *electronic-only* in 2009 nets to needing approximately 28 new or renewed lapsed subscriptions to render the outcome revenue neutral. It may be that only 3-6 will actually convert in the first year.
- Presently, 450 libraries appear to take only the CJM. These libraries can be offered *electronic-only* subscriptions to BOTH CJM and CMB for a small increase of $112 per subscriber. This option will be publicized widely to libraries and chairs, and form the basis of a campaign to all prospective subscribers.

This decision protects the CMS revenue stream, with a strong short-term story for CJM-only subscribers to convert to *electronic-only*, thereby increasing overall revenues. It also provides a tool to forestall or reduce cancellations from the group of 160 existing subscribers.

Coupled with *consortium pricing*, the possibility of getting 28 new or lapsed subscribers does not feel daunting, if pursued systematically and aggressively, particularly with Special Libraries Association (SLA) corporate members.

The purpose of these changes is to offer subscribers choices and flexibility in ways that can bridge the transition from print to electronic delivery that is sustainable long-term. This approach folds naturally into the current pricing model used with agents.

2008 Fundraising Initiatives

A. 2008 Fundraising Campaign

In 2007, the focus of fundraising was CMS Math Camps and prospects that had previously been CMS donors or had established business relationships with the CMS. Overall, about 65 proposals were sent to corporations, foundations, and government, mostly in the last half of the year — too late to impact 2007 finances. Early in 2008, we received a number of positive replies (e.g., NSERC, Crabtree, TD Financial, RBC Foundation, and some provinces), some of which are multi-year commitments.

For 2008, we thought that, based on 2007 experience, better research, a more seasoned request strategy, and with a more timely execution and follow-up, the CMS would be positioned for better results. We

- Developed "*CMS Math Advantage*", an umbrella program for Math Camps, Competitions, and CRUX with MAYHEM; and bundled them with a compelling public awareness program (e.g., 2009 Mathematics Education Forum);
- Redesigned the focus and language of the proposals;
- Constructed a fundraising database that made it possible to track actions;
- Researched 150 corporations and foundations and sent out more than 100 proposals by mid-year;
- Meetings took place from May to August with potential donors in Toronto, Ottawa, and Calgary;
- Consulted an experienced Canadian fundraiser about the focus, the materials, and the methodology.

The results were disappointing. At least 6 proposals went to corporate or foundation Boards, which usually signals serious interest, but with no positive outcomes.

B. Feedback and Observations

The following points reflect feedback from corporations that declined to support the CMS:

- The state of the Canadian and global economy clearly impacts CMS fundraising but it is not the whole story;
- There is a strong sense that the CMS ought to be able to raise needed funds from its own (professional) membership, either through donations or by adjusting prices for products and services;
- Mathematics education activities are main-stream and should be funded by governments and not by corporations and foundations;
- Corporations want engagement and direct and timely benefits for their donations, such as research collaboration, near-term pipeline access to employees, or programs only in communities where the company operates;
- Foundations want to seed 1-year, highly innovative, risky start-up programs because they believe mainstream programs such as mathematics are funded by governments;
- Canada does not have any number of very large, wealthy (e.g., Mellon, Carnegie, Ford) foundations.

C. Future CMS Fundraising Initiatives

For almost three years now, and particularly in 2008, the focus has been on corporations and foundations — Canadian, American with Canadian offices, and American who claim to donate in Canada - and there doesn't appear to be much traction. The advice received to date suggests that if there is a path, it is through influential, wealthy individuals in Canada who are interested in mathematics or mathematics education. This approach is slower, but the advice from experts is that building these types of relationships is the better path for the CMS in the longer run.

Considering the feedback and observations, as well as expert counsel, the CMS is best served focusing its resources on approximately 75% individual prospects and 25% on a small number of corporations and foundations where a hand-in-glove fit exists and where we can find insiders to champion CMS requests.

D. Changes for the Advancement of Mathematics Committee

The Advancement of Mathematics Committee sub-committee on fund-raising will be expanded to include individuals, not necessarily CMS members, who are in a position to help with CMS fundraising initiatives.

RAPPORT DU TRÉSORIER 2008

David L. Rodgers, CMS Treasurer

Pour l'exercice 2008, le budget de fonctionnement a affiché un déficit de 24 399 $, soit beaucoup moins que le déficit prévu au budget adopté par le Conseil d'administration et incroyablement moins que la projection budgétaire de 106 106 $ présentée l'automne dernier. Nous devons cette bonne nouvelle au vif succès de la Réunion d'hiver (480 participants), à des révisions des dépenses de la Réunion d'été 2008, à une augmentation considérable des dons en fin d'année par les membres de la SMC, à plusieurs dons imprévus des secteurs public et privé, et à des dépenses administratives et des comités inférieures aux prévisions.

Si les déficits de fonctionnement ne sont jamais de bonnes nouvelles, il faut tout de même souligner les efforts immenses déployés par de nombreuses personnes pour gérer les risques et les ressources de la SMC en 2008 afin d'obtenir un résultat raisonnable en des temps TRÈS difficiles et instables. C'est l'ensemble de la SMC et de ses membres qu'il faut féliciter.

La situation financière mondiale actuelle porte à croire que la Societé devra continuer à chercher de nouvelles sources de revenus au moyen de dons individuels et autres, si elle souhaite maintenir son éventail actuel d'activités. Il n'est pas prudent de laisser la Société à la merci des taux de change.

Budget 2009

Le budget de fonctionnement 2009 approuvé par le Conseil d'administration en décembre 2008 prévoit un déficit de 61 208 $ et comprend:

- les dons et les subventions promis seulement, de sorte que l'effet sur les finances de 2009 de ne pas trouver d'autres sources de don est clairement visible;
- le loyer du bureau administratif, soit 47 550 $ à la nouvelle adresse;
- le salaire du directeur administratif, divisé à 75 % - 25 % entre Graham Wright en tant que directeur administratif et Joseph Khoury en tant que directeur administratif adjoint jusqu'au 30 juin, et celui d'un nouveau directeur administratif à compter du 1er avril;
- des recettes découlant du taux de change s'élevant à 18 067 $ basées sur un dollar canadien valant 0,97 US$ pour l'abonnement au JCM et au BCM, de l'adhésion et de l'administration générale;
- aucun autre montant découlant du taux de change prévu pour les autres publications et services.

La bonne nouvelle, c'est que le montant reçu pour les abonnements de 2009 est beaucoup plus élevé que les prévisions, notamment en raison de la faiblesse du dollar canadien par rapport au dollar américain (il tourne autour de 0.80 US$ depuis octobre). Nous recevons la majeure partie des recettes d'abonnement de novembre à avril.

Le JCM et le BCM représentent à eux deux la plus grosse partie des recettes d'abonnement de la SMC. Le CRUX with MAYHEM, les collections d'ouvrages et les droits d'adhésion comptent pour une plus petite partie, mais tout de même importante. Pour l'exercice 2009, les recettes obtenues grâce au taux de change devraient donc éponger assez facilement le déficit projeté.

Abonnement aux versions électroniques et modèle de tarification en consortium

Le Conseil d'administration a approuvé une réduction de 15 % pour l'abonnement aux publications électroniques seulement pour 2009; 864 $ pour le JCM et le BCM, et 906 $ avec le CRUX with MAYHEM.

Le Conseil a aussi approuvé un modèle de tarification en consortium qui pourrait être appliqué au cas par cas, en partant du principe que les abonnés obtiennent des réductions lorsque la SMC voit ses recettes augmenter.

Les facteurs qui ont influencé cette décision sont les suivants:

- Les bibliothèques veulent avoir l'option de s'abonner aux publications électroniques seulement pour offrir un meilleur service à leurs utilisateurs (consultation à l'ordinateur, fonctions de recherche électronique, etc.) tout en réalisant des économies d'argent et d'espace.
- Le prix combiné 2009 pour le JCM et le BCM (1 017 $) en versions imprimées et électroniques est déjà réduit.
- Une réduction de 15 % sur l'abonnement aux publications électroniques seulement est sans doute le minimum nécessaire pour intéresser suffisamment les abonnés et se traduire naturellement en avantages pour les utilisateurs et en économies pour les bibliothèques.
- En ce moment, la SMC compte 160 abonnés au JCM et au BCM, de sorte qu'il faudrait environ 28 nouveaux abonnements ou renouvellements pour ramener à zéro le coût d'une conversion de 100 % aux publications électroniques seulement en 2009. Dans les faits, il n'y aura peut-être que de 3 à 6 personnes qui se convertiront la première année.
- En ce moment, 450 bibliothèques ne sont abonnées qu'au JCM. Or, nous pourrons offrir à ces bibliothèques l'abonnement au JCM et au BCM en version électronique seulement pour une petite hausse de 112 $ par abonné. Nous diffuserons cette option à grande échelle dans les bibliothèques et auprès des directeurs de départements, et elle sera au cœur d'une campagne de recrutement d'abonnés à nos publications.

Cette décision offre une certaine garantie financière à la SMC, les prévisions étant une conversion massive à court terme des abonnés du JCM uniquement à la version électronique seulement, ce qui se traduira par une augmentation globale des recettes. Cette décision nous aidera aussi à prévenir ou à réduire les annulations du groupe des 160 abonnés actuels. Compte tenu de la tarification en consortium, le recrutement de 28 nouveaux abonnés ou renouvellements d'abonnements échus ne

paraît pas difficile, pourvu que nous nous y appliquions de façon systématique et persistante, en particulier auprès des membres organisationnels de la Special Libraries Association (SLA).

L'objectif de ces changements est d'offrir aux abonnés des choix et une certaine souplesse par des moyens qui assureront une transition viable à long terme entre les publications imprimées et les publications électroniques. Cette démarche s'inscrit naturellement dans le modèle de tarification actuel des agents.

Initiatives de financement 2008

A. Campagne de financement 2008

En 2007, les objectifs de la campagne de financement de la SMC étaient les camps mathématiques et la sollicitation des anciens donateurs de la SMC et d'entreprises ou d'organismes avec lesquels la SMC a tissé des liens au fil des ans. Nous avons envoyé environ 65 propositions à des entreprises, à des fondations et aux gouvernements, la plupart dans la deuxième moitié de l'année, soit trop tard pour obtenir des effets mesurables sur les finances de 2007. Au début de 2008, nous avons reçu des réponses positives (CRSNG, Crabtree, Groupe financier TD, Fondation RBC, quelques gouvernements provinciaux), dont certaines ont abouti à des engagements sur plusieurs années.
En 2008, et d'après l'expérience de 2007, nous avons pensé qu'en faisant des recherches plus poussées, en élaborant une meilleure stratégie de sollicitation et en assurant une mise en œuvre et des suivis plus serrés, la SMC serait bien placée pour obtenir de meilleurs résultats. Nous avons

- Élaboré un programme cadre appelé CMS Math Advantage pour les camps de mathématiques, les concours et le CRUX with MAYHEM, et l'avons intégré à un programme de sensibilisation du public (par ex. : Forum sur l'enseignement des mathématiques 2009);
- Revu l'orientation et le vocabulaire des propositions;
- Conçu une base de données pour la campagne de financement pour pouvoir assurer les suivis nécessaires;
- Dressé une liste de 150 entreprises et fondations, et envoyé plus de 100 propositions dans la première moitié de l'année;
- Des rencontres ont eu lieu de mai à août avec des donateurs potentiels à Toronto, Ottawa et Calgary;
- Consulté un spécialiste des campagnes de financement canadiennes quant à l'orientation, le matériel et la méthodologie de la campagne.

Les résultats ont été décevants. Au moins six propositions se sont rendues au conseil d'administration d'entreprises ou de fondations, ce qui indique généralement un grand intérêt, mais nous n'avons reçu aucune réponse positive.

B. Commentaires et observations

Les points suivants reflètent les remarques des organizations qui ont décliné la demande pour supporter la SMC.

- La situation de l'économie canadienne et mondiale a de toute évidence des répercussions sur la campagne de financement de la SMC, mais ce n'est pas le seul facteur en cause.
- On semble généralement croire que la SMC devrait pouvoir trouver les fonds nécessaires à même ses membres (professionnels), soit au moyen de dons, soit en ajustant le prix de ses produits et services.
- Les activités d'éducation mathématique sont des activités grand public et devraient être financés par les gouvernements et non par des entreprises ou des fondations.
- Les entreprises veulent des engagements et des avantages directs et rapides en contrepartie de leurs dons : collaboration scientifique, accès direct à des employés potentiels presque prêts à intégrer le marché du travail, programmes réservés à la communauté où est située l'entreprise, etc.
- Les fondations souhaitent accorder du financement de démarrage à des programmes d'un an, très innovateurs et à haut risque, parce qu'elles croient que les programmes plus grands publics, comme les programmes d'éducation mathématique, sont financés par les gouvernements.
- Il n'y a pas, au Canada de fondation très grosse et très riche (Mellon, Carnegie, Ford, etc.).

C. L'avenir des activités de financement de la SMC

Depuis près de trois ans maintenant, et en particulier en 2008, la SMC a centré ses énergies sur la sollicitation des entreprises et des fondations (canadiennes, américaines ayant des bureaux au Canada, américaines qui disent faire des dons au Canada), ce qui n'a pas donné de très bons résultats. Selon les conseils que nous avons reçus, s'il y a une façon d'obtenir des résultats auprès de ces entreprises et fondations, ce sera avec l'aide de personnalités canadiennes bien nanties qui s'intéressent aux mathématiques ou à l'éducation mathématique. C'est une formule dont les résultats sont plus lents, mais les spécialistes nous disent que l'établissement de relations de ce type est la meilleure option pour la SMC à long terme.

Compte tenu des commentaires, observations et conseils d'experts que nous avons reçus, la SMC visera à recueillir environ 75 % de ses ressources auprès d'invidus, et 25 % auprès d'un petit nombre d'entreprises et de fondations dont les objectifs correspondent aux nôtres et où nous pourrons compter sur des influences internes pour faire avancer les intérêts de la SMC.

D. Changements au Comité pour l'avancement des mathématiques

Le sous-comité du financement du Comité pour l'avancement des mathématiques sera élargi et accueillera des personnes qui, sans être nécessairement membres de la SMC, pourront aider la SMC à mener ses activités de financement.

Mathematical Competitions Committee Report

Chair: Neal Madras (York)

The Mathematical Competitions Committee (MCC) oversees the Society's involvement in mathematics contests. The Society sponsors and runs two competitions: the Sun Life Financial Canadian Open Mathematics Challenge (COMC), in conjunction

with the Centre for Education in Mathematics and Computing (University of Waterloo), and the Canadian Mathematical Olympiad (CMO). The MCC is responsible for Canada's participation in the Asian Pacific Mathematics Olympiad (APMO) and the International Mathematical Olympiad (IMO), and supervises the Mathematical Olympiad Correspondence Program (Olymon) and the CMS National Math Camp.

Most of the work of the MCC is done by four sub-committees; the COMC, CMO and IMO Committees, and the Correspondence Coordinator. Further information, including press releases, on most of the items in this report can be found through the CMS Competitions web page www.cms.math.ca/Competitions/ and www.cms.math.ca/MediaReleases/.

The MCC and (especially) its sub-committees are very active, with a large number of deadlines throughout the calendar. We would like to thank all members for their enthusiasm, reliability, and hard work in making sure that everything runs smoothly. Special recognition is due to Edward Barbeau (Toronto) and Bill Sands (Calgary), who completed their terms as Chairs of the CMO sub-committee and IMO sub-committee respectively, on August 31, 2008, as well as to Daryl Tingley (New Brunswick - Fredericton), who completed his term as Math Camps Coordinator at the end of 2008. The CMS Executive Office staff, especially the Executive Director Graham Wright, also deserve our gratitude for their dedication.

The Canadian Mathematical Olympiad

96 students wrote the 40th Canadian Mathematical Olympiad on Wednesday, March 26, 2008. Eight students were presented with awards at the annual Awards Banquet at the University of Waterloo on Thursday, June 12, 2008:

FIRST PRIZE and the Sun Life Financial Cup - Chen Sun, A.B. Lucas Secondary School, London, ON; SECOND PRIZE - Jonathan Schneider, University of Toronto Schools, Toronto, ON; THIRD PRIZE – Yan (Cynthia) Li, Dr. Norman Bethune Collegiate Institute, Toronto, ON. HONOURABLE MENTIONS were awarded to: Dimitri Dziabenko, Don Mills Collegiate Institute, Toronto, ON; Neil Gurram, Indus Center for Academic Excellence, Troy, MI, USA; XiaoLin (Danny) Shi, Sir Winston Churchill High School, Calgary, AB; Chengyue (Jarno) Sun, Western Canada High School, Calgary, AB; and Tianyao Zhang, Sir John A. Macdonald Collegiate Institute, Toronto, ON. A full report of the CMO, including the question paper, solutions and an analysis of the grading can be found at www.cms.math.ca/Competitions/CMO/.

The candidates for the CMO are selected mainly on the basis of their performance in the Canadian Open Mathematics Challenge (COMC) written the previous November. We have been aware that this method of screening the candidates is imperfect, and the CMS introduced an intermediate step in 2008: the CMO Qualifying Repêchage (CMOQR). The top 67 students in the 2007 COMC were automatically invited to write the CMO. In January 2008, the next 200 (approximately) were invited to submit solutions to a set of ten repêchage problems posted on-line, within one week. Among these students, 126 submitted solutions, which were graded at the University of Waterloo under the supervision of Ian VanderBurgh. On the basis of the results, 35 additional students were invited to write the CMO. The first CMOQR was viewed as a successful experiment, which will continue for at least one more year before a decision is made as to whether and how to formalize the CMOQR as a permanent part of the CMS' annual competition cycle.

The Society is indebted to many sponsors for the success of the CMO, particularly to its dedicated and long-term major sponsor, Sun Life Financial.

The Asian Pacific Mathematics Olympiad

The 20th Asian Pacific Mathematics Olympiad (APMO) was written on March 10, 2008. A total of 36 Canadian students wrote the exam. The top two students were Chen Sun and Jonathan Schneider, with Nikita Lvov a very close third. The top ten students became Canada's official APMO contestants, and earned one Gold, two Silver, and four Bronze Awards, plus one Honourable Mention. Problem #5 of the contest was proposed by Daniel Brown of Toronto, a member of Canada's 1990 IMO Team. Further details regarding the 2008 APMO may be obtained through www.cms.math.ca/Competitions/APMO/.

International Mathematical Olympiad

The 49th International Mathematical Olympiad (IMO) took place in Madrid, Spain, from July 10 to July 22, 2008. The Team Leader was Dr. Felix Recio of the University of Toronto, the Deputy Leader was Mr. Yufei Zhao of the Massachusetts Institute of Technology, and the Deputy Leader Observer was Ms. Lindsey Shorser of the University of Toronto. The six high school students on the Canadian team were Yan (Cynthia) Li, Dr. Norman Bethune Collegiate Institute, Scarborough, ON; Alexander Remorov, William Lyon Mackenzie Collegiate Institute, North York, ON; Jonathan Schneider, University of Toronto Schools, Toronto, ON; XiaoLin (Danny) Shi, Sir Winston Churchill High School, Calgary, AB; Chen Sun, A.B. Lucas Secondary School, London, ON; and Chengyue (Jarno) Sun, Western Canada High School, Calgary, AB. The Canadian team placed 22nd out of 92 countries and Silver Medals were awarded to Yan (Cynthia) Li and Jonathan Schneider, and Bronze Medals to Alexander Remorov, XiaoLin (Danny) Shi, Chen Sun, and Chengyue (Jarno) Sun.

The Winter Training Seminar was hosted by York University, January 3-8, 2008, and was attended by fourteen high school students from across Canada. The local organizer was Neal Madras, assisted by Alfred Pietrowski and Andrew Toms (all from York University), as well as the staff of the Department of Mathematics and Statistics of Bethune College. The program of the seminar was organized by the Team Leader and Deputy

Leader, with the following assistant trainers: Edward Barbeau (Toronto), Peter Gibson (York), Lindsey Shorser (Toronto), and IMO alumni David Arthur, Peng Shi, and Jacob Tsimerman.

The Summer Training Seminar took place at Wilfrid Laurier University (WLU) from June 27 to July 9. On June 27, a Team Sendoff Reception was held at the Fields Institute in Toronto, where the Team was introduced to the local media, and later that afternoon the team members departed to WLU. Six local students from Ontario also attended the first few days of the Seminar. Thanks are due to Edward Wang for organizing the logistics of the Seminar. The trainers included the team leaders as well as Ed Barbeau, Felix Recio, Christopher Small (Waterloo), Edward Wang (Wilfrid Laurier University), and IMO alumni David Rhee (Waterloo), Adrian Tang (Calgary), and Jacob Tsimerman (Princeton). At the completion of the training, the team flew to Madrid, where they trained with the Swedish team for several days.

Lindsey Shorser's report on the 2008 IMO was published in the December 2008 issue of the CMS Notes. More information regarding the 2008 IMO can found at www.cms.math.ca/MediaReleases/ and www.cms.math.ca./Competitions/IMO.

Mathematical Olympiad Correspondence Program

The Mathematics Olympiad Correspondence Program (Olymon) is a continuing program in which secondary school students submit solutions to problems for marking. In 2008, there were nine sets of problems, proposed and marked by Edward Barbeau, Rosu Mihai, and Valeria Pandelieva. Generally, each set attracts solutions from about a dozen students. There are now over 500 problems with solutions available at:

www.cms.math.ca/Competitions/MOCP
or
www.math.utoronto.ca/barbeau.

CMS National Math Camp

The National Math Camp is designed primarily for younger Canadian students with at least two years remaining in high school (Grades 8-10) and with the potential to compete at the Mathematical Olympiad level. Participation in this camp is by invitation.

The 2008 CMS National Math Camp took place at John Abbott College (Quebec) from July 6 to 12. Seventeen students attended the camp (3 female, 14 male). We are grateful to the main organizer, Daniel Gatien (John Abbott), for all of his work in making this camp very successful. (See the Education Committee Report for information about the CMS Math Camps program.)

The Sun Life Financial Canadian Open Mathematics Challenge

November 2008 marked the thirteenth writing of the COMC, and its second under the banner of Sun Life Financial. The COMC is a collaborative activity between the CMS and the Centre for Education in Mathematics and Computing (CEMC). This Sun Life Financial Open Mathematics Contest (the Open) has several purposes. First and foremost, it aims to encourage students in their exploration of mathematics and problem-solving. Second, the Open provides an enrichment activity for teachers to use with their students during the fall term. And third, the Open is used by the CMS to identify students who will write the Canadian Mathematical Olympiad and who will attend, among other events, the Winter Training Seminar and the National Math Camp.

The 2008 Open had a record number of over 8200 participants (with almost 9200 registrants). The papers had an average mark of 43.9 out of 80, thus giving a good chance of success to every student who wrote the paper, while continuing to provide a challenge for the very best problem-solvers in the country. The 2008 Open also saw a marked increase in the number of international competitors, as well as Ontario competitors.

Thanks to the continuation in 2008-09 of the Canadian Mathematical Olympiad Qualification Repêchage, the Open does not have to be as difficult at the "top end", as there is now an additional mechanism to help select students to write the CMO. This should allow the COMC to maintain a slightly more consistent feel.

The top eight competitors in the 2008 Open were: Frank Ban, Vincent Massey Secondary School, Windsor, ON; Robin Cheng, Pinetree Secondary School, Coquitlam, BC; Neil Gurram, Indus Center for Academic Excellence, Troy, MI; Jonathan Schneider, University of Toronto Schools, Toronto, ON; Danny Shi, Sir Winston Churchill High School, Calgary, AB; Chen Sun, A.B. Lucas Secondary School, London, ON; Jarno Sun, Western Canada High School, Calgary, AB; Jonathan Zhou, Pinetree Secondary School, Coquitlam, BC. Thanks go to the hard-working Problems Committee who continue to ensure that the paper meets its varying goals, as well as the wonderful group of more than 70 graders. Further details are available at: www.cms.math.ca/Competitions/COMC/ or www.cemc.uwaterloo.ca/contests/open.shtml.

Nominating Committee Report

Chair: Edgar Goodaire (MUN) to June 30 and Richard Kane (Western) from July 1

Nearly 150 individuals contribute to the work of the Canadian Mathematical Society by serving on a CMS standing committee or sub-committee. During 2008, the Nominating Committee recruited 25 new volunteers to serve on these committees. This included both replacements for people whose terms expired at the end of 2008 and members to serve on the newly established Bilingualism Committee. Since 2009 is an election year, the committee also recruited another 20 people to stand as candidates for the CMS Executive Committee and for the

Board of Directors. The election will take place in the spring and those chosen will begin their service on July 1, 2009.

There is an enormous amount of energy and talent within the Canadian mathematical community. Nevertheless, it always proves to be a significant challenge for the Nominating Committee to identify individuals willing to contribute their talents and expertise to the Society, especially individuals who have not served the Society before. Given the major turnover in mathematics faculty across the country in the last few years, it is important to involve such "new people" and, given the changing gender balance in graduate schools and faculties across the country, it is particularly important to recruit more women to fill these positions. As well, the Committee also made a concerted effort to enlist the support of business and other professional people from outside academia because of the special expertise and fresh view points such individuals provide. The Society is grateful for the contributions to the Board of Directors and committees such as Electronic Services, Finance and Invested Funds, of people like Timothy Appelt, David Bates, Thomas Hurd, David Oakden, Klaus Peters, David Rodgers and Walter Stewart.

If you know of anyone within or outside academic circles whom you believe could help the Society, or if you yourself can see an opportunity for service, you are urged to contact the Chair of the Committee (chair-nomc@cms.math.ca).

Publications Committee Report

Chair: Matthias Neufang (Carleton)

The chief mandate of the CMS Publications Committee is to oversee and participate in various activities of the Society related to its publications. In particular, the Committee plays a key role in Editorial Board appointments. As reported below, many changes of this nature occurred within the last year.

In January 2008, the Committee welcomed three new Members for a three-year term:

- Javad Mashreghi (Laval);
- Mary Pugh (Toronto);
- Andrew Toms (York).

The current Editors-in-Chief of the *Canadian Journal of Mathematics* are Henry Kim and Robert McCann of the University of Toronto who are beginning the third year of their term. The Editors-in-Chief of the *Canadian Mathematical Bulletin*, Nantel Bergeron and Jianhong Wu of York University, are beginning the fourth year of their term.

Of the 11 Associate Editors on the Editorial Board for the *Canadian Journal of Mathematics* and the *Canadian Mathematical Bulletin* in 2008, Stephen Boyer (UQAM) and Pengfei Guan (McGill) stepped down in December at the end of their term. Stephen Kudla (University of Toronto) agreed to serve for another five-year term. The following individuals were appointed by the CMS Board of Directors for five-year terms as associate editors commencing in January 2009:

- Vladimir Pestov (Ottawa);
- Gordon Slade (UBC);
- Roland Speicher (Queen's);
- Vinayak Vatsal (UBC);
- Jie Xiao (MUN).

Thanks are due to ad hoc Electronic Submissions Sub-committee of the Publications Committee, chaired by David Rodgers, as well as to Robert McCann and Nantel Bergeron. As recommended by the Sub-committee, an online system - Editorial Express - for submitting, processing, refereeing and tracking articles submitted to the CJM or CMB, has been purchased and fully implemented. The system greatly streamlines the processes both for authors and for the editorial process.

Following the established tradition of alternating between the *Canadian Journal of Mathematics* and the *Canadian Mathematical Bulletin*, the 2008 G. de B. Robinson Award was given for the best article published in the CJM in 2006 or 2007. The recipients of the 2008 G. de B. Robinson Award were Dmitry Jakobson (McGill), Nikolai Nadirashvili (CNRS Marseille) and Iosif Polterovich (Montréal) for their article *Extremal metric for the first eigenvalue on a Klein bottle* which appeared in the *Canadian Journal of Mathematics* (2006), volume 58, no. 2, pages 381-400.

Bruce Shawyer (Memorial University) has been appointed for another three-year term starting in January 2009, as Editor-in-Chief of the series *A Taste of Mathematics* (ATOM). Graham Wright (CMS) will continue his service as Managing Editor until June 2009.

In 2008, Volume VIII: *Problems for Mathematics Leagues III*, by Peter Booth, John Grant McLoughlin and Bruce Shawyer appeared; and Volume IX: *The CAUT Problems*, by Edward Barbeau will be released in early 2009.

In March 2008, with Jim Totten's sudden passing, the Society lost a long-time friend and tireless worker who, beyond his retirement from Thompson Rivers University in 2007, had continued to serve as Editor-in-Chief of *Crux Mathematicorum with Mathematical Mayhem*. The Society is very grateful to Vaclav Linek of the University of Winnipeg for his work as Editor-in Chief since then. Further CRUX appointments approved by the Publications Committee are:

- J. Chris Fisher (University of Regina) as Problems Editor for a five-year term starting in January 2009;
- Mogens Lemvig Hansen (Yen-Hansen Learning Centre) and Lily Yen (Capilano University) as Skoliad Editors for one-year terms starting in January 2009, after Robert Bilinski (Collège Montmorency) stepped down in December 2008;

- John Grant McLoughlin (University of New Brunswick) as Member-at-Large for a one-year term starting in January 2009;
- Amar Sodhi (Memorial University, Sir Wilfred Grenfell College), as Book Reviews Editor for a five-year term starting in January 2009;
- Nicolae Strungaru (Grant MacEwan College) as Problems Editor for a five-year term starting in January 2009.

The Editors-in-Chief of the CMS Books in Mathematics series, published by Springer, are Karl Dilcher and Keith Taylor from Dalhousie University. Both the terms of Karl Dilcher as an Editor-in-Chief and of Richard Kane (Western) as an Associate Editor have been renewed for another five-year period starting in January 2009. The following books were published in the series in 2008 or will appear in 2009:

- *Biorthogonal Systems in Banach Spaces*, by P. Hajek, V. Montesinos Santalucia, J. Vanderwerff, and V. Zizler (2008);
- *The Riemann Hypothesis: A Resource for the Afficionado and Virtuoso Alike*, by P. Borwein, S. Choi, B. Rooney, and A. Weirathmueller (2008);
- *A Concrete Approach to Classical Analysis*, by M. Mureşan (2009).

In July 2008, Henri Darmon (McGill University) was appointed the Editor-in-Chief of the CMS Treatises in Mathematics series, published by A.K. Peters. At the same time, Jonathan Borwein (Dalhousie University) has been appointed Member of the Editorial Board. Their terms will end in December 2012 and December 2013, respectively. In 2008 one book was published: *Factorization: Unique and Otherwise* by S.H. Weintraub.

The terms of the CMS Notes Editors-in-Chief Robert Dawson (Saint Mary's) and Srinivasa Swaminathan (Dalhousie) have been renewed for three years starting in January 2009. Edward Barbeau (University of Toronto) will continue his role as Contributing Editor (Education) on the CMS Notes Editorial Board to June 2009.

Both the terms of Michael Doob (Manitoba) as Technical Consultant and Craig Platt (Manitoba) as Technical Editor have been extended for another three years. Moreover, Srinivasa Swaminathan's term as Associate Technical Editor was renewed, effective January 2008, and will end in December 2010.

Research Committee Report

Chair: Edward Bierstone (Toronto)

The Research Committee met on June 2, 2008 at the CMS Summer Meeting in Montreal, and on November 23, 2008 at the Fields Institute, Toronto. Much of the Committee's work is done by email correspondence.

The Research Committee helps select the scientific organizers for the summer and winter meetings, and participates in the scientific organization of these meetings. The Committee participates, to a lesser extent, in the organization of other special meetings of the CMS.

The Committee selects the winners of the Coxeter-James, Jeffery-Williams and Krieger-Nelson Prizes. These prizes recognize outstanding contributions to research by members of the Canadian mathematical community (the Coxeter-James Prize by younger mathematicians and the Krieger-Nelson by women mathematicians).

At the meeting in November 2008, the Research Committee selected the following prize winners: 2009 Coxeter James - Patrick Brosnan (UBC), 2010 Krieger-Nelson - Lia Bronsard (McMaster), and 2010 Jeffery-Williams – Mikhail Lyubich (SUNY - Stony Brook).

The Research Committee appoints the members of the Doctoral Prize Selection Committee (one of whom must be a member of the Research Committee). The Committee selected Matthew Greenberg (Ph.D. – McGill) as the recipient of the 2008 Doctoral Prize for his thesis supervised by Eyal Goren and Henri Darmon.

A summary of the CMS meetings held in 2008 is as follows:

Second Canada-France Congress 2008

(June 1-5, Université du Québec à Montréal)

The Second Canada-France Congress 2008 (June 1 to 5) hosted by was organized in partnership with the following organizations: Canadian Applied and Industrial Mathematics Society (CAIMS), Centre de recherches mathématiques (CRM), Fields Institute, Institut des sciences mathématiques (ISM), Mathematics of Information Technology & Complex Systems (MITACS), Pacific Institute for the Mathematical Sciences (PIMS), Société de Mathématiques Appliquées & Industrielles (SMAI), Société Mathématique de France (SMF), and Université du Québec à Montréal (UQAM). Close to 800 participants attended the 33 scientific sessions and mini-symposia, poster presentations, and workshops.

The Scientific Directors - Octav Cornea (Montréal), Nassif Ghoussoub (UBC), and François Loeser (ENS), together with the entire program committee - Jean-Pierre Bourguignon (IHES), Ivar Ekeland (UBC and PIMS), Étienne Ghys (ENS, Lyon), Arvind Gupta (SFU and MITACS), Barbara Keyfitz (Fields and Houston), François Lalonde (CRM and Montréal), William F. Langford (Guelph), Claude Le Bris (École nationale des Ponts et Chaussées), Etienne Pardoux (Provence), Gilles Pisier (Paris VII), and Christiane Rousseau (Montréal), who was also the Chair of Local Arrangements, planned the superb program.

Yves André (CNRS-ENS, Paris), Olivier Biquard (Strasbourg), Luc Devroye (McGill), Andrew Granville (Montréal), Alice Guionnet (CNRS-ENS, Lyon), Rick Kenyon (Brown), Gérard Laumon (CNRS-Orsay), Eric Sere (Paris-Dauphine), Jean-Pierre Serre (Collège de France), Nicole Tomczak-Jaegermann (Alberta),

Nizar Touzi (CREST-Paris), Jianhong Wu (York) presented the plenary lectures; Yvan Saint-Aubin (Montréal) presented the public lecture. The Prize Lectures were given by Alysson M. Costa (Universidade de Sao Paulo, Brazil) - CAIMS Cecil Graham Doctoral Dissertation Award; Alan George (Waterloo) - CAIMS Research Prize; Edward Bierstone (Toronto) - CMS Excellence in Teaching Award; Izabella Laba (UBC) - CMS Krieger-Nelson Prize; and Martin Barlow (UBC) - CMS Jeffery-Williams Prize.

CMS Winter Meeting 2008

(December 6-8, Ottawa, Ontario)

The Scientific Directors, Matthias Neufang and Benjamin Steinberg (Carleton) organized the 23 scientific sessions for this meeting.

The program included plenary lectures given by David Acheson (Oxford), Fan Chung (UC San Diego), Gilles Godefroy (Paris), Sorin Popa (UCLA), Laurent Saloff-Coste (Cornell), Mark Sapir (Vanderbilt), and Keith Taylor (Dalhousie), and the public lecture by Patrick Hayden (McGill). The prize lectures were given by: Harley Weston (Regina) - Adrien Pouliot Award; Ravi Vakil (Stanford) - Coxeter-James Prize; and Matthew Greenberg (Calgary) - Doctoral Prize.

With 475 participants, this was one of the best-attended CMS Winter meetings.

The 4th Workshop of *Connecting Women in Mathematics Across Canada* (CWiMAC 2008), organized by the CMS Committee for Women in Mathematics, took place at the University of Ottawa just before the 2008 Winter Meeting.

Student Committee Report

Co-chairs: Jenna Tichon (Winnipeg), Joy Abramson (York) to June 30 and Iva Halacheva (Toronto) from July 1

The Student Committee (Studc) has seen a significant overhaul in its membership in 2008 as the majority of the positions were filled by new members. We are excited to have this new group of people with fresh ideas and a lot of enthusiasm continue the committee's previous projects as well as undertake new ones. Even with the undergoing membership changes, the Committee continued its work in reaching out to Canadian undergraduate and graduate students, and encouraging communication among students from across the country.

Change of Membership

The Committee members whose terms ended in 2008 were Joy Abramson, Riyaad Dinath, Melisande Fortin-Boisvert, Laura Gauthier, Kathryn Mann, and Jessica McDonald. Thanks are due to these members for their work and dedication to the Student Committee. The new members of the Student Committee are: Gary Bazdell, Joanne Colling, Bradley Dart, Kseniya Garaschuk, Nathaniel Johnston, Louis-Xavier Proulx and Natasha Richardson. Their biographies are available at www.cms.math.ca/Students/Studc/.

Studc Website

The website has been updated on a regular basis. New projects have been planned for the new year. One of these is to re-launch the forum to encourage communication between mathematics students all over Canada. Also, new tools for communicating will be added on the website. We encourage readers to visit www.cms.math.ca/Students/. If you have any comments about the website, please e-mail student-webmaster@cms.math.ca.

Student Mailing Lists

The Studc webmaster moderates listservers that distribute announcements to math students across the country. There are separate lists for graduate and undergraduate students. There are currently 161 members on the graduate list and 208 members on the undergraduate list. The Committee is working to increase the frequency of postings to this list. The responsibility of sending relevant content to the list has been transferred to Bradley Dart.

Student Events

At every CMS meeting, Studc organizes successful student events. The task of organizing these events entails finding suitable speakers, getting gifts for the speakers and ordering lunch for students, creating the discussion points, and moderating the panel; contacting the local math student organizations, booking the social location, and printing flyers for the student activities.

At the 2008 CMS Summer Meeting, a panel discussion took place on the hiring process at universities. The 2008 CMS Winter Meeting featured a panel with four speakers on the topic "What, When, Who and How of Thesis Writing". At both meetings, catered student socials took place at a local pub.

Poster

The current version of the Studc poster was created some time ago. English and French versions are available on the Studc website. However, the poster is outdated and work is underway on creating a new poster.

Canadian Undergraduate Mathematics Conference

The 15th Canadian Undergraduate Mathematics Conference was held at the University of Toronto (July 9th to 12th). This was one of the highlight events in undergraduate mathematics in Canada for the year. The conference brought together over 150 undergraduates from across the country with more than 80 student talks and several keynote lectures. CUMC 2008 received administrative support from Studc, and financial support ($1000) from the CMS as well as support from various other scientific organizations. CUMC 2009 will be hosted by Carleton University (July 8th to 11th) and promises to be another great event.

Student Newsletter

The Winter 2008 issue was the 11th volume of The Student Mathematical Communicator. The Studc newsletter is a great way to keep students informed about mathematical events and activities, provide book reviews and articles on topics in

mathematics as well as some interesting trivia, and at the same time increase awareness about the Student Committee. The11th Volume was recently mailed to mathematics departments across Canada and included information about Studc and articles on topics like Pure Math vs. Applied Mathematics, Math in Quantum Computing, and the MITACS Industrial Math Summer School. In addition to contributions from Committee members, students are also encouraged to submit articles.

Committee on Women in Mathematics Committee Report

Chair: Ping Zhou (St. Francis Xavier)

The Committee on Women in Mathematics is charged with monitoring the status of women within the Canadian mathematical community, recommending actions that will help to ensure equitable treatment of women in the community, and encouraging the participation of women in mathematics at all levels.

The main activity of the Committee in 2008 was to host the fourth Connecting Women in Mathematics Across Canada (CWiMAC) workshop (held previously in 2003, 2005, and 2006). The purpose of the workshop is to bring together women in mathematics from all different levels (undergraduate and graduate students, postdoctoral fellows, and women in junior and senior faculty positions), with the aim of supporting women in the early stages of their career in the mathematical sciences. The CWiMAC 2008 workshop was held from December 4 to 5, at the University of Ottawa, in conjunction with the CMS Winter Meeting. Thirty-four women participated in the 2008 workshop and financial support was received from the CMS and the Fields Institute. The support provided partial funding for travel and registration.

The opening talk was given by Margaret-Ann Armour (Alberta) and focused on the needs and strategies for increasing the number of women faculty in mathematics and science departments. Mentorship was facilitated through informal pairings of junior and senior women at both dinner and lunch discussions. The dinner discussion was preceded by a presentation from Larissa Vingilis-Jaremko (Canadian Association for Girls in Science). The second day began with two featured talks by Gerda de Vries (Alberta) and Malgorzata Dubiel (SFU) followed by a Poster Session. The lunch was followed by a presentation by Wendy MacCaull (St. Francis Xavier). The most interactive part of the workshop was a panel discussion which tackled issues brought up by both the panelists and the audience. Six postdoctoral fellows presented their research in two parallel sessions each of which included three 20-minute talks. These presentations showcased a broad range of mathematical topics, ranging from pure to applied mathematics and mathematics education.

During 2008, the Committee continued working with the CMS Executive Committee to establish guidelines for the purpose of increasing gender diversity among speakers (particularly plenary and public speakers) at the CMS semi-annual meetings.

2008 Putnam Competition Results

The 69th Putnam Competition was written on December 6, 2008, and two Canadian teams performed among the top ten, and five students from Canadian Universities achieved at least honourable mention.

Ranking between 6 and 10 among 405 teams were the teams from the University of Toronto, consisting of Viktoriya Krakovna, Konstantin Matveev and Alexander Remorov, and the University of Waterloo consisting of Elyot Grant, Steven N. Karp and Dong Uk Rhee.

The top ranking student from a Canadian University was Cedric Lin from the University of British Columbia who ranked between 6 and 16 among 3627 candidates; he qualifies for an award of $1000 (US). Two students ranked between 17 and 25, Konstantin Matveev from the University of Toronto and Dong Uk Rhee from the University of Waterloo. These two students will each receive an award of $250.

Farzin Barekat from the University of British Columbia and Viktoriya Krakovna from the University of Toronto ranked between 26 and 79 and received Honorable Mention.

Ms. Krakovna also receives the Elizabeth Lowell Putnam Prize of $1000 for the top female competitor.

The top score out of 120 was 117. Mr. Lin received a score of at least 87 and the remaining students a score of at least 58. A Candian student at MIT and former Canadian IMO team member, Yufei Zhao, is a Putnam Fellow, one of the top five candidates with a score of at least 101. Our congratulations go to all of these students on a fine performance.

2008 CONTRIBUTORS / DONATEURS POUR L'AN 2008

The Canadian Mathematical Society would like to thank and acknowledge the following members, individuals, governments, foundations, institutes and corporations for their financial support and encouragement as well as those supporters who contributed anonymously to the Society's various activities.

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York University
York University, Dean of Arts
Ping Zhou

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

MAY 2009 MAI

4-8 Combinatorics, Randomization, Algorithms and Probability
(CRM, Montreal, QC)
www.crm.umontreal.ca/CARP09/Index.php

8-10 Workshop on "Connections in Geometry & Physics"
(Perimeter Inst. for Th. Physics, Waterloo, ON)
www.math.uwaterloo.ca/~gap/

10-15 ICMI (International Commission on Math Instruction) Study Conference on 'Proof and Proving in Mathematics Education'
(Taipei, Taiwan)
www.icmi19.com

27-31 Fields Institute Workshop on Geometry Related to the Langlands Programme
University of Ottawa, Ottawa, Canada
www.fields.utoronto.ca/programs/scientific/08-09/Langlands

31-June 1 MITACS 2009 Annual Conference - Celebrating 10 Years of Making Research Count
(Wu Conference Centre, University of New Brunswick, Fredericton, NB)
www.mitacs.ca/AC09

JUNE 2009 JUIN

6 - 8 **CMS/CSHPM Summer Meeting 2009**
Memorial University of Newfoundland, St. John's (NL)
www.cms.math.ca/Events

9 - 13 International Conference on Nielsen Theory and Related Topics
Memorial University of Newfoundland, St. John's (NL)
keppelma@unr.edu

14 - 20 47th International Symposium on Functional Equations
(Gargnano, Italy)
GianLuigi.Forti@mat.unimi.it

10 - 14 Annual meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS 2009)
(University of Western Ontario,London, ON)
www.apmaths.uwo.ca/CAIMS2009

15-18 3rd International Conference On Maths and Stats (Athens, Greece)
www.atiner.gr/

15-19 Analytic Theory of automorphic forms
(Woudschoten, Netherlands)
www.math.uu.nl/rb65

15-July 3 Summer School and Conference in Geometric Representation Theory and Extended Affine Lie Algebras (University of Ottawa)
www.fields.utoronto.ca/programs/scientific/08-09/geomrep/

22-July 3 SMS Summer School on Computational and Experimental Approaches to Automorphic Forms
(CRM, Université de Montreal, QC)
benhima@CRM.UMontreal.ca

25-28 Computer Algebra in Education session of ACA 2009
(Ecole de technologie superieure, Montreal, QC)
http://aca2009.etsmtl.ca/Education/
Univ. Bialystok,

28-July 4 Workshop on Geometric Methods in Physics
(University of Bialystok, Bialowieza, Poland)
www.wgmp.uwb.edu.pl/index.html,
voronov@manchester.ac.uk

JULY 2009 JUILLET

10 - 12 Ninth International Conference on Mathematical Knowledge Management (Grand Bend, ON)
www.orcca.on.ca/conferences/cicm09/mkm09

10 - 22 **The 50th International Mathematical Olympiad (Bremen, Germany)**
www.cms.math.ca/Competitions/IMO/

12-Aug 8 AARMS (Graduate) Summer School 2009, UNB-Fredericton
www.aarms.math.ca/summer/

27 - 30 The Society for Mathematical Biology Annual Meeting
(UBC, Vancouver, BC)
www.math.ubc.ca/research/MathBio/SMB2009/

AUGUST 2009 AOÛT

3 - 8 International Congress on Mathematical Physics (ICMP09)
(Clarion Congress Hotel, Prague, Czech republic)
www.icmp09.com

12 - 14 18th USENIX Symposium
(Le Centre Sheraton Hotel Montreal,West Montreal, QC)
www.usenix.org/events/sec09

13-15 **Second CMS/SMM Meeting 2009**
Host: Pacific Institute for the Mathematics Sciences (PIMS)
University of British Columbia, Vancouver (BC)
www.cms.math.ca/Events/CMS-SMM-2009/

OCTOBER 2009 OCTOBRE

12-16 Algebra, Geometry, and Mathematical Physics 5th Baltic-Nordic Workshop (Bedlewo, Poland)
www.agmf.astralgo.eu/bdl09/

DECEMBER 2009 DÉCEMBRE

5 - 7 **CMS Winter Meeting 2009, Host: University of Windsor**
Hilton Hotel, Windsor (ON)
www.cms.math.ca/Events/winter09/

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Math in Moscow Program
www.mccme.ru/mathinmoscow/

Application details
www.cms.math.ca/Scholarships/Moscow

For additional information please see your department or call the CMS at 613-733-2662.

Deadline **September 30, 2009** to attend the Winter 2010 semester.

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Programme Math à Moscou
www.mccme.ru/mathinmoscow/

Détails de soumission
www.smc.math.ca/Bourses/Moscou

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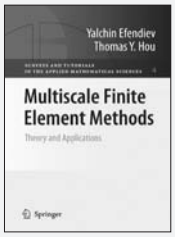

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Yalchin Efendiev, Texas A & M University, College Station, TX, USA; **Thomas Y. Hou**, California Institute of Technology, Pasadena, CA, USA

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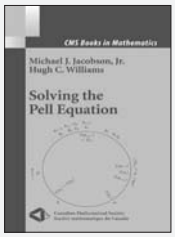

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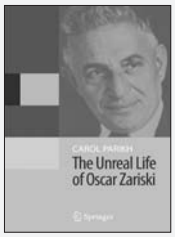

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