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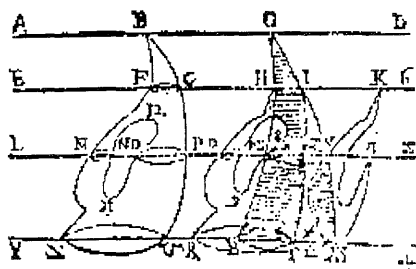
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**Canadian Society for History
and Philosophy of Mathematics**

**Société canadienne d'histoire et
de philosophie des mathématiques**

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ABOUT THE SOCIETY

Founded in 1974, the Canadian Society for the History and Philosophy of Mathematics / Société canadienne d'histoire et de philosophie des mathématiques (CSHPM /SCHPM) promotes research and teaching in the history and philosophy of mathematics. The Society's officers are:

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Further information is available on the Society's Web site, designed and maintained by Glen Van Brummelen. The URL is www.kingsu.ab.ca/~glen/cshpm/home.htm.

BSHM II

Preliminary planning is under way for the second joint meeting of the CSHPM and its sister society the British Society for the History of Mathematics (BSHM). The first such meeting was hosted by the British side, with much panache, at Oxford last July.

Jim Tattersall, who has taken the lead in advance planning for the reunion, has proposed that it be held at the Institute for the History and Philosophy of Science and Technology (IHPST), University of Toronto, from July 15 to July 17, 1999. The CSHPM's Executive Council has voted, without dissent, in favour of this plan, and has also endorsed, again without dissent, the idea of holding the own Society's Annual Meeting at the same time and place, *instead of* having it in late May or early June as usual. This arrangement now awaits only formal approval by the BSHM, whose Executive was to consider the matter in April. Updated information will be reported at the Ottawa meeting in May and communicated to members by e-mail.

Craig Fraser, who is based at the IHPST, has nobly volunteered to look after local arrangements if the present proposal goes ahead. The plan is for the session to begin with a reception on July 14 and conclude with a banquet on July 17; lodging would be available at the U of T's Victoria College.

<p>"In spite of rather devastating subsequent refutations, philosophers with a background in mathematics or physics continue to cling to the myth of mathematics as the queen of the sciences ... There are sciences, like systematics and evolutionary biology, in which the contributions of mathematics are very minor." ----- Ernst Mayr</p>
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A message from the President

Robert Thomas

My actions as president since I wrote in the last *Bulletin* have been rather limited. I have persuaded Len Berggren to step in as a new Nominating Committee, and he has done a fine job of lining up folks to stand for the new two-year terms (at least I hope that with all this warning the terms can be two years long). I have represented the Society at the annual meeting of the Humanities and Social Sciences Federation of Canada in Ottawa at the end of November — more on that in the next paragraph. And I have watched as other members of the Society have done their jobs, Sharon and Hardy putting out the *Bulletin* together while apart, Glen coping with our financial affairs while banking out of the country, Jim organizing our joint meeting with the British Society in 1999, Fran Abeles organizing the special session on late-nineteenth-century mathematics for the May meeting in Ottawa, Glen putting together the rest of the program for that occasion, and Ed Cohen making the local arrangements. (Ed recently had a stint in hospital; I'm glad to report that he's doing fine.)

I want to say a bit about the HSSFC and its annual meeting. Belonging to HSSFC costs us something. It is well worth it. Not only are we supporting a very useful lobby group that speaks for the humanities and social sciences in Ottawa and is listened to, but also we can call upon its good offices in our own dealings with the Social Sciences and Humanities Research Council, a body that they are adept at dealing with and that both Glen and I have found impossible to deal with directly as an unimportant client of a large faceless bureaucracy. Last year we had our cut-off funding restored. This past fall there seemed to be a real danger that our travel grants would not be forthcoming this year. The results of my inquiries about this at SSHRC were totally incomprehensible. We handed the matter over to HSSFC, and were told that the grants would be coming. It was as though I hadn't spoken the right

language! It is useful for us to be represented at HSSFC's annual meeting, and it is essential that organizations come to it or it can't happen. I want, however, to propose a change from the present (and past) custom of our President's going to that meeting, at some expense, to the policy adopted by a number of other organizations, which is to appoint as representative someone who lives in Ottawa (or at the most distant Kingston or Montreal). It is little trouble and expense for such a person to attend the meeting. The latter includes a rather good banquet -- adequate recompense for a local representative (along with whatever may be of interest in the meeting itself). This year my travel cost the Federation, the Society, and me about a hundred dollars each. I think that this is unnecessary. I shall put this proposal before our Executive at the May meeting.

It is a great pleasure to see this *Bulletin* blossoming, under the content editorship of Hardy and technical editorship of Sharon, into as good a newsletter as we have ever had.

As historians and philosophers you have an interest in how the world turns. You may therefore be a little interested that the department that I have been acting head and then head of for the last four calendar years is ceasing to exist at the end of my term, June 30. The Department of Applied Mathematics, created in April, 1974, will be rolled into the Department of Mathematics, whose new name is not yet decided. I am hoping to recuperate from my administrative labours next year at Wolfson College, Oxford.

We have a second joint meeting with the BSHM to look forward to, beyond our Ottawa meeting this May. The BSHM session is tentatively scheduled for July '99, in Toronto (see news item on page 2 above). The Executive Council has considered the advisability of our *also* meeting in May or June next year, as usual -- our regular participation in the annual "Congress of the Social Sciences and Humanities" (the new name for the old "Learned Societies Conference"). The '99 Congress will be in Lennoxville/Sherbrooke, Quebec -- perhaps not (See **President** page 14)

LOOKING BACK...

Ubiratan D'Ambrosio



A special conference at the joint AMS-MAA meetings in Baltimore in January celebrated the 65th birthday of longtime CSHPM member Ubiratan D'Ambrosio; a report on that conference appears on page 16 below. To further mark the occasion, the Bulletin invited "Ubi" to set down some reflections on his career and his philosophy. The photo shows him and his wife Maria relaxing at a resort near their home in São Paolo.

THE FORMATIVE YEARS

I begin by relating an experience which led me to an obsessive pursuit of peace.

Brazil entered WWII in 1942, joining the Allied Forces. War was something remote to us in Brazil. Newspapers and radios would report on the events, but everyday life was practically normal for us. When the war in Europe ended, some cinemas announced movies about the concentration camps. The movies were restricted to people younger than 14. I was so curious that I forged my age on my

student card. It was the only forgery in my life! And it was worthwhile. For some time I could not sleep. I was afraid of the possible consequences of my forgery, but most shocked about the scenes I had witnessed. If what was shown were the acts of the legally established government of a nation with the highest standards of civilization, how would I classify my act? Soon after that, I went to see the movie showing the "glorious" drop of the atomic bomb on Hiroshima and Nagasaki. While the first of these brutalities was dealt with by the

Nuremberg tribunal, the second was reacted with Congressional Medals and honors. The relations of morality, legality and rationality became my main intellectual concern.

Later I joined civil rights struggles, environmental action groups and the Pugwash movement. I am convinced that we can pursue peace only if we regard it in its many dimensions: military peace, environmental peace, social peace and inner peace.

I was also much marked by my professional initiation. My father, who was a math teacher, used to tutor groups of students preparing to take examinations for admission to the public administration. It was mainly Finance Mathematics. Soon, while 15 years old, I was given the responsibility of conducting a few classes on my own. I still remember how much I enjoyed this experience and how well those students, much older than their adolescent teacher, reacted to my classes. After 50 years of professional life, my style is practically the same, learned from my father. I was not then a "Mathematics Educator". I was a math teacher, seemingly a good one. I would become what is academically identified as a Mathematics Educator only in the early seventies.

After this initiation, I went to the Faculty of Sciences at the University of São Paulo for a degree in Mathematics. In 1954 I completed a major in Mathematics and was certified to teach in public schools. At that time there were no formal graduate programs in Brazil. The model was European and the doctorate was granted upon the completion of a thesis. Research was the focus. Soon after graduation I engaged in a research seminar in Number Theory. The influence of André Weil was still prevailing in the University of São Paulo and my theme was Class Field Theory. In this period I published a couple of papers. I was struggling with Chevalley's and Weil's seminal papers when a tenure-track position opened at the new campus at São Carlos, about 200 miles north of São Paulo. In those days such an appointment was as an Assistant to a Full Professor, in the European style. This position was as Assistant to

Jaurès P. Cecconi, a distinguished Italian analyst, former student of Leonida Tonelli, working in Area Theory and Calculus of Variations. Cecconi had been hired, together with two other Italian mathematicians, Achille Bassi and Ubaldo Richard, to build up a mathematics department in São Carlos.

Cecconi gave me the choice of what direction of research to follow, but it was wiser for me to work with him. And soon I was diverting the focus of my research to Real Analysis, focused on Area Theory and Calculus of Variations. I owe much to Cecconi. For him, teaching was as important as research. He taught freshman calculus. Indeed, it was a rigorous course in Real Analysis, in the line of Severi and Tonelli. As his Assistant, I was supposed to attend his lectures and complete and elucidate details of the proofs, do problems and exercises with the students, and occasionally conduct classes. Later I realized that he saw this as a mission of the advisor: to prepare the student to be a professor. And to be a human being in the totality of our actions. Everything is related: research, teaching, professional life, family life, citizenship. I was fortunate to have Cecconi as a mentor.

In an academic career, research was -- and continues to be -- very important. I had to complete my doctoral thesis in five years in order to get tenure. There were no courses to follow. What are considered the basic courses in the usual graduate programs we had to read on our own, to organize seminars and, of course, the professors were always available. Among the required books, I remember Saks, Caratheodory, van der Waerden, Hausdorff, Banach, and several volumes of Bourbaki, as having excited me most. This is the right feeling when you belong to a group doing mathematics and not merely listening to lectures. We read much more than what is required in the usual graduate programs. And the research area was always present, from the beginning. Cecconi thought that the approaches of L.C. Young (generalized surfaces / distributions) and of H. Federer and W.H. Fleming (currents) might be combined with the R. Cacciopoli and Ennio De

Giorgi techniques of Measures and Finite Perimeter. But he felt that to deal significantly with these modern ideas, it was important to understand the classics. And the list of papers to read was substantially increased by adding works of classical Area and Measure Theory (mainly H. Lebesgue) and of classical direct methods in Calculus of Variations (D. Hilbert and mainly L. Tonelli) and the seminal works of Jesse Douglas, L. Cesari and C.B. Morrey, Jr. Later my thesis subject focused on semicontinuity theorems in the calculus of variations. This was a good research program.

BROADENING MY VIEWS OF SOCIETY, OF THE WORLD AND OF MATHEMATICS

In 1963, upon completion of my doctorate, I went to Brown University to work with W.H. Fleming. Once again, my mentor was exemplary. I am so indebted to him as a model of the highest academic standards. As a teacher and a researcher and for his human qualities, Fleming was very influential in my life. The stay in Brown was rewarding. The intellectual and friendly atmosphere in that relatively small department was something I would not see in other places. In Brown I was fortunate to learn from Wendell Fleming, Herbert Federer, John Wermer, Ennio De Giorgi (who was visiting while I was there) and from the younger generation, Fred Almgren, William Ziemer, John Brothers, Yuji Ito and many others. I also met on several occasions L.C. Young and L. Cesari. I became familiar with the work of Hassler Whitney. While my research was focused in Geometric Measure Theory, I used to benefit also from what was going on in the Department of Applied Mathematics and my interest began to broaden to include Singularities and Dynamical Systems.

There I attended the seminars of René Thom. These were the early days of Catastrophe Theory and I focused my interest on non-linearity. My feeling was that it would be difficult to deal with non-linear phenomena with the instruments of Analysis based on time as an associative structure. My idea was to remove associativity. This led me to some works of Hadamard on Huyghens'

principle and to formulate what I called "dynamical systems with memory". I needed to study non-associative actions. What I could see on non-associative structures were only quasi-groups, loops and some Grassmannian structures. I did not advance much in the study of the dynamical systems with memory, but my interest in the philosophical, historical, religious and psychoanalytical dimensions of time remains. These led me naturally to look into Systems, Complexity and Chaos. My deeper involvement with the History of Mathematics dates from these times. I was interested in the generation of mathematical ideas: which factors are involved in the beginnings of mathematical theories, and also how these ideas are intellectually organized (epistemology) and how they are appropriated by the establishment and diffused through the media and school systems.

In 1968 I accepted a permanent position at the State University of New York at Buffalo. The SUNY system had been founded a few years before as a very modern university. The Buffalo campus was mainly a graduate center and its focus was interdisciplinary research. The main strengths of the university were focused on the emerging fields of Molecular Biology, Computational Linguistic and Computer Music. I benefitted much from relations with John Eccles, Charles Waddington, James F. Danielli, Lukas Foss, David Hays and many others. My ideas on systems with memory did not sound so strange in that environment. I became Director of a Master's Program in the Natural Sciences. It was essentially an interdisciplinarian program, something new in the USA. This was the beginning of my interest in interdisciplinarity, which would eventually lead to Transdisciplinarity.

But another aspect of my stay in Buffalo would mark me very strongly. The sixties were marked by the protests against the Vietnam War, the struggle against the dictatorships in Latin America, the intensification of civil rights movements, the effects of the 1968 student rebellion in Paris and the sit-ins. I got much involved with all these social struggles. Only by chance did I not spend a

night in jail after a sit-in at the President's Office in SUNYAB.

I was soon appointed Graduate Chairman in the Department of Mathematics. As such, I received one morning a call from the high administration of the University telling me that among the Ph.D. candidates, 25% should be blacks. Simply that. The graduate enrolment was then 60. It was not easy to find 15 qualified black candidates. To fulfill the quota, I decided to do an aggressive recruitment, and this put me in touch with the reality of racial discrimination in American society. What one knows through the media does not reveal the deep issues and the historical contradictions in the development of the economic strength of that country.

In this same period I was invited by UNESCO to join a doctoral program in Africa, devised by a Congolese poet, Tchicaya U'Tamsi. The program was to take place in Bamako, Mali. It was a very innovative graduate program in situ, in which professors would go to Bamako three or four times a year, for two or three weeks, for intensive work with the advisees, conducting seminars and proposing books and papers that the students would read on their own. The regular returns of the advisors would guarantee a good research atmosphere in Bamako. Indeed, it was so and the program, which lasted 10 years, was successful.

I was visiting Africa for the first time and I was able to corroborate my impressions of the uncivilizing mission of the colonial model and of the inhumanity of slavery. Of course, colonization and slavery go together, they are partners in bringing evil to mankind. I often refer to genocide, exclusion and economical inequities, but the cultural deprivation of colonized and enslaved populations deserves equal condemnation. The exclusion of people in their own countries, so common nowadays, is a consequence of colonization and slavery. In Africa I had some of my most beautiful human experiences. Most amazing in my first contact with Africans, I was received with no rancor. After all, my great-great-great-grandfather might have been a

slave trader! But I was received as a fellow human being. I learned of a deep sense of humanity, joy of life and hope.

A good feature of the program was the encounter of visiting professors from different countries of the world and of different disciplines. It was a multinational interdisciplinary task force. I, like many of my colleagues, soon developed an interest in learning about African culture. As a consultant for UNESCO, I was given the opportunity of visiting most African countries and of participating in several scientific events in the region.

This allowed me to understand many moments of African history, such as the influence of the Kingdom of Mali in the European economy of the Middle Ages, the learning center established in Timbuktu, the visions of man and the universe in the Dogon tradition, the epics of Sundjata, the religious architecture in Mopti and Djenné, the saga of the great heroes of the resistance to the colonizer, whose names were -- and continued to be — unmentioned in history, while colonial governors still give names to the modern avenues and plazas in these countries. The effects of the colonial period are felt in the struggle to free the countries of post-colonial control.

I had a beautiful encounter and friendship with an important African young intellectual, Bakary Traoré, who was my first and favorite student. This privileged mathematical mind and patriot, deeply involved in the struggle of his people, was brutally murdered in the revolution of 1991 in Mali. This is an example of the contradictions of the "civilizing" mission imposed on Africa and other regions of the world by colonialism.

In 1972 I returned to Brazil to be the Director of the Institute of Mathematics, Statistics and Computer Science (IMECC) of the recently founded State University of Campinas (UNICAMP). There I was a Professor of Mathematics, Director of the Institute and Pro-Rector for University Development. The IMECC became one of the most important research institutions in Latin America.

I remained there until my retirement, in 1993, when I received the title of Emeritus Professor of Mathematics. At the same time, I continued my own research projects in Mathematics and directed others. Simultaneously, I began to engage in educational projects. My interests in Mathematics Education come from this period.

In the seventies there was a great effort to modernize Science and Mathematics Education in Latin America. In 1973 I was invited to direct a major research project on New Trends in Science and Mathematics Education, sponsored by the Brazilian Ministry of Education and the Organization of American States. This was a multimillion-dollar project which had two strands: the development of a new curriculum for Mathematics Education for grades 4-8 and the launching of a Graduate Program in Mathematics and Science Education. Research Associates and students from all over Brazil and Latin America were involved in these projects. We had enough funds to invite people like Hassler Whitney, who would go to Campinas every year for about ten years.

We also had the visit of Seymour Papert and Marvin Minsky, who came together to Campinas with the project of finalizing their work on Logo. And we had several other visitors from the USA, Canada, Europe, Japan and other countries. I see my effort to acquire background to run these projects as my in-service education as a Science and Mathematics Educator. I learned much about philosophy of education and about curriculum, methodology, evaluation, teacher training, and cognition and learning.

In 1980 I was appointed chief of the unit of Curriculum and Innovation of Educational Systems in Washington, D.C. As part of the project and my functions in the headquarters of the O.A.S., I was required to visit regularly every country of Latin America and the Caribbean. This was an excellent opportunity to corroborate the ideas on colonialism and slavery which I had developed in my work in Africa. The UNESCO

project in Africa was still active and this gave me the opportunity for a comparative study of civilizations and the effects of colonialism. From these two projects, in Africa and Latin America, grew my broader sense of Mathematics and of History of Mathematics, which culminated in Ethnomathematics.

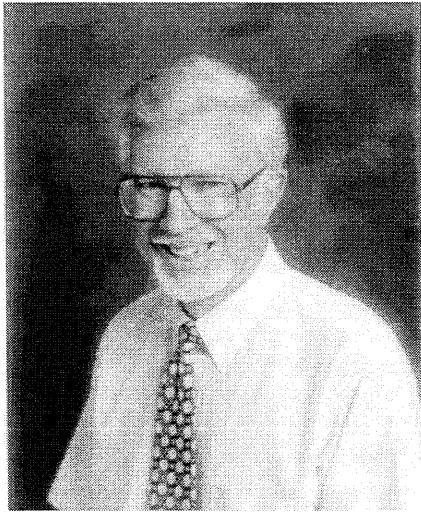
In 1982, I returned to UNICAMP to be Pro-Rector for University Development, something equivalent to a Vice-President for Academic Affairs. It was a good experience. I was very involved with several aspects of higher education, such as recognizing and supporting emergent projects and programs. I got involved with prospectives and this was the start of my interest in Studies of the Future.

In 1988 I was invited to be the Coordinator of the Research Institutes of the Secretary of Health of the State of São Paulo. This was an entirely new area for me. I had developed some interest in Mathematical Biology while at SUNY at Buffalo, and indeed played an active role in founding the Sociedad Latinoamericana de Biomatemática in the late seventies. Even so, to direct institutes doing research in molecular biology, organ transplants, epidemiology, and several other areas on the frontier of medical research, and which had at the same time the responsibility of attending to the population, was a major challenge.

Soon I realized that to deal with the health problems of such an ethnically diverse population as the Brazilian, I would need to support "alternative" medicine. Its ideas were very difficult to propose for acceptance by the medical profession -- as hard as Ethnomathematics had been, and continues to be -- for mathematicians and mathematics educators. But the efforts to relate both medicine and mathematics to popular culture and beliefs expose similar epistemological barriers. The contacts with the medical profession, both practitioners and researchers, were very instructive for me. Dealing with a child who is not learning mathematics and with one who is facing death entails different levels of urgency but reveals similar conflicts. (See **Ubi** Page 24)

Purveyor of the History of Mathematics: A Retrospective

Barnabas Hughes, O.F.M.



My history teacher, Father Florian Guest, O.F.M., always wiggled his glasses before making a pronouncement. I was a junior in a high school modeled after the typical German Gymnasium. The word came down from on high, "If you want to learn anything well, study its history." Yeah, sure! His advice went sub cerebral until thirteen years later when I was teaching mathematics to high school juniors. Then I remembered what he had said.

First I bought a set of Heath's Euclid (three volumes at \$2.25 each!), next a copy of D.E. Smith's translation of Descartes' *Geometrie*, and then I found a copy of Karpinski's translation of the Latin translation of al-Khwarizmi's al-Jabr. A book collector (a very inadequate description of Sam Barchas whose superb collection of books on and about the history of science is now at Stanford University) offered to buy a first edition (1533) of Regiomontanus' *De triangulis omnimodis* if I would translate and prepare it for publication. That I did. Thanks to Sam's friend, William H. Stahl of *Roman*

Science fame, my work was published by the University of Wisconsin Press as *Regiomontanus on Triangles* (1967), a slight intrusion into the realm of the history of mathematics.

The opportunity arose to pursue the doctorate in history of mathematics at Stanford and it was adequately supported by grants from the Shell Oil Company. With degree in hand I began teaching at San Fernando State College, now California State University, Northridge, fall semester 1970. While my appointment has been in the Department of Secondary Education, I have always taught courses in the history of mathematics for the Mathematics Department.

The scope of my historical research has been late Middle Ages and early Renaissance, with investigations in other times out of curiosity. In every phase I have tried to discover how and why the person thought about mathematics. The major influences in my academic life have been the works and encouragement of Marshall Clagett, Michael Mahoney (Princeton), Christoph Scriba (Hamburg), Menso Folkerts (Munich), Richard Rouse (UCLA), Jens Høyrup (Roskilde), and Raffaella Franci (Siena).

I chose to describe myself as a "Purveyor of the History of Mathematics" for a very good reason. As there is more to physiology than skeletons, so there is more to mathematics than theory and applications. The history of mathematics unites these two; it needs to be made available to teachers, particularly in the secondary schools. And so I have spent much of my time speaking and writing about the

history in a way that is at once attractive to and useful for the classroom teacher. From October 1973 through May 1986 (except for the eighteen months that I was on leave in Italy), I wrote 62 columns on the history of mathematics for *The Calculator*, the (nearly) monthly bulletin of the Los Angeles City Teachers of Mathematics Association, not to overlook almost the same number of talks given at local, state, and national teachers' conferences to the present day. An occasional article or book chapter still appears.

In order to comply with new standards for the education of prospective teachers, in 1989 the Chairman of the Department of Mathematics asked me to organize an undergraduate course in the history of mathematics for such students. My initial choice of a text proved unfortunate for three reasons: too many problems, too long, too cumbersome for an undergraduate text. (Katz's excellent book was not available then.) So, in the second offering of the course the next year, I subjected the students to handouts of what became *A History of Mathematics from Problems in Mathematics*. Its range is the mathematics ordinarily taught in secondary schools. About two hundred pages long, it begins with the number systems of the ancient people in the Western hemisphere including Hawaii. Thereafter the traditional topics are covered, with more emphasis on Babylonian, Chinese, and Arabic mathematics, on the development of proof in Greece, and on the discoveries of the Italian abacists (really algebraists), than may be found in other texts, all useful topics in the secondary classroom. After an in-depth examination of 17th-century mathematics that features analytic geometry and calculus, I conclude with a sampling of what has happened since the end of the 17th century. There are enough

problems, all of which are solved by the students. While the attraction of the text is too narrow to interest publishers, the book has done a good job for its audience.

Needful to say, I've enjoyed my work immensely: the challenge to trace down an idea and make it understandable, the people whom I've met, the students who caught fire. While I have found research to be fascinating, the selling of the history of mathematics has been a great joy!

Publications

- 1972 Medieval Latin Mathematical Writings in the University Library, Basel, A Provisional Catalogue. California State University, Northridge (private printing). "A Note on DB 186 Sup." *Scriptorium* 26: 125-27.
- 1975 "Biographical Information on Jordanus de Nemore To Date," *Janus* 62: 151-56.
- 1980 "De Regulis Generalibus: A Thirteenth-Century English Mathematical Tract on Problem Solving," *Viator* 11: 209-24.
- 1982 *Jordanus de Nemore: De Numeris Datis*. University of California Press.
"The Medieval Latin Translations of al-Khwarizmi's al-Jabr," *Manuscripta* 26: 31-37.
- 1983 "Franciscans and Mathematics, Part I," *Archivum Franciscanum Historicum* 76: 98-128.
- 1984 "Franciscans and Mathematics, Part II," *Archivum Franciscanum Historicum* 77: 3-66.
- 1985 "De numeris mysticis of John Pecham, O.F.M., A Critical Edition," *Archivum Franciscanum Historicum* 78: 3-28.
- 1986 "Gerard of Cremona's Translation of al-Khwarizmi's al-Jabr," *Mediaeval Studies* 48: 211-63.
- 1987 "An Early 15th -Century Algebra Codex: A Description," *Historia Mathematica* 14: 167-172.
- 1989 *Robert of Chester's Latin Translation of al-Khwarizmi's al-Jabr: A New Critical Edition*. Stuttgart: Franz Steiner.
"The Arithmetical Triangle of Jordanus de Nemore," *Historia Mathematica*, 16: 213-223.
- 1990 "Learning Algebra in 14th Century Italy," in N. van Deusen & A.E. Ford (eds.), *Paradigms in Medieval Thought-Applications in Medieval Disciplines* (Lewiston, NY: Mellen Press), 1-14. (See Hughes page 12)

The Evolution of Magnitude

Gregory H. Moore

For many centuries, mathematics was the science of quantity or magnitude, which, in many older dictionaries, was defined as “what can be increased or decreased”. Where did this definition originate? It is old, since it occurred in 1780 in Euler's *Vollständige Anleitung zur Algebra*. But it had already appeared in 1715 in George Cheyne's *Philosophical Principles of Religion*.

Earlier, in Euclid's *Elements*, magnitude was not defined, nor was quantity. However, his Common Notions appear to be about magnitudes; e.g. his first: things which are equal to the same thing are also equal to each other; and his third: if equals be subtracted from equals, the remainders are equal. Aristotle made quantity one of his ten categories (basic predicates), stated that it must consist of “parts”, then divided it into two kinds: discrete and continuous. His two kinds of “discrete” quantities were number and (surprisingly) oral communication, since words have short and long syllables. His “continuous” quantities were line segments, surfaces, solids, time, and place. For him, what characterized quantity was that two quantities are equal or unequal. By contrast, a quality (another of his categories) possessed by a given object “may vary ... in degree. For example, a body, if white, is called whiter just now than it was” [1962, 3b]. In sum, Aristotle does not define magnitude or quantity as what can be increased or decreased.

In the *Metaphysics*, Aristotle gave a somewhat different treatment of quantity, defining it as what is divisible into two or more parts. A quantity was said to be a multitude if

numerable and a magnitude if measurable; a multitude was potentially divisible into discrete parts, a magnitude into continuous parts [p.1020a].

Aristotle's view of quantity was criticized by the Neo-Platonist Plotinos, who held that “there is no single genus of Quantity. Only number is Quantity, the rest (magnitudes, space, time, motion) are quantities only in a secondary degree” [1992, 512]. By contrast, other ancient commentators on Aristotle, such as Ammonios [1991, 76] and Porphyry [1992, 111], continued to characterize quantity as what can be equal or unequal.

It is unclear when the definition of magnitude became “what can be increased or decreased”. In the *Dictionnaire des arts et des sciences* of 1694, this definition is not found, but quantity is defined as what can be measured or numbered [v.2, p.347]. However, in a later volume of the same year, quantity is defined as “a term of philosophy. An accident which makes bodies capable of number or measure” [v.4, p.287] -- a definition showing a strong Aristotelian influence. Magnitude (“grandeur”) is not given any mathematical meaning. But in 1762 the *Dictionnaire de l'Académie Française* defines magnitude as what “is said, in Mathematics, of everything which can be increased or decreased” [v.1, p. 836].

Cheyne's *Philosophical Principles of Religion* (1715), in its second part (“Containing the *Nature* and *Kinds* of *Infinities*, their *Arithmetick* and *Uses*, and the *Philosophick Principles* of *Reveal'd Religion*”) is the earliest source we have found that adopts the increase/decrease definition: “QUANTITY is what may be encreas'd or diminished. Tho' this *Definition* may not exhaust the

Metaphysical Nature of Quantity; yet it points out that Quality in it, that is here chiefly regarded" [Part II, 1]. By the way he presents this definition, it is unlikely he originated it.

Although Dr. Johnson's famous dictionary (1764) cited Milton as an example of magnitude in the sense of "grandeur", and cited Newton for magnitude as "comparative bulk", it cited Cheyne for quantity as what "can be increased or decreased". Already in 1728, Ephraim Chambers' *Cyclopaedia: or an Universal Dictionary of Arts and Sciences* adopted a definition of quantity that is close to Cheyne's: "any thing capable of Estimation, or Mensuration; or, which being compared with another thing of the same kind, may be said to be greater, or less, than; equal, or unequal to, it" [1728, 934]. Yet he then all but reversed himself by adding: "Quantity is a general Attribute, apply'd in a very different Manner to things of very different Nature; whence it is impossible to give any universal Definition thereof." Nevertheless, he regarded mathematics as the science of quantity. Cheyne's general definition of magnitude lasted in textbooks until the 20th century. Thus G. A. Wentworth's *College Algebra* stated: "Whatever admits of increase or decrease is called a magnitude. Every magnitude must therefore admit of comparison with another magnitude of the same kind in such a way as to determine whether the first is greater than, less than, or equal to the other" [1902, 1].

It is a poignant historical irony that, when "magnitude" was made precise in the late 19th century, the basis of that concept was Aristotle's: what can be equal or unequal. Yet the mathematicians who made it precise — Otto Stolz and Rodolfo Bettazzi — did not credit the idea to Aristotle, but to Hermann Grassmann.

References

Ammonios 1991: *On Aristotle's Categories* (London: Duckworth). Aristotle 1962: *Categories* (Cambridge, MA: Harvard University Press). Plotinos 1992: *The Enneads* (New York: Larson). Porphyry 1992: *On Aristotle's Categories* (Ithaca: Cornell University Press).

Gregory H. Moore (*ghmoore@mcmail.CIS.McMaster.CA*) is currently editing volume 5 of Russell's papers (1906-08) and preparing a source book on the infinite in mathematics, physics and philosophy.

Hughes (Cont.from page 10)

1994 "Problem-Solving by Ajjub I-Basri, An Early Algebraist," *J. for the History of Arabic Science* 10: 31-39.

1995 "Indian Roots for Latin Problems?" *Ganita Bharati* (Bulletin of the Indian Society for the History of Mathematics) 17: 1-9.

1996 "The Earliest Correct Algebraic Solutions of Cubic Equations", in Ronald Calinger (ed.), *Vita Mathematica Historical Research and Integration with Teaching*. Notes No. 40 of the Mathematical Association of America.

"Arabic Algebra. Victim of Religious and Intellectual Animus," in Menso Folkerts (ed.), *Mathematische Probleme im Mittelalter: Der lateinische und arabische Sprachbereich* (Wiesbaden: Harrassowitz Verlag), 197-220.

1997 "Mathematics and Geometry," in F.A.C. Mantello & A.G. Rigg (eds.), *Medieval Latin* (Catholic University of America Press), 348-354

"Intellectual Mathematical Activity in the Thirteenth Century," in Nancy Van Deusen (ed.), *The Intellectual Climate of the Early University -- Essays in Honor of Otto Grundler* (Kalamazoo: Western Michigan University), 73-100.

1998 "Jordanus de Nemore's Theory of Figurate Numbers: an historico-mathematical analysis of two books from *De Elementis Arithmetice Artis* with Implications for Learning" (in preparation).

HISTORY-OF-LOGIC SESSION IN BALTIMORE

John Dawson

A special session on the history of mathematical logic, organized by John W. Dawson, Jr. of Penn State University, was held January 7 in Baltimore, Maryland, as part of the joint annual meeting of the American Mathematical Society and the Mathematical Association of America. Speakers in the morning half of the session were Professors Wim Ruitenburg of Marquette University, Jean Larson of the University of Florida, Akihiro Kanamori of Boston University, and Dirk van Dalen of the University of Utrecht. Professor Anil Nerode of Cornell was also scheduled to speak, but withdrew at the last moment on account of illness.

Professor Ruitenburg spoke on the relatively sudden appearance, during the years prior to 1914, of several non-classical approaches to the foundations of mathematics, including intuitionism. Professor Larson then engaged the audience members in a participatory exploration of their academic roots. Titled "Set-theory genealogy", her talk presented preliminary reconstructions of the academic family trees of numerous prominent logicians, with special emphasis on the descendants (under the doctoral advisor/student relation) of Alfred Tarski and Alonzo Church.

Professor Kanamori gave an overview of his paper "The Mathematical Import of Zermelo's Well-ordering Theorem", recently published in the *Bulletin of Symbolic Logic*; in it he stressed the importance (and belated recognition) of the distinction between set inclusion and set membership and isolated the guiding principle underlying Zermelo's proofs

of the well-ordering theorem in a theorem that correlates well-orderings with injective mappings from the power set of a set X into X itself. The morning session concluded with Professor van Dalen's survey of the role Abraham Fraenkel played in expounding L.E.J. Brouwer's doctrine of intuitionism. The talk was based upon the speaker's study of the correspondence between the two men that is preserved in the Brouwer Archive.

The afternoon session featured talks by Professors Wilfried Sieg of Carnegie Mellon University, John Corcoran of the State University of New York at Buffalo, and Gregory H. Moore of McMaster University. Professor Sieg analyzed the consistency proofs that Hilbert gave in his lecture courses at Göttingen during the years 1917- 1923; details are preserved in Hilbert's unpublished notes for those lectures, which are preserved in his Nachlass. Next, Professor Corcoran delineated various senses in which logic may be regarded as mathematical, and examined the extent to which, in those senses, Aristotle might be regarded as a mathematical logician. Finally, Professor Moore surveyed the history of the notion of infinitesimals, from attempts to treat the problem of horn angles to Abraham Robinson's development of nonstandard analysis. A focal point of his presentation was Cantor's vehement opposition to the idea of infinitesimal quantities, despite his development of the theory of infinite magnitudes.

Much to the organizer's gratification, both the morning and afternoon sessions were very well attended.

CONSTITUTIONAL CHANGES

The following changes in the Society's constitution were recommended by the executive a year ago but did not reach the membership in time to be voted on at the 1997 Annual Meeting; they will therefore be voted on at this year's Annual Meeting in Ottawa. For rationales one may consult the President's message in *Bulletin* issue 20, May 1997. A copy of the present version of the constitution can be obtained from the Secretary, Glen Van Brummelen, Department of Mathematics and Statistics, Simon Fraser University, Burnaby, B.C. V5A 1S6 (Canada), <gvb@sfu.ca>.

Article III, Section 2: delete "who is nominated by two members" / "et dont la candidature est appuyée par deux membres,".

Article IV, Section 3: change to read "After the annual meeting, in odd-numbered years ..." / "Après la réunion annuelle, lors des années impaires ..."

Article IV, Section 4: change to read "... shall be elected by mail ballot in even-numbered years. ... officers shall serve for two years ..." / "est effectuée par le courrier lors des années paires. ... officiers sont élus pour une période de deux ans ..."

Article VI, Section 1: change to read "... from January 1 to December 31." / "... du 1er janvier au 31 décembre.".

De plus, les changements suivantes au version française des règlements ont été recommandés par Jacques Lefebvre:

Article III, Section I: remplacer "et" par "ou".

Article III, Section 3: "... aux membres au moins trente jours ...".

Article IV, Section 3: remplacer "communiquer" par "communiquée".

Article IV, Section 4: "... L'élection de leurs successeurs, et les membres du Conseil sont élus pour une période de deux ans ou jusqu'à l'élection de leurs successeurs. Les membres du Conseil exécutif ...".

Article VI, remplacer "Finance" par "Finances".

President's Message (Cont. from page 3)

the ideal location in terms of access or adventure; I suspect that a meeting there of our Society, with another scheduled six weeks later, would not be well attended. I have preferred therefore to skip the Congress for that year and to combine our own annual meeting with the BSHM session, and the Executive has now formally endorsed this idea.

I am not aware of other pressing issues for me to remark on at this time. I am looking forward to seeing many of you in May and hoping that we can have some way of knowing how to keep (or get) in touch with one another while we are there. I am intending to stay in one of the University of Ottawa residences. The simplest device I can think of is to put a registrants' list at our booth and let each of us indicate on it where we are or how else to reach us (a phone number in the case of someone staying with friends). Might this work? Any better ideas? See you there!

Nominating Committee Report

Len Berggren, for the Nominating Committee, has submitted a report proposing the following slate:

President, Jim Tattersall;

Vice-President, Jacques Lefebvre;

Secretary-Treasurer, Glen Van Brummelen;

Council, John Fauvel, Craig Fraser & Alex Jones.

Fred Rickey will continue on Council for another year if the Ottawa meeting ratifies the appropriate constitutional change (see page 14).

A ballot accompanies this issue of the *Bulletin*; please return yours to Sharon Kunoff by May 25 at the address on the ballot.

BOOK REISSUED

Good news for admirers of *A Mathematical History of the Golden Number* by long-time Society member (and former *Bulletin* editor) Roger Herz-Fischler. Roger's book has been reissued by Dover Publications (ISBN 0-486-40007-7; \$14.95 U.S., \$20.95 Cdn).

Web Review

Web Site of the Semester: British Museum for History of Science, Oxford

<http://www.mhs.ox.ac.uk>

Glen Van Brummelen

For me one of the highlights of the CSHPM's joint meeting with the British Society for History of Mathematics last summer was a visit to the British Museum for History of Science, just a few blocks away from our quarters at Oriel College. Our tour leader gave us a detailed and informative exposition, at least for the first half. Then he lost at least one member of his entourage when he swept past the real reason for my visit: the world's largest collection of astrolabes. I wandered among the roughly 70 Islamic and European astrolabes until the last possible minute, when I had to hurry back to the conference for the next talk. I vaguely heard rumours of other special exhibits of great interest in the museum, but I had found my home and wasn't about to leave.

Fortunately, when I returned to Canada I was able to extend my all-too-short visit to the Museum to those other exhibits, at least virtually. The MHS was one of the first museums to try to use the Internet to extend their audience (over two years ago!), and to my pleasure I found that the MHS's four major special exhibits over the past two years live on, at least as files of image and text, stored on the Web. My addiction to astrolabes had not entirely cost me the experience of the rest of the museum.

A museum on the Internet might seem like a contradiction in terms. A museum is intended to bring history, culture, and other aspects of our world to us face to face. Can you really wander from artifact to artifact, browse through exhibits, and get a good close look at, say, an astrolabe, while sitting with a mouse in one hand, staring at a ten-inch-square monitor? Simply put, you can't. But the MHS does get you surprisingly close to the

real experience. Those four special exhibits contain roughly one hundred images each, and each image appears in three sizes: a small one for browsers (human ones, that is), and two larger ones for those who wish a closer look. Detailed text for most of the images allow one to learn as much or as little as one pleases. It's not quite the same as being in the same room as the world's only remaining intact spherical astrolabe, but it's a much shorter walk to get there!

Three of the four special exhibits are of special interest to the history of mathematics: "The Measurers: A Flemish Image of Mathematics in the 16th Century", "The Geometry of War, 1500-1750", and "Images of Tycho Brahe". The first two are virtual siblings, emphasizing the role of practical mathematics in the development of mathematics and science. Thus we are treated to an impressive array of mathematical instruments and treatises for gunnery and rangefinding, surveying, gauging, and measuring commercial products, and so on. Extended and well-informed essays argue that the mathematics lying between theory, as taught in history of mathematics texts, and practice, as found in daily and military life, may have played a larger role in the shaping of modern mathematics than it is usually given credit for. The Tycho Brahe exhibit revolves around a 19th-century painting of Brahe demonstrating a celestial globe to Emperor Rudolph II. It uses this and other surviving images of Brahe to compare the public images of historical scientists with reality. The non-linear structure of this exhibit is well captured in its virtual version. (The fourth exhibit, on the history of camera technology, may end up as a self-referential display within itself, as it were, in a few decades.)

A lunchtime visit to the MHS is not on the cards for most of us, but a visit to the Web site is a good substitute. Spend as much or as little time as you like, and be sure to dig a little to explore some of the breathtaking images; include a few astrolabes. It's a pleasant educational experience that intrigues the casual visitor and satisfies the expert, and that is after all the hallmark of a great museum.

Glen will give perhaps the first-ever academic talk actually presented solely through the Internet, to the ICMI Study Group on the history of mathematics, in April, in Luminy, France. Appropriately enough, the talk is entitled "Resources for the History of Mathematics on the World Wide Web", and this method of presentation is meant to illustrate first-hand both the available resources of the new medium and its possibilities and shortcomings. Participants will use Web browsers to experience the presentation, and will engage in discussion (technology permitting) with Glen — who will be in Vancouver, Canada.

CSHPM members will be able to see the presentation, when it is completed, at <http://www.kingsu.ab.ca/~glen/luminy/title.htm>

UBI CONFERENCE

Victor Katz

Over eighty people from countries all around the world gathered at the Omni Hotel in Baltimore on January 6 to honor long-time CSHPM member Ubiratan D'Ambrosio on his 65th birthday. Some twenty-five speakers dealt with issues related to Ubi's work in Ethnomathematics, the History of Mathematics, and Mathematics and the Search for Justice. It was clear from the talks that Ubi has had both a broad and a deep influence on mathematics education, since the range of topics, each of which was related to his work, was so wide.

One of the speakers was Dirk Struik, still

going strong at age 103, who spoke on "Ethnomathematics at the Beginning". Among the other speakers were Bill Barton (New Zealand), "The Philosophical Background to D'Ambrosio's Conception of Ethno-mathematics"; Gelsa Knijnik (Brazil), "Ethnomathematics, the Politics of Knowledge, and Postmodernism"; Marcia Ascher (Ithaca College), "Mongolian Board Games"; Claudia Zaslavsky (New York), "Ethnomathematics in Alaska and Peace in the World"; Paulus Gerdes (Mozambique), "Ubiratan D'Ambrosio and Ethnomathematical Research in Mozambique"; John Fauvel (UK), "The Role of the History of Mathematics in Building a Democratic and Just Society"; and Reuben Hersh (New Mexico), "The Secret About the Hungarian Mathematics Miracle". Other speakers included Diana Coben, Larry D'Antonio, Walter Sizer, Rebecca Berg, Nkechi Agwu, Alejandro Garciadiego, Helena Pycior, Marilyn Frankenstein, Beatrice Lumpkin, Gloria Gilmer, Swapna Mukhopadhyay, Jose Segarra, Munir Fasheh, and Arthur Powell.

At the festive birthday dinner in the evening, Jeremy Kilpatrick, Vice-President of the International Commission on Mathematical Instruction, gave the toast and brought greetings from ICMI. Kilpatrick, Alvin White, and Martin Hoffman also made remarks during dinner. After he blew out the candles on his birthday cake and the guests sang the requisite "Happy Birthday", Ubi himself spoke movingly on how he felt about the gathering and about his long career in mathematics education. The program of the conference was organized by Marilyn Frankenstein, Gloria Gilmer, Arthur Powell, and Victor J. Katz.

WILBUR KNORR MEMORIAL CONFERENCE AT STANFORD

Len Berggren

A conference was held at Stanford University from March 12 to March 14 to honor the memory of Wilbur Knorr, whose sudden death from a melanoma early last year shocked his many friends and colleagues in the history-of-mathematics community. The meeting was generously funded by the School of Humanities and Sciences and by the Departments of Classics, of Philosophy and of History and Philosophy of Science. The organizers of the conference were three long-time friends of Wilbur's: Professors Henry Mendell (Department of Philosophy at Cal State University, Los Angeles) and Julius Moravcsik and Patrick Suppes (Philosophy Department, Stanford), who jointly arranged the following program of invited talks:

Friday, March 13

David Fowler (University of Warwick) "Techniques of Fractions in Ancient Greece"

The speaker followed up on what had been (at the time of Wilbur's death) an ongoing debate between him and Wilbur on how the historian should interpret the way Greek mathematicians conceived of fractions in view of the papyrological (and other) evidence for their representation and arithmetic.

Charles Burnett (Warburg Institute) "The Coherence of the Arab-Latin Translation Program in Twelfth Century Toledo"

The focus of the talk was the translation activity of Gerard of Cremona and a few others associated with the Frankish hierarchy of the cathedral in Toledo in the twelfth century, and the speaker argued that there was both an internal coherence and a rationale for Gerard's more than seventy translations.

Henry Mendell (Cal. State U., L.A.) "The Trouble with Eudoxus"

The talk centered on the models of planetary motion by means of homocentric spheres developed by Eudoxus and modified by Callippus of Cyzicus. An impressive display of these models by means of modern computer animations showed the kind of insight modern computing technology could provide into the models and, consequently, the possible reasons for their rejection.

Saturday, March 14

David Nivison (Stanford University) "The Key to the Chronology of the Three Dynasties: the 'modern text' Bamboo Annals"

The speaker presented the results of two decades of his own work on these documents, which had once been labeled as forgeries, to show how modern scholarly detective work, using - among other tools - astronomical records, could shed light on the early history of China.

Commentator: Jeffrey Riegel

J. L. Berggren (Simon Fraser University) "The Tradition of Analysis in Ancient Mathematics from Greece to Medieval Islam"

The speaker, reporting on work he has done jointly with Glen van Brummelen, reviewed evidence from Greek mathematical and philosophical sources for what analysis was and how it was used, and he introduced new evidence from Islamic writers of the tenth and eleventh centuries to show how the role of analysis had changed during almost one and a half millennia.

Judith V. Grabiner (Pitzer College) "Maclaurin Among the Molasses Barrels: Archimedean Geometry Meets the Modern State"

The speaker presented some beautiful mathematical results on frustrum of conoids of revolution from a memoir of Colin Maclaurin on gauging the contents of molasses barrels, written around 1735, and then examined the social and economic reasons behind the production of this mathematical work.

Although only one of the talks had an official commentator the whole audience gladly took on that role for all of the talks, and the two hours allotted to each talk were barely sufficient to accommodate the lively discussion following each of the contributions.

After the conclusion of the conference on Saturday afternoon the West Coast Aristotelian Society met to discuss Aristotle's Posterior Analytics B6, and on the following day those participants who were able to remain gathered on the Stanford Campus to plant a tree in Wilbur's memory in the New Guinea Garden.

SPECIAL SESSION ON HISTORY OF MATHEMATICS IN BALTIMORE

Jim Tattersall

Karen Parshall (Virginia) and Jim Tattersall (Providence) organized a Joint Special Session on History of Mathematics at the 104th Annual Meeting of the American Mathematical Society and the 81st Annual Meeting of the Mathematical Association of America held in Baltimore, January 7-10.

Among the speakers were;

Shai Simonson (Stonehill), "The Mathematics of Levi ben Gershon";

Helena Pycior (Wisconsin-Milwaukee) "George Berkeley's Mathematical, Philosophical, and Religious Ideas: the Intersections, 1732-1735";

Peter Duren (Michigan), "Continuous Nowhere Differentiable Functions";

Kim Plofker (Brown), "Women and Mathematical Education in India";

John Fauvel (The Open University), "The Mathematical Love Letters of Barnes Wallis";

Della Fenster (Richmond), "Leonard Eugene Dickson: One Quote, One Question - An Inextricable Link?";

Rebecca A. Adams (Southern California College), "The Beginnings of General Topology";

Len Berggren (Simon Fraser), "Three Geometrical Jewels of Al-Kuhl";

Marcia Ascher (Ithaca), "Divination in Madagascar: A Case of Ethnomathematics";

Hourya Sinaceur (Centre National de la Recherche Scientifique), "Fourier's Analysis of Inequalities (1831) and Tarski's Definable Sets of Real Numbers";

Judith Grabiner (Pitzer), "Mathematics and the

Modern State: The Case of Colin Maclaurin";

David Kullman (Miami), "Mathematics Problems Appearing in the *Ohio Journal of Education*";

Erwin Kreyszig (Carleton), "Interrelationships Between Early Topology and Analysis";

Mark McKinzie (Wisconsin), "Euler's Factorization of the Sine Function: One Aspect of the Prehistory of the Riemann Integral";

Joel Goldstein (Drexel), "Some Roots of a Revolution: The Conflict Over Arithmetization in Sixteenth-, Seventeenth-, and Eighteenth-Century English Editions of Euclid's Elements Books I Through VI: 1570-1795";

Diann Porter (Arizona) "William Fogg Osgood at Harvard";

Ubi D'Ambrosio (Brazilian Society of History of Science), "Mathematics in the XIX and First Half of the XX Century in South America";

Bruce Reznick (Illinois), "The Search for L.C. Walker", Craig Fraser (Toronto), "Adolph Mayer's Early Work in the Calculus of Variations";

Robin Wilson (The Open University), "The Origin of the Fifteen School Girls Problem".

"The mathematician Euclid, working in a convention of abstractions, shows us relations between the distances of our unwieldy and cluttered-up environment upon which we are able to count. A drama of Sophocles also indicates relations between the various human impulses, which appear so confused and dangerous ... [N]ot only do both Euclid and Sophocles satisfy us by making patterns, they make much the same kind of patterns."

-- Edmund Wilson

Secretary-Treasurer's Report, 1997

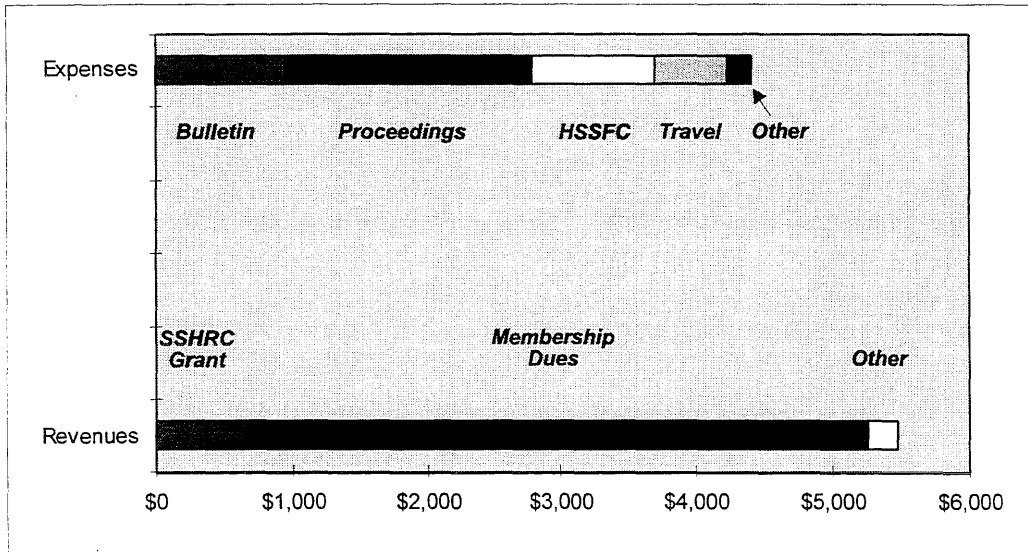
Once again, the CSHPM enjoyed considerable success this year. The implementation of our cross-membership arrangements with the BSHM and CSHPS produced a membership increase of 22%, from 154 to 188. We recorded a surplus of over \$1000 for the fourth year running, even though our SSHRC administrative grant was cut in half. This places the Society on firm financial ground, heading into the first year in which the SSHRC administrative grant is completely eliminated.

Financial Statement (must be approved at the Annual General Meeting)

Credit		Debit	
SSHRC grant	\$669.00	Publications	
Membership dues	\$10453.81	<i>(Bulletin, Proceedings)</i>	\$2779.01
Gain in US\$ currency exchange	\$66.67	HSSFC dues	\$922.00
Other (sale of <i>Proceedings</i>)	\$145.88	<i>Historia Mathematica</i>	\$4179.77
		<i>Philosophia Mathematica</i>	\$1676.98
		Conference expenses (keynote)	\$131.10
		Sponsorship of ICHS '97 dues (for Canadian delegates to general assembly)	\$270.00
		President's trip to HSSFC annual meeting	\$133.42
		Misc. (postage, copying, bank charges, etc.)	\$167.43
TOTAL:	\$11335.36	TOTAL:	\$10259.71
		Surplus:	\$1075.65
		Amount carried forward (1996):	\$5677.70
		YEAR-END BALANCE:	\$6753.35

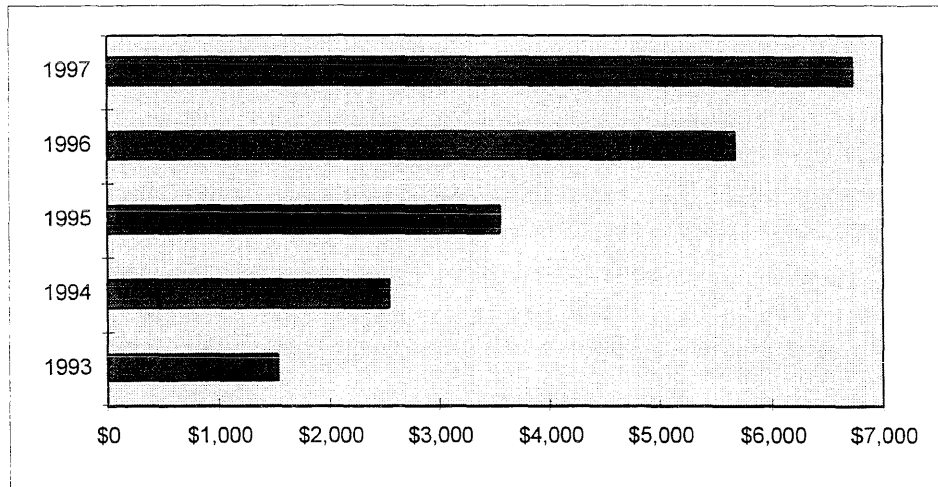
Graph of Revenues and Expenses:

Two major items in the above statement (*Historia Mathematica* and *Philosophia Mathematica* subscriptions) are "in-out" budget items, and may obscure what our dues money actually gets spent on. The graphic below illustrates the ways in which income, apart from journal subscriptions, was actually received and spent.



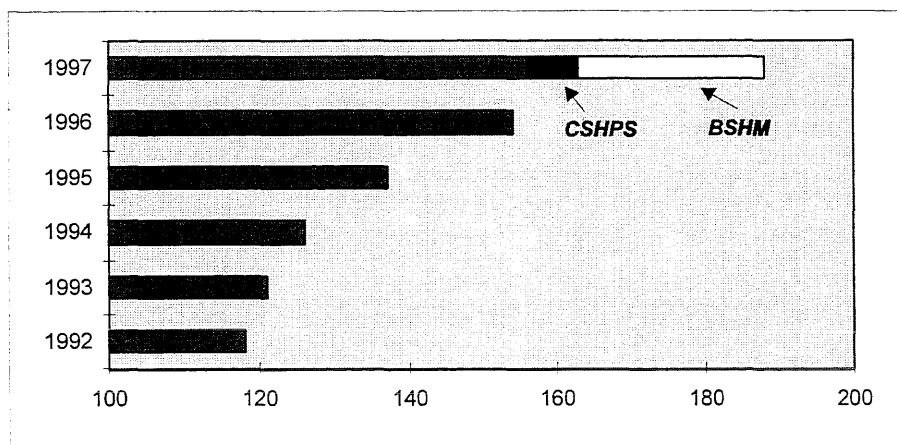
Projection for 1998

Our SSHRC administrative grant shrank from \$1339 to \$669 in 1997, and completely vanishes in 1998. Also, we expect the conference keynote expenses for 1998 to be greater than usual, since some of the expenses for the 1997 keynote speaker were processed early in 1998. Hence, given our recent trend of \$1000 surpluses, I expect that we will come close to breaking even in 1998.



Membership Totals

Our membership totals have been increasing strongly for several years now. Our record growth in 1998 is due mostly to our cross-membership agreements with the CSHPS and BSHM, both of which took effect in 1997. The graphic below shows our recent membership history, as well as the breakdown of the number of members we received through the cross-membership arrangements. Conversely, we sent 44 members to the BSHM, and 37 members to the CSHPS.



CSHPM members who took memberships in the CSHPS through the affiliation agreement were left off the mailing list due to some administrative problems within the CSHPS. Those problems have now been resolved, and memberships extended through 1998.

Glen Van Brummelen, Secretary-Treasurer

“PM” HONOURED

Philosophia Mathematica, the CSHPM’s philosophical journal, has been named the 1997 runner-up for the Phoenix Award of the Council of Editors of Learned Journals (CELJ). The award was presented at the Toronto meeting of the Modern Language Association in late December and was accepted by Israel Kleiner of the Society’s Executive Council. The Phoenix Award is given annually for what is officially called “significant editorial achievement” but can perhaps be more precisely described (as its name suggests) as improvement in an existing journal.

“PM”, as it is known around the CSHPM, is edited in Winnipeg by Robert Thomas — who of course happens also to be (pro tem) the Society’s President. Robert was previously the founder (in 1971) and managing editor of *Utilitas Mathematica*, which was published at the University of Manitoba until its recent migration to

South Africa. *PM* (www.amath.umanitoba.ca/PM/) is the only journal in the world devoted exclusively to the philosophy of mathematics. It was founded in 1964 at Chicago by J. Fang, who edited it through two series, 1964-77 and 1986-91. Series III was then taken on by the present editor and the CSHPM, and since 1992 it has appeared two and then three times a year. It is distributed world-wide (abstracted in Chinese and Russian as well as English and French) by Wilfrid Laurier University Press in Waterloo, Ontario (www.wlu.ca/~wwwpress/).

The CELJ (www.msu.edu/user/pod/celj/) is an organization for editors of learned journals, all over the world but mostly in North America. It presents awards annually in five categories: best journal design, best new journal, best special issue, distinguished retiring editor, and the Phoenix Award. The singling out of *PM*

was the only award or runner-up prize conferred this year outside the U.S.A. At the presentation ceremony, a judge was quoted as writing, in praise of *PM*, "The improvement manifested in the third series

is inspiring. Now ensconced in a lovely cover, each number impressed with its depth and coverage".

Congratulations, Robert!

OTTAWA MEETING

As Society members will know, the Annual General Meeting is to be held from May 29 to May 31 at the University of Ottawa. Ed Cohen has generously agreed to look after local arrangements, and welcomes enquiries -- by phone to 613-728-9526 or by e-mail to <ecohen@aix1.uottawa.ca>.

The CSHPM meeting is part of the 11-day-long Congress of the Social Sciences and Humanities, a "re-casting" of what until this year was called the "Learned Societies Conference". The Humanities and Social Sciences Federation of Canada (HSSFC) says that "by adding innovations to the best features of the traditional annual gatherings of scholarly associations", it seeks "to build a Congress that will be a truly significant event for both the research community and all those who can benefit from our findings".

For a copy of the Registration Guide, or answers to queries about the Congress, contact the Humanities and Social Sciences Federation of Canada, 151 Slater Street, Suite 415, Ottawa ON K1P 5H3, phone 613-238-6112, ext. 312; fax 613-236-4853, e-mail CONGRESS@HSSFC.CA. Information is also available, and registration possible, on the Web, in English at www.hssfc.ca/cong/Congress

InfoEng.html, en français à www.hssfc.ca/cong/CongressInfoFr.html.

The printed Registration Guide contains several errors, whose corrections are:

* The Convention Number to quote to Air Canada is CV981127.

* The phone number for information on University of Ottawa residences is 613-562-5771.

* The cost of a double room in residence is \$5 higher than listed ("to include full breakfast for both guests").

There is also an error in the printed form relating to accommodation at the university. The correct rates are: "regular", single \$41, double \$54; student, single \$29, double \$49.

HSSFC invites participation in special events, including colloquia on health, on "Migration / Immigration", and on "the Public Good"; further information is available on their Web site (www.hssfc.ca). Among the other attractions of the Congress will be special tours spotlighting Ottawa's role as Canada's capital city. Jean LeBlanc of the Morisset Library at "Ottawa U" will coordinate special group tours of the National Library, the National Archives and the Library of Parliament. Please contact him (jjleblan@uottawa.ca or (613)-562-5800) if you would like to

arrange for a group visit to one of these facilities. Information about a number of tours can be found in the Registration Guide; the following two tours are *not* described there:

National Library. General tour of the Reference and Information Services and the Reading Room, including a visit of the exhibition "Cultivating Canadian Gardens", which traces the history of gardening in Canada through published materials. This group tour will also

include a meeting with curators who will display some of the special treasures from the Literary Manuscripts, Rare Books, Music and Jacob M. Lowy collections.

National Archives. 27 May, 9:30 to 12:00. Special group tour of the most state-of-the-art preservation building in the world -- the National Archives' Gatineau Preservation Centre. Tour an award-winning building whose purpose is to protect Canada's documentary heritage for the next 500 years.

REDEEMER CONFERENCE

An international conference on "Science in Theistic Contexts: Cognitive Dimensions" will be held at the Pascal Centre for Advanced Studies in Faith and Science, Redeemer College, Ancaster, Ontario from July 21 to 25. The theme is "an analysis and evaluation of the internal role of theistic religious beliefs in the natural sciences and mathematics", and the conference is "intended for those with an interest in the relationship between science and religious belief". The deadline for submission of papers was April 1.

Of particular interest to CSHPM members will be a workshop on "Religion and Mathematics" chaired by Ivor Grattan-Guinness, who needs no introduction, and who will speak on "Manifestations of Christianity in Mathematical Theories —

and Vice Versa". The abstract reads in part: "A deeply neglected factor in the history of mathematics is the influence that religious positions or theological factors have played in the formation and interpretation of theories. Conversely, mathematics has played a role in aspects of the content of various religious positions. This lecture will view examples of influence in both directions, but confine itself largely to Christianity and to developments since the early modern period."

For more information on the conference, contact Dr. Jitse van der Meer, Redeemer College, 777 Garner Road, Ancaster, ON L9K 1J4 (Canada), phone 905-648-2131, fax 905-648-2134, e-mail pascalcentre@redeemer.on.ca, or visit www.redeemer.on.ca/pascal.

UBI (Cont.)

These two new directions of involvement, the studies of the future and of health, culminated in the organization of two very ambitious events, which proved very successful. These were (i) an international conference in 1992 on "Education for the Future/Education for Peace", and the founding of the "Instituto de Estudos do Futuro", and later on, (ii) another major international symposium on the encounters and conflicts of traditional and high-technology medical practices.

My involvement with Pugwash and with the "Science and Culture" forum of UNESCO were also important in broadening my views of man as a reality in itself, a social reality, a planetary and a cosmic reality. The dichotomies that still persist between matter and mind, intellectual and manual labor, space and time, good and bad behavior became my main focus of concern. I embraced studies of consciousness, which synthesize all this.

WHERE DO I STAND NOW? HOW DO I SEE MYSELF? WHAT AM I DOING?

It is difficult to say how I place myself professionally. I continue to be a teacher. Now, I teach smaller groups, only occasionally children and mostly graduate students. I have students doing research and writing theses in very diverse areas, from Ethnomathematics and History of Mathematics through Philosophy.

I have part-time academic appointments in graduate programs of Education (Universidade Regional de Blumenau), Mathematics Education (Universidade Estadual Paulista / UNESP, Rio Claro), Ethnomathematics (Pontificia Universidade Católica at Campinas) and History of Science (Pontificia Universidade Católica at São Paulo). There I have my students working for masters degrees and doctorates.

I am also active in the Instituto de Estudos do

Futuro, a sort of think-tank on the state of the world, at which I preside. There, together with many academic and non-academic thinkers, we deal with all sort of problems affecting the planet. Related to this, I regularly lecture to groups dealing with peace, the rise of consciousness, and educational innovation. And I am active in academic societies, conferences, congresses in many places of the world and I continue to write on several topics -- much more than I publish!

In my long journey, I have realized that much of the unhappy and disgraceful state of the world can be traced to a narrow vision of man, as an individual and as a social, planetary and cosmic reality. Lack of an ethics of respect, solidarity and cooperation in human, individual and social behavior is a major problem. This kind of moralist discourse follows naturally from a broad look into history -- and particularly the history of science and mathematics, which are part of the essence of Western civilization. This is not revisionism but recognition of the mistakes and of the nonadjustment of systems of knowledge to the ideal of a planetary civilization. Of course, the ideals of a planetary civilization, of equity and of solidarity are not shared by all. I have been instilling these ideals in my academic and pedagogical practices and in my behavior.

ABOUT THE BULLETIN

The *Bulletin* is published each May and November, and is co-edited by Hardy Grant (hgrant@freenet.carleton.ca) and Sharon Kunoff (kunoff@titan.liunet.edu). Material without a byline or other attribution has been written by the editors. Les pages sont chaleureusement ouvertes aux textes soumis en français. Comments and suggestions are welcome, and can be directed to either of the editors; submissions should be sent to Hardy Grant, at the above e-mail address or by post to 539 Highland Avenue, Ottawa, ON K2A 2J8 (Canada).