BULLETIN
CSHPM / SCHPM

May / mai 1997
Number / le numéro 20

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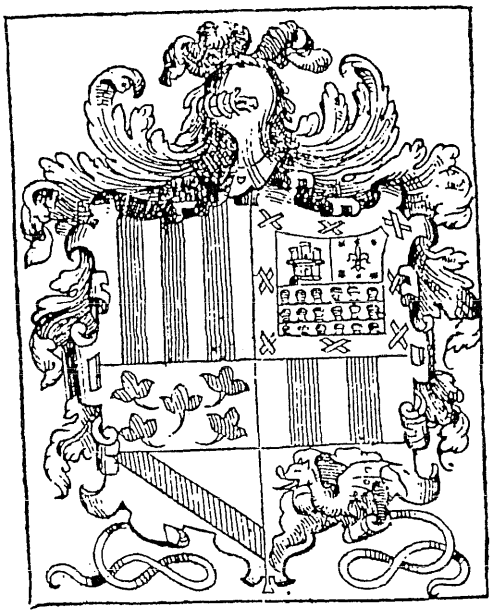

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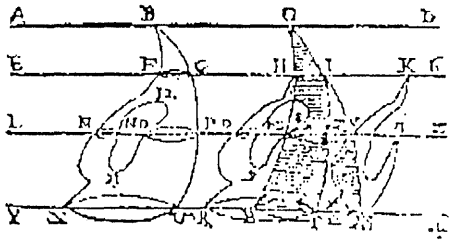
1576.

Euclid's *Elements* in 16th-century Spain (see back page)



Canadian Society for History and Philosophy of Mathematics

Société canadienne d'histoire et de philosophie des mathématiques

ISSN 0835-5924

A message from the President

Robert Thomas

As there is no Annual Meeting, with its aftermath, to report on, there is rather less to say in this message than in the one I wrote last fall. Still, I do have a few matters to draw to your attention. The Executive has discussed the Society's constitution, and is now proposing minor changes; these are set out on page 21 of this issue. (I present below the rationales for these changes.) Craig Fraser, Tom Drucker, and Jim Tattersall have been at work on the St. John's and Oxford meetings; for more on the latter see also p.17 below.

Since I last wrote I have done as president two things on which I can report here briefly. In December I attended the founding general meeting of the Humanities and Social Sciences Federation of Canada at the National Arts Centre in Ottawa -- a pleasant venue for a meeting, though not so large that it required the performance facilities, just other rooms in the building, which you will get a chance to see, if you have not already, at the 1998 meeting, scheduled for Ottawa. The organization is a merger of the Social Sciences Federation and the organization to which we belonged, the Humanities Federation of Canada. Much overhead will of course be saved by the merger, and as well it gives us collectively a strong voice to which the Social Sciences and Humanities Research Council, the national funding body, must listen. When I compare the strength of this voice to the divided way in which disciplinary organizations plead with the scientific funding body NSERC, I see how much more effective the scientists and engineers would be if they could get their act together. HSSFC comprises not only organizations like ours, including some that are much larger, but also the universities. When it speaks, it is heard. It lobbied on our behalf to get our missing funding restored, and it *was* restored. On our own, Glen and I would simply have been ignored -- indeed, *were* ignored. The meeting was of comparatively little interest, but its being held and its approval of a new constitution for the organization was of some importance to us and to the humanities, social sciences, and universities in Canada.

As president of the CSHPM I am a member, with the presidents of three other organizations, of the Canadian National Committee of the International Union of History and Philosophy of Science. Relations with this body are in the hands of the National Research Council, which occasionally consults our committee on policy matters. I have in turn been consulted by Wesley Stevens, formerly president of the CSHPM and now president of the CSHPS and the committee's chair. We have also had to line up representatives for a meeting to be held in conjunction with the conference at Liège. This more or less has to be someone already attending, since there is no money to send anyone else. I have proposed Craig and Glen to Wesley. As I am quite new to the international politics of the history and philosophy of science, I haven't a lot of insight to offer about these matters. Perhaps it would be

useful if our representatives put a report in the next *Bulletin.*

I have received an inquiry that I can only pass on to you. SSHRC wants to consult us in their attempt to ape the science councils by identifying research at which to throw targeted money. They want "broad social, cultural and intellectual issues of national importance or public concern which should be targeted for research over the next several years". They claim to have been doing this since 1979. "The four themes under which support is currently available include Applied Ethics; Managing for Global Competitiveness; Science and Technology Policy in Canada; and Women and Change." They want us to identify one or two multidisciplinary research topics or areas, within major intellectual, social or cultural issues, which in our view should be funded by SSHRC in the next five years; to provide rationales for such choices, including both the need for, and the potential significance of, the research; and to identify potential users of the research and/or possible partners in undertaking it. Since none of this is wanted before our St. John's meeting, I suggest that, in the unlikely event that you have ideas of this kind, you send them to me or discuss them with me at that meeting. I shall be happy to send them on to SSHRC. Only in the case where we had too many worthwhile ideas would it be necessary for the Society to vet or prioritize them. You can get more information from France Landriault, Director of Policy, Planning and International Relations, SSHRC, P.O. Box 1610, Ottawa, K1P 6G4, 613-992-5125, fla@sshrc.ca.

Now the rationale for our Society's proposed constitutional changes. The change to Article III removes the need to have new members nominated; we have not required this for many years. (The organization is apparently sufficiently esoteric not to attract cranks!) This change was suggested by Glen. The changes to Article IV are to put into effect the instruction of the Annual Meeting at Brock last year. The first of the new elections will be in 1998. The change to Article VI is to bring the fiscal year on paper into line with what it has been in fact for years -- another suggestion by Glen for the sake of agreement between word and deed. These changes have been cast into French by Jacques Lefebvre, who has also corrected some small discrepancies between the constitution's English and French versions.

You will by now have received the brochure on the Oxford meeting. The brochure does not point out that you can come early or stay on after the conference on a full-board basis at Oriel College. Just specify exactly what you want when you send in the booking form, and cover the costs at 55 pounds per 24-hour period. Fewer meals are also possible, but arrangements need to be made; that will require communicating with the organizer, John Earle (C.J.Earle@exeter.ac.uk) beforehand. Also, spouses can be accommodated, but all rooms are single. The College is not keen on small children on account of noise, etc. There are sets of single rooms linked somehow that might better accommodate families. Accommodation should have been booked by early May, so it needs to be done very soon by the time you get this.

Hoping to see many of you at St. John's or Oxford or both.

History of mathematics in Mexico: in search of the "Boston Connection"

Alejandro Garciadiego

Between 1920 and 1940, changes in political and academic conditions resulted in dramatic innovations in the perceived role and value of the mathematical sciences in Mexico. Political spokesmen now anticipated the modernization of Mexico through industrialization and the incorporation and application of new technologies. Emphasis was given to the study of engineering, and mathematics was looked upon much more favourably than in the past because of its critical role in the engineering sciences.

Sotero Prieto, who was the son of an elementary-school mathematics teacher, and who had himself taught and delivered lectures on several branches of higher mathematics, was able to unite a small but highly interested group of students who wished to pursue mathematical studies. In a relatively brief period of time, the status of this group was formally established and it grew into a section of the Faculty of Philosophy of the Universidad Nacional Autonoma de Mexico. Unfortunately, Prieto committed suicide by shooting himself in the head, in 1935. Nevertheless, in 1939, almost four hundred years after the foundation of the National University and in spite of Prieto's departure, the Department of Mathematics was formally established in the university's Faculty of Sciences. Soon after, the Institute of Mathematics (1942) and the Mexican Mathematical Society (1943) were founded.

At least one factor was fundamental in the "professionalization" of mathematics in Mexico: the frequent and prolonged visits of some well established American mathematicians -- Dirk Struik, George David Birkhoff, Garrett Birkhoff, Solomon Lefschetz and Norbert Wiener, among others. The Boston area was the focal point of this influence.

Many historical questions immediately arise. Are there analogies between the professionalization of mathematics in Mexico and in the United States? Are there differences? Are there analogies between Prieto and American historians of mathematics during the 1930s? Why the sudden interest by American scholars? Was there a formal program to follow? If so, who took the initiative in formulating it? Were any economic, political or ideological interests involved? When, how and why did it start? Who selected the individuals and institutions involved? What sort of mathematics were they trying to develop in Mexico? Were there specific mathematical branches to pursue, or problems to solve?

Did American scholars attempt to emulate other successful cases of "national" mathematics? How successful was this attempt to professionalize mathematics in Mexico, by American standards? Was there any difference between American and Mexican standards of quality measurement,

in research and in teaching? What were the mathematical backgrounds of Prieto and of Alfonso Napoles, the first dean of the Mathematics Institute? Why did Prieto kill himself?

What caused Mexican intellectuals, especially scientists, to shift their attention from French to American scientific writings? Is it a mere coincidence that similar institutes of mathematical research were established in other Latin American countries (e.g. Uruguay), even within the same weeks? Why did the stress on the history of mathematics disappear from the original curricula? Who was behind these changes? Were Mexicans trying to imitate an American program? Why were young Mexican scholars so taken with Birkhoff's theory of gravitation? How did these scholars contribute to the field? How did the international and physical communities react to their findings? How, where and by whom were these young Mexican scholars trained? Who formed the first Mexican Mathematical Society? Whence came its members? Did Struik's writings on the history and sociology of mathematics affect the work of Mexican mathematicians? Who trained the first Mexican mathematicians interested in foundational studies? If their first publications were positively reviewed by international scholars, why did they abandon this line of research?

In brief, I would like to find the "Boston Connection" that finally allowed the development of professional mathematics in Mexico. Surely some of the answers to these (and many other) questions are to be found in the archives of some of the individuals and institutions involved, especially those at MIT, Harvard and Princeton.

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(after June 30)

Conference set for Montreal in September

There will be a special session on history of mathematics at the Eastern Sectional meeting of the American Mathematical Society, to be held at the University of Montreal from September 26 to 28. Participants include John Anderson (U. of Toronto), Bill Anglin (U. of Toronto), Tom Archibald (Acadia U.), Ed Barbeau (U. of Toronto), Liliane Beaulieu (U. de Montréal), Louis Charbonneau (U. du Québec à Montréal), Roger Cooke (U. of Vermont), Craig Fraser (U. of Toronto), Hardy Grant (York U.), Judy Green (Marymount U.), Michael Hallett (McGill U.), Katherine Hill (Edinburgh U.), Israel Kleiner (York U.), Jim Lambek (McGill U.), Jacques Lefebvre (U. du Québec à Montréal), Greg Moore (McMaster U.), Roger Rosenkrantz (independent scholar), and Shai Simonson (Stonehill College).

If interest warrants, there may be additional openings for ten-minute papers. Further information is available from the organizers, Israel Kleiner (kleiner@yorku.ca) and Jim Tattersall (tat@providence.edu).

Cranks and professional advancement: the early years of the calculus

Tom Drucker

There has been a good deal of discussion of the distinction between externalist and internalist approaches to the history of mathematics. The fashionable approaches to the history of science tend to be easier to carry out if one adheres more to the externalist approach, since that is closer to the spirit of general history. Internalist history tends to be both difficult (requiring a close knowledge of the mathematics) and dull, especially for non-mathematicians. The work of the two individuals to be discussed here runs little risk of being dismissed as dull, although it may be liable to accusations of eccentricity.

What is offered here is just a suggestion of a kind of explanation that makes sense of otherwise puzzling approaches to a relatively new discipline. Both authors followed paths from which later approaches diverged, and it is easy to see them consequently as voices in the wilderness. From the standpoint of their own times, however, the wilderness may not have been all that unattractive (this does not depend upon 18th-century theories of aesthetics, fortunately).

Biography is an inevitable contributor to the study of mathematical history, since mathematical work is performed by individuals. Mathematicians who have made notable contributions technically have also been notable for their contributions to what is now regarded as pseudo-science, e.g. Newton, although he is far from alone. Trying to find a motivation for the pseudo-scientific work can be misleading, since such a course suggests that the mathematical work we still respect does not need an explanation. If there is a way of finding an explanation for the whole of an individual's work, that is bound to be more attractive.

Nikolaus Bernoulli (1687-1759) was the author of a treatise *De Usu Artis Conjectandi in Jure*, for which he received his doctorate in law. It builds on the work of his uncle Jakob, who had died in 1705. Nikolaus Bernoulli's treatise appeared in 1709, while the edition of his uncle's contribution's to probability (*Ars Conjectandi*) did not appear until 1713. It has been speculated that the younger Bernoulli felt that his own work would attract more attention if he delayed the publication ofthe materials on which he based his conclusions.

A few comments about Nikolaus Bernoulli's *De Usu* will give an idea of the nature of the work. He starts from the principle that probability is not relevant when the truth of a situation is easily determined, and he works on the assumption that proportions in the future will be like those in the past under similar circumstances. As a result, he can apply the data generally available about subjects like length of life to answer questions in a way different from the

standard responses in the law. In particular, Bernoulli argues that artificial definitions of legal terms should be replaced by criteria taking into account the characteristics of the individual.

A good example is the question how long an individual has to be missing before being proclaimed legally dead. Bernoulli quotes a range of values from the legal literature and then points out that it is surely worth taking into account at least the age of the individual who has disappeared. The use of actuarial tables enables him to calculate the number of years after which it becomes more likely than not that an individual who disappeared at a given age has died. He is careful to put his conclusions against the background of standard legal views, since this was a dissertation in law.

Some of the conclusions to which Bernoulli comes later in *De Usu* are distinctly unexpected (and must have been rather puzzling to legal colleagues). For example he proposes a model for the trustworthiness of witnesses depending on the number of their true utterances divided by the total number of all their utterances. His use of integration was certainly beyond the training of lawyers in that age (or subseqent ones). It is unclear how well informed the readers of the dissertation were for tackling the mathematics, and Bernoulli did receive his degree.

At any rate, Nikolaus achieved a good rate of professional advancement, becoming professor of logic at Basel in 1722 and professor of law there in 1731. His work had achieved its goal of earning his elevation in the legal profession. To many of the legal readers of *De Usu*, the use of advanced mathematics must have been opaque, but they would have been reluctant to stand in the way of the advancement of their science with the help of mathematics.

Of John Craig (d. 1731) rather less is known, although his impact on British mathematics was long-lasting. He was the first to publish in England examples of Leibniz's notation for the calculus. Craig did not receive much by way of mathematical advancement, but he did receive advancement within the Church. This is less surprising in light of the title of one of his works, *Theologicae Christianae Principia Mathematica.* As the title suggests, this was an attempt to adapt the methods of Newton as demonstrated in his *Principia* to Christian theology.

Craig's approach strikes most readers as naive, as he simply assumes that everything behaves in a Newtonian fashion. As a result, he ends up with the equation

$$P = X + (m-1)S + kT^2/t^2 + qD^2/d^2$$

for the reliability of testimony, where X is the initial probability of an account, m the number of witnesses, s the "suspicion" created by each stage of communicating the account, t the time since the original event, and d the distance from the event. As critics since Karl Pearson have noted, the adding of terms is quite implausible. But Craig perseveres with the formula for a specific purpose. He argues that the Second Coming will have occurred by the time this quantity diminishes to zero, and a calculation establishes the terminus ad quem of 3153 A.D.

It is easy to dismiss this sort of calculation

(see "Cranks", back page)

What did Democritus really do?

Mac Priestley

Archimedes in his *Method* praises Democritus for being first to discover the proper formula for the volume of the pyramid (and the cone), even though he "did not prove it". What, then, did Democritus do? T.L. Heath seems to have been the first to suggest an answer often repeated, that Democritus might have offered a heuristic argument using parallel planar sections in a manner made famous by Cavalieri two thousand years later. Archimedes, however, whose main purpose in the *Method* is to describe heuristic arguments using sections, acknowledges no debt to Democritus in their development. Moreover, Plutarch quotes Democritus as having misgivings about such arguments, worrying about the fact that if two adjacent sections of a cone are the same, then the cone would be a cylinder, and if not, then the cone would have jagged edges. Isn't it more plausible for an atomist like Democritus to find one-third as the ratio of a pyramid to its containing prism of the same base and height by thinking along the following lines?

It suffices to take the case of a pyramid with square base whose height is equal to the side of the square. The ratio of such a pyramid to its containing cube is, for an atomist, the ratio of the atoms in the pyramid to the atoms in the cube. To count the atoms in the pyramid, note that there is one atom on the top vertex (there couldn't be more than one, could there?), supported by the smallest possible square of atoms, viz. 2x2. These in turn, as any transcendental eye can see, rest upon a 3x3 square of atoms. And so on, down to the bottom, which is a square of nxn atoms, where n is the (inconceivably large) number of atoms required to make up a side of the pyramid's square base. There must then be n^3 atoms in the cube with this same square base.

The ratio of the pyramid to the cube is then the ratio of the sum of the first n squares of positive integers, given by the formula

$$n(n + 1) (2n + 1) / 6,$$

to the cube of n. If, as seems likely, this formula was known in the time of Democritus (ca. 460-370 B.C.), he could easily have taken it to imply that the ratio of the pyramid to the cube is

$$(1 + 1/n) (2 + 1/n) / 6,$$

which must equal 1/3, since 1/n must be 0. Of course 1/n must be 0, or else the number of atoms on a side of the square base would not be inconceivably large (!).

A virtue of this argument is that it makes just as much "sense" when the pyramid is listing to one side as when it is upright, indicating that pyramids of the same base and height have the same volume even when they are not congruent. This is a nontrivial fact, for as we now know from the solution to Hilbert's third problem, it can not be proved with "scissors-and-paste" geometry. It must have been Democritus' insight into this aspect of the matter that drew Archimedes' praise.

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DISCUSSION DOCUMENT FOR AN ICMI STUDY (1997-2000)

The role of the history of mathematics in the teaching and learning of mathematics

John Fauvel, Open University
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In recent years there has been growing interest in the role of history of mathematics in improving the teaching and learning of mathematics. ICMI, the International Commission on Mathematics Instruction, has set up a Study on this topic, to report back at the next International Congress in Mathematics Education (ICME), in Japan in the year 2000. The present document sketches some of the concerns to be addressed in the ICMI Study, in the hope that many people across the world will wish to contribute to the international discussions and the growing understandings reached in and about this area.

This discussion document will be followed by an invited conference (to be held in France in April 1998), from which a publication will be prepared to appear by 2000. The next section of the present document surveys the questions to be addressed. Your views are solicited both on the questions and on how to take the issues forward as implied in the commentary.

Some research questions

The overall intention is to study the role of the history of mathematics, in its many dimensions, at all the levels of the educational system: in its relations to the teaching and the learning of mathematics as well as with regard to teacher training and in educational research. The order in which the questions are put down here carries no implication about their relative importance or significance.

1. How does the educational level of the learner bear upon the role of history of mathematics?

The way history of mathematics can be used, and the rationale for its use, may vary according to the educational level of the class: children at elementary school and students at university (for example) do have different needs and possibilites. Questions arise about the ways in which history can address those differences.

2. At what level does history of mathematics as a taught subject become relevant?

In analyzing the role of history of mathematics, it is important to distinguish issues around using history of mathematics in a situation whose immediate purpose is the teaching of mathematics, and teaching the history of mathematics as such, in a course or a shorter session.

3. What are the particular functions of a history-of-mathematics course or component for teachers?

History of mathematics may play an especially important role in the training of future teachers, and also of teachers undergoing in-service training. There are a number of reasons for including a historical component in such training, including the promotion of enthusiasm for mathematics, enabling trainees to see pupils differently, to see mathematics differently, and to develop skills in reading, library use and expository writing, skills which can be neglected in mathematics courses.

4. What is the relation between historians of mathematics and those whose main concern is in using history of mathematics in mathematics education?

This question focuses on the professional base from which practitioners emerge, and relates to the social fabric of today's mathematics education community as well as to issues about the nature of history. It is important that historians and mathematics educators work co-operatively, since historical learning and classroom experience at the appropriate level do not always co-exist in the same person.

5. Should different parts of the curriculum involve history of mathematics in different ways?

Already research is taking place to investigate the particularities of the role of history in the teaching of algebra, compared with the role of history in the teaching of geometry.

Even for the design of the curriculum, historical knowledge may be valuable. A survey of recent trends in research, for example (bearing in mind that history extends into the future), could lead to suggestions for new topics to be taught.

6. Does the experience of learning and teaching mathematics in different parts of the world, or cultural groups in local contexts, make different demands on the history of mathematics?

A historical dimension to mathematics learning helps bring out two contrary perceptions in a dialectical way. One is that mathematical developments take place within cultural contexts. The antithesis to this is the realisation that all human cultures have given rise to mathematical developments which are now the heritage of everyone; this therefore acts against a narrow ethnocentric view within the educational system.

The Study should explore the benefit to learners of realising both that they have a local heritage from their direct ancestors and also that every culture in the world has contributed to the knowledge and experience base made available to today's learners.

7. What role can history of mathematics play in supporting special educational needs?

The experience of teachers with responsibility for a wide variety of special educational needs is that history of mathematics can empower the students and valuably support the learning process. Among such areas are experiences with mature students, with students attending numeracy classes, with students in particular apprenticeship situations, with hitherto low-attaining students, with gifted students, and with students whose special needs arise from handicaps.

8. What are the relations between the role or roles we attribute to history and the ways of introducing or using it in education?

This question has been the focus of considerable attention over recent decades. Every time someone reports on a classroom experience of using history and what it achieved they have been offering a response to this question.

The question also involves a listing of ways of introducing or incorporating a historical dimension: for example anecdotal, broad outline, content, dramatic, etc. Then one would draw attention to the range of educational aims served by each mode of incorporation: the way that historical anecdotes are intended to change the image of mathematics and humanize it, for example. And there are rich issues for discussion and research in, for example, the use of primary sources in mathematics classrooms at appropriate levels.

9. What are the consequences for classroom organisation and practice?

The consequences of integrating history are far-reaching. In particular, there are wider opportunities for modes of assessment. Assessment can be broadened to develop different skills (such as writing and project activity), and consequences for students' interest and enjoyment have been noted. Teachers may well need practical guidance and support both in fresh areas of assessment and in aspects of classroom organisation.

10. How can history of mathematics be useful for the mathematics education researcher?

One example is the use of history of mathematics to help both teacher and learner understand and overcome epistemological breaks in the development of mathematical understanding. A constructive critical analysis of the view that "ontogeny recapitulates phylogeny" -- that the development of an individual's mathematical understanding follows the historical development of mathematical ideas -- may be appropriate. Another example is of research on the development of mathematical concepts. In this case the researcher applies history as possible "looking glasses" on the mechanisms that put mathematical thought into motion. Such combinations of historical and psychological perspectives deserve serious attention.

11. What are the national experiences of incorporating history of mathematics in national curriculum documents and central political guidance?

This is not so much a question for discussion as a fairly straightforward empirical question, needing input from knowledgeable people in as many countries and states as possible. But of course it has policy implications too, and could lead to a sharing of experience among members of the community about how they have reached the policy-making level in their countries to influence the content or rhetoric of public documents.

12. What work has been done in the area of this Study in the past?

The answer is: quite a lot. But it is all over the place and needs to be gathered together and referenced analytically. A major annotated critical bibliographical study of the field, which might well take up a sizeable proportion of the final publication, would be an enormously valuable contribution that the ICMI Study could make. It should include a brief abstract of each paper or work included, and indications of the categories to which the work relates in an analytical index. Work in progress could be made available on the WorldWideWeb.

Call for contributions

The ICMI Study on the role of the history of mathematics in the teaching and learning of mathematics will investigate the above questions over the next two years. The Study has three components: an invited study conference, related research activities, and a publication to appear in the ICMI Study series that will be based on contributions to and outcomes of the conference and related research activities. The conference will be held in April 1998 in France. The major outcomes of the Study will be published as an ICMI Study in 1999 and presented at the International Congress of Mathematics Education in Japan in 2000.

The International Programme Committee (IPC) for the Study invites members of the educational and historical communities to propose or submit contributions on specific questions, problems or issues stimulated by this discussion document no later than 1 October 1997 (but earlier if possible). Contributions, in the form of research papers, discussion papers or shorter responses, may address questions raised above or questions that arise in response, or further issues relating to the content of the study. Contributions should be sent to the co-chairs (addresses below). Proposals for research that is on its way, or still to be carried out, are also welcome; questions should be carefully stated and a sketch of the outcome -- actual or hoped-for -- should be presented, if possible with reference to earlier and related studies. All such contributions will be regarded as input to the planning of the study conference.

The members of the International Programme Committee are Abraham Arcavi (Israel), Evelyne Barbin (France), Jean-Luc Dorier (France), Florence Fasanelli (USA), John Fauvel (UK, co-chair), Alejandro Garciadiego (Mexico), Ewa Lakoma (Poland), Jan van Maanen (Netherlands, co-chair), Mogens Niss (Denmark) and Man-Keung Siu (Hong Kong).

This document is a shortened version of a longer one which is available on the WorldWideWeb at

http://www.math.rug.nl/indvHPs/Maanen.html#dd
It was prepared by John Fauvel and Jan van Maanen with the help of Abraham Arcavi, Evelyne Barbin, Alphonse Buccino, Ron Calinger, Jean-Luc Dorier, Florence Fasanelli, Alejandro Garciadiego, Torkil Heiede, Victor Katz, Manfred Kronfeller, Reinhard Laubenbacher, David Robertson, Anna Sfard, and Daniele Struppa.

Contributions should be sent to the co-chairs at the following addresses:
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On the Russell and Peirce archives

Albert Lewis

After many enjoyable years with the Bertrand Russell Editorial Project at McMaster University, this summer I shall become the associate editor on the C.S. Peirce Edition Project at Indiana University -- Purdue University, Indianapolis. The Peirce project has existed longer than the Russell project but has actually produced volumes of Peirce's writings -- five so far -- for the same time, about 16 years. Nathan Houser, a philosopher and historian of logic, formerly the associate editor, has been the editor for nearly four years.

The outstanding difference that I see between the two projects is the state of the respective archives. While the Russell Archive has been diligently tended from its inception by Kenneth Blackwell (recently retired), Peirce's Harvard papers were acquired in such a state of disarray that they have eluded several major efforts at organization during the past 80 years. Thus, establishing the "true" Peirce texts, even for works already published in some form, is a major task. I expect to help the other editors ("textual", "assistant" and "technical") put the pieces of that puzzle together. Another difference between the two projects stems from the fact that Peirce worked on logical, mathematical and scientific endeavours throughout his life; indeed his main source of income, such as it was, came from his research work on the U.S. Coast and Geodetic Survey. Moreover these subjects are inseparable from the development of his philosophical work in semiotics and pragmatism. Russell's work in mathematical logic, however intensive and significant, was only a relatively small and isolated part of his long life. All but one of the volumes of Russell's Collected Papers dealing with that period have now been published. So I am looking forward to helping analyze and describe Peirce's myriad mathematical and scientific endeavours, just as 15 years ago I came with similar anticipation to Russell.

WEB-SITE REVIEW

History-of-mathematics courses on the Web

Glen Van Brummelen

Bill Gates assures us, in *The Road Ahead*, that in the near future publishers will no longer print books on paper. Instead, they will be transmitted to paying customers, wherever these may happen to be, via the information highway. If this is true, scholarly publishing will change forever, not only making publishing easier for refereed (and non-refereed) sources, but also broadening and expanding the possible modes of interaction with the material. The World Wide Web, a precursor of this highway, gives us a foretaste of the new style of information presentation. We scholars may not fully make the transition to this new world in our lifetimes. Our students, however, are growing up within this culture and may have little transition to make.

Several sites on the web are surfacing, demonstrating a variety of student efforts in courses relating to the history of science and of mathematics. Not fettered by the constraints of presenting their work in a conventional typed paper, many of these students are finding creative outlets to better publicize their work, both to their professors and to the outside world. This can range from a simple categorization of biographies and categories by hyper-links to more involved sites that allow the reader to work interactively with the presentation. We may be skeptical of the extent to which this revolution will really change student work, but some of the student projects listed here, still only early explorations of the medium, may at least demonstrate that the Web can be an effective presentation tool in some situations.

The crown jewel of student work in the history of mathematics on the Web is the site on women in mathematics,

http://www.scottlan.edu/lriddle/women.women.htm,

coordinated by Larry Riddle of Agnes Scott College. Over the last few years, students participating in the course have contributed to the site as part of course expectations, resulting in a project composed by various classes over the years, that has won numerous awards for Web publishing. A similar collaborative effort, applied to the entire history of mathematics, has recently started at Simon Fraser University, in Len Berggren's history-of-mathematics course, at

http://mathserv.math.sfu.ca/History_of_Math/mapidx.html.

These sites broaden the definition of collaborative learning beyond even the bounds of the semester structure. Paradoxically, these paperless sites are providing a chance for students to make more permanent contributions than term papers that are filed away and forgotten when the course ends.

Professors of history-of-mathematics courses are also beginning to find innovative uses for the Internet. Gary Stoudt is building a site that may find its uses in courses everywhere: a collection of original sources, scanned and organized in a Web site

http://www.ma.iup.edu/~gstoudt/history/ma350/sources_home.html

This provides easy access to these sources for any teacher of a history-of-mathematics course. The list is already impressive, and it is growing. About a year ago, Dan Alexander of Drake University polled members of the MAA's Math History List (see review in the last *Bulletin*) for people who would be willing to assist students in his class with questions on specialized topics. This past year, I was about to experiment with an in-house e-mail discussion list in my course, to replace the weekly seminar -- partly because of scheduling difficulties but also because I felt it gave students an opportunity to consider their words, look up sources, etc., before making statements on issues. Unfortunately the plans fell through when I suffered my now-legendary finger injury and had to drop several responsibilities.

The potential for course improvement is great. I would like to see some of these courses break beyond institutional walls. For seminar discussion groups, the technology already exists for this. Those of you who teach a course in the history of mathematics for liberal arts students may wish to contact me about the possibilities. As communication improves, collaborative student work may also grow beyond the institution. Students on different continents, sharing certain interests, may collaborate to compose Web-based projects or even traditional term papers. Some day, when the information highway's ability to handle video conferencing reaches acceptable levels, instructors will find it much easier to bring international scholars into their classrooms -- and, conversely, the scholars will find it much easier to find students who share their particular enthusiasms.

Although these musings may sound like Bill Gates' utopianism, I believe that fears about the information highway are greatly exaggerated. Nevertheless, the enhanced communication *will* have its drawbacks. Already there are several sites on the Internet containing libraries of term papers written by students across North America (for instance,

http://www.schoolsucks.com),

allegedly for the purpose of student research but likely used for less honourable purposes. This and similar aspects of, shall we say, improved student communication, will force us to rethink our methods of evaluation, either by maintaining closer contact with students as they work on their papers or by finding more secure ways to have our students explore subjects than the writing of term papers.

The Net will revolutionize the ways that we interact with each other, and the classroom may be one of the places that will undergo the greatest change the most quickly. It's up to us whether we view these changes as a nasty problem or as an opportunity to grow. This growth may well take us to places we can't imagine today.

gvb@sfu.ca
(until Aug. 1)

P.S. A new, graphical, glitzier version of the Society's own web site, with updated links, should be up and running by the time you read this. Check it out!

CONTRIBUTORS SOUGHT

CD-ROM revision of Dauben bibliography

Albert Lewis

The popular J.W. Dauben bibliography, *The History of Mathematics from Antiquity to the Present: A Selective Bibliography* (1985), has for some years been out of print and hard to find outside of libraries. Fortunately, a new, revised and expanded edition is underway for publication as a CD-ROM, thanks to an agreement between the International Commission of the History of Mathematics and the American Mathematical Society. The price is expected to be more affordable than the $85 U.S. of the original edition. Royalties will go to the ICHM, as they did for the first edition. This promises to be the first CD-ROM produced within the AMS and thus something of a ground-breaker.

At Joe Dauben's request, I have agreed to take over the chief editor's role of organizing what must be a cooperative venture of historians of mathematics. Hopefully the original contributing editors will be willing to update their sections. (I have been gradually getting in touch with them.) In addition, the new medium of publication may suggest to us new ways of handling and accessing the same material, or even suggest new types of material. The growth in electronic publications raises even more strongly than 15 years ago the need for overviews and critical guides in subject areas that are growing as rapidly as is the history of mathematics.

This preliminary announcement is an invitation to get in touch with me if you have suggestions for emendations or would be interested in contributing in whatever way. I hope to provide status reports and excerpts on the World Wide Web and encourage everyone to evaluate the work as it progresses. We are aiming for 1998 publication and so need to have everything in by January of that year.

The main thing to keep in mind is that the bibliography is intended as a first resource for someone with a historical question who wants to know what to read (or see, or hear). Thus it should provide not only the best scholarship in each subject area but also the best introductions. We may not always agree on what the best scholarly work is, but hopefully we can agree on what a fair annotation is so that a work can still be usefully cited. This tone has, I believe, already been set in the first edition. In the case of living authors I hope the authors themselves would at least oversee the selection and annotation of their own works, whether or not they are contributing editors.

alewis2@champion.iupui.edu

If you're going to St. John's ...

please note that the phone number for tour registrations, given incorrectly in the registration guide (p. 27), should in fact be 1-888-660-6060.

Wallis correspondence edition in preparation

Preparation of an edition of John Wallis' scientific correspondence has been started at Hamburg University. The project, headed by Professor Christoph J. Scriba in collaboration with Dr. Philip Beeley and Dr. Siegmund Probst, is funded by a grant from the Deutsche Forschungsgemeinschaft (DFG). The plan is to provide a complete index and to publish the letters not covered by other major editions (e.g. Flamsteed, Boyle, Huygens, Oldenburg, and Rigaud's *Correspondence of Scientific Men*).

The editors would be grateful for any information on the whereabouts of letters not contained in C.J. Scriba's "A Tentative Index of the Correspondence of John Wallis, F.R.S.", *Notes and Records of the Royal Society of London* 22 (1967), 58-93. Please contact C.J. Scriba or Philip Beeley, Institut für Geschichte der Naturwissenschaften, Mathematik und Technik, Universität Hamburg, Bundestrasse 55, D-20146, Hamburg Germany. Telephone +49-40-4123-6172 or -6173; fax +49-40-4123-5260; e-mail scriba@math.uni-hamburg.de or beeley@math.uni-hamburg.de.

Oxford meeting updates

All members should have received a brochure (including a registration form) for the first joint meeting of our Society and the British Society for the History of Mathematics, to be held at Oriel College, Oxford, July 18 to 20. Here is some additional information; see also Robert Thomas' message on page 3 above.

The registration fee includes accommodation at Oriel for the nights of July 18 and 19. Additional nights in the College can be booked, at a cost that will depend on your requirements -- for example, 30 pounds per day for room and breakfast only. Early booking would be greatly appreciated by the organizers.

Two activities are planned for the Saturday afternoon: a tour of mathematical Oxford, led by John Fauvel and Robin Wilson of the BSHM, and a visit to the Oxford Museum of the History of Science, guided by the museum's director, Dr. Jim Bennett.

To the list of speakers given in the brochure, add the names of Tom Archibald and Hardy Grant; remove the name of Shawnee McMurran.

Conference in honour of "Ubi" D'Ambrosio

A conference celebrating the 65th birthday of long-time CSHPM member Ubiratan D'Ambrosio will be held in Baltimore on January 6, 1998, the day before the annual American Mathematical Society / Mathematical Association of America joint meeting. Papers are invited on any topic related to Ubi's work or to areas influenced by him. For more information, including registration costs (mostly to cover the food!), please contact Victor Katz (vkatz@udc.edu).

"Items of interest"

Wanderings and activities of Society members

Fran Abeles gave a paper on Martin Gardner, celebrating his 82nd birthday and his role in Lewis Carroll studies, at NYU on April 19.

Len Berggren
* was elected chair of the Department of Mathematics at Simon Fraser University (in British Columbia) for the period May 1996 -- April 2001
* gave a talk on "Late medieval arithmetic: Arabic texts and European motivations" at a conference on "Word, Number, and Image in the Middle Ages" at Penn State University, April 5 -6
* is co-editor, with J. and P. Borwein, of *Pi: A Sourcebook*, a collection of important writings on the history and cultural significance of pi, "as well as some that are just plain whimsical", to be published this year by Springer.

John Dawson's book *Logical Dilemmas: The Life and Work of Kurt Gödel* was published late last year by A.K. Peters Ltd. of Wellesley, Mass.

Judy Grabiner has spent the past academic year at Cambridge, as a Visiting Scholar in History and Philosophy of Science, working on Maclaurin.

Albert Lewis will this summer become the associate editor on the C.S. Peirce Edition Project at Indiana University -- Purdue University, Indianapolis (see article, page 13).

Greg Moore
* gave a colloquium talk on the work of Felix Hausdorff at the Institute for History and Philosophy of Science and Technology, Uniersity of Toronto, in March
* gave a talk on Weierstrass and the origins of compactness at the San Diego meeting of the AMS in January
* will review John Dawson's biography of Gödel for *Science*
* will contribute to *Historia Mathematica* a letter on whether mathematical logic is part of mathematics.

Mac Priestley is at work on a second edition of his *Calculus: An Historical Approach*, originally published by Springer in 1979.

Abe Shenitzer has completed, or is at work on, translations
* from German, of a paper on Riemann by Detlef Laugwitz, to appear later this year in two instalments in the column which Abe edits for the *American Mathematical Monthly*
* from Russian, of a small book by I.G. Bashmakova on diophantine equations from Diophantus to Andrew Wiles
* from a Russian version of the (no longer extant?) French original, of a short monograph by Hadamard on hyperbolic geometry in the theory of automorphic functions
* from Polish, of a book of short essays on various mathematical topics by K. Ciesielski and Z. Pogoda
* from German, of a full-length (over 330 pages) scientific biography of Riemann by Laugwitz.

Glen Van Brummelen is on sabbatical at Simon Fraser University, where he will continue his work with Len Berggren on the translation and analysis of the work of the 10th-century geometer Abu Sahl al-Kuhi. From September to December he will be at the Institute for Advanced Study in Princeton, NJ, working with E.S. Kennedy in attempting to reconstruct early planetary theories from medieval astrological documents. Then from January to June '98 he will be back at Simon Fraser.

Secretary-Treasurer's Report, 1996

1996 was a positive year for the Society. Membership totals increased by a record number, we had a substantial surplus for the third year running, and we instituted cross-membership arrangements with both the CSHPS and the BSHM. We lost our SSHRC funding in May (due to an administrative mix-up), but, through an appeal, our funding was restored by year's end. The administrative portion of our SSHRC grant will cease after 1997 (the travel portion, however, will continue). Our continued surpluses will remove the necessity to raise dues.

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

Credit		Debit	
SSHRC grant	$1339.00	Publications (*Bulletin, Proceedings*)	$1834.97
Membership dues	$9356.25	HSSFC funds dispensed	$416.68
HSSFC travel funding	$416.67	CFH (now HSSFC)	$882.00
Other	$147.98	*Historia Mathematica*	$3416.19
		Philosophia Mathematica	$1743.13
		Conference expenses (keynote)	$673.17
		Miscellaneous (postage, photo-copying, bank charges, etc.)	$166.22
TOTAL	$11259.90	TOTAL	$9132.36

Surplus:	**$2127.54**
Amount carried forward (1995)	$3550.16
YEAR-END BALANCE:	**$5677.70**

(Re the "amount carried forward": a change in the reporting procedure caused a transfer of a carryover of $107.96 in SSHRC travel money from our administrative budget into a separate travel budget.)

How does a $500 Deficit become a $2100 Surplus?

Some of you may recall that I projected a deficit of about $500 for 1996. Instead, we have a record surplus of $2100. There are several causes:

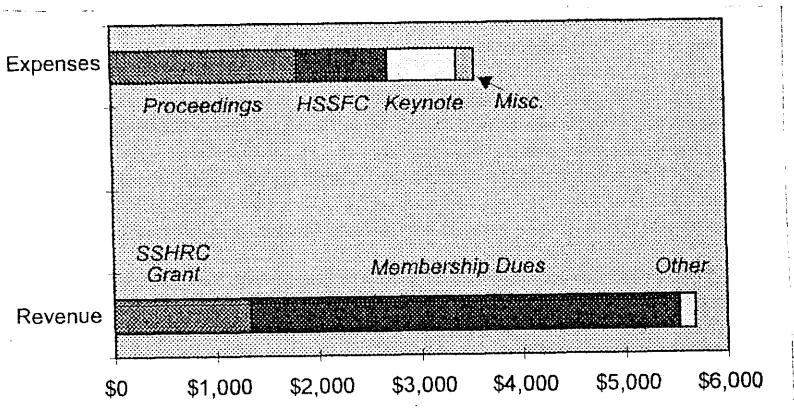
* Our SSHRC funding ($1339) was restored after my projection
* Our travel expenses for the keynote speaker came in about $450 under budget
* Two cheques for 1996 services, totalling about $300, were not cashed until January 1997.

Graphical View of Revenues and Expenses

Two major items in the above statement (journal subscriptions and HSSFC travel funds) are "in-out" budget items, and may obscure what our dues money is being spent on. The first graphic on the next page removes these two items.

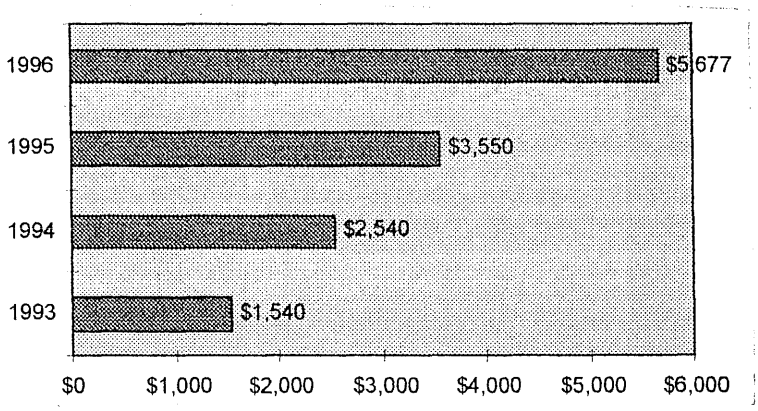
Projection for 1997

Our SSHRC administrative grant shrinks to $669 for the year 1997, and disappears entirely in 1998. The loss of the administrative grant, about 1/3 of our income, is offset by the large surpluses. Keynote speaker expenses



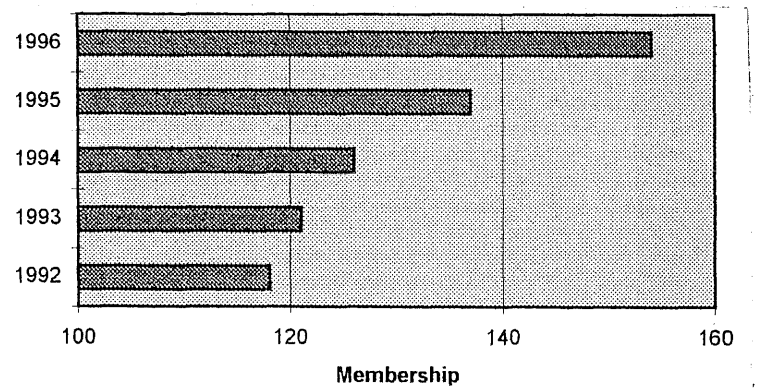
for this year's Learneds will be quite low. Finally, we must take into account the $300 in 1996 expenses that were not cashed until 1997. Thus I anticipate a surplus of about $800 in 1997, and a virtual balance in 1998 (the first year of no SSHRC funding).

Year-End Balances: History



Membership Totals

The Society continues to grow, increasing from 137 to 154 members in 1996. In particular, we have seen a major growth in *student* membership in the last few years. We currently have 19 student members (as opposed to two in 1991). Several of our long-time student members are graduating and finding employment.



Report on CSHPS Trial Affiliate Memberships (1997)

We have a trial arrangement with the CSHPS, offering $5 affiliate memberships to CSHPM members and

receiving a similar benefit in return. The success of the offering this year (1997) is to be used to determine whether or not to continue the practice next year. Of about 160 CSHPM members, 29 have so far taken advantage of the discounted CSHPS membership. Only a couple of these were previously CSHPS members. We have in return received seven CSHPS members.

Report on BSHM Cross-Membership (1997)

The BSHM cross-membership agreement began in 1997 as well. Thus far, 42 of our members have taken advantage of the BSHM rates. It seems that a number of these may be renewals; this information is not currently available. Since the BSHM delayed their membership drive in order to finish the procedures required to be able to accept credit-card payments, we have not yet heard how many BSHM members have taken out CSHPM memberships.

Final Words

It is a real loss to me not to be able to attend the annual meeting this year, to share this good news and to meet good friends. Due to a financial crisis at my college, our travel money was taken away, including my ticket to St. John's. My best wishes for a successful conference, and I promise I will be there next year to re-acquaint with you all!

Glen Van Brummelen, Secretary-Treasurer

Recommended changes in the Society's constitution

The following changes in the Society's constitution have been recommended by the executive; for rationales please see the President's message, page 3 above. The changes will be voted on at the Annual Meeting in St. John's. The present version of the constitution was mailed to all members by the Secretary last fall.

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 suivants 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 members 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".

Cranks and calculus

(continued from page 7)

as raving lunacy and to liken it to Newton's biblical chronology. The point is that Craig did manage to achieve ecclesiastical preferment, becoming prebendary of Salisbury in 1708. Like Bernoulli, Craig probably did not have many colleagues who were capable of penetrating his arguments. Perhaps many of them did not even try.

If a more recent analogue is sought, readers may remember the popularity of catastrophe theory in the 1970s. All sorts of papers were devoted to the applications of this theory to animal psychology and other remote areas. Looking back, we may be tempted to suspect that the content of these was less impressive than it seemed.

Clearly, to establish the claim made here would require access to materials that are not likely to have survived. One can suggest, however, that early applications of calculus may have served a purpose, even if the present sees them with a jaundiced eye. Bernoulli achieved eminence in the law and Craig achieved preferment in the Church. Mathematical eccentricity has its rewards.

tld@globalim.com

COVER

The front-cover illustration is by courtesy of Alejandro Garciadiego. This reproduction of the title page of a Euclid edition published in Seville in 1576 comes from F.J. Duarte, *Bibliografia: Euclides, Arquimedes, Newton* (Caracas, 1967).

New members

The following have recently joined the Society. Asterisks identify CSHPS members who have affiliated with us. A warm welcome to all!

Naseem Ahmad, St. Laurent, PQ
Alan Baker (student), Princeton University
Mehran Basti, University of Manitoba
A. Buckingham (student), The King's University College, Edmonton
Floyd Christian, Austin Peay University
Rick Dale (student), University of Toronto
* Keith Donnelly, Ontario Hydro
Don Eidam, Millersville University
Don Fallis, University of California, Irvine
Ibrahim Garro, Aleppo, Syria
* Robert Hudson, Auburn University
Herb Kasube, Bradley University
* Jean Leroux, University of Ottawa
Burt Madden, University of Arkansas, Little Rock
Joseph Mamo, Valetta, Malta
Michael Miller, University of Northern Iowa
Michael Morelli, Mount Pleasant, MI
* Peter Morton, Mount Royal College
* F.J. Pelletier, University of Alberta
* Stuart Pierson, Memorial University
Lisa Shabel (student), Northampton, MA
* J.A. Van Evra, University of Waterloo
Mark Yanotta (student), University of Missouri

About the *Bulletin*

The *Bulletin* is published each May and November. Les pages sont chaleureusement ouvertes aux textes soumis en français. Please send all comments, suggestions and submissions to the editor, Hardy Grant, 539 Highland Avenue, Ottawa, ON K2A 2J8 (Canada), hgrant@freenet.carleton.ca. The set of volunteer successors to the present editor remains emptier than a politician's promise.