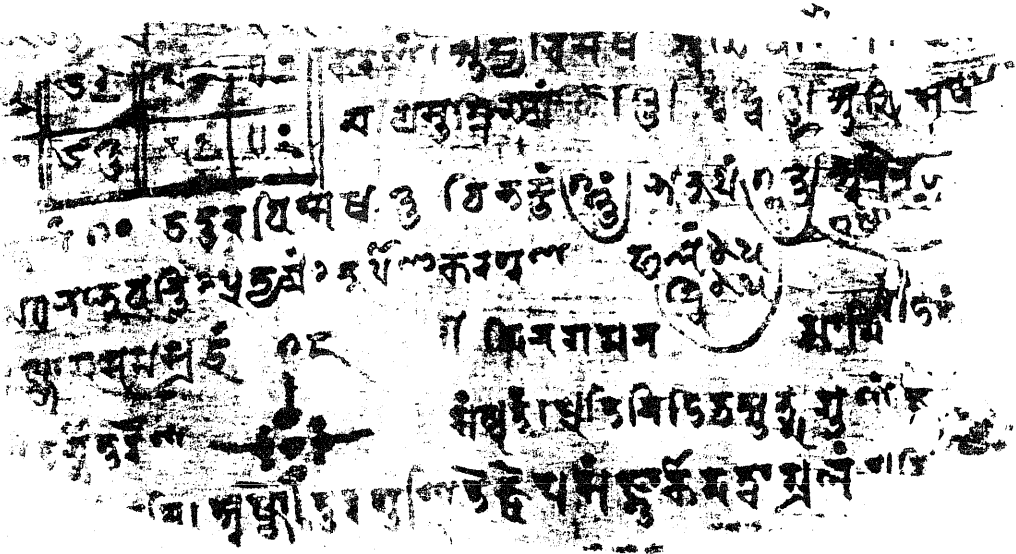


# BULLETIN

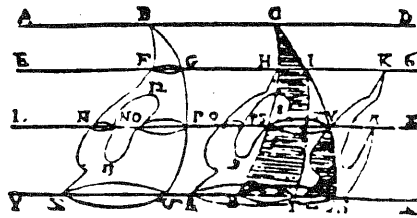
## CSHPM/SCHPM



The Bakhshâlî Manuscript, folio 5r

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Canadian Society for History  
and Philosophy of Mathematics  
Société canadienne d'histoire et  
de philosophie des mathématiques

The Bulletin is an informal medium whose aim is to inform members of the CSHPM\SCHPM, and others interested in the history and philosophy of mathematics, of happenings, meetings, current research work, publications etc. and to provide a place where one can present tidbits, historical problems, quotations etc. which do not find a place in more formal media.

Material should be sent to :

Roger Herz-Fischler, Department of Mathematics and Statistics, Carleton University, Ottawa, Ontario, K1S-5B6.

The preferred method is via electronic mail because it renders retyping unnecessary and avoids mail delays of up to plus infinity. Electronic mail address:

<ROGERHF@CARLETON.NETNORTH>.

The second best method is to send an IBM compatible diskette, via the mail. The mention of these methods should not however discourage those writing with quill and ink, à la Babylonian or by other methods. It would be appreciated if those submitting more than simple news items would send it them in final typed form so that the text can be reproduced as is.

#### **CSHPM/SCHPM**

The society is international in outlook and membership. Its purpose is to unite scholars who are interested in the history and philosophy of mathematics.

Annual dues are \$15 (\$US 11).

If a subscription to *Historia Mathematica* (the official journal of the society) is desired the additional cost is \$29.50 (\$US 22) i.e. a total of \$44.50 (\$US 33).

Remittances should be sent to: M.A. Malik, Department of Mathematics, Concordia University, 1455 Maisonneuve, Montréal, Québec, H3G-1M8; <MAMALIK@CONU1.NETNORTH>. Kindly include your electronic mail address if you have one.

Members are entitled to a free distribution of a one page publicity sheet for their books; contact Herz-Fischler for details. Publishers may do so for a fee.

Members are requested to send in the names of prospective new members.

#### **Annual Meeting**

The next annual meeting will be held at Université Laval. The tentative dates as of this writing are May 29,30 1989. There will be a special session on *Eighteenth Century Mathematics*.

## COVER

The *Bakhshâli Manuscript* is a mathematical work, written on birch-bark, which was discovered at Bakhshâli in the northwestern part of the Indian subcontinent in 1881. The reproduction is from G. Kaye, *The Bakhshâli Manuscript*, Calcutta, Govt. India Central Publ., 1927 (Archaeological Survey of India, new series, 43) [Toronto QA/27/I4K3]. Kaye [pt. 1, chap. 9] dates the manuscript and the composition of the text to the twelfth century, but this was not the opinion of an earlier scholar nor of B. Datta (*Bull. Amer. Math. Soc.*, 35(1929), 579-580. In B. Datta and A. Singh, *History of Hindu Mathematics*, pts I, II, Bombay, 1935, 1938; pt. II, p. 60, a date of c.200 is given for the original. Indeed Datta and Singh (preface to pt. I and elsewhere) find Kaye's work "to be extremely unreliable"; but see the reference in the "current work" section!. The following description of the problem that starts at the end of folio 5r and continues on 5v (the transliteration is given on page 109 of Kaye) is based on *History*, pt. II, p. 60.

The problem is of the type: A certain person travels  $s$  *yojana* on the first day and  $b$  *yojana* more on each successive day. Another person, who travels at the uniform rate of  $S$  *yojana* per day, has a start of  $t$  days. When will the first man overtake the second?

This leads to the quadratic equation:

$$S(t+x) = x\{s + [(x-1)/2]b\}$$

where  $x$  is the sought for number of days. In this particular case  $S = 5$ ,  $t = 6$ ,  $s = 3$  and  $b = 4$ . There is a verbal description of the procedure to be followed and the calculations lead to  $x = 5$ .

## CURRENT WORK AND INTERESTS

Radha Charan Gupta is a professor of mathematics at the Birla Institute of Technology in Mesra, India. He is well known as the founder and editor of *Gaṇita-Bhāratī* which is the bulletin of Indian Society for the History of Mathematics. In 1972 Kenneth May praised him for his "energetic work in popularizing the history of mathematics in India". Professor Gupta is the author of over 200 articles and he has indicated his willingness to send lists and copies to those readers who are interested. In particular his study of trigonometry [see below and the historical example section] has been of great importance in elucidating the early methods that were used.

"It all started by reading a book review. In the review (*Mathematics Review*, 26, p. 1142) of Datta and Singh, *History of Hindu Mathematics*, the authors are charged with being ignorant of historical matters and their theories are said to 'often

rest on the grossest of errors of fact'. Such remarks against a standard text made me curious and I decided to take up research in history of mathematics. Due to the non-publication of Part III of *History*, T.A. Sarasvati Amma completed her Ph.D thesis at Ranchi in 1963/64 (now published as *Geometry in Ancient and Medieval India*, Delhi, 1979) and, as a sequel, I completed my Ph.D. thesis *Trigonometry in Ancient and Medieval India* at Ranchi in 1970/71. My thesis remains unpublished although many papers based on it have now appeared.

Soon after the above, Professor Kenneth O. May invited me in 1971 to become a member of the International Commission on the History of Mathematics and to cooperate in bringing out the *World Directory of Historians of Mathematics* (1<sup>st</sup> edition 1972; 2<sup>nd</sup> edition 1978, supplement 1985). My work in connection with the *Directory* enabled me to do more active work, learn more from it and widen my horizon of activities in the field.

During my doctoral research work, I also succeeded in tracing typed copies of the reported 'lost' manuscript of Part III of Datta and Singh's *History* and referred to it in my thesis. In reply to a sort of challenge<sup>1</sup> I published a short article<sup>2</sup> on Datta whose birth centenary is being celebrated this year. In the mean time K.S. Shukla (who also had the manuscript) has brought out Part III of Datta and Singh in a series of articles in the *Indian Journal of History of Science* starting from 1980. The trigonometry part has been drastically revised in the light of my thesis for which Shukla was an examiner.

In 1979, I started editing a new journal called *Ganita Bharati* which has all the usual features including book reviews and abstracting service. Through its columns scholars can become familiar with new research and publications in the field of history of mathematics. In particular with reference to India they need not be ignorant as were the editors of *Classics of Mathematics* (Moore Pub., 1982) and *The History of Mathematics: A Reader* (Macmillan Education, 1987)."

1. In *Historica Mathematica* 3(1976), 77-78, Phillip Jones published a reproduction of a letter from Datta that L. Karpinski had pasted into his copy of one of Datta's articles. In the letter, dated 1934, Datta states that he had resigned his professorship at the University of Calcutta five years earlier and had taken up a life of spiritual contemplation. Jones asked for further information on Datta.

2. *Historica Mathematica* 7(1980), 126-133. The article includes a biography of Datta as well as a list of his publications.

## FALSE HISTORICAL PROOF OF THE MONTH

(Readers are invited to send in examples; see also issue number 2)

In his article "Sine of Eighteen Degrees in India up to the Eighteenth Century" [*Indian Journal of the History of Science*, 13(1976), 125-143] Radha Gupta gives the following "proof" due to Lakṣmīdāsa Miśra (c. 1500):

The Indian Sine function is defined as follows. Let  $\text{chd}(\theta)$  be the length of the chord subtended by an angle  $\theta$  then  $\text{Sine}(\theta) = 1/2 \text{chd}(2\theta)$ . Note that unlike the modern sine function the Indian Sine function depends upon the radius of the given circle and we have  $\text{Sine}(\theta) = r \cdot \sin(\theta)$ . In particular note that  $\text{Sine}(90^\circ) = r$ .

Miśra's aim is to find  $\text{Sine}(18^\circ)$ . First of all he writes<sup>1</sup>:  
 $\text{Sine}(90^\circ) = r = [R(25r^2) - r]/4$ . Since  $18 = 1/5(90)$  the author now reasons that we can obtain  $\text{Sine}(18^\circ)$  by replacing the term  $25r^2$  in the expression for  $\text{Sine}(90^\circ)$  by  $1/5(25r^2) = 5r^2$ . This procedure gives

$$\text{Sine}(18^\circ) = [R(5r^2) - r]/4$$

which as the reader can check is the correct answer!

By the by this result is easily obtained as a generalization of Ptolemy's computations in Book I of *Almagest*.

1. Following the Renaissance tradition we use  $R$  to indicate the operation of taking the square root; see F. Cajori, *A History of Mathematical Notations*, Open Court, 1928, vol. 1, p. 366.

### 1988 ANNUAL MEETING

May 29,30 - University of Windsor

Despite certain initial technical difficulties, the 1988 meeting was a success on all levels. An estimated 35 people attended various talks. The highlight was the talk by the invited speaker Helena Pycior (University of Wisconsin - Managing Editor of *Historia Mathematica*) dealing with Charles Darwin's relationship with mathematics. As usual the speakers covered a wide range of topics; from those of the special session on *Victorian Mathematics* to a discussion of the apparent lack of the use of trigonometric methods in ancient and even relatively modern texts dealing with land measurement. Tasoula Berggren is preparing the proceedings of the meeting and these will be mailed out to members at a later date.

From the view point of conviviality we started off with dinner on the evening before the meeting; partook of a special luncheon arranged by the local coordinator Erika Kuendiger; and then had a superb dinner in a restaurant which had been previously scouted out for us by the CSHPM's *honorary gourmet* and *resident historical wine expert* Ernie Abeles.

At an administrative level formal and informal discussions, some running late into the night and starting early in the morning, were held with the view to improving the society and in particular the coordination of activities.

### GENERAL MEETING OF THE SOCIETY

May 29, 1988

The meeting was chaired by the vice-president Len Berggren in the absence of the president Louis Charboneau. The following items were discussed:

1. The secretary-treasurer M.A. Malik presented the financial report (see further on in this issue).
2. Roger Herz-Fischler reported on the *Bulletin*. Copies, along with a statement of aims and activities of the CSHPM, have been sent to a myriad of people. He asked members for suggestions of names of those who might be interested. Members were asked to send in announcements, lists of publications and n'importe quoi. He threatened those present with an unending stream of verbage about the "golden number" unless they sent in material. Craig Fraser was thanked for his efforts in asking members for a description of their research activities etc.
3. Len Berggren was appointed the representative of the CSHPM/SCHPM to the Canadian Federation of the Humanities.
4. The elections were held with Francine Abeles and J. de Koning as scrutineers. The following members were elected:

President: Len Berggren (Simon Fraser)

Vice-President: Craig Fraser (Toronto)

Secretary-Treasurer: M.A. Malik (Concordia)

Council: Roger Herz-Fischer  
(Carleton), 88-90

Israel Kleiner (York), 88-90

Tom Archibald (Acadia), 88-89

note: Victor Katz (District of Columbia) was elected to the council last year. Gregory Moore (McMaster), who was elected last year, has resigned his position on the council "...in order to meet my previous research commitments".

5. There were announcements and a discussion related to an exchange relationship with the Association for the Philosophy of Mathematics which publishes *Philosophia Mathematica* (details in this issue). This discussion was continued in the council meeting.

6. Planning for the Laval meeting. It was decided that there would be a special session - to coincide with the 200<sup>th</sup> anniversary of the French Revolution - on "Mathematics in the 18<sup>th</sup> Century". See the sheet included with this issue for details.

7. Wesley Stevens gave a report on the board meetings of the Canadian Federation of the Humanities. He talked about lobbying activities, funding, publishing and the distribution of SSHRC funds.

8. Wesley Stevens gave a very enlightening report on executive meeting and activities of the International Union of the History and Philosophy of Science (a UNESCO sponsored organization) of which the Commission on the History of Mathematics (which publishes *Historia Mathematica*) forms a part.

9. For the purpose of opening a discussion Len Berggren gave a notice of motion which involved changing the name of the society to "The Society for the History of Mathematics".

#### COUNCIL MEETING

Forsaking a calm (and in some cases any) breakfast the members of the Council met at 8.00 a.m. on May 30. The following matters were discussed.

1. Attracting new members to the society. Tom Archibald will prepare material for a brochure inviting people to join the CSHPM/SCHPM. M.A. Malik will arrange for a brochure to be produced professionally and will send these out. Victor Katz will investigate means of increasing membership among American historians of mathematics.

2. The question of changing the name of the society as per item 9 of the General Meeting was brought up. It was suggested that the new name would better indicate the international outlook of the society. There was a discussion pro and con.

3. The Laval meeting was organized (item 6 of the General Meeting). Roland Eddy will be in charge of the overall organization and will ask B. Hodgson of Laval to be the local organizer. Craig Fraser will be in charge of the special session.

4. The general question of annual meeting was addressed. It was decided that:

i. The meeting should be scheduled for two days instead of three as in the past, preferably not on the weekends.

ii. Each person will be allowed to talk only once, with the norm being thirty minutes.

iii. Depending on the number of speakers some longer talks will be permitted.

5. Three issues of the Bulletin were planned: September, January and April with the latter to contain the program for the annual meeting.

### Interim Financial Statement

M.A. Malik, Secretary-Treasurer

		<u>Debit</u>	
Secretary-Treasurer			
Interim Report			Historia Mathematica 1267.35
May 26, 1988			Bulletin (Herz-Fischler) 536.02
			Membership FCSH/CFH 435.00
<u>Credit</u>			Secretarial Assist. 300.00
Balance	1577.94		Postage, Printing etc. 300.00
Membership dues	2335.05		
Travel Grant	1189.00		2838.37
Administrative Grant	1361.00		
	6462.99		Balance 3624.62

### The Recollections of Gilbert de B. Robinson

The *Bulletin* has recently received a copy of Gilbert Robinson's *Recollections (1906-1987)* published by the University of Toronto Press [\$5.00]. Members will recall that he was vice-president of the CSHPM from 1976 to 1979 and president from 1979-1981. In 1981 (Halifax) he gave a survey on "Mathematics in Canada" [For the short of memory this is discussed on page 51]. This book contains much of interest concerning mathematics and mathematicians in the twentieth century. The bibliography on page 95 lists seven biographies of mathematicians (Infield, Beatty, Krieger-Donaj, Jeffery, Williams, James, Young) that Gilbert Robinson has written. Recall also Robinson's *History of the Mathematics Department in the University of Toronto*, University of Toronto Press, 1979.



## PUBLICATIONS

- Anellis, Irving. "Russell's Problems with the Calculus" in V.L. Rabinovich (ed.), *Abstracts, LMPs '87*, vol. 3, sec. 13, Moscow, Nauka, 1987, 16-19.
- Ascher, Marcia. "Mu Torere: An Analysis of a Maori Game", *Mathematics Magazine*, 60(1987), 90-100.
- Berggren, Len. "The Collected Papers of E.S. Kennedy: A Brief Review", *From Deferent to Equant: A Volume of Studies in the History of Science in the Ancient and Medieval Near East in Honour of E.S. Kennedy*, (Annals of the New York Academy of Sciences, vol. 500), New York, The New York Academy of Sciences, 1987.
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- Closs, Michael. "A Discussion of Selected Hieroglyphic Texts from Maya: Treasures of an Ancient Civilization", Workshop on Ancient Maya Civilization, Royal Ontario Museum, 1986.
- Crowe, Donald. "Groups and Geometry in the Ceramic Art of San Ildefonso", *Algebras, Groups and Geometries*, 3(1985) 263-277.
- Dhombres, Jean. "Les présupposés d'Euler dans l'emploi de la méthode fonctionnelle", *Revue d'Histoire des Sciences* 40(1987), 179-202.
- De Young, Greg. "The Khulāṣat al-Ḥisab of Bahā'al-Din al-'Amili and the Dars-i-Nizāmī in India", *Gaṇita-Bharātī*, 8(1986), 1-15.
- Gupta, Radha Charan. "On Some Ancient and Medieval Methods of Approximating Quadratic Surds", *Gaṇita-Bharātī*, 7(1985), 13-22.
- Hogendijk, Jan. "Observations on the Icosahedron in Euclid's Elements", *Historia Mathematica*, 14(1987), 175-177.
- Laird, Roy. "Giuseppe Moletti's *Dialogue on Mechanics* (1576)", *Renaissance Quarterly*, 40(1987), 209-223.
- Miura, Nobuo. "Charles de Bovelles and Perfect Numbers", *Historia Scientiarum*, 34(1988), 1-10.
- Robinson, Gilbert de B.. *Recollections*, Univ. of Toronto, Press, 1988.
- Schnitzer, Abe. *The Genesis Abstract Group Concept: A Contribution to the History of the Origin of Abstract Group Theory* (translation of the work by H. Wussing), MIT Press, 1984.

Schubring, Gert. "The Cross-Cultural 'Transmission' of Concepts - The First International Mathematics Curricular Reform Around 1900, with an Appendix on the Biography of F. Klein", *Occasional Paper 92* (1988), Institut für Didaktik der Mathematik der Universität Bielefeld. (4800 Bielefeld 1, FRG)

Unguru, Sabetai. "Mathematics and Experiment in Witelo's *Perspectiva*" in *Mathematics and its Applications to Science and Natural Philosophy in the Middle Ages*, (E. Grant; J. Murdoch, Cambridge Univ., 1987, p.269-297.

### Ritual and Geometry

A very interesting aspect of early Hindu mathematics is the relationship between rituals and geometrical constructions. These appear in a series of early (? - 500 to -300 in the present form ?) of texts called the *Sulva Sutras*. Among the problems that must be solved in the course of the construction of the brick altars is that of finding rectangles and squares with areas equal to that of a basic altar. The diagrams show a falcon-shaped altar and a variant; these are taken from:

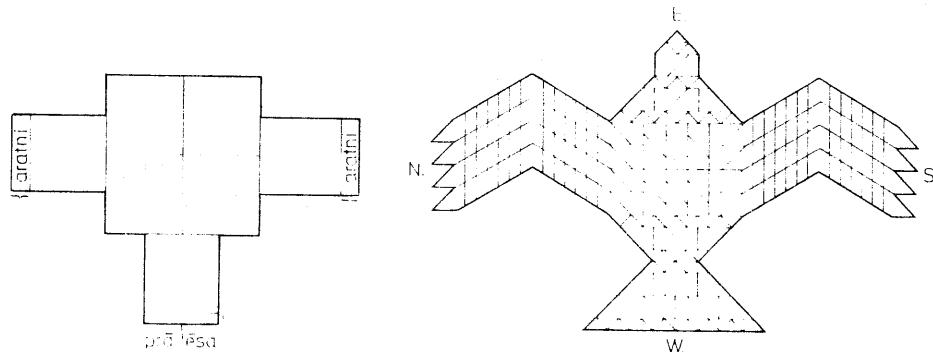
Seidenberg, A. "The Origin of Mathematics", *Archive History of Exact Sciences*, 18(1978), 301 -342.

See also:

Datta, B. *The Science of the Sulba*, Calcutta, University of Calcutta, 1932.

Seidenberg, A. "The Geometry of the Vedic Rituals", Berkeley, 1983

Winter, H. "Science" in *A Cultural History of India* (A. Basham ed.), Oxford Univ., 1975., 141 - 161. [This survey volume provides a background for the understanding of mathematics and Science in India].



## CONFERENCES

The British Society for the History of Mathematics held a conference at the University of Leicester on September 1-3, 1988. the principal topic was the relationship between the teaching of mathematics and history of mathematics education. Among the speakers were: J. Fauvel ("Robert Recorde: An Early Exponent of Distant Learning in Mathematics"); Albert Lewis ("The Mathematical Education of Bertrand Russell"); Ivor Grattan-Guinness ("Set Theory and other Possible and Impossible Things before Breakfast for the Little Kiddies"); W. Ledermann ("Teaching Linear Algebra in an Historical Setting"); A. Gardiner ("History in an Introduction to Group Theory") and C. Fletcher ("Fermat's Little Theorem", 300-1600-1988).

## NEWS/ACTIVITÉS

Roland Eddy (Memorial) is currently interested in plane geometry of the late 19<sup>th</sup> and 20<sup>th</sup> centuries, particularly the application of the specialized homogeneous coordinate systems to locus and incidence problems associated with the triangle. His interest in this field started when he started researching the Kiepert conics. Memorial offers a course (4800 "History of Mathematics") which deals with the development of mathematics from the seventeenth to the beginning of the twentieth centuries.

Ronald Gowing (Royal Institution Centre for the History of Science and Technology, The Royal Institution, 21 Albermarle St., London, W1X 4BS) is currently doing research on the life and work of Pierre Varignon (Caen 1654 -Paris 1722). Dr. Gowing is also editor of the Newsletter of the British Society for the History of Mathematics.

Tom Archibald (Acadia) has been awarded a two-year research grant of \$13,050 by the Social Sciences and Humanities Research Council. The title of his project is "Potential Theory from Laplace to Poincaré".

Louis Charbonneau a dû subir une intervention chirurgicale au mois de mai. Louis et sa famille passent une année sabbatique à l'Université de Nantes. Adresse: 3, rue du Docteur Pouzin-Malegue, 44100, Nantes.

Roger Cooke (Vermont) who is working on the history of algebraic function theory in the nineteenth century, specifically the Jacobi Inversion Problem became interested in the history of mathematics when he was an undergraduate. He found that his primary interest was in how the human race came to understand the small amount that it does understand about nature. In the mid-1970's, ten years after he had received his Ph.D. degree, he felt that he could most contribute to this effort by reflecting on and explaining the knowledge the human race already possesses.

## CITATIONS/QUOTES

"My passion and love for these [mathematical] studies were so strong that I would forget food and drink when pondering." - Samau'al al-Maghribi (12th century) in M. Pearlman (ed.), Ifham al-Yahud / Silencing the Jews, Proceedings of the American Academy of Jewish Research, 32, 1964, p.77.

"Je fis des mathématiques qui ne me servirent à rien dans la suite. Mais peut-être m'ont-elles formé l'esprit." - Le Corbusier, L'Art décoratif d'aujourd'hui, Paris, 1925, p. 206.

"Then did the father in the joy of his heart say joyfully to the headmaster of the school, 'My little fellow has opened wide his hand, and you made wisdom enter there; you showed him all the fine points of the scribal art; you made him see the solutions of the mathematical and arithmetical problems...'" - from an essay "Schooldays" written by a Sumerian schoolteacher c. -2000. In Kramer, S. The Sumerians, Chicago, University of Chicago Press, 1963, p. 239.

"Elders that were before us of masons had these charges written to them as we have now in our charges of the story of Euclidius as we have seen them written in Latin and French both; but how that Euclid come to geometry reason we should tell you as it is noted in the Bible. ... And Abraham as the chronicle saith he was a wise man and a great clerk. And cowthe [i.e.knew] all the vii sciences. And taught the Egyptians the science of Geometry. And this worthy clerk Euclidius was his clerk and learned of him." - from the Cooke manuscript (c. 1400); cited in I. Bulmer-Thomas, "Euclid and Medieval Architecture", Archaeological Journal, 136(1979), 136-150.

"Ah! why, ye Gods, should two and two make four? - Alexander Pope, The Dunciad, Book 2, line 285.

"Mathematics is like checkers in being suitable for the young [Plato, LAWS, 820d], not too difficult, harmless, amusing and without peril to the state." - D. Steele, "A Mathematical Reappraisal of the Corpus Platonikum", Scripta Mathematica, 17(1951), 173-187, p. 185.