AFRICAN MATHEMATICAL UNION

COMMISSION ON THE HISTORY OF MATHEMATICS IN AFRICA

AMUCHMA-NEWSLETTER-20

TABLE OF CONTENTS

Universidade Pedagógica (UP), Maputo (Mozambique), 25.08.1998

1. OBJECTIVES

The A.M.U. Commission on the History of Mathematics in Africa (AMUCHMA), formed in 1986, has the following objectives:

a. to improve communication among those interested in the history of mathematics in Africa;
b. to promote active cooperation between historians, mathematicians, archaeologists, ethnographers, sociologists, etc., doing research in, or related to, the history of mathematics in Africa;
c. to promote research in the history of mathematics in Africa, and the publication of its results, in order to contribute to the demystification of the still-dominant Eurocentric bias in the historiography of mathematics;
d. to cooperate with any and all organizations pursuing similar objectives.

The main activities of AMUCHMA are as follows:

a. publication of a newsletter;
b. setting up of a documentation centre;
c. organization of lectures on the history of mathematics at national, regional, continental and international congresses and conferences.

2. MEETINGS, EXHIBITIONS, EVENTS

2.1 International Colloquium in Béjaïa (Algeria)

The Study Group for the History of Mathematics in Béjaïa (GEHIMAB) organised (University Centre of Béjaïa, November 9-11, 1997) an international colloquium on "Béjaïa and environment during the ages: History, Society, Sciences, Culture". Related to the history of mathematics the following papers were presented:

* Mustapha Abdelkader-Khaddaoui, E.N.S. d'Alger (Algeria): Arithmetic and its methods in Bougie;
* Moktadir Zerrouki, E.N.S. d'Alger (Algeria): Some mathematical algorithms used in the science of inheritance by two mathematicians who lived in Bougie;.
* Michel Ballieu, Louvière (Belgium) & Djamal Aïssani, Université de Bougie (Algeria): The mathematical knowledge available in the Small Kabylia in the 19th century;
* Djamel Eddine Mechhed, Université de Bougie (Algeria): The alphabetical numeration in the manuscripts of the Small Kabylia
* Bernard Rouxel, Université de Bretagne Occidentale (France) & Djamel Aïssani, Université de Bougie (Algeria): The geometer Albert Ribaucourt in Bougie;
* Rachide Bebbouchi, Université d'Alger (Algeria): The geometrical reflections of the Eugène Dewulf in Bougie;

* Ettore Picutti, U.M.I., Milan (Italy): Leonardo of Pisa and his “Liber Abaci”;
* Jacques Sésiano, Ecole Polytechnique de Lausanne (Switzerland): The algebra of Leonardo of Pisa and its influence in medieval Europe;
* Gino Arrighi, Lucca (Italy): Towards a better knowledge of the Latin versions of Arabic texts.

2.2 Papers presented at recent meetings

* At the Conference in Honor of the 65th Birthday of Ubiratan D'Ambrosio (the 'father of ethnomathematics'), realized on January 6, 1998 in Baltimore (USA), two talks were related to the history of mathematics in Africa. Paulus Gerdes spoke about the historical development of ethnomathematical research in Mozambique and D'Ambrosio's influence. Nkechi Agwu (City University of New York) presented the paper "Mathematical teaching techniques inherent in Nigerian cultures".

* At the 76th Annual Meeting of the National Council of Teachers of Mathematics (2-4 April 1998, Washington DC, USA), various papers were presented which are related to mathematics in or from Africa:

Ron Eglash & Gloria Gilmer: African hairstyle designs;
Arthur Powell: Out-of-school application of ethnomathematics: the game of oware;
Daniel Ness: Ethnomathematics and Asante kete drumming;
Beatrice Lumpkin: Some mathematical gems from Egypt;
John Sims: Designs from the Kuba (Congo) and the teaching of mathematics to arts students;
Paulus Gerdes: Exploring geometrical ideas from Southern Africa;
Nelson Sanz: Problem solving and 'aha' calculation experiences with the Rhind mathematical papyrus;
Anthony Stevens & Janet Sharp: Learning about fractions and ratios by using African rhythms played on drums.

3. CURRENT RESEARCH INTERESTS

* Franz Gnaedinger (Zurich, Switzerland) is concluding a book entitled "Geometrie und Mathematik im alten Ägypten" (Geometry and Mathematics in ancient Egypt).

* Milo Gardner (Sacramento, USA) is analysing fractions in Ancient Egypt and prepared several manuscripts on "'false position' arithmetic that 'picked a number' to solve Egyptian fraction problems".

4. NOTES AND QUERIES

This section is reserved for questions that readers would like to have answered; these are the 'queries'. The answers will be the 'notes'. If you have questions or answers about sources, dates, names, titles, facts, or other such matters related to the history of mathematics in Africa, frame them in clear and concise language and send them to the editors. If you are answering a question, make clear reference to that question. All readers may send both questions and answers. Each will be published with the name of the sender.

* Mathematical manuscripts from Mali?

Mike Morelli (University of Wisconsin-Stout) has the following query "A while back, the Chronicle of Higher Education printed an article which stated that Dr. Henry Louis Gates, while in Mali, discovered 4000 books from a 14th century university library (Timbuktu?). I have been trying to get more information about this important discovery. What do you know about this? In what language are the books written? Were any of them math books? "

5. HAVE YOU READ?

5.1 On the History of Mathematics in Africa

#248 Bashakova, I.: **Diophantus and Diophantine Equations**, Mathematical Association of America, Washington, 1997, 104 pp.

Presents the works of Diophantus of Alexandria, focusing on Diophantus' general methods of obtaining rational solutions of indeterminate equations of the second and third order. The second part of the book considers the evolution of the theory of Diophantine equations from the Renaissance to the middle of the 20th century.

#249 Kielland, Else Christie: **Geometry in Egyptian Art**, Alec Tiranti, London, 1955, 214 pp.

Presents a brief survey of Egyptian geometry based on the papyri that have been found, followed by the interpretations which scholars placed on the geometric marks found on the Egyptian works of art. Finally, Lange's law of frontality is discussed, with its revision by Schäfer.

#250 Lumpkin, Beatrice: **From Egypt to Benjamin Banneker: African origins of false position solutions**, in: Ronald Calinger (ed.), Vita Mathematica, Historical Research and Integration with Teaching, MAA Notes (MAA = Mathematical Association of America), 1996, Vol. 40, 279-289

Describes the use of the rule of false positions in ancient Egypt, in the work of later Alexandrian mathematicians, like Diophantus (c. 250), and of Abu Kamil (born 850), the influence on mathematicians in Europe and later on Benjamin Banneker (1731-1806), one of the first African American who dedicated himself to mathematics (cf. # 32, 82).

#251 Robins, Gay: **Proposition and style in Ancient Egyptian Art**, University of Texas Press, Austin, 1994, 279 pp.

"It has long been known that much Egyptian art executed in two dimensions as painting or relief was conceived and carried out on a squared grid, which helped to determine the proportions of the human figure. Although there have been several previous studies of the Egyptian grid, these have been almost entirely limited to single standing or seated male figures... In this book I have attempted to base my own ideas ... primarily on observations carried out on the actual monuments. I have considered female figures as well as male, other postures besides standing and sitting... I show that the squared grid had an important influence on the composition of scenes as a whole and in helping to determine the characteristic style of a particular period. I consider the effects of the major change in the grid that occurred in the twenty-fifth dynasty and persisted thereafter, and elaborate my discovery of the grid system adopted during the Amarna period." (Preface, p. vii)

5.2 Publications on the History of Mathematics, Ethnomathematics and Mathematics Education

#252 Ascher, Marcia: **Malagasy *Sikidy*: A Case in Ethnomathematics**, in: Historia Mathematica, New York, 1997, Vol. 24, 376-395

"*Sikidy* is a system of divination that plays a significant role in the lives of the people of Madagascar. Here we focus on the mathematical ideas which it embodies. Formal algebraic algorithms are applied to initial random data, and knowledge of the internal logic of the resulting array enables the diviner to check for and detect errors. *Sikidy* and the mathematical ideas within it are placed in their cultural and historical contexts".

#253 Doumbia, Salimata: **Maths et Cultures: Pythagore en Afrique**, in: Bulletin Harmonisation des Programmes de mathématiques des pays francophones d'Afrique et de l'Océan Indien, Abidjan, 1997, Vol. 3, 6-11

Gives examples of Pythagorical figurative numbers in West Africa and presents some ideas of Paulus Gerdes' book "African

Pythagoras" on African crafts and the Pythagorean theorem (cf. # 108, 182).

#254 Eglash, Ron: **Scaling hexagons in a Bassari initiation mask**, in: *Mathematics Teacher*, Reston VA, 1995, Vol. 88, No. 7, pp. 618, 620

Short note that analyses the presence of a scaling series of hexagons in a mask from the Bassari (eastern Senegal) and compares it with the use of the number six in other contexts (time reckoning, string tallies, divination).

#255 Eglash, Ron: **Bamana Sand Divination – Recursion in Ethnomathematics**, in: *American Anthropologist*, Arlington VA, 1997, Vol. 99, No. 1, 112-122

Reflecting on his fieldwork realized among Bamana (or Bambara) diviners, the author compares their use of recursion, where the iterative function is addition modulo 2, with Cantor's recursion (cantor set), and hypotheses that an African concept of self-generated fecundity is the shared origin of both the Bamana divination and transfinite set theory.

#256 Eglash, Ron; Christian Sina Diatta and Nfally Badiane: **Fractal structure in Jola material culture**, in: *Ekistics*, Athens, 1994, Vol. 368, 367-371

Discusses self-similarity in altar, house, and village structures among the Jola in the Lower Casamance region in southern Senegal.

#257 Eglash, Ron: **The African heritage of Benjamin Banneker**, in: *Social Studies of Science*, London, 1997, Vol. 27, 307-315

"Benjamin Banneker (1731-1806) is well known for his accomplishments in early American applied science, as well as for his seminal role in African-American science history. Historical and linguistic evidence suggests that his grandfather was of Wolof origin, and that his father was from the area between what is now Ghana and Nigeria. This cultural heritage may have emerged in some of his mathematical thinking" (p.307). (cf. # 32, 82)

#258 Eglash, Ron: **Geometric algorithms in Mangbetu design**, in: *Mathematics Teacher*, Reston, 1998, Vol.91, No.5, 376-381

Analyzes an ivory hat pin from the Mangbetu (northeastern Zaire / Congo) and the geometric algorithm involved in its production. The top of the pin is composed of four scaled, similar heads (forming isosceles right triangles in photographic projection).

#259 Gerdes, Paulus: **On culture and mathematics teacher education**, in: *Journal of Mathematics Teacher Education*, Dordrecht, 1998, Vol. 1, No. 1, 33-53

Presents a short history of mathematics teacher education in Mozambique since independence in 1975, highlighting the multicultural context and the role of the history of mathematics and of ethnomathematics in teacher education.

#260 Huylebrouck, D.: **The bone that began the space odyssey**, in: *The Mathematical Intelligencer*, New York, 1996, Vol. 18, No. 4, 56-60

Describes the Ishango bone (Congo / Zaire) as a Mesolithic mathematical artifact, some interpretations of the notches, and uses. Shallit remarks in a letter to the editor (Vol. 19, No. 3, p. 7) that papers by A.S.Brooks present a date of 20,000 years ago (not 11,000 years ago as stated by Huylebrouck) for the bone (cf. #20, 99, 162)

#261 Middleton, John (Ed.): **Encyclopedia of Africa South of the Sahara**, Charles Scribner's Sons, New York, 1997, 4 volumes

This encyclopedia contains two short articles by Paulus Gerdes: Geometries, Vol. 2, 224-227;
Number systems, Vol. 3, 346-348.

#262 Wilson, Eva: **The interlacing and geometrical art of the Kuba**, in: Eva Wilson, *Ornament 8,000 years*, Harry N. Abrams, New York / British Museum Press, London, 1994, 195-196

Short article on (a)symmetries in Kuba art (cf. #2, 105, 182).

5.3 Other publications on the History of Mathematics by African mathematicians

#263 Djebbar, Ahmed: **La rédaction de *L'istikmal d'al-Mu'taman* (XI^{e} s.) par Ibn Sartaq, un mathématicien des XIII^{e}–XIV^{e} siècles**, *Historia Mathematica*, New York, 1997, Vol. 24, 185-192

The author presents a "14th-century manuscript which has not been studied before. It contains a complete redaction of the *Kitab al-Istikmal* by the Andalusian mathematician, al-Mu'taman ibn Hud (11th century), and informs us about the missing pieces of al-Mu'taman's book and about the content of his initial project that had never been completed".

#264 Hitchcock, Gavin: **Teaching the Negatives, 1870-1970: A Medley of Models**, *For the Learning of Mathematics*, Vancouver, 1997, Vol. 17, No. 1, 17-25

Six snapshots of important representative moments in the teaching of the negatives are represented in historical sequence as classroom scenes.

6. ANNOUNCEMENTS

6.1 First International Congress on Ethnomathematics

The International Study Group on Ethnomathematics organizes from 2 to 5 September 1998 in Granada (Spain) the First International Congress on Ethnomathematics. For more information, contact:

Maria Luisa Oliveras, Dpto. de Didáctica de la Matemática. Facultad de Ciencias de la Educación, Universidad de Granada, 18071 Granada - Spain (Fax: 34-58-246359 /34-58-243949; E-mail: oliveras@platon. ugr.es)
Website: http://www.ugr.es/~oliveras/ICEM1IN.htm

6.2 Web sites that may interest the readers of the AMUCHMA-Newsletter

* **AMUCHMA website**

Scott Williams (Buffalo, USA) has been so kind to set a webpage for the English language edition of the AMUCHMA-Newsletter:
http://www.math.buffalo.edu/mad/amu_chma_announce.html
See also Williams' web page "Mathematicians of the African diaspora":
http://www.math.buffalo.edu/mad/mad0.html

* **African Indigenous Knowledge Systems website**

Gloria Emeagwali (New Brittain, USA) has created a website on African Indigenous Knowledge Systems:
http://members.aol.com/Afsci/africana.htm

* **ISGEm website**

The official website of the International Study Group on Ethnomathematics is maintained by Ron Eglash. It contains the ISGEm-Newsletter and several useful links, including to 'African mathematics':
http://www.cohums.ohio-state.edu/comp/isgem.htm

* **Indigenous Knowledge and Development Monitor website**

The Indigenous Knowledge and Development Monitor is now also available directly from the web:
http://www.nufficcs.nl/ciran/ikdm/
E-mail addresses of African centres:

Cameroon Indigenous Knowledge Organisation:
ngwasiri@ciko.sdncmr.undp.org
Centre for Cosmovisions and Indigenous Knowledge:
aispcg@ncs.com.gh
Kenya Resource Centre for Indigenous Knowledge:
kenrik@tt.gnapc.org, kenrik@tt.sasa.unep.no
South African Resource Centre for Indigenous Knowledge:
alwyn@aztec.co.za

* **Benjamin Banneker Association website**

The Benjamin Banneker Association [BBA] (cf. # 32, 82, 257), founded in 1986, provides a forum for mathematics educators, mathematicians, and other interested people to discuss the learning and teaching of mathematics for African- American children. The BBA recently created its website, managed by its president Carol Malloy:

http://www.unc.edu/~cmalloy/banneker.html

7. ADDRESSES OF SCHOLARS, INSTITUTIONS AND PUBLISHERS MENTIONED IN THIS NEWSLETTER

* Abdelkader-Khaddaoui, Mustapha: E.N.S., Vieux Kouba, 16050 Kouba, Algeria
* Agwu, Nkechi: Department of Mathematics, Borough of Manhattan Community College, City University of New York, 199 Chambers Street, New York, NY 10007, USA (E-mail: nmabm@cunyvm.cuny.edu)
* Aïssani, Djamal : Université de Bougie, Laboratoire LAMOS, 06000 Bougie, Algeria
* Badiane, Nfally: Enda Tiers Monde, Relais pour le developpement Urbain Participe (RUP),BP. 3370, Dakar, Senegal (Tel.: (221) 822 09 42, Fax: (221) 823 51 57, E-mail : rup@enda.sn)
* Bebbouchi, Rachid : Département de mathématiques, USTHB, Bab Ezzouar, Alger, Algeria
* Benjamin Banneker Association: Post Office Box 2686, Durham, NC 27715, USA
* Diatta, Christian Sina: Institut Technologie Nucleaire Appliquée, Université Cheikh Anta Diop, Dakar, Senegal (E-mail: sina@ucad.refer.sn)
* Djebbar, Ahmed: Département de Mathématiques, Bâtiment 425, Université de Paris-Sud, 91405 Orsay Cedex, France (Fax: 33-1-47015917; E-mail: ahmed.djebbar@wanadoo.fr, Ahmed.Djebbar@math.u-psud.fr)
* Eglash, Ron: Comparative Studies, Ohio State University, Columbus OH 43210, USA (E-mail: eglash.1@osu.edu)
* Ekistics: Athens Technological Organization, 24 Strat. Syndesmou Street, 106 73 Athens Greece

* Emeagwali, Gloria: History Department, Central Connecticut State University, 1615 Stanley Street, New Britain, CT 06050, USA (E-mail: emeagwali@ccsu.edu)
* Frankenstein, Marilyn: CCPS, University of Massachusetts Boston, 100 Morrisey Boulevard, Boston Ma 02125-3393, USA (E-mail: frankie@umbsky.cc.umb.edu)
* Gardner, Milo: Sacramento, CA, USA (E-mail: milo.gardner@24stex.com)
* Gerdes, Paulus: Universidade Pedagógica, C.P. 915, Maputo, Mozambique (Fax: 258-1-422113; E-mail: paulus@virconn.com)
* Gilmer, Gloria: Math Tech, 9155 North 70 Street, Milwaukee, WI 53223, USA (E-mail: ggilme@aol.com)
* Gnaedinger, Franz: Hafnerstrasse 60, CH-8005 Zürich, Switzerland (E-mail: circle@access.ch)
* Hitchcock, Gavin: Department of Mathematics, University of Zimbabwe, P.O.Box MP 167, Zimbabwe (E-mail: gavin@maths.uz.zw)
* Jama, Jama Musse: Via di Pretale 103F, 56100 Pisa, Italy (E-mail: jama@betti.dm.unipi.it)
* Lumpkin, Beatrice: 7123 S. Crandon, Chicago, IL 60649, USA (E-mail: Bealumpkin@aol.com)
* Mechhed, Eddine Djamel: Université de Bougie, Laboratoire LAMOS, 06000 Bougie, Algeria
* Morelli, Mike: Department of Mathematics, Statistics, and Computer Science, 237c Harvey Hall, University of Wisconsin-Stout, Menomonie, WI 54751 (E-mail: morellim@UWSTOUT.EDU)
* Powell, Arthur B.: Academic Foundations Department, University Heights, 175 University Avenue, Newark NJ 07102 (E-mail: abpowell@andromeda.rutgers.edu)
* Rouxel, Bernard: Université de Bretagne Occidentale, 29200 Brest, France

* Sésiano, Jacques: Ecole Polytechnique de Lausanne, Lausanne, Switserland
* Shallit, Jeffrey: Department of Computer Science, University of waterloo, Waterloo, Ontario N2L 3G1, Canada (E-mail: shallit@graceland.uwaterloo.ca)
* Sims, John: Mathematics Coordinator, Ringling School of Arts and Design, 2700 North Tamiani Trail, Sarasota, Florida 34234-5895 (E-mail: jsims@rsad.edu)
* Social Studies of Science: SAGE Publications, 6 Bonhill Street, London EC2A 4PU, UK (editor: David Edge, E-mail: doe@tattoo.ed.ac.uk)
* Williams, Scott: Department of Mathematics, South Campus, State University of New York at Buffalo, Buffalo NY 14214, USA (E-mail: bonvibre@aol.com; sww@acsu.buffalo.edu)
* Zerrouki, Moktadir: E.N.S., Vieux Kouba, 16050 Kouba, Algeria

8. SUGGESTIONS

What are your suggestions for improving the AMUCHMA Newsletter?
What are your suggestions for other activities of AMUCHMA?
Send your suggestions, comments, information, questions and any other contributions to the chairman or secretary of AMUCHMA.
Send articles, books and manuscripts for the AMUCHMA Documentation Centre to the Chairman or Secretary.

9. DO YOU WANT TO RECEIVE THE NEXT AMUCHMA-NEWSLETTER?

The AMUCHMA Newsletter, published in Arabic, English and French, is available free of charge upon request.

Send requests to the Chairman

> Paulus Gerdes: Universidade Pedagógica, C.P. 915, Maputo, Mozambique (Fax: 258-1-422113; E-mail: pgerdes@virconn.com)

for the **English** version;

or to the Secretary

> Ahmed Djebbar: Département de Mathématiques, Bâtiment 425, Université de Paris-Sud, 91405 Orsay Cedex, France (Fax: 33-1-47015917; E-mail: Ahmed.Djebbar@wanadoo.fr)

for the **French** and **Arabic** versions.

Readers who would like to receive the **AMUCHMA Journal in Portuguese** should contact the chairman, C.P. 915, Maputo, Mozambique.

The English version of AMUCHMA 20 is reproduced and distributed
with financial support from **SIDA-SAREC** (Sweden)