AFRICAN MATHEMATICAL UNION

Commission on the History of Mathematics in Africa

(AMUCHMA)

AMUCHMA-NEWSLETTER-27

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Maputo (Mozambique), 25.05.2003

AMUCHMA

Chairman: Paulus Gerdes (Mozambique)
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Members: Cyprien Gnanvo (Benin), Salimata Doumbia (Côte d'Ivoire), Nefertiti Megahed (Egypt), Mohamed Aballagh (Morocco), Abdoulaye Kane (Senegal), David Mosimege (South Africa), Mohamed Souissi (Tunisia), David Mtwetwa (Zimbabwe)
Associate Members: José Barrios (Canary Islands, Spain), Scott Williams (USA)

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. Organisation of lectures on the history of mathematics at national, regional, continental and international congresses and conferences.

2. MEETINGS, EXHIBITIONS, EVENTS

2.1 7th Meeting of the Catalan Society for the History of Science and Technology

At the 7th Meeting of the Catalan Society for the History of Science and Technology (Barcelona, Spain, November 14-16, 2002), two activities were dedicated to the history of mathematics and astronomy in the Maghreb and in Andalusia:

* A Round Table on "*Science and Islam*". It was coordinated by the research team in Historv of the Arabic Astronomv of Barcelona: Julio Samso

(Director of the team), Roser Puig (coordinator of the Round Table), Emilia Calvo, Mercè Comes, Miguel Forcada, and Monica Rius.

* A plenary talk by Ahmed Djebbar (Algeria) on "*Mathematical activities in the Maghreb and Andalusia from the 9th to the 14th century*."

2.2 International Colloquium on "Fibonacci: Mathematics and Society in the Mediterranean of the 13th century"

An international colloquium on "*Fibonacci: Mathematics and Society in the Mediterranean of the 13th century*" took place at the Universities of Pisa and Florence (Italy, November 20-23, 2002). The following papers were presented and are related directly to North Africa:

* Roshdi Rashed (Egypt): Fibonacci and the Latin extension of Arabic mathematics;
* Ahmed Djebbar (Algeria): Mathematics in the Maghreb at the time of Fibonacci;
* Ivo Schneider (Germany): The solution of the two main problems concerning games of chance in the late European Middle Ages and the possibility of an Islamic background;
* Djamil Aïssani (Algeria): Mathematics, Commerce and Society in Béjaïa at the time of Leonardo Fibonacci's stay;
* Menso Folkerts (Germany): Leonardo Fibonacci's knowledge of Euclid's "Elements".

2.3 Study day on Book V of Euclid's Elements

The following papers were presented at the Study day on Book V of Euclid's Elements held at the University of Lille III, Lille (France) on December 7, 2002:

* Fabio Acerbi (Italy): Mathematical generality in Book V of the *Elements*, the data of the Arab-Latin tradition;
* Ahmed Djebbar (Algeria): The definitions of Book V in the Arab tradition;
* Jan Hogendijk (Netherlands): Notes on al-Mahani's treatise on anthyphairetic ratios;
* Sabine Rommevaux (France): The definition of the similitude of ratios in the commentary of Clavius on Book V of the *Elements*;
* Bernard Vitrac (France): Some Greek scholia on the definitions of Book V.

2.4 Course on "Arab Mathematics between the East, the Maghreb and Spain"

At the invitation of the University of Mons-Hainaut and the Free University of Belgium, Ahmed Djebbar (Algeria) delivered in February and March 2003 a series of 8 lectures on the themes "Arab mathematics between the east, the Maghreb and Spain." The 8 dealt with the following topics: 1. The sources of Arab mathematics; 2. Geometry; 3. Number theory; 4. Algebra; 5. Combinatorics; 6. The science of calculation; 7. Trigonometry; 8. Approximation methods. Thirty teachers and researchers took part in the course. A book will be published containing the text of the lecture series.

2.5 History of Science Activities in Cairo

During the month of April 2003 the University of Cairo and other Egyptian cultural organisms organised, in collaboration with the French Centre for Cultural Co-operation (CFCC), several activities around the theme "*when science speaks Arab*." Some of these activities envisaged a public of school going youth: publication of booklets on Arab art and sciences, and organisation of games. Other activities concerned the general public: an exhibition, an international colloquium and a series of lectures.

The exhibition took place at the Cairo Museum for Islamic Art. It was dedicated to different scientific activities in Egypt and other islamic countries in the period from the 9th to the 15th century and displayed manuscripts and ancient scientific instruments.

The colloquium took place at the University of Cairo (April 15-16). It was organised in collaboration with the University of Science and Technology of Lille (represented by Ahmed Djebbar and Bernard Maitte). The following papers were presented:

* Maher Abdel Kader (Cairo University): The role of the Greek school of Alexandria;
* Ahmed Fouad Pasha (Vice President of Cairo University): The Egyptian school of the history of science;
* Refaat Hilal (Cairo University): Arab chemistry and its travel to the West,
* Julio Samso (Barcelona University): Arab astronomy: circulation in the Islamic world and in Europe;
* Jacques Sesiano (Ecole Polytechnique de Lausanne): Mathematics produced in the Arab world and its circulation to the West.

A series of lectures on the history of mathematics and physics was given in the buildings of the Supreme Council of Culture before and after the colloquium:

* Djebbar (University of Lille 1): The contribution Andalusia and the Maghreb to the development of the Arab sciences: the example of mathematics;
* Bernard Maitte (University of Lille 1): Science in the eyes of the other: the appropriation of Arab optics by the Christian Middle Ages and by modern science;

* Roshdi Rashed (CNRS, Paris): Translation and appropriation of science in the 9th century: Baghdad;
* Nefertiti Megahed (Cairo University) & Régis Morelon (CNRS, Paris): Scientific solidarity between successive areas of the Mediterranean;
* Maurice Aymard (Maison des sciences de l'homme, Paris,): Circulation of people, circulation of ideas in the Mediterranean from the 10th to the 18th century.

In parallel to these activities, Ahmed Djebbar organised a working session with mathematics lecturers of Cairo University interested in the history of mathematics. During the meeting, in which also Nefertiti Megahed (member of AMUCHMA) took part, a fruitfull exchange of ideas took place with the aim to determine the possibilities and modalities of the development of activities in the field of the history of mathematics at Cairo University.

During the opening session of the colloquium, a convention of co-operation was signed by Bernard Maitte, Director of the Centre for the History of Science of the University of Science and Technology of Lille and by Refaat Hilal, Director of the Heritage Centre of Cairo University.

The convention provides for:

* The introduction of the history of science at all levels of education,
* The teaching of the history of science from a universal and comparative point of view not restricted to only one civilisation,
* The development of training in the history of science,
* The organisation of co-ordinated action plan in order to guarantee permanent links between training, research, preparation of trainers and the popularisation of the history of science,
* The encouragement of publications that popularise past and present scientific activities.

The following actions have been proposed to put into practice the general objectives:

* Realisation of a bibliography on research in the history of science in the Arab countries,
* Elaboration of a manual to help the teaching of the history of science in Egypt,
* Data collection for the realisation of a dictionary of Arab scientists,
* Translation into Arabic of French books on the history of science,
* Bilingual edition of scientific manuscripts.

2.6 Series of lectures on the history of mathematics at the Island of Reunion

Ahmed Djebbar (Algeria) was invited to the Island of Reunion to deliver from 20 to 26 April 2003, a series of lectures on the following themes:

* The life and work of Umar al-Khayyam,
* Debates and controversies among Arab scientists,
* The Arab phase of theoretical astronomy,
* The Arab phase of applied astronomy,
* The astrolabe, its history and use.

The first lecture took place before the final classes of the Lycée Lislet Geoffroy at Saint-Denis and the other four at the observatory of Makes before mathematics teachers from different cities at the Island of Reunion.

2.7 Papers presented at recent meetings

* At the 8th Congress of the Spanish Society for the History of Science and Techniques (Logrono, Spain, September 16-20, 2002) Ahmed Djebbar (Algeria) delivered a paper on "*The scientific tradition of al-Andalus and the Maghreb between the 9th and the 15th centuries.*"

* During the 2nd Week of International Cooperation and Solidarity about the theme of the Arab World in the Mediterranean Space, held at the University of Aix-Marseille (France, December 9-13, 2002) Ahmed Djebbar (Algeria) presented two lectures
  * Arab mathematics and the zero;
  * The birth and development of Arab sciences.

* At the 11th Conference of the Southern African Association for Research in Mathematics and Science Education (SAARMSE) held in Mbabane (Swaziland) (January 2003), Ramila Patel presented the paper "*Geometry in Swazi Grass Mats*."

* In the context of the 13th Pan-African Mathematics Olympiad, realised in Maputo (Mozambique), Paulus Gerdes presented, on April 22, 2003, a paper to the participants, entitled "*From African Sona to the Discovery of New Symmetries and Matrices*."

3. CURRENT RESEARCH INTERESTS

3.1 Note on research inspired by the historical reconstruction of mathematical ideas in the 'sona' geometric tradition of Southern-Central Africa (Paulus Gerdes)

Wolfgang Jaritz (1983) of the University of Graz (Austria) may have been the first to do mathematical research inspired by the 'sona' tradition of the Cokwe and related peoples of eastern Angola and neighbouring regions of Zambia and Congo. Informed by the anthropological studies of Gerhard Kubik, he studied the algorithm for drawing a particular class of 'sona' and compared it to the

paths of a ball at a billiard table. Marcia Ascher (1988, 1990) of the Ithaca College (USA) analysed several 'sona' as graphs. The book by Gerdes (1993, 1994, 1995, 1997a) contributed to the historical reconstruction and analysis of mathematical ideas inherent in the 'sona' tradition. He has developed further the geometry of the 'sona' introducing the concept of mirror curves and inventing Lunda-designs, presented for the first time in (Gerdes 1990). Inspired by this research, Slavik Jablan (Belgrade, Serbia) has studied mirror curves and their relationship with mathematical knot theory (Jablan 1995, 2001); Robert Lange (Brandeis University, USA) developed 'sona tiles' in the early 1990s; Franco Favilli and his student Laura Maffei at the University of Pisa (Italy) have been developing software for the construction of mirror curves and Lunda-designs; and Mark Schlatter (Centenary College of Louisiana, USA) is studying mirror curves and permutations (2000, 2001; for an introduction, see Peterson 2001). Nils Rossing (University of Science and Technology, Trondheim, Norway) and Christoph Kirfel (2003) applied methods of 'sona' analysis by mirror curves to the mathematical analysis of a class of traditional Norwegian mats. Gerdes himself advanced with the study of Lunda-designs and a sub-class called Liki-designs, and found several interesting classes of matrices, like cyclic, helix, cylinder and chess-board matrices. Several of his papers are available in on-line journals (1998, 1999b, 2002c-g). Other links with determinants and magic squares were established (2000, 2002i). The newness and the multiple relationships of mathematical ideas arising from the analysis of the 'sona' tradition with other areas of mathematics reflects the profoundness and the mathematical fertility of the ideas of the Cokwe master drawers.

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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.

5. THESES

Daniel Soares (Mozambique) concluded a doctoral thesis entitled *The incorporation of the geometry involved in traditional house building in Mathematics Education in Mozambique. The cases of the Zambezia and Sofala Provinces*, to be defended at the University of the Western Cape (South Africa)

6. SOURCES

6.1 Further Sources on Numeration in Africa [3]: Duodecimal Numeration in Nigeria

(Paulus Gerdes)

In addition to the sources on numeration systems in Africa presented in AMUCHMA 9, AMUCHMA 22:4, and AMUCHMA 23:6.1, the following sources give information on duodecimal numeration in Nigeria:

Bouquiaux, Luc: **A propos de numération: L'emploi du système décimal et du systéme duodécimal dans la langue birom (Nigéria septentrional**), *Africana Linguistica*, Tervuren, 1962, 7-10

Describes the traditional duodecimal numeration system of the Birom (Plateau Province, central Nigeria) and its interaction with decimal systems. Present the following table (p. 8):

	Birom	that is
1	gwinìŋ	
2	bà	
3	tàt	
4	nààs	
5	tùŋún	
6	tìimin	
7	tàamá	
8	rwiit	
9	ʃaatàt	[12] − 3
10	ʃaabà	[12] − 2
11	ʃaagwinìŋ	[12] − 1
12	kúrú	
13	kúrú na gwɛ gwinìŋ	12 + 1
14	kúrú na vɛ bà	12 + 2
15	kúrú na vɛ tàt	12 + 3
20	kúrú na vɛ rwiit	12 + 8
24	bákúrú bibá	12 x 2
36	bákúrú bitát	12 x 3
108	bákúrú ʃaabitàt	12 x 9
132	bákúrú ʃaagwinìŋ	12 x 11
144	nàga	

Mathews, H.F.: **Duodecimal numeration in Northern Nigeria**, *The Nigerian Field*, and **Notes on the Nungu tribe, Nassawara Province, Northern Nigeria, and the neighboring tribes which use the duodecimal system of numeration**, *Harvard African Studies*, 1917, Vol. 1, 83-93

The author, a colonial assistant district commissioner, describes (pages 92-93) the numeration systems used by the Nungu and by neighboring peoples like the Ninzam on the north, the four clans known as the Artum,

Barrku, Burrza, and Upye on the east, and the people known collectively as the Mada on the south. Reproduction of pages 92 and 93:

"All these tribes use the duodecimal system of counting, as do also a number of others living to the north and northeast – i.e. along the bottom and top of the western escarpment of the Bauchi Plateau. I have had no opportunity of investigating the geographical limits of the system of duodecimal numeration. None of the tribes have any system of writing. The various languages extend over very limited areas and shade off at the edges into the neighboring ones. A native traveling twenty miles from his village would in most cases have great difficulty in making himself understood. This appears to be due to two causes: first, the languages, not having been reduced to writing, tend to alter rapidly; and second, the mutual distrust and hostility between villages and tribes restrict intercourse so much that the alterations are quite local, and the languages tend to diverge. Owing to the primitive character of the people, and to the limited time at my disposal for such researches, I have been unable to collect very large vocabularies, or to get sufficient data to compare fully the various inflexions, particles, prefixes, and suffixes they employ, but I have collected enough to show that the languages are very varied both in grammar and vocabulary. I have also been able to compare the numerals in four of the languages, namely, Nungu, South Mada, Mama, and Ninzam and have made the appended comparative table. I have drawn certain conclusions from the data given thereby, and these conclusions I will first state and then explain. My conclusions are: (10 originally the tribes from which the present ones are descended used a quinary, and then a decimal system of numeration, (2) that at a comparatively recent date some influences, which affected a large area comprising many tribes, introduced words for eleven and twelve on which, with their previous decimal system, were built the present duodecimal vocabularies. This introduction was not only original, but was a stroke of genius, for it produced a system which is far more convenient than the decimal system, the twelve-group being divisible by two, three, four, and six whereas the ten-group is only divisible by two and five."

"The data which seem to support the two conclusions are as follows. Even at the present day there remain sufficient indications that the numbers from six to nine were originally formed by some sort of compounding of five with the numbers from one to four respectively – the essential characteristic of a quinary system. The Nungu shows this least. But even here we see *ata* (=5) with *tamba* (=7). It is true that the termination *–ba* (=2), very common around the Niger-Benue confluence, seems to be lost here, unless it emerges in the Mama word *bari.* We have also a similarity between *anne* (=4) and *isane* (=9)."

"In South mada the words from six to nine have *af-* in common for their first syllable, and four and nine are *enye* and *afwunyei* respectively."

"In mama we have *bari* (=2) and *tañzabari* (=7), *iyenu* (=4) and *tinzhenu* (=9). These last two are even more closely allied than the spelling

indicates, for the actual difference is very slight between the sounds which in the formar was reduced in writing to *iy*- and in the latter to *zh*-. In each the tongue is in contact with the palate, and the teeth are not closed, the regulating shade of difference seeming to be determined by the first syllabe in *tinzhenu*."

"In Ninzam there is *etoñi* (=5) which with *iri* (=1) seems to give *tañre* (=6). With the above-mentioned *–ba* termination for two, *eton* (=5) gives *tañba* (=7), while with *itra* (=3) gives *tandra* (=8)."

"Further, it is noticed that although the numerals from one to ten in the respective languages differ widely, the numerals for eleven and twelve have an obvious similarity. Thus, eleven in Nungu is *opo*; in South Mada *helaiobo* (the last two syllables therefore equivalating *–opo*); in Mama *po*, and in Ninzam *ipo*. Twelve is in Nungu *oso*; in South Mada *eswo*; in Mama *so*, and in Ninzam *tso*. It seems natural, therefore, to infer that these two numerals for eleven and twelve have not been influenced by the causes making for divergence to anything like the extent that the other ten have. But as the only cause discernible is the passage of time, it would seem (unless these conclusions are refuted by data collected from the remaining tribes in the future) that the names for eleven and twelve must be comparatively modern additions to what were formerly, as shown by internal evidence, quinary and decimal systems."

"The decimal system is now being very gradually reverted to by dropping the numerals for eleven and twelve and forming the higher number on multiples of ten. This is due to increasing intercourse with the Hausa and Yoruba traders and the surrounding tribes which, until the establishment of the British administration, did not dare to enter these parts."

Numeration

Decimal	Duodecimal	NUNGU	SOUTH MADA	MAMA	NINZAM
1	1	iri, or ndindi	eren, -tye (in compounds)	mo'on	iri
2	2	aha	ehe	bari	aha
3	3	acha	echa	taru	itra
4	4	anne	enye	iyenu	nza
5	5	ata	atono	tonñu	etoñ
6	6	ndra	afini	tañza	tañrebari
7	7	tamba	afwa	tañzabari	tañba
8	8	sene	afwotara	yanga	tañdra
9	9	sane	afwunye	tinzhenu	chra
10	t	owo	ekobo	lum	uru
11	e	opo	helaiobo	po	ipo
12	10	oso	eswo	so	tso

6.2 Games in Africa

In addition to the sources on mathematical aspects of games in African cultures presented in AMUCHMA 3:4.4, AMUCHMA 9, AMUCHMA 22:6, and AMUCHMA 'Have you read?' (# 12, 30, 55, 62, 91, 106, 155, 162, 167, 181, 194, 217, 218, 225, 228, 237, 239, 243, 275, 282, 336, 372), the following bibliography may be useful:

> Scheerder, Jeroen & Renson, Roland: *Annotated Bibliography of Traditional Play and Games in Africa*, International Council of Sport Science and Physical Education (ICSSPE), Berlin, 1998

The bibliography may be obtained on disk from ICSSPE.

6.3 Four-tablet divination in Southern Africa

Ascher's paper (#252) analyses mathematical aspects of 'sikidy' four-tablet divination on Madagascar. The following paper presents regional and historical connections:

> Binsbergen, Wim van (1996), Regional and historical connections of four-tablet divination in Southern Africa, *Journal of Religion in Africa*, Leiden (Netherlands), Vol. XXVI, 1, 3-29

7. REVIEWS

Review by **Claudia Zaslavsky** (Author of *Africa Counts* [#20, 199, 283]) of Paulus Gerdes' ***Awakening of Geometrical Thought in Early Culture***, MEP-Publications, Minneapolis MN, 2003, 200 pages (ISBN 930656-75-X). [Foreword by Dirk Struik (MIT)]

Paulus Gerdes is the author of many books and articles in several languages dealing with ethnomathematics, the interface between mathematics and anthropology. For many years, he and his colleagues in Mozambique have been investigating and documenting the mathematics inherent in the daily activities of various African cultures. Among his recent books in English are *Geometry From Africa: Mathematical and Educational Explorations* (Mathematical Association of America) and *Women, Art and Geometry in Southern Africa* (Africa World Press).

With *Awakening of Geometrical Thought in Early Cultures,* Gerdes digs deeper into the origins of geometric concepts. In this book, a translation and revision of an earlier work in Portuguese and German, he investigates the mathematical thought "frozen" in the activities of early societies, relying on both literature and on observation of such current practices of mat- and basket-weaving and house building as have survived colonization.

Basic to his analysis is Engels' theory of "human labor" as the driving force in the construction of knowledge. Gerdes writes: "The dialectical interplay between active life and abstract thinking constitutes the motor of the development of geometry" (page 9). The ability to abstract the geometric properties of objects is the outcome of a lengthy historical development based on experience. People learned to apply geometric principles in their practical lives, to fulfill their human needs.

The role of labor is central to this development. As one among several examples, Gerdes describes in detail the process of weaving a basket, using a wealth of diagrams and other illustrations. Over the generations, practitioners developed various styles of weaving, giving rise to geometric shapes—squares, hexagons, circles, cylinders. They found the optimal angles at which to fold the strips to produce the desired effect. They discovered that symmetrical shapes were not only the most practical, but also the most beautiful, as illustrated by drawings of decorative designs of several different societies. They observed and were influenced by phenomena in nature.

Gerdes applies a similar analysis to house building and other activities. What practical activities inspired the Egyptians to memorialize their kings with square-based pyramids? How did they carry out that amazing feat of ancient Egyptian mathematics, the derivation of the formula for the volume of a truncated pyramid? Here again, Gerdes describes the possible path to this achievement in the "material products of human labor… and in their empirically discovered relationships" (page 126).

Much has been written about the early development of geometric concepts. Gerdes analyzes these writings and reveals their shortcomings, from "unscientific" mysticism to inadequate probing into the origins of geometric ideas.

With its clear exposition, its hitherto-untapped theoretical concepts, its wealth of drawings, diagrams, and other illustrations, and its many references to the literature, *Awakening of Geometric Thought in Early Cultures* will appeal to mathematicians, anthropologists, historians, philosophers, educators, the lay public, and students of many disciplines.

Contents:

The book is available from MEP Publications, University of Minnesota, Physics Building, 116 Church St. S. E., Minneapolis, MN 55455-0112, USA (http://umn.edu/home/marqu002, E-mail: marqu002@tc.umn.edu).

8. HAVE YOU READ?

8.1 On the History of Mathematics in Africa

#381 Aïssani, Djamil: ***Bougie á l'époque médièvale: les mathématiques au sein du mouvement intellectuel*** [Béjaïa in the time of the Middle Ages: Mathematics inside the intellectual movement], IREM de Rouen, Rouen (France), 1993, 112 pp.

The study begins with an introduction on the city of Béjaïa, as a centre of contact between the Moslem and Christian worlds. It continues with the presentation of the various intellectual activities of this city in particular those that have a direct or indirect link with mathematics (logic, astronomy, inheritance, geography). Mathematical activities are presented through some authors having a link with Béjaïa and who are known through their production or their biography (al-Qurashi, Fibonacci).

#382 Aïssani, Djamil: **Les mathématiques à Bougie médièvale et Fibonacci** [Mathematics in medieval Béjaïa and Fibonacci], *Revue Algérienne de l'Éducation*, Algiers (Algeria), No. 2, 1995, 5-19

Overview of research realised during the last decades about the role of Béjaïa as a scientific centre in the 12th and 13th century.

#383 Djebbar, Ahmed: **A Panorama of Research on the History of Mathematics in al-Andalus and the Maghrib between the Ninth and the Sixteenth Century**, in Jan P. Hogendijk & A. Sabra (Eds.), *The Enterprise of Science in Islam, New perspectives*, MIT Press, Cambridge, 2003, 309-350.

Paper presented at the Dibner Institute Conference on "New Perspectives on Science in Medieval Islam" (Boston, November 6-8, 1998).

#384 Djebbar, Ahmed: **L'épître d'al-Khayyâm sur "l'explication des prémisses problématiques du livre d'Euclide"**, *Farhang*, Teheran (Iran), Vol. 14, N° 39-40 (2002), 79-136.

This is the French translation of an important book of al-Khayyâm, that includes three chapters: the first contains an attempt of demonstration of the postulate of parallels. The second presents new definitions of the equality and the inequality of two proportions considered better than those given by Euclid in Book V of the "Elements." The third chapter deals with the composition

of the proportions, which was an operation very useful for the astronomers.

#385 Djebbar, Ahmed: **La circulation des mathématiques entre l'Orient et l'Occident musulman: interrogations anciennes et éléments nouveaux**, in Y. Dold-Samplonius, J. W. Dauben, M. Folkerts & B. Van Dalen (Eds.), *From China to Paris: 2000 Years Transmission of Mathematical Ideas*, Stuttgart, Franz Steiner Verlag, 2002, 213-236.

Paper included in the Proceedings of the Colloquium on "2000 Years Transmission of Mathematical Ideas: *Exchange and Influence from Late Babylonian Mathematics to Early Renaissance Science*" (Bellagio, Italy, May 8-12, 2000).

#386 Engels, Hermann: **Über Kreisquadraturen der Antike** (in German) [On Quadratures of the Circle in Antiquity], *Mitteillungen aus dem mathematischen Seminar Giessen*, Vol. 243, 2000, 51-77

Notes a connection between an Egyptian and an Indian approximation of π and contains an analysis of the first Archimedean bounds for π and a reconstruction of the second Archimedean bounds mentioned by Heron of Alexandria.

#387 Gairín Sallán, José María: **Una interpretácion de las fracciones egipcias desde el Recto del Papiro Rhind** [An interpretation of Egyptian fractions based on the Recto of Rhind's Papyrus], *LLULL, Revista de la Sociedad Española de Historia de las Ciencias y de las Técnicas*, Vol. 24, 2001, 649-684

"Accepting as a premise that numerical entities must be associated to the social reality in which they appear, this article exposes that ancient Egyptian fractions are considered to be expressions of the magnitude quantities which have been obtained after being equally shared-out. Taking into account this view, an exhausting analysis of the different cases collected in the table which appears in the Recto of the Rhind's papyrus has allowed as the reconstruction of the shared-out processes used by the scribe Ahmes. Such a process has been undoubtedly complex, due to the fact that, for each one of the situations collected in this table, the scribe must make those decisions which will help the realization of a real share-out under the most suitable conditions. This reconstruction has enabled us to interpret Egyptian fractions as the addition of the partial results obtained when the share-out must be carried out following consecutive stages, as well as to devise two possible alternatives about the way in which the scribe would execute the numerical calculations associated to the share-out process."

#388 Gerdes, Paulus: ***Awakening of Geometrical Thought in Early Culture***, MEP-Publications, Minneapolis, 2003, 200 pp. (Preface by Dirk J. Struik)

(cf. #95, 108, 119)

See the review by Claudia Zaslavsky (AMUCHMA 27:7).

#389 Gerdes, Paulus: **Origins of Geometrical Thought in Human Labor**, *Nature, Society, and Thought*, 14(4), 2003, 391-418 (available at the following website http://umn.edu/home/marqu002 by going to the NST link)

Slightly modified excerpt constructed from the first, second, and third chapters of #389.

#390 Ibish, Yusuf (Ed.): ***Editing Islamic Manuscripts on Science***, Al Furqan Islamic Heritage Foundation, London, 1999, xx + 242 pp.

Proceedings of a 1997 conference, containing among others the following papers:

Julio Samsó: Andalusi and Maghribi Astronomical Sources: What has been done and what remains to be done, pp. 75-104;

Hossein Massoumi Hamedani: Remarks on the manuscript tradition of some optical works of Ibn al-Haytham, pp. 165-180.

#391 Mansfeld, J.: ***Pappus, Mathematicus en een beetje Filosoof*** (in Dutch) [Pappus, Mathematician and a bit of a Philosopher], Koninklijke Nederlandse Akademie van Wetenschappen, Amsterdam, 1998, 20 pp.

A brief analysis of some philosophical passages in Books III and V of the *Mathematical collection* of Pappus and in Pappus' commentary on Book X of Euclid's *Elements* [Reviewed by Jan Hogendijk in *Mathematical Reviews* 2001d:01003].

#392 Zhang, Xin Li: **Ancient Egyptian Unit Fractions and their Calculation** [in Chinese], *Journal of Liaoming Normal University. Natural Science*, Vol. 23, No. 3, 2000, 257-262

Presents an introduction to Egyptian unit fractions and their influence on other subjects.

8.2 Publications on the History of Mathematics in Africa, Ethnomathematics and / or Mathematics Education

#393 Bertolini, Marina: ***Arte e Geometria nelle Culture Africane*** [Art and Geometry in African Cultures], Dipartimento di Matematica, Universitá degli Studi di Milano, Milan (Italy), 2002, 60 pp.

Presents an introduction to the studies of Paulus Gerdes on geometrical ideas embedded in African cultural activities.

#394 Euclid: ***Euclid's Elements of Plane Geometry*** (with appendix and supplements by William Desborough Cooley), Elibron, Boston MA (USA), 2001, 189 pp. (paperback and electronic versions).

Reprint of the 1840 edition of Cooley's edition of the *Elements*, which was intended primarily for educational purposes.

#395 Euclid: ***The Elements of Euclid for the Use of Schools and Colleges*** (with notes, appendix, and exercises by Isaac Todhunter), Elibron, Boston MA (USA), 2001, 421 pp. (paperback and electronic versions)

Reprint of the 1864 edition of Todhunter's edition of the *Elements*; contains the first six books and portions of books XI and XII.

#396 Gerdes, Paulus: **Sobre a Produção de Conhecimentos Matemáticos em Países da África Central e Austral** [On the production of mathematical knowledge in Central and Southern Africa], in: Mariana Leal Ferreira (Ed.), *Ideias Matemáticas de Povos Culturalmente Distintos*, Global Editora, São Paulo, 2002, 206-220

Translation by Mariana Leal Ferreira of #301.

#397 Gerdes, Paulus: **Plaited strip patterns on Tonga handbags in Inhambane (Mozambique) – An update**, *Visual Mathematics*, March 2003, 5(1) (www.mi.samu.ac.yu/vismath/gerdtonga/index.html)

The paper presents an update on strip patterns found on twill-plaited handbags and baskets made by Tonga artisans, mostly women. It includes a catalogue of 58 new strip patterns. All seven symmetry classes are represented. Attention is drawn to two particular types of strip patterns characterised by special plaiting structures.

#398 Oliver, Jack: **Fractions in Ancient Egyptian Times**, *Mathematics in School*, Leicester (UK), 2003, 32(1), 14-16

Introduction to fractions in Ancient Egypt in a 'History Special' of Mathematics in School (The Mathematical Association, 259 London Road, Leicester LE2 3BE, Unied Kingdom), edited by John Earle of the British Society for the History of Mathematics.

8.3 Other publications on the History of Mathematics by African mathematicians

#399 Djebbar, Ahmed: **Le manuscrit (retrouvé) de Saragosse** [The (rediscovered) manuscript of Saragossa], *Revue Alliage*, No. 47, 2002, 67-71

Tells the story of the extraordinary fate of an important work by the mathematician and king of Zaragossa, al-Mu'taman (d. 1085),

of its transmission from Europe to Asia passing through North Africa, and of its discovery ¾ less than 20 years ago ¾ by two researchers, Jan Hogendijk (Netherlands) and Ahmed Djebbar (Algeria).

8.4 Publications on the History of Mathematics and the African Diaspora

None were reported.

8.5 Reviews

#400 Mukono, Tendai (Harare, Zimbabwe): Paulus Gerdes' 'Geometry from Africa', *Indigenous Knowledge World Wide Newsletter*, March 2002, p. 7 (cf. #279)
(available on the web: www.nuffic.nl/ik-pages/ikww/index.html)

8.6 Mathematical books and documents published in Africa

#401 Yacoubi, Nouzha El (Ed.), ***Actes, 11e Edition des Olympiades Pan Africaines de Mathématiques***, AMUPAMO & La Société Mathématique de Côte D'Ivoire, Abidjan, 2001, 48 pp.
Proceedings of the 11th Pan African Mathematics Olympiad held in Ouagadougou, Burkina Faso (July 15-22, 2001) and organised by the African Mathematical Union Commission for the Pan-African Mathematical Olympiad (AMUPAMO).

#402 Yacoubi, Nouzha El & John Webb (Eds.), ***Proceedings of the 12th Pan African Mathematics Olympiad of the African Mathematical Union***, AMUPAMO & Foundation for Education, Science and Technology, Pretoria, 2002, 49 pp.
Proceedings of the 12th Pan African Mathematics Olympiad held in Pretoria, South Africa (April 6-14, 2002).

8.7 Mathematical books published by Africans outside Africa

None were reported.

9. ANNOUNCEMENTS

9.1 Death of Khalil Jaouiche

Khalil Jaouiche, French historian of mathematics of Egyptian origin died on September 2, 2002, in Paris at the age of 78. His works in the history of mathematics deal essentially with the continuation of the Greek tradition of Alexandria in Arab mathematics. In this context he published two important books:

* *Le livre du Qarasn de Thabit Ibn Qurra*, Brill, Leiden, 1976.
* *La théorie des parallèles en pays d'Islam*, Vrin, Paris, 1986 (#67, 146).

9.2 Election to the African Academy of Sciences (AAS)

In "recognition of his distinguished career and achievements", AMUCHMA's Chairman Paulus Gerdes was elected a Fellow of the African Academy of Sciences. The AAS Governing Council approved his election in November 2002. He became the first Mozambican scholar to be elected to the AAS.

9.3 NUMAC – Claudia Zaslavsky Prize

AMUCHMA's associate founding member Claudia Zaslavsky, author of *Africa Counts* (#20, 199, 283, cf. #21, 30, 72, 85, 133, 206, 245, 293, 372-4), made a donation to the Kovalevskaia Fund, that enabled the Mozambican Association of Female Lecturers and Researchers (NUMAC) to establish in 2002 the Claudia Zaslavsky Prize to stimulate Mozambican girls and women to study mathematics. On September 27 took place in Maputo the first public ceremony where nineteen girls from lower secondary schools and five female mathematics teacher education students received their awards.
Further donations are welcomed.
For more information, contact:

Generosa Cossa, Chairwoman NUMAC, c/o UEM, C.P. 257, Maputo, Mozambique (generosa@nambu.uem.mz)

9.4 Exhibition "Mathematics in medieval Béjaïa and Fibonacci

In the context of the celebration of 800 years of the conclusion of Fibonacci's Liber Abaci (1202-2002), the Study group on the History of Mathematics in Medieval Béjaïa **[**Groupe d'Études sur l'Histoire des Mathématiques à Bougie Medieval GEHIMAB] (cf. AMUCHMA 8: 7.1) is organising together with the Town of Béjaïa (Bugia, Bougie, Bgayet) the exhibition "Mathematics in Medieval Béjaïa and Fibonacci" (cf. #194, 207, 234, 381-2). The exhibition will be held until June 2003.
For more information, contact:

Djamil Aïssani, Chairman GEHIMAB, Laboratoire LAMOS, Université de Béjaïa, 06000 Béjaïa, Algeria (Tel/Fax: +213 34 21 51 88, E-mail: lamos_bejaia@hotmail.com)

or consult the webpage of GEHIMAB:

www.gehimab.org

9.5 Websites

Ishango bone (cf. #260, AMUCHMA 24: 3.1)

Information about the famous Ishango bone (Congo), kept at a Museum in Brussels (Belgium), can be found on the web page of Dirk Huylebrouck:

http://193.75.136.15/~dhuylebrouck/Ishango_web.htm

International Commission for the History of Mathematics

The International Commission for the History of Mathematics (ICHM) created a webpage. It is located at:

www.math.uu.nl/ichm

The ICHM is preparing a new Directory of Historians of Mathematics. Colleagues interested in being included in the Directory should fill in the form available at the ICHM webpage.

Indigenous Science Network Bulletin

The Indigenous Science Network Bulletin edited by Michael Michie (mmichie@ozemail.com.au) is available at the following webpage:

www.ozemail.comau/~mmichie/newsletter.html

9.6 Reprints / New Editions of Books

#95 Gerdes, Paulus: ***Ethnogeometrie. Kulturanthropologische Beiträge zur Genese und Didaktik der Geometrie***, Verlag Franzbecker, Hildesheim (Germany), 1991, 360 pp.

Reprinted (December 2002) by Verlag Franzbecker, Postfach 100 420, 31104 Hildesheim, Germany (Tel. 05121/877955, Fax. 05121/877954, Email: verlag@franzbecker.de, Webpage: www.franzbecker.de)

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- Hilal, Refaat: Director, Centre of Scientific Heritage, Cairo University, Cairo, Egypt
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11. 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.

12. 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: Centro de Investigação Etnomatemática, C.P. 915, Maputo, Mozambique (Fax: 258-1-49 45 04; E-mail: pgerdes@virconn.com)

for the **English** version;

or to the Secretary

> Ahmed Djebbar: Département de mathématiques, Bt. M 2, Université de Lille 1, 59655 Villeneuve D'Asq Cedex, France
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for the **French** and **Arabic** versions.

13. AMUCHMA-NEWSLETTER website

Thanks to Scott Williams, the English language edition of all issues of the **AMUCHMA Newsletter** is also accessible on the following website:

http://www.math.buffalo.edu/mad/AMU/amuchma_online.html