



AFRICAN MATHEMATICAL UNION

COMMISSION ON THE HISTORY OF MATHEMATICS IN AFRICA

AMUCHMA-NEWSLETTER-7

Instituto Superior Pedagógico, Maputo (Mozambique), 5.10.90

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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 an 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 eurocentristic bias in the historiography of mathematics;
- d. to cooperate with any and all organisations pursuing similar objectives.

The main forms of activity of AMUCHMA are as follows:

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

2. MEETINGS

2.1 Summer university in Evora (Portugal)

Luís Saraiva of the University of Lisbon (Portugal) organised, together with Jean Dhombres of the C.N.R.S. in Paris (France), the first Portuguese Summer university on the History of Mathematics from 16 to 23 July 1990. The summer university was held at the University of Evora. One whole day, coordinated by Ahmed Djebbar (Algeria) was dedicated to the study of book V of Euclid's Elements in the Arabic mathematical tradition of the Islamic east and west. Ahmed Djebbar presented also a lecture on 'The combinatorics in the mathematical tradition of the Maghreb'.

2.2 World Historical Congress

Paulus Gerdes (Mozambique) was not able to attend the 17th World Historical Congress held in Madrid (Spain) from August 26 to September 2, 1990 [see AMUCHMA 4: 6.4]. His paper 'On Ethnomathematics and the History of Mathematics in Africa' was read by a colleague.

3. THESES COMPLETED OR IN PROGRESS

* Ahmed Djebbar has defended, on 11 June 1990 at the University of Nantes (France), a higher doctoral thesis ('Thèse de Doctorat'), entitled: Mathematics and Mathematicians in medieval Maghreb (9th-16th centuries): contribution to the study of scientific activities in the Islamic West.

The dissertation of over 800 p. has the following chapters:

1. General Introduction
2. Historical introduction: the context of the arrival and development of mathematical activities in the Maghreb
3. Mathematical education and research in the Maghreb during the 13th and 14th centuries
4. Combinatorics in the Maghreb: the example of Ibn Mun'im (12th-13th centuries)
5. Some remarks on the relationship between Arabic philosophy and mathematics
6. Two little known mathematicians from 11th century Spain: al-Mu'taman and Ibn Sayyid

7. The mathematical contribution of al-Mu'taman and his influence on the Maghreb
8. The treatment of fractions in the Arabic mathematical tradition of the Maghreb
9. Abu Bakr Ibn Bajja and the mathematics of his time
10. Discovery of a mathematical manuscript of al-Hassar (12th century): Book I of Kamil
11. Figurate numbers in the mathematical tradition in Andalusia and in the Maghreb
12. Some new elements on Arabic mathematical activity in the oriental Maghreb (9th-16th c.)
13. Some aspects of algebra in the Arabic mathematical tradition
14. The algebra book of Ibn al-Banna
- * Introduction and mathematical analysis
- * Translation into French
- * Arabic text

* Youcef Guergour will defend on 27 November, 1990 at the École Normale Supérieure, Alger (Algeria) a Master's thesis in the history of mathematics on "The mathematical manuscripts of Ibn Qunfudh al-Qasantini (d.1406)"

* E.Laabid will defend in October 1990 in Montreal (Canada) a Master's thesis in the didactics and history of mathematics with a dissertation on mathematical, didactical and historical aspects of heritage problems in Morocco. It contains also the edition of a Arabic mathematical treatise on heritages written by a mathematician from the 10th century, al-Hububi.

4. CURRENT RESEARCH INTERESTS

* Pierre Lapousterle (Bamako, Mali) prepares a study on the contents of three mathematical manuscripts written in Arabic, that belong to the Ahmad Baba Library in Tombouctou (Mali). One of the three manuscripts (whose calligraphy is typical for the Subsaharan Africa) seems to have been written by a mathematician from Mali, al-Arwani. The other two contain references to medieval mathematicians from north Africa (central and extreme Maghreb). The results of this study will be presented at the 3rd Maghrebien

Symposium on the History of Arabic Mathematics (Alger, Algeria, 1-3.12.1990).

5. BOOKREVIEWS

5.1

G.Robins & Ch.Shute, The Rhind mathematical papyrus: an ancient Egyptian text, London: British Museum Publications, 1987, 60 p., 23 drawings, 24 plates

Review by E.M.Bruins

The Papyrus Rhind has been the subject of many studies by a range of authors. The idea to present a popularising edition seems to be at the basis of this charmingly looking booklet. This requests, however, a familiarity with the contents, the results of many previous authors, knowing the ins and outs of the subject, particularly so as the choice of the clarifying sections is of paramount importance. The presentation of the authors on the cover gives for Robins that she made numerous studies on Egyptian graphic art, and for Shute that he is a medical biologist. This might lead a historian of mathematics to frown his eyebrows in perplexity, though, however, any zealous scientists might reach a similar goal. The authors here give a distorted picture, using old and partly refuted publications. Unfortunately, there are not aware of the fact that Neugebauer's work has been severely criticized and that the main texts used - Rhind 24, 25, 26, 27 and 31, 32, 33, 34 - can be found in a drastical revision: On some hau-problems, Janus LXX, 1983, 238-252. The equation $47x=33$ is incorrectly solved, not leading to the correct Egyptian result. The reader might delete fully, as leading astray off the Egyptian methods, all that is found on the pages 16-40, as well as whole sections on the circle, the table of tenths, the conclusion. The excursion on convergent series plays no role since the Egyptians treated the finite number of terms in arithmetical and geometrical series directly. The reviewer is of the opinion that some books might be reviewed in one sentence: This is a good book. But [our] view cannot consist of the whole sentence: This is a book full of errors. In the later case the reviewer has to provide satisfactory evidence for his opinion. The space available here for such a review is too small.

Thus the reviewer refers to his more extensive review in Janus, LXXIII (1986-1990).

[Reproduced from: Mededelingen van het Wiskundig Genootschap, Utrecht (Netherlands), Vol.33, No.3, 1990]

6. NOTES AND QUERIES

This section is reserved for questions that readers would like to have answers; 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 the question. All readers may send both questions and answers. Each will be published with the name of the sender.

7. HAVE YOU READ?

7.1 On the History of Mathematics in Africa

#73

Ascher, Marcia: A River-Crossing Problem in Cross-Cultural Perspective, in: Mathematics Magazine, (USA), 1990, Vol.63, No.1, 26-29

Analyses the logical structure behind traditional story puzzles from Algeria, Cape Verde Islands, Ethiopia, Liberia, Tanzania, Zambia [cf. AMUCHMA 2:5].

#74

Couchoud, Sylvie: Essai d'une nouvelle interpretation du premier probleme du Papyrus mathematique demotique 10520 du British Museum, in: Centaurus, Vol.29, 1986, 1-4

In this problem, the scribe calculates two sums of natural numbers. The first is the sum of the first ten natural numbers. According to R.A.Parker, the second should be the sum of the first ten square

numbers. But the sum given by the scribe is 220 and not 385. The author of the paper thinks that in fact the scribe wanted to calculate the following sum:

$S1 + S2 + \dots + S10$,

with:

$S1 = 1, S2 = 1+2, S3 = 1+2+3, \dots$,

$S10 = 1+2+\dots+10$,

that is indeed equal to 220. If this interpretation is exact, then "only Egypt [among the peoples of Antiquity] could give evidence, by means of the formulation of problem number 53 of the demotic papyrus B.M.10520 and the solution that may have obtained, of this very advanced knowledge". [cf. AMUCHMA 5: 6 # 65]

#75

Djebbar, Ahmed: Arabic Mathematics and Linguistics in the medieval Maghreb: the example of combinatorics (in Arabic), in: *Revue Arabe des Technologies*, Paris (France), 1990, No.3, 43-50

In the first part of this paper the author presents the different known aspects of combinatorial practices in various domains of medieval Arabic culture and science (linguistics, lexicography, grammatics, poetry, astronomy, algebra). The second part is dedicated to the mathematisation of these combinatorial practices and to the contribution of two Maghrebian scientists - Ibn Mun'im (d.1228) and Ibn al-Banna (d.1321) - to this mathematisation: elaboration of definitions, propositions and demonstrations of combinatorial nature and the introduction of combinatorial techniques in different domains, both mathematical and non-mathematical. [Cf. AMUCHMA 5: 6 #61]

#76

Djebbar, Ahmed: al-Qalasadi: an Andalusian-Maghrebian scientist in the 15th century (in Arabic), in: *Revue Arabe des Technologies*, Paris (France), 1990, No.9.

This article is dedicated to the Maghrebian scientist (of Andalusian origin) 'Ali al-Qalasadi (1412-1486) who has been the most important mathematician in the Maghreb during the 15th century. The paper contains a detailed biography of this scientist and an exposition of

the contents of his mathematical works on arithmetics, algebra and also on the use of arithmetical techniques in the solution of heritage problems.

#77

Djebbar, Ahmed: Le traitement des fractions dans la tradition mathématique médiévale du Maghreb, Université de Paris-Sud, Paris (France), 1990, Pré-publications Mathématiques d'Orsay No. 90-04, 30p.

The author exposes first the essential aspects of the theory of fractions in the Arabic mathematical tradition of the East and then, on the basis of a study of manuscripts from the 12th-16th centuries, he analyses the transmission of the concepts and techniques of the fractions from the East to the West and he exposes new elements that concern the practices of calculation with fractions as encountered in the mathematical works of the Maghreb.

#78

Kubik, Gerhard: Visimu vya mukatikati - dilemma tales and 'arithmetical puzzles' collected among the Valuchazi, in: South African Journal of African Languages, Pretoria, 1990, Vol.10, No.2, 59-68

Dilemma tales are discussed on the basis of recordings and cinematographic documentation of narrative performances from eastern Angola and northwestern Zambia. In the oral literature of the Valuchazi, use is sometimes made of axplanatory visual symbols, or ideographs, drawn in the sand. This is exemplified by Chindamba Ngunga's dilemma tale, transcribed and analysed in this paper: "This particular dilemma tale is about three women and three men who want to cross a river in order to attend a dance on the other side. With the river between them there is a boat with the capacity for taking only two people at one time. However, each of the men wishes to marry all the three women himself alone. Regarding the crossing, they would like to cross in pairs, each man with his female partner, but failing that any of the other men could claim all the women for himself. How are they crossing?" (p.62).

#79

Ojoade, J.Olowa: The number 3 in African Lore, in: Abacus, the Journal of the Mathematical Association of Nigeria, Ilorin (Nigeria), 1988, Vol.18, No.1, 21-43

Describes the "frequent occurrence of the number 3 in African lore, making comparisons, where necessary with other world lores. Additionally the paper highlights the sacredness, mysticism, taboos, and superstitions attached to the number" [cf. AMUCHMA 1: 2.1]

#80

Page, Donna: Two, three, four: multiples in African art, Muhlenberg College, Allentown, 1987, 36p.

"Forty objects of African art, mostly from the Yoruba (Nigeria) are analysed in function of the involved repetitions. The twofold objects evoke the most usual dichotomies : good/bad, life/death; the threefold objects evoke sometimes a hierarchy; the fourfold objects may be associated with the directions in space" [summary reproduced from: Afrique Contemporaine, Paris, 1989, No.149, p.94]

#81

Smith, Arthur: Angles of elevation of the pyramids of Egypt, in: Mathematics Teacher, Reston (USA), 1982, Vol.75, No.2, 124-127

Addresses the question 'Why did the Egyptians build pyramids using angles of elevation of approximately $43\frac{1}{2}$ or 52 degrees?'

7.2 On mathematicians of African descent

#82

Bedini, Silvio A.: The Life of Benjamin Banneker, Scribner, New York (USA), 1972, 434 p.

"Benjamin Banneker (1731-1806) was a famous member of the community of 'mathematical practitioners' in Colonial America. A landed freeman and tobacco planter, Banneker was introduced to astronomy and surveying during the 1780s, learning from the popular Newtonian texts of the period with the help of his neighbour George Ellicott. Banneker mastered methods for the calculation of ephemerides and incorporated his results in a series of almanacs

published in Philadelphia, Baltimore, and other eastern cities between 1791 and 1796. During 1791 he served as astronomical assistant on the survey of the District of Columbia directed by Andrew Ellicott. Using all extant records concerning Banneker's life and a wide variety of other sources, Bedini has reconstructed the intellectual and social environment in which Banneker worked" [abstract published in: *American Studies*, an annotated bibliography, Cambridge University Press, 1986; cf. also AMUCHMA 2: 7 # 32]

#83

Fauvel, John & Gerdes, Paulus: African Slave and Calculating Prodigy: Bicentenary of the Death of Thomas Fuller, in: *Historia Mathematica*, New York (USA), 1990, Vol.17, 141-151

"Thomas Fuller (1710-1790) was an African, shipped to America as a slave in 1724. He had remarkable powers of calculation, and late in his life was discovered by antislavery campaigners who used him as a demonstration that blacks are not mentally inferior to whites. This paper describes what we know of Fuller, discusses the various uses made of his story since his death, and appeals for further study of the 18th-century African ethnomathematical context" [cf. AMUCHMA 4:3, AMUCHMA 3: 4.2 and AMUCHMA 2: 7.2 #33].

7.3 Publications on Education, Ethnomathematics and the History of Mathematics in Africa

#84

Gerdes, Paulus: On some possible uses of traditional Angolan sand drawings in the mathematics classroom [1], in: *Abacus, the Journal of the Mathematical Association of Nigeria*, Ilorin (Nigeria), 1988, Vol.18, No.1, 107-125

Following a brief description of the drawing tradition of the Tchokwe people (Angola), some possible uses of their pictogrammes in the mathematics classroom are suggested. The examples given in this paper range from the study of arithmetical relationships, progressions, symmetry, similarity to the determination of the greatest common divisor of two natural numbers [cf. AMUCHMA 3: 6 #37; AMUCHMA 5: 6 #63]

#85

Zaslavsky, Claudia: People who live in round houses, in: Arithmetic Teacher, Reston (USA), 1989, September, 18-21

Gives information on the tradition of round houses in Africa and other parts of the world with suggestions of incorporating this issue in the mathematics classroom.

7.4 Publications by Africans on the History of Mathematics (outside Africa)

#86

Oguntebi, Z.K.: Some historical reflections on the function concept, in: Abacus, the Journal of the Mathematical Association of Nigeria, Ilorin (Nigeria), 1988, Vol.18, No.1, 74-79

Examines a "few of the historical events and characters that contributed some works or discoveries in function-related concepts".

8. ANNOUNCEMENTS

8.1 Colloquium in Marrakech (Morocco)

The Study and Research Centre on Marrakech (Faculty of Arts and Human Sciences, Marrakech, Morocco) will organise a colloquium on the scientific activities realized in Marrakech to be held from 8 to 10 November, 1990. During the event one whole day will be dedicated to the Maghrebian mathematician Ibn al-Banna (1256-1321), who was born in this city. Mohamed Aballagh, member of AMUCHMA, has been invited to present at this colloquium a communication entitled 'The place of the mathematical works of Ibn al-Banna in education and research in the Maghreb during the 14th and 15th centuries'.

8.2 Colloquium in Tétouan (Morocco)

The Faculty of Arts and Human Sciences of Tétouan will organise a colloquium on 'The Maghrebian-Andalusian Studies' from 13 to 15 December, 1990. This colloquium will center around two principal axes: the first one concerns the "reading of the Maghrebian and

Andalusian heritage" (in particular, the scientific and technical heritage). The second axis concerns the "authentification of this same heritage".

8.3 Ibn Qunfudh Studydays in Constantine (Algeria)

The City of Constantine (Algeria) together with various cultural associations in this town will organise three studydays dedicated to the juridical, literary and scientific work of the Maghrebian mathematician Ibn Qunfudh (d.1406) from 4 to 7 December, 1990.

8.4. Philosophical research in Africa

Paulin J.Houtondji (Benin), Chairman of the Inter-African Council for Philosophy, published in 1987, the first volume of a bibliographic survey on philosophical research in Africa: *Philosophical Research in Africa. A bibliographic survey (Bilan de la Recherche Philosophique Africaine. Repertoire Alphabetique)*, Part 1: 1900-1985, Vol.1: A-M, 339p. A following series of articles mentioned in this survey may be interesting also for the history of mathematics in Africa. Readers of the AMUCHMA-Newsletter in possession of one or more of these publications, are requested to send a copy to the Chairman or secretary of AMUCHMA, so that they may be included in the Have you read?-section:

- * Beidelman, T.O.: Kaguru time reckoning: an aspect of the cosmology of an East African people, in: *Southwestern Journal of Anthropology*, 1963, Vol.19, 9-20
- * Bekombo, M.: Note sur le temps. Conception et attitudes chez les Dwala, in: *L'ethnographie*, 1966-67, Vol.60-61, 60-64
- * Bohannan, P.: Concepts of time among the Tiv of Nigeria, in: *Southwestern Journal of Anthropology*, 1953, Vol.9, 251-262
- * Booth, N.S.: Time and change in African traditional thought, in: *Journal of Religion in Africa*, 1975, Vol.VII, Fasc.2, 81-91
- * Diagne, Bachir S.: Note sur la question: faire des mathematiques en Ouolof, in: *Langues africaines et echange des connaissances, Serie d'etudes prepares pour l'UNESCO par le Conseil Interafricain de Philosophie en 1982*
- * Gluckman, M.: The logic of African science and witchcraft: an appreciation of Evans-Pritchards's 'Witchcraft, oracles and magic

among the Azande', in: Rhodes-Livingstone Journal, 1944, No.1, 61-71

* Gnanvo, Cyprien: L'enseignement des mathematiques dans les langues africaines: cours de geometrie en Fon, in: Colloque sur Langues Africaines et Philosophie, Cotonou, 1985

* Gnanvo, Cyprien: La logique, discipline philosophique - discipline mathematique, paper presented at the Seminar on Philosophy and the Development of Science in Africa, Cotonou, 1978

* Gnanvo, Cyprien: Plaidoyer pour la decimalisation, in: Langues africaines et echange des connaissances, serie d'etudes redigees pour l'UNESCO par le Conseil Inter africain de Philosophie, 1981

* Griaule, M.: Le savoir des Dogons, in: Journal de la Societe des Africanistes, 1952, Vol.22, 27-42

* Grootaert, J.: De Bantu-logica toegepast op de Bantoe-filosofie, in: Band, Leopoldstad, 1947, Vol.6, No.2, 52-58

* Hazoume, Marc-Laurent: La numeration en GUN, GEN et en BARIBA, in: Langues Africaines et echange des connaissances, etudes redigees pour l'UNESCO par le Conseil Inter africain de Philosophie, 1983

* Hegba, M.: Plaidoyer pour les logiques de l'Afrique noire, in: Aspects de la culture noire, Paris, 1958, 104-116

* Hyombo, Om'okoko: La logique d'Aristote et les logiques d'Afrique. Possibilites de dialogue, Memoire de graduation en philosophie et religion africaines, Faculty of Catholic Theology, Kinshasa (Zaire), 1979

* Junod, H.P.: Essai sur les notions fondamentales de la pensee africaine-bantoue, in: Geneve-Afrique, 1968, Vol.7, 83-90

* Junod, H.P.: Essai sur les notions fondamentales de la pensee africaine bantoue, in: Presence Africaine, Paris, 1972, 315-325

* Kabasele, Kabala: Propos sur la logique bantu, Masters thesis presented at the University of Daker (Senegal), 1976

* Kagame, Alexis: The empirical perception of time and the conception of history in Bantu thought, in: Cultures and Time, UNESCO, Paris, 1976, 89-116

* Kane, Abdoulaye: Topologie archaïque, in: Revue Senegalaise de Philosophie, Dakar (Senegal), 1982, Vol.1, 75-90

* Keller, J.: Astronomische Ansichten der Isubu in Kamerun, in: Zeitschrift für Afrikanische und Ozeanische Sprachen, 1902, Vol.6

* Kibasomba, Man Byemba: Sur la logique africaine: proces de formalisation, Memoire de Licence, University of Lubumbashi (Zaire), 1980

* Lacroix, Pierre-Francois: L'expression du temps dans quelques langues de l'Ouest africain, Selaf, Paris, 1972

8.5 International Society for the Interdisciplinary Study of Symmetry (ISIS-Symmetry)

The International Society for the Interdisciplinary Study of Symmetry (ISIS-Symmetry) was founded at the 1st Interdisciplinary Symposium on Symmetry of Structure held in Budapest (Hungary) in August 1989. The interest of the Society covers any interdisciplinary, intercultural study of various aspects of symmetry and related concepts (e.g., proportion, rhythm, invariance) in science, art and technology ("symmetrology").

The purposes of the Society are:

- (1) to bring together artists, educators and scientists devoted to, or interested in the research and understanding of the concept and application of symmetry (asymmetry, dissymmetry);
- (2) to offer to the membership and the general public information about events and news in symmetrology;
- (3) to ensure a regular forum (including organizing symposia and other meetings, the publication of a periodical) for all interested in symmetrology.

The Society started in 1990 the publication of its quarterly 'Symmetry: Culture and Science'.

For more information contact the Executive Secretary of ISIS-Symmetry: Gyorgy Darvas, ISIS-Symmetry, c/o Institute for Research Organisation, Hungarian Academy of Sciences, P.O.Box 91, Budapest, H-1361, Hungary
or the Regional Chairman for Africa: Paulus Gerdes, C.P.915, Maputo, Mozambique

9.ADDRESSES

1. Aballagh, Mohamed: Université de Fez, Faculté de Lettres et Sciences Humaines, Département de Philosophie, Fez, Morocco
2. Ascher, Marcia: Mathematics Department, Ithaca College, Ithaca, NY 14850, USA

3. Bruins, E.: Joh.Verhulststraat 185, 1075 GZ Amsterdam, Netherlands
4. Couchoud, Sylvie: Place de l'eglise, Le Daillet, 69570 Dardilly, France
5. Djebbar, Ahmed: Département de Mathématiques, Université de Paris-Sud, 91405 Orsay Cedex, France
6. Fauvel, John: Faculty of Mathematics, The Open University, Milton Keynes MK7 6AA, England
7. Gerdes, Paulus: Faculty of Mathematics and Physics, Higher Pedagogical Institute (ISP), C.P.3276, Maputo, Mozambique
8. Houtondji, Paulin: Inter-African Council for Philosophy, B.P.1268, Cotonou, Benin
9. Kubik, Gerhard: Institut fur Volkerkunde, University of Vienna, 7 Universitat Str., A-1010 Vienna, Austria
10. Lapousterle, Pierre: c/o Mission Française de Coopération, B.P.84, Bamako, Mali
11. Oguntebi, Z.K.: Department of Mathematics, Faculty of Education, Ahmadu Bello University, Zaria, Nigeria
12. Ojoade, J.Olowa: Centre for Development Studies / General Studies, University of Jos, Jos, Nigeria
13. Smith, Arthur: Mathematics Department, Rhode Island College, Providence, RI 02908, USA
14. Zaslavsky, Claudia: 45 Fairview Avenue #13-1, New York, NY 10040, USA

10. 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.

11. 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, C.P.915, Maputo, Mozambique,

for the English version, or to the Secretary

Ahmed Djebbar, Departement de Mathématiques, Université Paris-Sud, 91405 Orsay Cedex, France,

for the French version, or to Professor

Mahdi Abdeljaoud, I.S.E.F.C., 43 rue de la Liberté, 2019 Le Bardo, Tunis, Tunisia,

for the Arabic version.

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