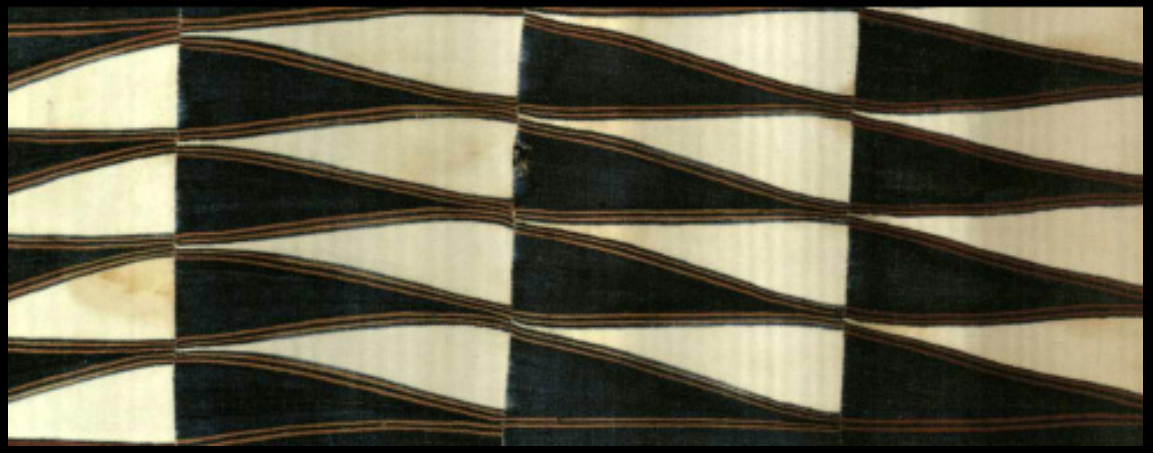
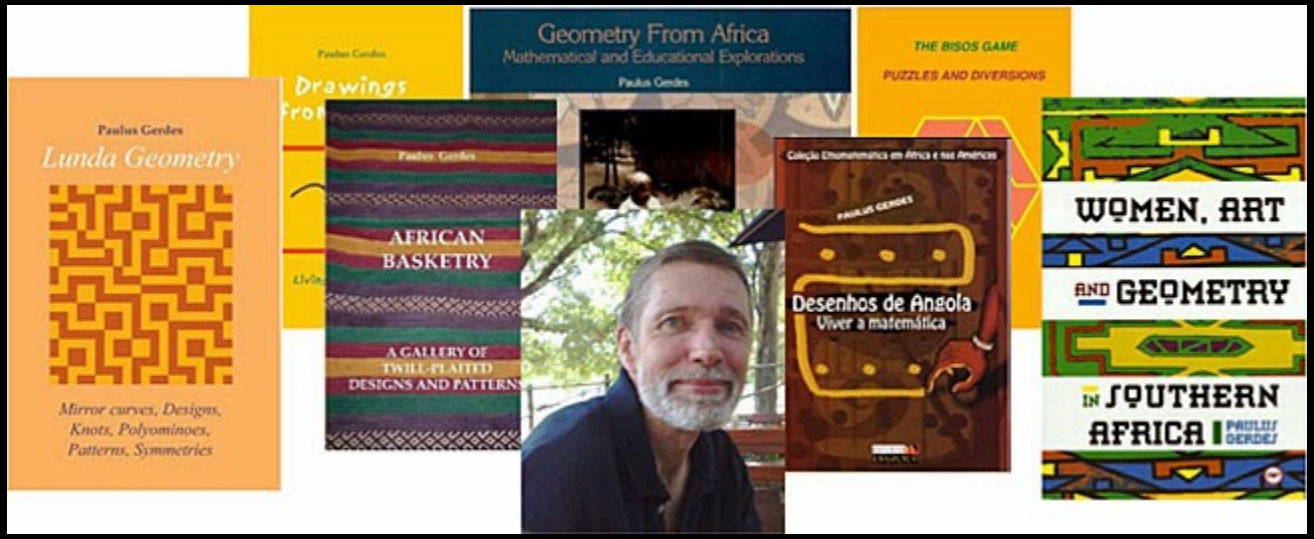


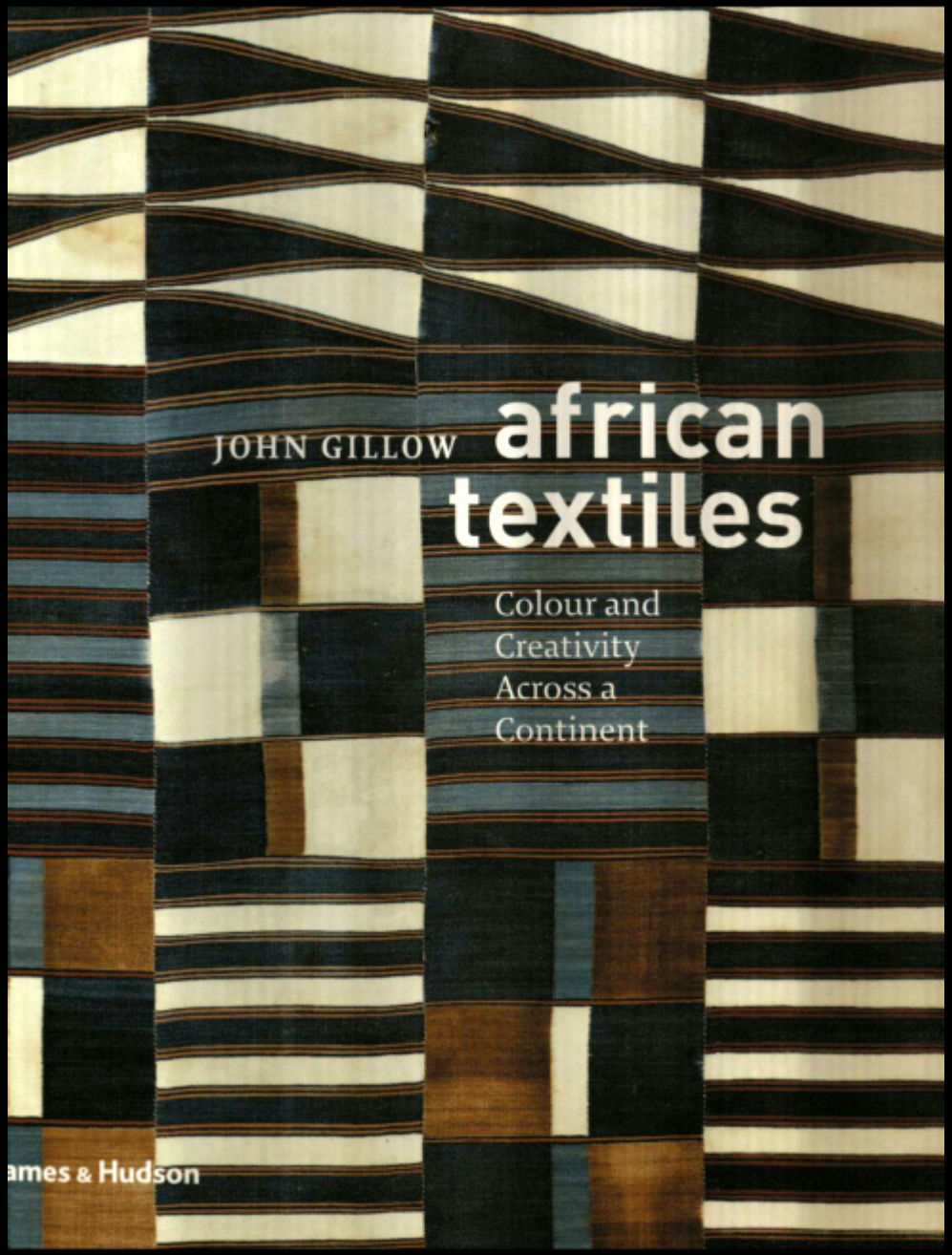
John Bibby –
MathsJam, November 2015

Maths & African Textiles - Common Threads

Paulus Gerdes
1952 - 2014



In Memoriam



Triggered by a random purchase

Lots of stunning images …….

Kenti loom & stitchwork

Lots of stunning patterns

…….

Mbuti bark-cloths

Ndebele apron
showing 2 “children”

Endless scope for
mathematical imaginings ….

"..... (I)t has been calculated that the Shoowa use at least two-thirds of the known geometric (wallpaper?) patterns in their cut-pile embroidery"

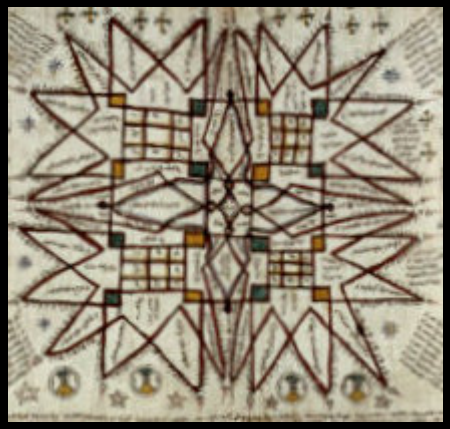
(p.196)

Not much explicit maths ……

Shades of Sierpinski ??

“*Rigan yaki* charm gown,

inscribed with Koranic verse, magical diagrams … with leather amulets”



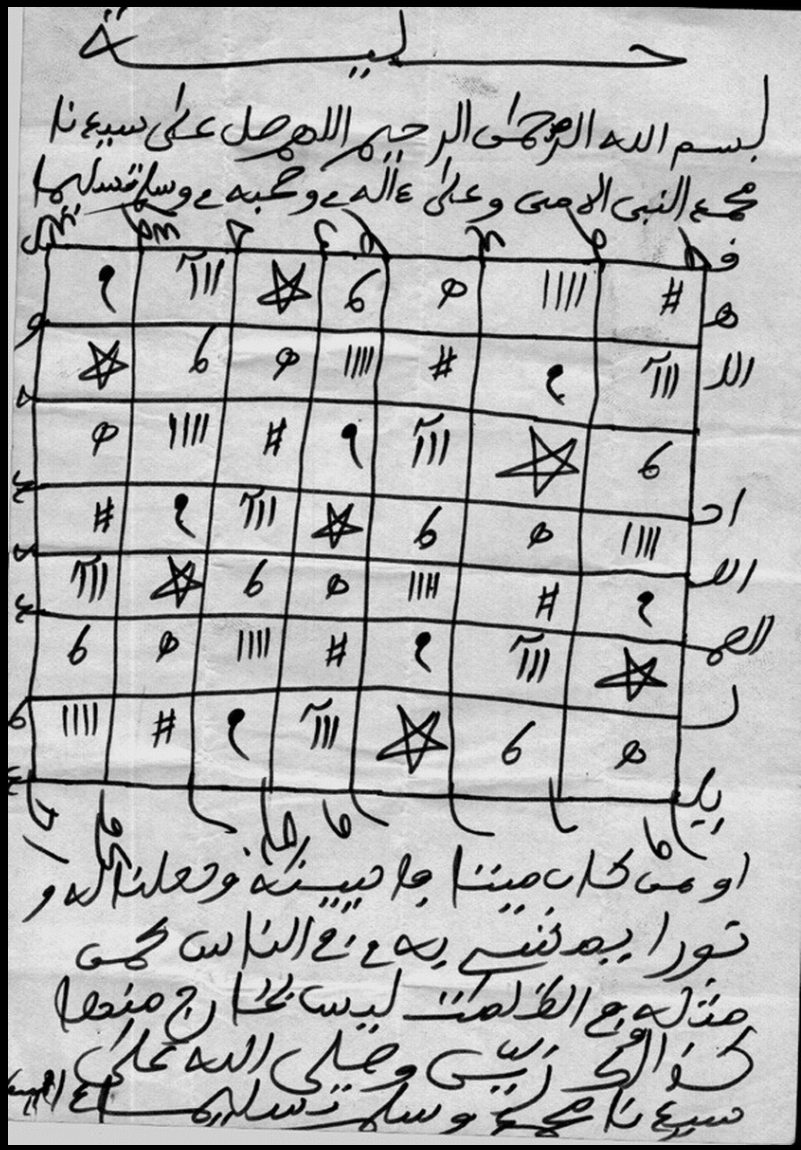
Images unclear – but there does seem to be a ‘gap’ in the central square

On another smock ….

Similar patterns ….

Magic(???) squares elsewhere

(‘*Hatim*’ in Arabic: *pl. ‘hatimi’*)



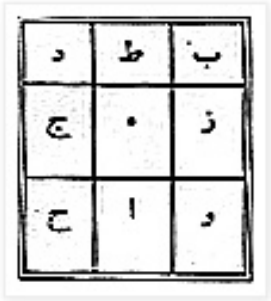
European	0	1	2	3	4	5	6	7	8	9
Arabic-Indic	٠	١	٢	٣	٤	٥	٦	٧	٨	٩
Eastern Arabic-Indic (Persian and Urdu)	۰	۱	۲	۳	۴	۵	۶	۷	۸	۹
Devanagari (Hindi)	०	१	२	३	४	५	६	७	८	९
Tamil		க	உ	ரு	சு	ரூ	சூ	எ	அ	கஃ

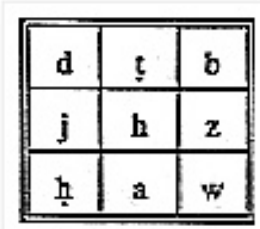
Note:

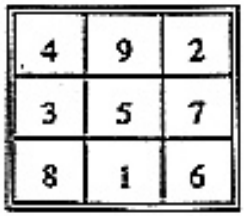
- Good friends: 0, 1, 9 recognisable to us
- False friend: Arabic ‘6’ looks like ‘7’
- 5 and 0 easily confused

the Jabirean corpus, is thought to be of Chinese origin. It consisted of nine cells with the numbers 1 to 9 arranged with 5 in the center so that the contents of each row, column and the two diagonals added up to 15.

The numbers were written in the abjad letter-numerals, and because the four corners of this square contained the letters *ba'*, *dal*, *waw* [or *u*], and *ha'*, this particular square became known as the *buduh* square.



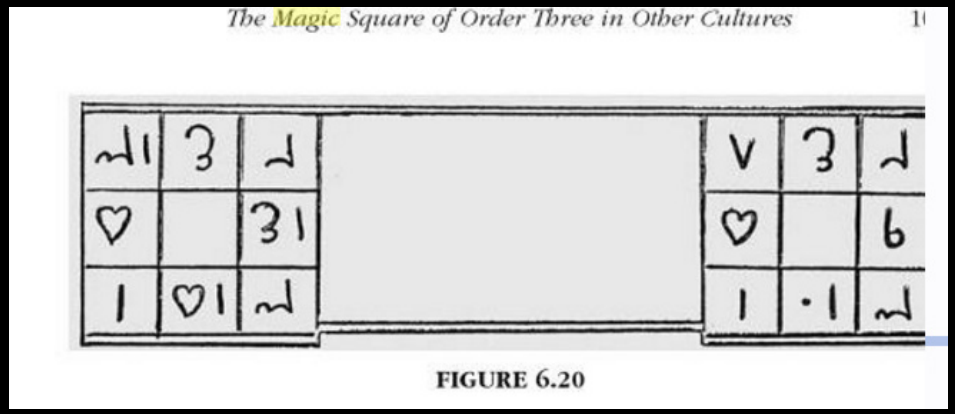




The Arabic letters for the four corners, if read from right to left, form the word BEDUH, the "word of power" as handed down by Adam. This word itself, or its abbreviations—just the letter B or the numerical equivalents 2, 4, 6, 8—are believed to be powerful talismans that protect travelers, babies, and postal letters and packages in transit. In some Islamic countries today, one finds packages with "2," "4," "6," "8" written in their corners or postal letters bearing an extraneous "B" written under the address as added postal insurance.

Ikhwan As-Safa

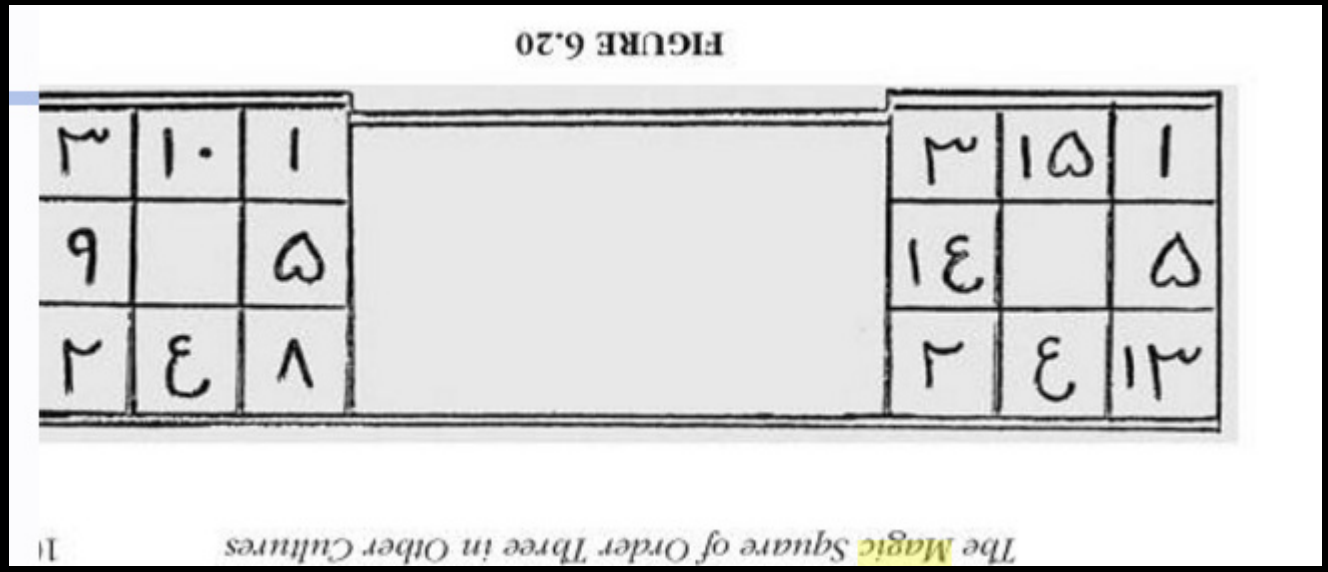
The first magic squares of order 5 and 6 known to have been devised by Arab mathematicians appear in an encyclopedia from Baghdad *circa* 983, the Rasa'il Ikhwan al-Safa (the Encyclopedia of the Brethren of Purity) ;



Swetz *Luoshu* , p. 103
- difficult to interpret!

3	15	1
14		5
2	4	13

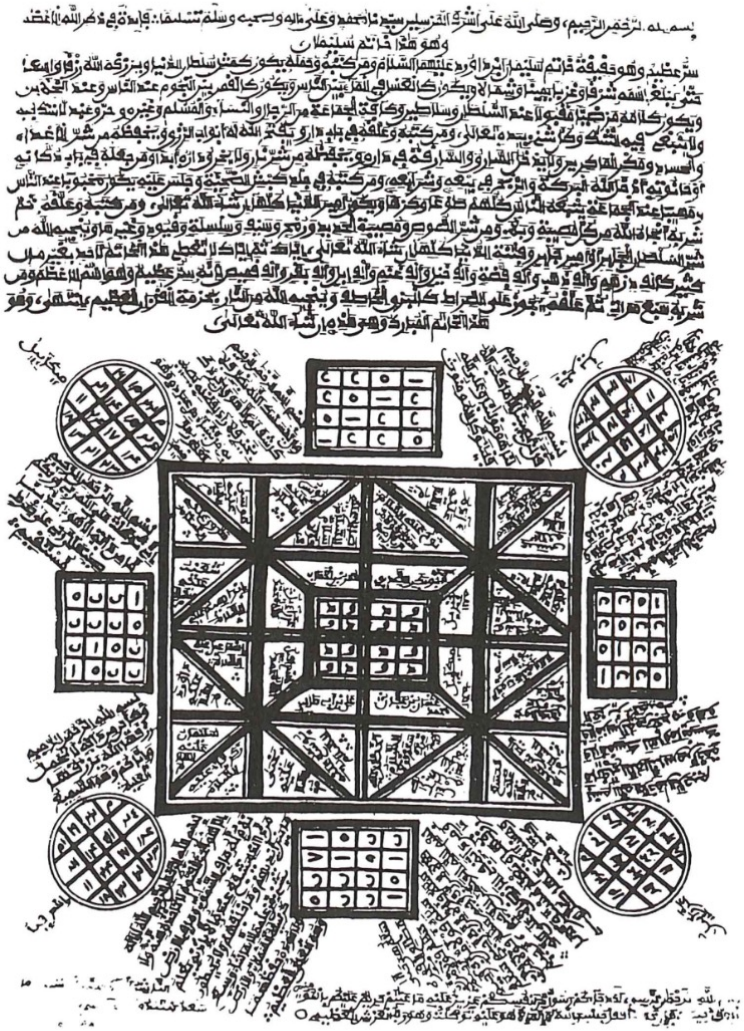
3	10	1
9		5
2	4	8

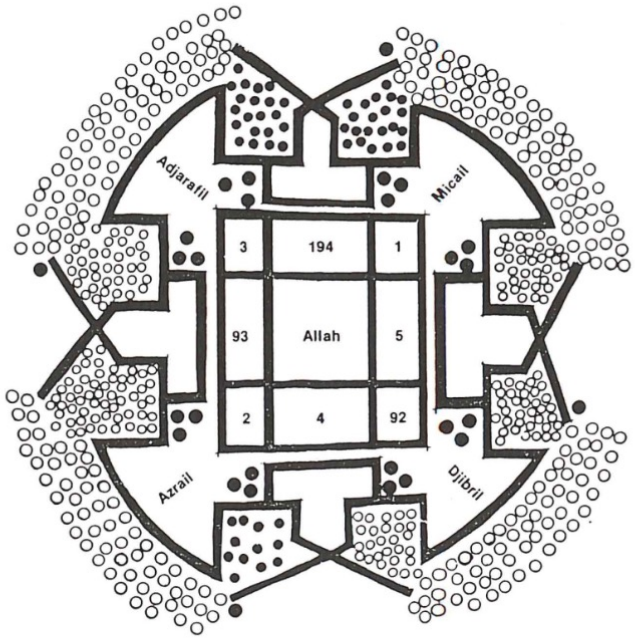


Labelle Prussin unless otherwise indicated.

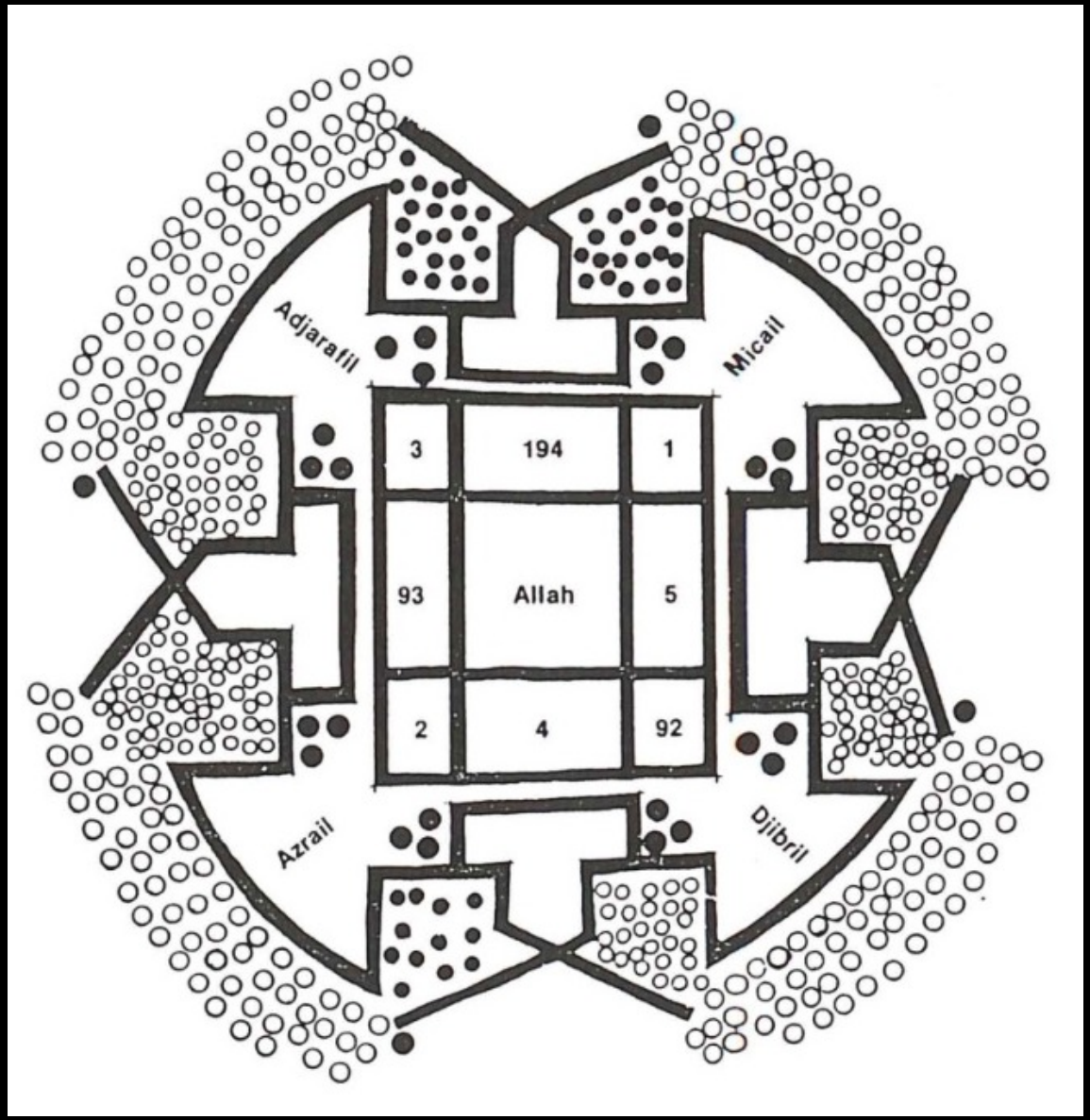
the nascent political hierarchies did indigenous ruling elites begin to exploit Islamic symbols and integrate them into

mited to the elite. The visual element inherent in the artifact or in the natural environment is the vehicle through



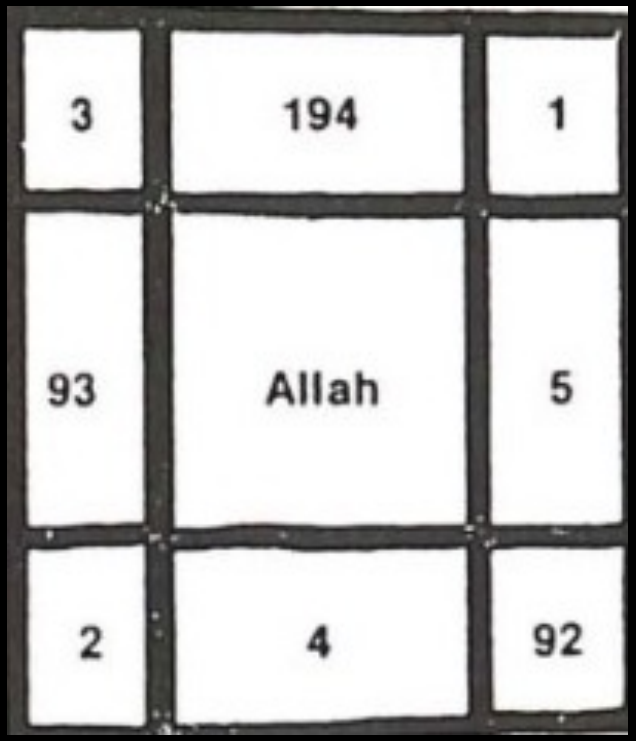


Left: Sheet of printed magic squares from Cairo, intended for use in amulets. Niamey, Niger, 1974. The circles are also four-by-four squares of the Allah type, in which the sum of all vertical, horizontal, and diagonal numbers as well as each adjoining group of four houses totals sixty-six.
Above: A magic square from the Republic of Benin (Dahomey), in which the centre square is filled by Allah. Drawing after Béart (1955), vol. 1.



Map showing Islamic angels?

- Adjarfil (3)
- Micail (1)
- Djibril (92)
- Azrail (2)



Changing 92, 93, 194 to 2, 3, 4 gives:

3 4 1
3 - 5
2 4 2

Is this

(a) a magic square with total 8

(b) A list all possible ways of summing numbers 1-5 to add to 8 ?

… or even
(c) a Duhrer-type square showing the date 1941 (cf. *Melancholia*)?

3+4+1 = 3+5 = 2+4+2 = 3+3+2 = 4+4 = 1+5+2

The *ruhan* can tell you exactly which day you are going to die.

In the Qu'ran it says "*ashrabu wa taghlabu*," i.e., "Drink and wear." In *hadiss* and *el-kitaban* like the one Ahnou uses [*Tāj al-mulūk*, mentioned above; see photos immediately below] there are some sections which describe drinks [see above] and some which describe talismans, including some for ring patterns. It depends on what the *marabout* in contact with his *ruhan* (*jinn*) will be asked to do to satisfy his client.

During the discussion with his son about talismanic rings, Ahnou Immini consults his copy of the Tāj al-mulūk.*Photo © Mohamed Ahnou Immini, used with permission.*

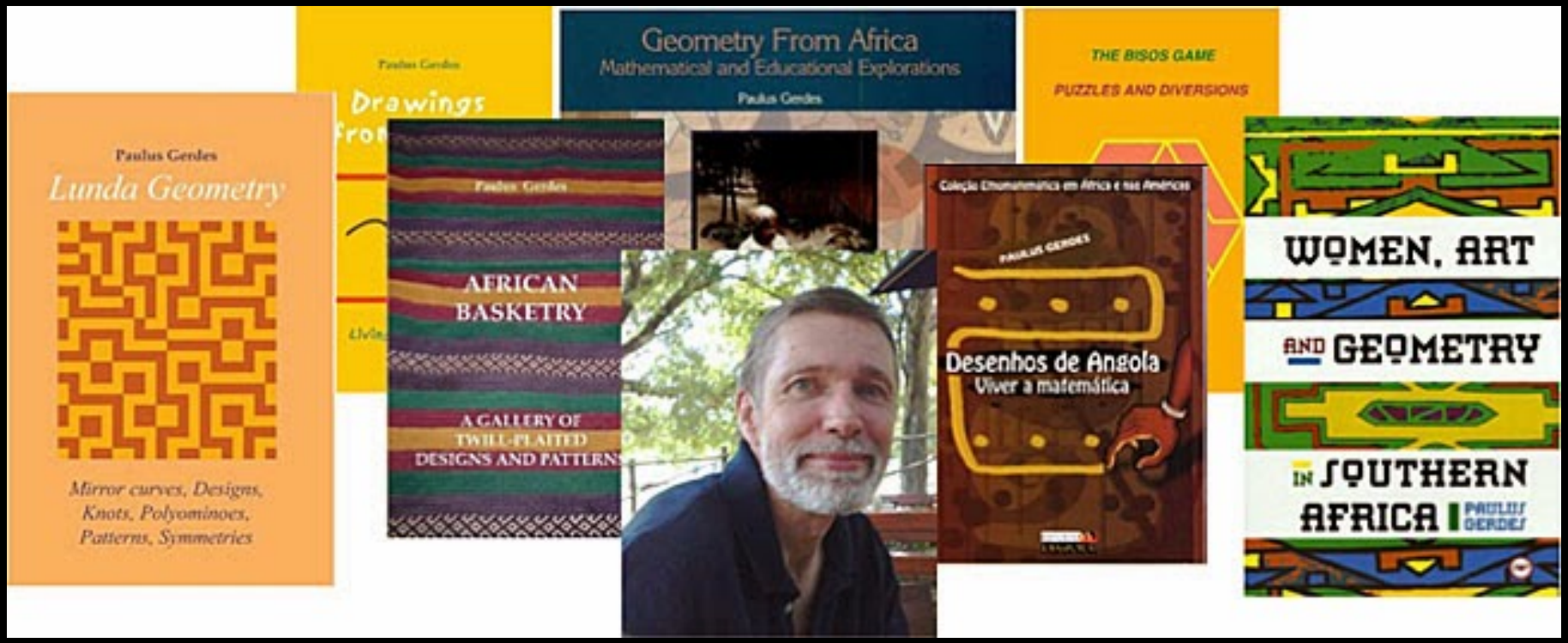
Q. Does each *marabout* have a set of patterns or symbols that they have acquired or inherited the rights to use?

A. No. There is no heritage in regard to what is in the Qur'an. Everyone has access. It's

More questions than answers:

- Is there any ‘real’ maths here, or are we just ‘playing’?
- If so, does it matter?
- How best to ‘learn through play’?
- Problems of ‘orientalism’ in discussing folk-mathematics.

The End


Paulus Gerdes
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Mirror curves, Designs, Knots, Polyominoes, Patterns, Symmetries
Geometry From Africa
Mathematical and Educational Explorations
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THE BISOS GAME
PUZZLES AND DIVERSIONS
AFRICAN BASKETRY
A GALLERY OF TWILL-PLAITED DESIGNS AND PATTERNS
Desenhos de Angola
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WOMEN, ART AND GEOMETRY IN SOUTHERN AFRICA
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