

## **AFRICAN SPACE/TIME CONCEPTS AND THE *TUSONA* IDEOGRAPHS IN LUCHAZI CULTURE with a discussion of possible cross-parallels in music**

*by*

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In April 1981 I was honoured by the Folklore Department of Indiana University, Bloomington, with an invitation to speak in the African Studies Lecture Series, whose general theme was 'African Dimensions of Time'. Prof. Ruth Stone who organised my trip and stay in Bloomington marvellously, wrote to me on October 27, 1980: "...I have read your many articles on the subject of African musical rhythm which relate very well to our theme. In this series, we will attempt to explore concepts of time in African experience as a fundamental aspect of folklore, music, art, religion, history, and other areas of the humanities. We invite you to explore how African music provides insight into the temporal dimensions and may provide a key to understanding the broader organization of experience in African life".

The suggested topic gave me a lot of headaches and, although I accepted the invitation and committed myself to probing into this set of problems, the first question that came to my mind was, are we really dealing here with a scientific problem reflecting what is conceptualized in African cultures or does 'time', explored cross-culturally, merely create another phantom problem through the projection of Western philosophical concepts onto Africa.

Apart from the prospect of the tremendous investigation that would be necessary even to give an outline of the requested topic, I was plagued by questions any researcher working on African music might pose himself sooner or later. Can African music provide any insight at all into "temporal dimensions" as conceptualized by the carriers of the cultures themselves? Is there any evidence explicitly stated by representative African musicians in their own language that song or dance are connected with temporal notions? The basic problem, as so often in cultural studies, seemed to be an 'emic' versus 'etic' one, created by the fact that the general theme 'African Dimensions of Time' gravitates around categories in a European language, which cannot a priori be expected to have corresponding linear translations in African languages. 'Dimensions of time' is not directly translatable and this configuration of terms probably has no meaning at all anywhere in Africa, remembering also that the word "dimension" has strictly culture-dependent connotations. The point of departure seemed to be that the research problem was conceptualized in English and not in African languages, while the answers were expected to come from verbal (and possibly non-verbal) statements on aspects of African expressive cultures.

Another point which seemed to emerge from the topic indirectly was a kind of assumption that we may expect the results of structural and/or conceptual analysis of one culture complex, e.g. African music, to give us a key to the understanding of broader behaviour, experience and organisation, e.g. 'African life'.

I have been reluctant over the years to go along enthusiastically with the approach

that postulates that expressions or forms of behaviour detected by observers as determining the organisation of one aspect of culture must be paralleled in another. Alan Lomax (1969: 161-169) for example, seems to believe quite firmly that different types of multi-part organisation in music reflect social structure. He treats 'instrument variety' and performance conditions in a similar manner:

The key to understanding the performance situation, however, and its relationship to social structure is to be found in the social organization of the singing group..... we have already discovered that the relation between leader and led in song performance varies directly not only with societal complexity (Figs. 45, 46) but, more specifically, with the level of political complexity (Figs. 47, 48)... (Lomax 1969:155)

The problem here is that data are not correlated with data but with abstractions such as 'societal' and 'political complexity' which are themselves cultural products, in this case from the standpoint of Western European evolutionistic ideas.

The logic behind the search for such relationships occasionally sinks to the level of late 18th century philosophers such as J.B.P.A. de Monet, chevalier de Lamarck (1744-1829), a French naturalist, who held that a face which looks (to an external observer) like a pig reveals that the person has the "character of a pig".

In a more abstract manner, it was also the fashion time and again, that apparent characteristics in African musical performance should reflect tendencies towards similar interaction at the level of general societal behaviour: for instance, that elements such as 'conflict', 'cooperation', 'unity', 'solidarity' which a researcher may believe he has detected as important patterns of interaction in African musical performances or even in the music itself, should directly mirror general tendencies of behaviour in African societies, as contrasted with those of other parts of the world.

In order to avoid being trapped in this from the start it seemed advisable first to narrow down the geographical extent of the discussion from 'Africa' to one relatively homogeneous culture area. I chose an area which I know well from repeated field-trips: G.P. Murdock's Cluster 16 ('Lunda') in Eastern Angola/Northwestern Zambia, where Chokwe, Luvale, and Bantu languages of the so-called Ngangela group, such as Luchazi, Mbunda, Mbwela, Nkhangala, Lwimbi etc. are spoken. Secondly, I realised that 'space' and 'time' — when looking at the matter from an external standpoint, and one does so from the moment one uses the English words — are related in Bantu languages to such a degree that concepts in either sphere may be represented by the same particle, i.e. the 'locative' prefixes are equally 'time' indicators. Under these circumstances it seemed advisable to treat the Western concept of 'space' and 'time' as a merger, and one may then more adequately call the 'locative' prefixes locative/temporal, thus opening up a path for looking at equivalents or synonyms in both the visual and aural aspects of the expressive culture.

For a start we may discuss what has been referred to as the 'time concept' in Ngangela culture on the basis of what is conceptualized in the language. No one is perhaps more qualified to be quoted on this subject than Emil Pearson, who lived in southeastern Angola from the 1920s and has recently published a unique inside account of Ngangela culture in his book: *People of the Aurora* (1977).

Pearson hints at the synonymy of 'time' and 'space' ('place') in Ngangela thinking as reflected in the language. And like me he seems to be reluctant to project Western notions of 'time' directly onto a culture so different from the Western European,

although he then attempts to dilute the dilemma of cross-language incommunicability by improvising philosophically with the word 'time'. In a short section entitled 'The Time Concept' he writes:

In the Ngangela language there is no word, as far as I know, for "time" as a continuous, flowing passage of events or the lack of same. Time is experiential or subjective, that is, it is that which is meaningful to the person or thing which experiences it. Time and space are cognate incidents of eternity. The same word is used for both "time" and "space" (the latter in the sense of "distance"). "Ntunda" can either express meaningful time or meaningful space. For example: "Ntunda kua i li" — "There is some distance;" and, "Ntunda i na hiti" — "Time has passed." Another word, "Ntsimbu" (or "Simbu"), expresses the thought of "definite time." The related verb, "Simbula," means "delay," the thought being of awaiting "meaningful time". To the European the African may seem to be idling away useful time, whereas the latter, according to his philosophy, is awaiting experiential time, the time that is right for accomplishing his objective.

"Time" is locative, something that is virtually concrete, not something abstract. The locatives "Ha," "Ku" and "Mu" are used for expressing "time" as well as "place". Example: "Ha katete" — "In the beginning" (as to either time or place); "Ku lutue" can mean either "in front" or "in the future". "Mu nima" can mean "behind" as to place, or "after" as to time. (Pearson 1977:30)<sup>1</sup>

Neither of the terms *ntunda* or *ntsimbu* appear in Ngangela descriptive vocabulary with relation to music except the verb *kusimbula* (to delay) which may appear, as it does in words of similar meaning in other African languages, in connection with tempo and speed coordination in a performance group. A learner on the drum (*chipwali*) may 'delay' his strokes as a consequence of inexperience and thus be behind the others. In musical conversation the word *kusimbula* is then used for correcting him. The locative prefixes *ha* and *ku* on the other hand are normally used for pointing out different playing areas on musical instruments, i.e. tapping areas on a drum skin, spots on a slit drum or individual lamellae on lamellophones, and more rarely with 'temporal' implications, for example when something has gone wrong in group teaching of a new song and the leader wants the group to repeat the song from the point (in time) where the mistake occurred.

Neither *ntunda* nor *ntsimbu* is used in reference to 'musical time', i.e. 'measures', 'time-signatures' etc., concepts which seem to be totally foreign to the musical cultures of the Ngangela group of peoples. Even what is now widely called a 'time-line' pattern, since Kwabena Nketia first used the term in the 1960s is identified in Ngangela culture only by the syllables used for teaching it, and in the case of the 16-pulse time-line pattern also by the name of the dance with which it is associated: *kachacha*.

Phonetic and structural analysis of such mnemonics can only confirm that there is strict 'time' in Eastern Angolan music, but this result is hooked into the European notion of 'time'. *Ntunda* or *ntsimbu* do not come into the picture. The differences in 'understanding' generated by either the 'etic' or the 'emic' approach in this field of study are nearly total and communication between the mutually exclusive standpoints is very difficult.

A similar situation is found in the realm of visual perception, when it comes to analyzing ornamental structures (as found on artefacts, in basket plaiting etc.) in the same culture. While the locative/temporal prefixes are used in abundance in

discussions by the relative craftsmen, there is no term in the Ngangela languages equivalent in its semantic field with the notion of 'space' either. On the other hand the apparent ambiguity in the 'locative' prefixes seems to be corroborated — as long as one maintains the same external standpoint — in parallel principles of construction in the visual and aural realms.

In much African music the presence of form or cycle numbers, the equidistant layout of elements, parallel movement in 'doubles', duple-division interlocking and puzzle effects (which I have called inherent patterns) seem to show parallels in at least one visual tradition of the Ngangela-speaking peoples: the writing of geometrically structured ideographs in the sand.

With this observation, touching on the central topic of this paper, the obstacles to a satisfactory analysis are however not overcome. The first problem thereby created is that analogies or identities in construction principles across the two realms seem to be discernible only from an external ('etic') standpoint, and that they are dependent on the notion that 'time' can be represented visually in 'space'.

It is likely that synaesthetic experience of 'space' and 'time' is universal in the sense that *distance* may be understood as either spatial or temporal and, therefore, spatial distance which is visually perceptible may be used to symbolize the experience of temporal distance which is non-perceptual. Graphic representation of 'temporal distance' in the form of a spatial layout of symbols, however, may well be culture-specific, as much as depth perception in pictures seems to be. In Western European cultures it is customary to represent measured time graphically through measured space, implying that both realms are experienced as analogous and connected through the notion of distance. It is interesting though that this analogy does not appear to determine the European notation system for music, which is older than modern scientific diagrams and uses, basically, symbols with a *durational* meaning, while equal spacing as a representation of equal lapse of time is only used as a matter of convenience (when several pitch lines have to sound simultaneously). This contrasts with some modern notation systems for African music (cf. Andrew Tracey 1970, Kubik in Simon, Ed. 1983) which are based on strict analogy in the treatment of temporal and spatial distance.

In Ngangela-speaking cultures of Angola/N.W. Zambia no written notation system for music has come to our knowledge and certainly none in which 'temporal distance' would be transferred linearly into 'spatial distance'. Moreover, the idea of the traditional system of drawing ideographs in the sand having any musical connotation or application is out of the question and remote to the carriers of the culture themselves. Avoiding leading questions, I tried to bring up this point on a number of occasions in discussion with Luchazi-speaking elders in my research area, and the result was always negative.

The second problem created is that the parallels between construction principles in the Angolan sand ideographs and African music do not seem to embrace to any great extent the African music of the area where the ideographs themselves are found, but are strongest when comparing them with African music some 1500km away, namely in the Lake Victoria area on the one hand, and in the Cameroon grasslands on the other. We are thus not only attempting to link cultural phenomena across different perceptual realms, but also across geographical areas remote from each other. And yet

the observations made possible by this comparison have some attraction. At the time of my invitation to Bloomington in 1981 I decided to choose as a lecture topic one inclining more towards the visual than the aural side, dealing with my field studies in N.W. Zambia and E. Angola.

In my lecture on 15 April 1981 in the Distinguished Alumni Hall, Indiana University, Bloomington, under the title 'Space/time relationships in *tusona* ideographs', I pointed out, with the help of slides and live demonstration, that *tusona*, which may also be regarded as a traditional system of writing, constitute a method of expressing ideas by means of graphemes and their constellations in a space/time continuum. Although I mentioned that spatial relationships in the *tusona* ideographs seem to be equivalent to temporal relationships in some kinds of African music, I did not elaborate further for some of the reasons given above, and promised Prof. Ruth Stone to do so in the future after some more reflection.

The topic of *tusona* as unintended symbols of structural principles basic to African music came up again during my lecture on "*Tusona* ideographs: results of recent fieldwork in N.W. Zambia and E. Angola" given at the 4th annual Symposium on Ethnomusicology, Grahamstown, 7th and 8th October 1983, jointly organised by the International Library of African Music and the Music Department at Rhodes University.

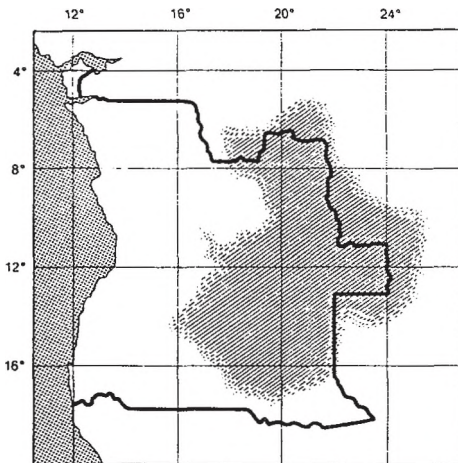
In the present paper I am attempting a synthesis of what I said on the two occasions, extended by a detailed presentation of some of the original field material itself. I now invite the reader to look with me at the *tusona* tradition.

*Tusona* (sing. *kasona*) is the name in Luchazi — one of the languages of the Ngangela group — for graphic configurations of specific characteristics and style, usually drawn with the fingers on a plane of white sand. They may also appear on house walls and more rarely, on objects.<sup>2</sup> Traditionally the writing of *tusona* was one of the social pastimes of men, normally of elders (*vakuhuntu*) in their forties and fifties. *Tusona* are drawn during leisure-time gatherings in the *ndzango*, i.e. the round, thatched assembly pavilion which can be found in every village of this culture area. The *ndzango* is a 'hut' without closed walls, open on the sides. It is normally located in the centre of a village or group of houses. It is a most important place of social encounter in a Luchazi village, representing the male community, as opposed to the *ntsenge* (often translated as 'kitchen') where the women come together for their own activities and gossip. *Ndzango* is the place where important news is communicated, where stories are told, where disputes are settled, where strangers are first received by the village headman when they enter a village, where the blacksmith may do his work, where men sit together to discuss, work, rest, or play games. The *ndzango* is accessible from several sides and in the middle there is a fire-place, often with blacksmith's equipment nearby, such as bellows. The drawing of a *kasona* may begin without any particular instigation, as long as a sufficient number of men are together with one or two experts present. Millet beer (*vwalwa vwa masangu*) may be passed round, and then someone suddenly begins to draw, all the others looking at him quietly until he finishes and begins to explain the meaning of the drawing. Expert drawers of *tusona* were often rewarded in the past with free millet beer. Often the figures are drawn outside the *ndzango*, where it is not so dark and where the white sand may be less



mingled with charcoal. In some ways these elderly men's activities parallel youngster's social activities such as riddling, or story-telling among members of all age-groups.

We may categorize some of these structures in English as ideographs, others as pictographs. The content and meaning of the *tusona* are philosophical and they serve within the community both as entertainment and a store of abstract ideas about some of the people's most central institutions. They represent a written symbolic record of deep structures in the cultural heritage. They are drawn to convey to the male community ideas about existing institutions, to stimulate fantasy, abstract logical thinking and even meditation. A *kasona* conveys an idea about an object, a situation or a constellation of things or events. The mood radiated by *tusona* is reflective, witty, often enigmatic. Sometimes the essentials of a narrative are visualized in an abstract manner. In a sense, *tusona* are something like a traditional library of esoteric subjects and experience among the -Luchazi, -Chokwe and related peoples in the culture area concerned. However, they are strictly ephemeral — because they are wiped off soon after production — and it is, therefore, difficult to assess how old the tradition is. Although largely obsolete today, the tradition was originally shared by the -Chokwe and most of the Ngangela-speaking peoples in the eastern half of Angola, in the Northwestern Province, Zambia, and the Kasai area of Zaire, a territory perhaps as large as France. It is certain that the tradition is pre-colonial.



Approximate range of the eastern Angolan culture area in which the *sona* resp. *tusona* tradition is found.

Repr. from G. Kubik, *Mukanda na Makisi*, double LP with commentary, Museum Collection Berlin (West), Ed. Artur Simon, MC 11, Berlin 1981.

It is not possible in this article to give a full account of all the social, cultural and historical implications of this tradition. We have to limit ourselves to the present context. It must be mentioned, however, that there exist several distinctive strains within the *tusona* tradition, each with its own set of graphic symbols. Some are purely pictographic, while others are highly geometric in layout. The diversity of forms not only suggests that the tradition is very old, but even that several traditions may have merged into one, a fact that is perhaps no longer remembered. Consequently I could not find any of my informants verbalizing any divisions of the tradition into subcategories. Whether in the past such sub-categories may have been conceptualized and designated in the terminology is a question we cannot solve at the moment. What

we find today is probably only the remnants, becoming more and more obsolete, of a once amazingly rich and varied repertoire of symbols.

The most common *tusona* consist of a series of regularly laid-out dots which are circumscribed by lines. The resulting configurations may sometimes remind non-Luchazi observers of what is known in Western European cultures as a 'labyrinth', also with regard to their noticeable quality of thought-play. In this paper we only deal with those characterized by a highly geometrical construction and examine their space/time relationships and the apparent parallels in some kinds of African music. Anyone wanting a more thorough idea of *tusona*, especially the literary aspect, I would refer to my book in which all the texts in Luchazi are transcribed word-by-word from the tape recordings, translated and interpreted with an often detailed semantic etymological analysis.

The class VI noun *kasona* (pl. *tusona*) comes from the verb *kusona* which means 'to draw', 'to paint' abstract figures using dots, rings, lines and other elements — not only in the sand, but also on house-walls and on the human body, for example during initiation ceremonies. The applied *kusoneka* is also often used in connection with drawing (or writing) the ideographs on the sand.

In the relatively homogenous culture area of eastern Angola (including the neighbouring zones of Zaire and northwestern Zambia) key words such as *kusoneka* and *kutanga*, which are now translated as 'to write' and 'to read', existed before the introduction of Western-style alphabetic writing. When colonial schools began to appear in the area, at first on the 'British' side, i.e. in present day northwestern Zambia, and then also in Angola, it was no problem for Luvalé, Luchazi, Chokwe and Mbunda speakers to use the familiar terms in the new context, writing alphabetical symbols in a paper exercise book or on a blackboard and reading aloud graphically fixed texts during school lessons.

It is revealing to consider the original meanings of the words *kusoneka* and *kutanga* in Luchazi, Luvalé and related languages; words that are now generally used for expressing ideas such as 'writing a letter' (*kusoneka múkanda*) or 'reading a book' (*kutanga múkanda*), the word *múkanda* referring to any paper, cloth or other material carrying a written message, such as a letter, book or exercise book, document, certificate etc. The original meaning of the word *kutanga* may be approximately conveyed in English by 'to recite' (often a historical oral text), or 'to speak aloud' in a formal manner. A frequent expression heard in Luchazi is *kutanga muzimbu* or *kuta muzimbu*, 'to recite history', 'to read the news', to tell what has happened during one's journey, an important traditional custom in Luchazi society. Someone returning home from a long journey is required to narrate in a formal manner, almost as if reading from a book, everything that has happened to him. The boys in a traditional circumcision school are also taught *muzimbu*; this is called *kutangesa* (= to make recite, teach), and some of the masked characters made by the VaLuchazi tell *muzimbu* (history, chronicle) in the form of long narrative texts, accompanied by drums, to the village lined up to receive them (Kubik: 1981). Since reading in Western-style primary schools begins with the young pupils practising reading aloud in chorus, the semantic field of *kutanga* was easily extended to include the new situations. While *kutanga* has slightly widened its semantic field by now including the silent form of 'reciting', i.e. the stage of reading a book or letter which follows the first year

alphabet-spelling stage at primary school, the original meaning of *kusoneka* has changed very little. It was always understood in the sense of writing, i.e. drawing meaningful graphical structures in an abstract manner — in contrast to pictures depicting objects. While traditionally these line and dot structures were drawn in sand with the fingers, or in colour on walls, with a drawing instrument such as a brush, what was added in colonial times was new writing materials; pens, pencils, ball-point pens, paper, blackboard, industrially manufactured chalk (replacing *mphemba*, white kaolin) and new graphic symbols: the Western alphabet. What has remained stable, however, is the basic concept of writing contained in the verb *kusoneka* and the action expressed by it. The one who draws a *kasona* is called *mukakusona*, i.e. ‘the one who does’ (*muka-*) ‘draw, write’ (*kusona*).

The major portion of eastern Angola and northwestern Zambia is characterized geologically by the so-called Kalahari sands (*musekeseke* in Luchazi) which provide an excellent ground for writing *tusona*. The *mukakusona* uses the fingers of his right hand, following strict technical rules. He begins his performance by selecting a spot in front of him where the ground is relatively hard and level like a board. Then he brushes away the layer of loose sand on top of the hard surface with his flat palm, until it is very thin. He begins to draw, while the other men often stop their conversation and watch him attentively. Usually he does not utter a word during the process, concentrating on the intricacies of what he has to reproduce from memory, and well aware of the fact that many *tusona* are difficult to remember. In many *tusona* two basic modes of action are involved:

1. The impressing of dots. These are called *mafundungwino* (singular: *lifundungwino*) or *mafundungwinyo* (sing. *lifundungwinyo*). In the sand they look like little craters or rather — to the Luchazi eye — like the round depressions left by fowls which nest on the ground, such as partridge (*nthento*), or even a chicken, when it wants to lay its eggs. When these fowls leave the spot a circular depression remains, which is called *lifundungwino*. The *tusona* dots are like miniature versions of the fowls’ *mafundungwino*. They are pressed in pairs into the sand, the *mukakusona* using his first and third fingers at the same time in parallel movement. In starting the drawing a series of pairs of dots is pressed into the sand at geometrically regular distances. Here the *mukakusona* normally works away from his body. When he wants to work sideways he uses an interesting technique: in order to obtain equal spacing between the



Fig. 1. Basic movement with the 1st and 3rd fingers



Fig. 2. Sideways extension to the left

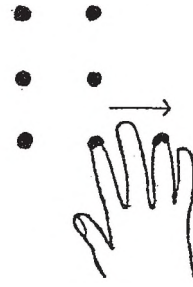


Fig. 3. Sideways extension to the right



basic dots he only impresses a new dot with one of the two fingers used, while the other one rests on a dot already impressed. Thus the span between first and third fingers is meticulously preserved and transferred sideways as a measure. For instance, if he has completed a vertical double-column of dots and wants to extend it to the left, he will put his third finger into one of the *mafundungwino* of the left column and impress a new dot with his first finger. This action may then be repeated with the usual movement away from the body (upwards on the paper), until a third parallel column is completed (Fig. 2). If, on the other hand, he wants to extend to the right, he puts his first finger into an 'old' *lifundungwino* and impresses a new one with his third finger (Fig. 3).

The result is a basic layout of a specific number of dots according to the character of the *kasona* intended. The method ensures that all the dots are equi-distant from each other. Distance is measured by the eye alone, but equal distances are obtained by the consecutive use of the natural span of the first and third fingers. The action of impressing the dots is called *kusona* (to write, to draw), sometimes also *kufunda* (to draw figures).

In the next stage the basic screen of dots thus obtained is amended by impressing 'interlocking' or in-between dots throughout the structure. This is done using only the first finger of the right hand and is called *kusononwena* (to write between) (Fig. 4).

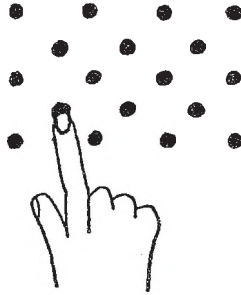


Fig. 4. Impression of the interlocking dots

2. Lines are then drawn which pass between the dots, surrounding and circumscribing them in geometrically regular ways. These lines are about as thick as the pad of the index finger of the right hand with which they are drawn. According to one informant, John Mazunga at Katuva, Kabompo District, Zambia, the lines in the *tusona* are called *mifunda* (sing. *mufunda*), a class II noun in Luchazi, which is related to the verb *kufunda*.

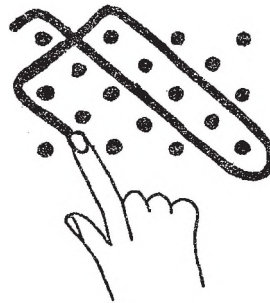


Fig. 5. Drawing the lines

This is the basic technique of drawing a *kasona*. We find it applied in most of the ideographs of this tradition. In some figures however, modified or special techniques may be used.

When the *mukakusona* has finished drawing, and in a few instances even while he is still drawing, he begins with the verbal explanation (*kulumbununa*) of the ideograph. Sometimes a *kasona* is pictographic and merely represents an animal such as a tortoise or crocodile. In these cases the verbal explanation may be short, often not much longer than the name of the animal itself. In other instances, a *kasona* may visualise in an abstract manner the content of a proverb, in which case the proverb is recited by the *mukakusona* and its meaning explained. Many *tusona* have long narratives or philosophical considerations attached to them. In these cases the *kasona* functions not only as a structural representation of the thought to be expressed, but at the same time as a mnemonic aid.

The meaning of a *kasona* is explained by the 'owner' or *mukakusona* to the elders assembled in the *ndzango*, who listen attentively and may occasionally comment on the drawing and its explanation. The process of explaining is called *kulumbununa chakasona*. One of the criteria of an effective *kasona* is that there should be a convincing logical relationship between the structure of the drawing and the explanation from the viewpoint of the cognitive system of the culture which has produced it. It is characteristic of some *tusona* that the logic of a thought may be transformed and remoulded into the geometrical logic apparent in the relations between dots and lines. Many *tusona* have a complex inner geometry. Apart from their function as ideographic carriers of important verbal traditions from one generation to the next, the *tusona* also transmit empirical mathematical experiences. Luchazi mathematics is completely different from Latin/Western mathematical traditions; its geometrical dimension is based not on one grapheme (lines) but on two: dots and lines. One can get a glimpse of the geometrical complexity of some of these ingenious ideographs by closing one's eyes and trying to reproduce from memory a *kasona* such as "*Kambava wamulivwe*". This was a figure communicated to Mr Kayombo kaChinyeka and me in July, 1973 by the late Mwangana (Chief) Kalunga Ntsamba Chiwaya (1898-1981). We sat down inside the enclosure (*kulilapa*) of his traditional residence in Chikenge, Kabompo District, N.W. Province, Zambia, and Chief Kalunga drew this figure in the sand (Fig. 6).

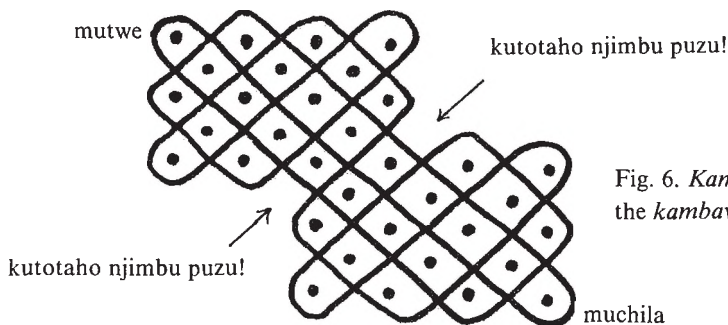


Fig. 6. *Kambava wamulivwe*, the *kambava* (animal) in the rock

It was six years later before I was able to obtain an explanation of this ideograph from another elder at Chikenge village who has also died in the meantime: Kapokola

Chimbau. On July 20, 1979 he let us know that it represented an animal called *kambava* which had died in the rock: “*Kambava kasitu wamumusenge. Wengilile mulivwe. Kumulya mutwe utovala. Kumulya muchila utovala. Wengilile mulivwe. Muvila weni kutotaho njimbu puzu chapolele mulivwe*” (*Kambava* is a mammal living in the forest. It entered inside a rock. If one eats the head, it tastes very well. If one eats the tail, it tastes very well. It entered inside a rock. Hacking at its body with an axe, *puzu!* a large piece was chopped out! And the corpse decayed in the rock)

In the drawing I have identified the parts denoted by the informant as the head (*mutwe*), and the tail (*muchila*). The figure has a narrow waist. This is where the hunters who found the animal in the rock chopped out a piece with the axe (*kutotaho njimbu puzu*). *Kutota* means: to knock, beat, cut out (also a bee’s nest, for example). *Puzu* is an ideophone, conveying the idea of breaking up, disintegrating, crumbling.

Although the figurative content projected into this *kasona* by the carriers of the tradition is an important aspect, so is the geometrical or mathematical content. *Tusona* mathematics is the undisclosed knowledge of an expert *mukakusona*, the very element which helps him to create surprise and excitement when he draws such a figure, beneath the eyes of the other men in the *ndzango*, at an incredible speed.

In the present figure 34 dots are laid out in such a manner that it is possible to pass between them with a single line which eventually returns to its starting point. The path of the line is prescribed by mathematical laws, the whole figure thus being absolutely predetermined.

Mwangana Kalunga drew one more figure for us, “*Vamphulu*” (The Gnus). This *kasona* has a “mandala”-type structure (see C.G. Jung 1950, 1974) and may induce a meditative mood in a viewer. It has an oscillating quality in which its components may ‘shift’ in visual perception, i.e. as in a picture puzzle, one may begin to see changing images by associating the lines and dots in this or that manner. (Fig. 7)\*

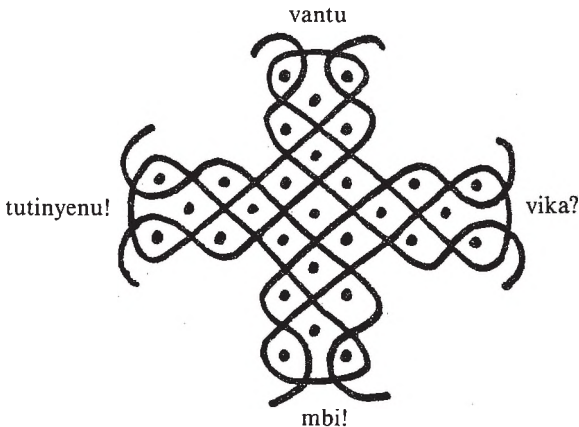


Fig. 7. *Vamphulu* (The gnus)

With the last line completed by the *mukakusona*, the spectator begins to recognise four faces emerging from the four corners of the figure, each with two eyes, a mouth

\*Ed. This *kasona* appeared on the cover of the last number but one of “African Music”, (6,2).

and two horns: it is the four gnus in the story associated with this *kasona*. Chief Kalunga immediately pointed to the four heads and then explained to us what each of them says, starting at the bottom of the figure and moving his index finger counterclockwise. The first gnu says “*Mbi!*”, then the second one asks “*Vika?*” (What?), to which the third one replies “*Vantu*” (People) and the fourth one concludes: “*Tutinyenu!*” (Let us run away!) These words are shown next to the heads in the figure above. The full story as told by Chief Kalunga follows (recorded tape A 78/I/1, June 30, 1979, in Chikenge):

### Luchazi text

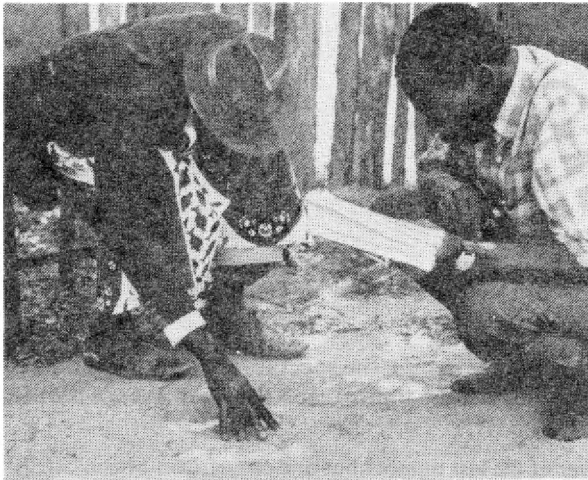
*Ndzita yezile muchifuti. Kaha ngwavo ineza mukutsiha vantu. Kaha vatinine kumusenge. Kaha muvevwa: Mbi! Ngwavo vuta vene ovwo. Kaha ndzo, ou ngweni: “Vika?” Ngweni: “Njinevu mbi!” — “Ove unevu mbi?” — “Ee.” — Ngweni: “Ange cho njinevu, iii! ngweha vantu.” Ou ngweni: “Vantu?” — “Ee.” — “He! Tutinyenu vovo vene vakwanakutsiha vantu.” Kaha mwatu, hoho havatinininine. Kaha vatinina mumusenge, vakayoya.*

### English translation (G. Kubik)

War came to the country. So they (the gnus) said, it has come to kill people. And they ran away into the forest. When they heard the sound *mbi*, they said, That is surely a gun! So then one of them said: “What is that?” The other replied: “I have heard *mbi*.” — “You have heard *mbi*?” — “Yes.” — The third one said: “Me too, I have heard it, terrible! It is like people.” — And this one here said: “People?” — The other one replied: “Yes.” — “Hey! Let us run away, over there they are just killing people.” Then they were off, scattered, in a moment they had run away. So they fled into the forest and survived.

*Mbi* is an ideophone and represents the sound of a gun.

This *kasona* may also lead us to some historical questions, since we have by chance one document from Angola showing it in identical shape about fifty years ago: Hermann Baumann photographed it in 1930 as a wall painting in Chokwe-speaking



Chief Kalunga beginning to draw the *kasona* of the Gnus, Kayombo kaChinyeka watching with note-book in hand. At the Chief's enclosure, Chikenge, July 22, 1973.



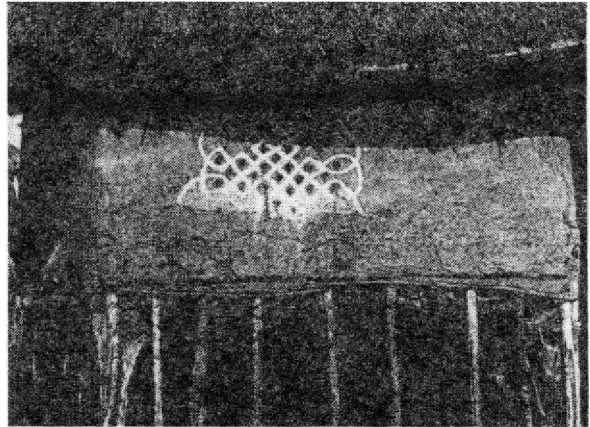


Chief Kalunga, as above

country, northeastern Angola. Three important facts arise (see photograph):

1. Although the lower part of the figure is destroyed, probably washed away by rain, it is clear that the drawing is "*Vamphulu*" and that it is absolutely identical in shape with the one I obtained from Chief Kalunga in Zambia, 1973.
2. The place where it was photographed, although not identified exactly, is several hundred kilometres from where I found the same *kasona* in Zambia.
3. The ethnic group in Baumann's research area was -Chokwe, in mine -Luchazi.

A photograph reproduced from "*Lunda*" by Hermann Baumann, 1935, showing the *kasona* 'Vampulu' painted on the wall of a *ntsenge* (store, kitchen and fireplace for the women) in Chokwe country, northwestern Angola.



These three facts suggest great stability for this particular *kasona* as a tradition, a cross-ethnic stability that extends over a wide geographical area, and at least half a century, probably much longer. It confirms our impression gathered from informants that the *tusona* tradition must be very old. In spite of the opportunity for creative invention at all times, and some margin of variation (evident when comparing my collection with other authors' accounts, Hamelberger 1951, Dos Santos 1962, Emil Pearson 1977), it must have remained essentially stable over long time periods in the

Eastern Angolan culture area. Further, Baumann's photograph confirms that *tusona*, although normally drawn in the sand may occasionally be painted on mud walls. This is also confirmed by Marie-Louise Bastin (personal communication), the expert on Chokwe decorative art, who has placed a colour slide at my disposal in which Chokwe *sona* (although in a modern context) are painted on a house wall at Dundo. Baumann's photograph, however, reveals one more important detail. When drawing them on walls the -Chokwe, and most likely others, use the two traditional colours of the eastern Angolan peoples: *mukundu* (red ochre) symbolizing blood, death etc. and *mphemba* (white kaolin) symbolizing luck, resurrection. These two colours are conceptualized as opposing forces in Chokwe and Luchazi cosmogony. It is most interesting, and clearly visible in the black-and-white photograph, that *mukundu* was used for the dots, and *mphemba* for the lines. Further it is sociologically interesting that the ideograph appears on a *ntsenge*, the store and fire-place for women who are not carriers of the tradition, although occasionally a woman may be able to draw *tusona*, as I saw in N.W. Zambia. It is difficult to interpret this observation since Baumann barely gives any documentation.

One of the most ingenious Luchazi ideographs is the one called *mukanda* (boys' circumcision school). I recorded it on January 4, 1978 at Chindzombo village, north of Chikenge, Kabompo district, Zambia. It was drawn, and explained simultaneously, by Mose Chindumba, a young man, still under 30 years old, who normally works as a medical assistant in Zambezi and who had come to Chindzombo to visit his relatives. He had learned it from his father, who lives in Zambezi, and who according to him, knows many more.

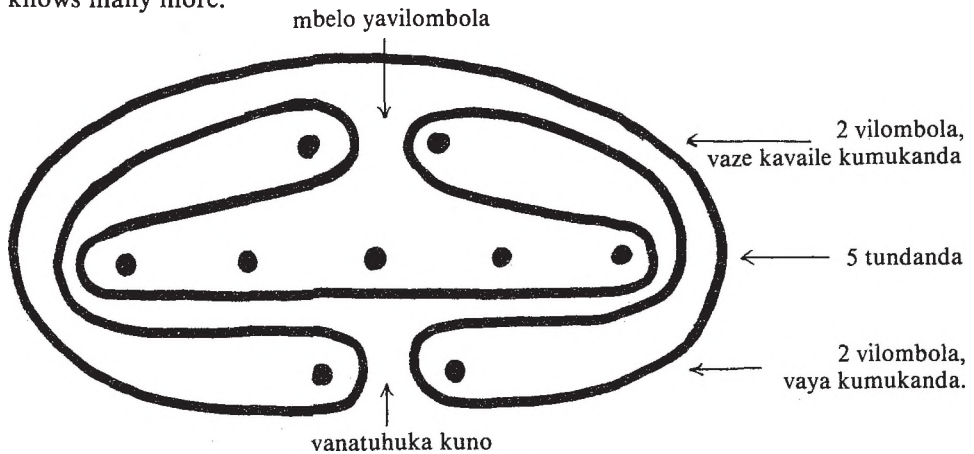


Fig. 8. *Mukanda* (boys' circumcision school)

*Mukanda* (speech tones: \_ - -) is the term in Luchazi and related languages for the circumcision school for boys. This is a central institution in the culture of the peoples of eastern Angola, north-western Zambia and southern Zaire. The *mukanda* lodge is constructed outside the village and the newly circumcised boys, who are called *tundanda* (sing. *kandanda*) in Luchazi, *tundanji* (sing. *kandanji*) in Chokwe and Luvale, are kept there in seclusion for several months' instruction.

*Mukanda* among the -Luchazi starts at the beginning of the dry season, usually in April, May or June and is closed in about October, November or December. The age of the boys to be initiated is usually ca. 6-10 years. It is a pre-puberty school, intended to make the young boys self-reliant, group-conscious, and independent of their mothers, in anticipation of their future tasks and roles as members of the society of men.

During his prolonged stay in the lodge each *kandanda* has a personal guardian (*chilombola*, pl. *vilombola*) who is responsible for his well-being and education. In addition there are assistant guardians, usually adolescents, who perform minor tasks. These are called *tulombola-tito* (sing. *kalombola-tito*).

An uncircumcised male, i.e. someone who has not been to the *mukanda* is called *chilima* (pl. *vilima*). This is a depreciatory term, implying that such a person lacks the education which is provided by Luchazi society for young males.

The five dots in the middle of the drawing represent five *tundanda* (initiates) who are in seclusion inside the lodge. The two at the bottom represent two publicly acknowledged *vilombola* (guardians), whose task, among others, is to bring the food, cooked by the boys' mothers in the village, to the boys in the *mukanda*.

The true *vilombola* know where to enter, because they are initiated, they themselves went to a *mukanda* when they were young. In the drawing this is expressed in such a way that the paths of the two acknowledged *vilombola* inevitably lead to the narrow entrance of the *mukanda*, seen at the top of the figure, which I have marked with an arrow as *mbelo yavilombola*. Everyone can comprehend — and this is explained by the 'owner' of the *kasona* — that the two dots, if they were movable, could move between the lines encircling the enclosure and reach the entrance without meeting any obstacle on their path.

However there are also two pretenders, false *vilombola* who have never passed through a *mukanda* school. They are *vilima* (uncircumcised). These are represented by the two dots at the top. Now they also want to carry food to the *tundanda* and they



The *kasona* "Mukanda" (boys' circumcision school) as drawn in the sand by Moses Chindumba, Chindombo village, N. of Chikenge, Kabompo Dist., N.W. Prov., Zambia, January 4, 1978



begin their walk. But being uninitiated they simply cannot recognise the entrance, they cannot see it. Their path leads out of the area. In the drawing this is expressed such that the paths which could be followed by the two top dots do not lead to the five points in the middle, but out of the structure.

It is possible to call *tusona* compound ideogram configurations, because they are nearly always complex structures composed of several ideogram elements. It is not simply one sign attached to one idea by convention, but a set of complex ideas expressed by graphemes with distinctive spatial relationships. I call them "compound ideograms" because the individual graphemes forming a *kasona* each have ideogram functions and meanings which are, however, variable according to their position and context. A dot, for example can mean a person, an animal or an object, depending on the overall theme; a line can mean a path, a wall, a fence, again depending on context. The graphemes of a *kasona* only obtain their full meaning by configuration over a plane. An alphabetic script and a compound ideogram script such as *tusona* represent two completely different approaches to graphic communication and could, therefore, never be related along an evolutionary line. With a *kasona* it is possible to express non-verbal ideas and insights into the structure of the world in and around us, impossible to render by words. The logic of a situation or event, including the logic of laws governing long-established institutions such as *mukanda*, may be conserved in the form of the written imprint of a *kasona*, by being transformed into structural drawing logic.

In the *kasona* "*Mukanda*" the audience satisfaction derives mainly from the fact that an axiomatic law of this institution is expressed so perfectly: namely that only someone who has previously graduated can ever freely enter it and assume functions, such as for example that of a *chilombola* (guardian) or *kalombola-tito* (assistant guardian). This is convincingly demonstrated by the graphic logic: there is no path that would allow the uninitiated to reach the entrance. Following the only path available to them they land outside (*hambandza*).

A precondition to the appreciation of the ideographic message of this *kasona* lies in the knowledge shared by the *mukakusona* and his male audience about this central Luchazi institution, which every male had to pass when young. The satisfaction arises from the perception of a 'written proof' that those false guardians who have never been to *mukanda*, and therefore do not deserve their title, because they are *vilima* (uncircumcised) cannot a priori discover its secrets. The sand figure corroborates by its structure that this is indeed the natural order of things. As if blinded by magic, the false guardians are unable even to recognise the entrance to the enclosure.

In this example it is shown by purely graphical means 'why' *vilima* (uncircumcised) can never assume the functions of *vilombola*, even if they wanted to. The *mukanda* is a world of rigorous laws and carefully balanced behavioural rules, which are inculcated into the initiates by instructions and taboos (*vizila*). One of these is presented in this witty *kasona*.

*Tusona* ideographs often make the inner, perhaps we should say essential, order in situations, events, institutions and human interaction visible to the eye. They take the mind on a trip to unknown dimensions of the psyche. In a number of *tusona* such a 'trip' is assisted by their oscillating visual quality. We have hints that new *tusona* were usually invented in solitude, far away from the village, for example by a hunter resting



for a while in the shade of a tree, by someone passing time between work-hours in the fields (*ku mehya*) or by a long-distance traveller visiting relatives in a remote part of the country. The very nature of *tusona* geometry with its dots and lines gives rise to picture-puzzle effects. As we have seen in “*Kambava wamulivwe*” or “*Vamphulu*”, as soon as one looks at them with a passive, dream-like stare, these points and lines begin to ‘move’; visual perception begins to group the components into fluctuating patterns, as in a picture-puzzle. In other words, there are **inherent patterns** in many of the *tusona* emerging from a perceptual regrouping process. These patterns then stimulate in the lonely drawer day-dream-like associations: trees, people, animals, paths, objects seem to emerge from them, and this in turn is a stimulus for creative thought. What the *mukakusona* begins to see in those structures is in some way comparable to what a diviner (*mukakutaha*) ‘sees’ in the configuration formed by the little objects in his *ngombo* (divining basket), although the *tusona*, of course, have nothing to do with divination. What the drawer sees he may later share with the *ndzango* community. The other men endorse these associations, when the *mukakusona* explains the ‘meaning’ of his figure, by discovering the logic in them. The following *kasona* is a further example of the many in which ‘inherent patterns’ emerge. It was communicated to us by Jeremiah Makondo at Chikenge village on 1 July 1979. Although he had nearly forgotten it, we eventually managed to reconstruct it completely.

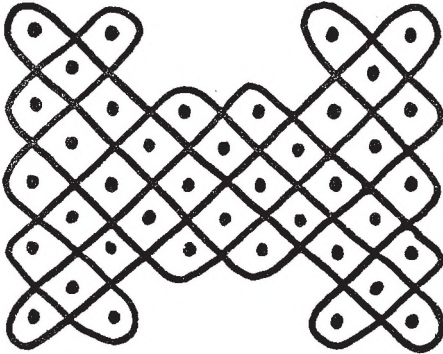


Fig. 9. “*Tunwenu vwala vwetu*”  
(Let us drink our beer)

It is one of those ingenious structures where a single line circumscribes a layout of forty dots in this case, in an odyssey of paths and finally returns to its starting point. Another old man whom we used to consult, the late Kapokola Chimbau, identified it as: “*Tunwenu vwala vwetu*” (Let us drink our beer). This is indeed what one may come to see in this drawing, looking at it with Luchazi eyes. There are two people, one left and one right, with their hands merged into each other. They are bound together by something, passing something between themselves, or united by a table between them. Drinking millet beer is an important social activity among VaLuchazi men, it brings people together and promotes discussion. *Vwala* is, therefore, something that would easily come to mind, which could have linked the hands of the two figures. The dots in the middle could, perhaps, be seen as vessels containing beer. From this viewpoint, the interpretation is convincing, and others will agree with Kapokola Chimbau that two people can be seen in this *kasona* sharing their drinks.

A question of quite a different nature, however, is whether this is the generally

accepted explanation. I knew Kapokola Chimbau as one of the most imaginative elders in Chikenge. It is probably his personal interpretation, i.e. what he himself projected into the figure. But this in no way diminishes the value of his comment. The interpretation of *tusona* is originally a creative process, and even what may come to be accepted in the course of time as the standard meaning of a *kasona* ultimately owes its existence to the very same creative process we witness in Kapokola Chimbau's naming.

It is evident that the 'trip' induced by some *tusona* (without the aid of any hallucinogenes) can also be a trip into the enigma of human existence. There is one *kasona*, which I have not so far found myself but which was collected independently by two missionaries in eastern Angola, Hamelberger (1951:126) among the TvuCokwe and Emil Pearson (1977:25) among the VaLucazi of Muxiku Province. It is another example of a 'mandala'-style figure, as if taken from the pages of Jung's works on the collective unconscious. It is called *Kalunga*, translated by both authors as 'God'. Although one may argue (cf. Kubik 1977) whether the Ngangela word *kalunga*, which has many meanings, basically 'rain' and more specifically 'anything without beginning and end', 'infinity' etc. can be equated in its semantic field with the concept of a High God, the *kulumbununa chakasona* (explanation of the ideograph) given by one of the authors, Hamelberger, and in a way confirmed by the other, sounds original. It assumes the form of an aetiological myth, explaining how human death originated. Hamelberger could definitely not have invented this, although he does not give us the original Chokwe text, but only a Portuguese and French translation. The translation evidently embodies some editing in style, although apparently not in content.

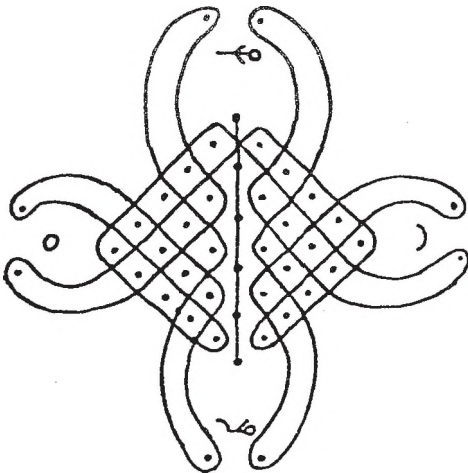


Fig. 10. "Kalunga"  
(repr. from Hamelberger 1951:126)

The small sign at the top represents *Kalunga* ('God'), the sign at the bottom: Man. The Sun is represented by the disc on the left, the Moon by the sickle on the right. The vertical line linking six central dots represents the path leading to 'God'. The other dots forming the basic structure of this *kasona* are circumscribed by a single line which rejoins itself after a long and complicated journey.

To those who can read the eastern Angolan ideographic script, the figure transmits

the following story: ... Long ago the Sun went to see God in order to render homage to him. He travelled on and on until he found the path which leads directly to God. God gave the Sun a cock and said, "Come back to see me tomorrow morning, before you finally depart". On leaving God the Sun went to sleep. The following morning very early, the cock which God gave the Sun began to crow. The Sun rose at once and presented himself again before God, who said, "I heard the cock crow in the morning which I gave you yesterday for your supper! You can go your way, but you must present yourself here every day..." It is for this reason that the Sun travels round the world and reappears every day.

The Moon also went to visit God, and received a cock. He kept it during the following night. Next morning, after the cock began to crow the Moon presented himself again to God, as promised, with the cock under his arm. God said, "You too, you did not eat the cock which I gave you yesterday for your supper! All right, from now on you have to come back here and see me every 28 days!" Is it not precisely what the Moon has been doing until today?

Man in his turn went to visit God. He also received a cock, but since he was very hungry after his long journey, he killed it. One half he ate the same night, while the other half he put aside for his return journey. Next morning the Sun was already high in the sky when Man woke up. He ate what remained of the cock and then took a holiday from God (he did not go there). God said to him smilingly, "And what about the cock which I gave you yesterday evening? I didn't hear it crow this morning." Man began to be frightened, "I was very hungry. I killed it. Yesterday evening I ate one half and the other half this morning in order to obtain strength for my return journey." "All right, all right" replied God, "the cock belonged to you. But now listen. You know that the Sun and the Moon also came to me and each of them received a cock like you, but did not kill it. For this reason neither Sun nor Moon will ever die. You who killed the cock will die like it did. And at your death you will come and present yourself again here to me!" (Hamelberger 1951: 126, transl. Kubik)

Finally there is one *kasona* which seems to hold the key to an understanding of the structure of most of the geometrical *tusona*. It is the smallest figure in the tradition among those whose dots can be circumscribed by a single line rejoining itself. We collected it from an elderly informant, Sachiteta Kakoma, born in 1914, whom we met at village Kanguya during our excursion to the villages along Katuva river, Kabompo District, Zambia, at the beginning of July, 1979. He had some difficulty responding to our request for *tusona*, since he, like many other elders, said he had forgotten them. After some time, however, he produced "*Katuva-vufwati*" (Fig. 11), a *kasona* which

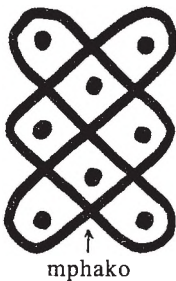


Fig. 11. *Katuva vufwati* (The one who pierces intestines)

was called “*Kangano kanthyengu*” (The little foot-print of the roan antelope) by another informant in the same place, Benson Muzaza.<sup>4</sup>

The word *katuva-vufwati* comes from *kutuva* — to pierce, bore a hole, and *vufwati* — the content of the stomach and intestines; *vize vitwekulya haze halufu* (The things we eat which are there in the intestines).

*Katuva-vufwati*, says Sachiteta Kakoma, is a small animal (*kasitu wamundende*), which can kill the goats in the pen (*vamphembe mulimba*.) (Interview on July 23, 1979 in Katuva).

According to another informant, Robert Ngunga, *Katuva-vufwati* is “something like a small mammal of the type of animals which used to stay in the holes in trees” (*Kakele ngwe hakakasitu, tusitu vekukala muzimphako*). “Because people come to poke again and again there at the hole, then when they pierce through it, when they pierce the animal through its abdomen, the content comes out.” (*Mwomu vantu vakwiza nakutuvatuva kuze kumphako, kaha muvamuutuvila, kaha havakumutuva hazimo kaha vufwati havukwiza*.)

**Luchazi text:** (rec. tape A 79/II/7, July 5, 1979)

*Uze kasona uze, mwomu wakele kumphako, kaha lizina lyeni ikeye Katuva-vufwati. Wakele kumphako muze. Kaha vuno muvakumbata kaha kumbata luswango kaha kuhakaho muze. Kaha vunoni vuze vufwati vweni vunatwika, kaha kutalako ngechize: Nana! Oku kumphako kuli vufwati. Oku kumphako kuli vufwati. Oku kumphako kuli vufwati. Kaha ngavo: Kal’iya? Kutotaho haze, kaha kutalako ngwavo: Kali katuva-vufwati, lizina lyeni.*

#### **Translation**

This drawing here, its name is *Katuva-vufwati*, because that animal was in the tree-hole. It was in the tree-hole just like that. Then the people took a long stick and put it in there in a certain manner, until the content of its stomach burst out. Then they looked at it and wondered: “Hey! There in the tree-hole there is the content of a stomach! There in the tree-hole there is the content of a stomach!” And they asked: “Who is this little animal?” When they cut it out and looked at it, they said: “This is *katuva-vufwati*, that is his name.”

Our discussion of six *tusona* selected from a tradition of hundreds formerly known in eastern Angola may have given us sufficient insight for the moment to examine them structurally and return to some of the questions raised at the beginning of this paper. We have seen that the geometrical type discussed here, which I call Formal Type A in my book, displays some intriguing mathematical qualities. Sometimes a single line will suffice to circumscribe all the constituent dots and return to its starting point, sometimes more than one line is needed. The circumscription of the dots by one or more lines is systematic and follows strict, though not verbally formulated, rules.

In most *tusona*, every dot must be isolated by a line, thus acquiring a ‘field’ or surrounding area or ‘territory’ of its own. There must never be more than one dot in each field. To achieve the drawing of a *kasona* of Type A, only a limited number of operational possibilities exist. In many cases there is only one possible route for the line to take. Lines always pass between series or rows of dots, never crossing a dot. The number of structured combinations of dots and lines in the *tusona* system is therefore



limited. Although we cannot determine the number of *tusona* mathematically possible in this tradition as a whole, because construction techniques do show unpredictable variation, it would be possible to do so for one subgroup, Formal Type A1 (see Kubik, in press). This awareness allows a *mukakusona* even today to reconstruct any figures he might have forgotten, merely by applying the strict rules of behaviour for dots and lines which can be deduced from the tradition.

*Tusona* of Formal Type A consist of a basic screen of equidistant dots, into which a contrasting, interlocking series is inserted, bisecting the basic one, with each interlocking dot placed so that it divides the distance between its two diagonal neighbours in half.

The layout of dots is then circum-, or rather interscribed by lines which normally return to their starting point. In some *tusona*, a single line is destined to circumscribe dozens of dots, returning to itself with amazing accuracy after an odyssey of labyrinthine movements. For the observer, watching an expert *mukakasona* drawing at top speed, it often seems miraculous how this can be accomplished.

The 'rules of behaviour' for dots and lines which I deduce below from our sample were not explained to me by Luchazi elders. I have good reason to assume however, that they reflect the concepts of the carriers of the tradition. They are inherent in the structure of the figures, and also partly implicit in the style and technique of the drawing process.

1. **Basic dots.** The basic screen is laid out first. The *mukakasona* impresses them in pairs, extending his series upwards, then to the left, finally to the right, by transferring the span between the first and third fingers of his right hand from place to place, as described earlier. The dots transferred sideways constitute, from a technical viewpoint (not detectable in the finished product), a chain of 'overlapping' or 'anchored' pairs. We shall discover that the anchoring principle thus isolated contains an important clue to an understanding of the mathematics of this tradition. It is at the basis of a proliferation process from elementary to composite shapes.

2. **Interlocking dots.** The interlocking dots are then inserted between the basic ones as one might place a fifth dot into a cube with four 'eyes'. With the interlocking dots a new dimension is created. The screen of combined dots is now diagonally divisible in addition to the already established horizontal and vertical divisibility. The total resulting number of dots in a *kasona* is, therefore, to be considered as a composite entity, with the shortest distance between any two dots being diagonal. It consists of a regular number of equidistant basic dots and an 'interlocking screen' of dependent dots. This structural characteristic of the *tusona* cannot be seen after the drawing is completed, because basic and interlocking dots are indistinguishable, and the two screens merge completely.

Looking back at the structural implications of the drawing process, we can say that the **pair** of basic dots (formed by the first and third fingers) is something like an autonomous unit, standing by itself, while the interlocking dots are singular in conception. The combination of these two divergent entities is at the root of the relative frequency of odd numbers we encounter in the total number of dots forming a *kasona*. We have to note that it is an essential concept, inherent in the *mukakusona*'s drawing technique, to transfer pairs of basic dots over the surface of the sand while developing his figure.

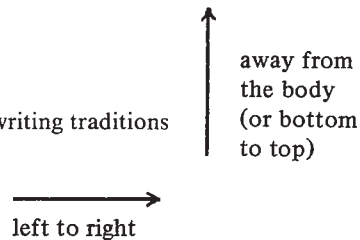
3. **Symmetry.** A further important trait is revealed in the number and total arrangement of the combined dots. In most cases their layout is governed by a principle of symmetry. They may form implicit squares, rectangles, overlapping (anchored) rectangles, a broad cross or other symmetrical shapes leading to an overall symmetry, once the lines are inscribed. The geometrical symmetry does not give a corresponding symmetry in the total number of dots in the final complex structure. This number rarely seems to display any regular form numbers such as 12, 18, 24, 36, 48, so prominent in other realms of African culture. This is due in part to the principle of visual interlocking, and in part to the overlapping or anchoring of surfaces formed by the dots. However, as will be seen later, regular form numbers are also a governing structural principle in the *tusona* tradition, only they are hidden in the deep structure of the figures. Most of the *tusona* have a left-right symmetry like an anthropomorphic or zoomorphic being, but there are some with quaternary symmetry, such as “*Vamphulu*” and “*Kalunga*”. Some of these do not contain any concept of ‘up’ or ‘down’, ‘left’ or ‘right’. “*Vamphulu*” for example can be turned in any direction without losing its identity. It can also be mirror-inverted.

This is not merely of theoretical interest. Some *tusona* have actually been collected mirror-inverted or upside down from different informants in this culture area. Directional concepts are important in the *tusona* tradition, but as a **performance technique**. In relation to the *mukakusona* directional movement during the process of drawing a *kasona* is:

- a) away from the body (on sand) or from bottom to top (on walls);
- b) from left to right.

This is a common approach in many African writing traditions and contrary to that of various areas on the northern half of the globe.

Fig.12. The concept of direction in many African writing traditions



If the two directional concepts are combined, they tend to generate circular movement **anticlockwise**. This is paralleled in the directional movement of African circular dances (the famous exception is the *ngwaya* of Upangwa, Tanzania, which is clockwise) and in numerous art traditions across cultural and linguistic boundaries in Africa: e.g. Uroborus-type figures on the walls of the King’s court in Abomey (Dahomey) and the left-directedness of the snake-figure called *kalunga* in the shrine of *mungongi* initiation among the Ngangela-speaking peoples. (Field notes Kubik 1965).

4. **Lines.** The next, and in many *tusona* the final stage, only supplemented in some by pictorial additions, is the drawing of the intersecting or circumscribing lines. These lines follow strict rules of behaviour. With regard to the possible relationships between dots and lines we may distinguish three types of lines used in the *tusona* of Formal Type A:

a) Straight line. This is the basic type of line in the *tusona*. It is however, only nominally 'straight'; actually one could call it 'reactive'. In principle it pursues a straight course along a row or between two parallel rows of dots, until it reaches the end of the longer row. Only then does it have to change direction, describing an angle, or rather a gentle curve of either  $90^{\circ}$  or  $180^{\circ}$ , according to a further set of rules. Since its curves or angles do not come about arbitrarily, but are 'reactive', i.e. determined by the structural layout of the dots, we may for the sake of simplicity refer to this type as the 'straight line'.

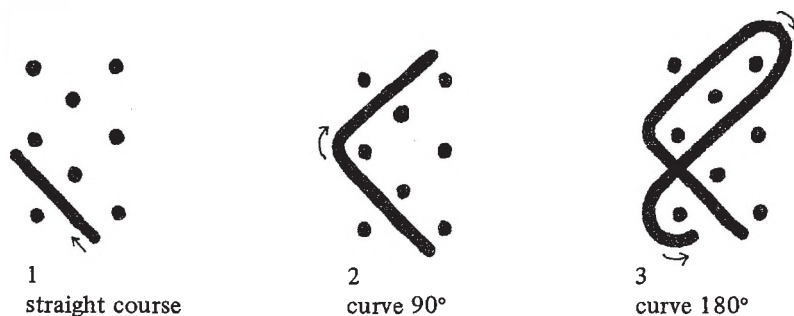


Fig. 13. Examples of the behaviour of the 'straight line'

In whatever direction one wants to begin drawing a line of this type, it must proceed straight as long as there is a row of dots along which it can move, up to the last dot in that row. (See under 1 above). The line cannot change its direction ad lib; any changes depend on the configuration of the dots in each area it traverses. It cannot turn before the end of the row of dots along which it is proceeding. From the viewpoint of the executant the movement of the straight line is always diagonal, thus linking the shortest distances between dots.

Directional change is determined by the following rules:

1: If the 'wall' of dots along which the line is proceeding ends and another 'wall' or row opens up at a right angle, then the line has to 'bend', describing a gentle curve of  $90^{\circ}$ , and continue along the new row (see under 2 above). In principle, it cannot proceed into empty space and leave the field of dots behind, unless it is to assume a different function. (For this see below under 'roving lines'). The straight line must always find a row of dots against which to lean.

2: If on the other hand there is no new row in sight and consequently the last dot in the row 'sticks out' of the coherent body of dots, then the line must go round it in a  $180^{\circ}$  U-turn and return on the other side of the same row of dots (see under 3 above). Once again it must proceed to the end of that row until a new situation comes about, provoking a new change in direction.

This should suffice to show that the structural layout of the dots and the movement of the interscribing lines are absolutely interdependent in Formal Type A of the *tusona*. It is important to keep in mind that the change in direction of the line comes about after the last dot of the (longer) row of two parallel rows of dots. Gaps in any of the rows are ignored. In those instances, the line leans against that section of a row which is at that spot complete and uninterrupted. (See the following sketch, Fig. 14).

Strict observation of these implicit rules leads to the assured result that a line will return to its starting point, sometimes after a long and tortuous journey (see “*Kambava wamulivwe*”). This holds true for single as well as multiple lines. The rules are strictly observed unless special effects are desired, such as in “*Vamphulu*” where the inventor of this probably very ancient *kasona* wanted to visualise the horns of the four gnus, and consequently modified the route of some lines.

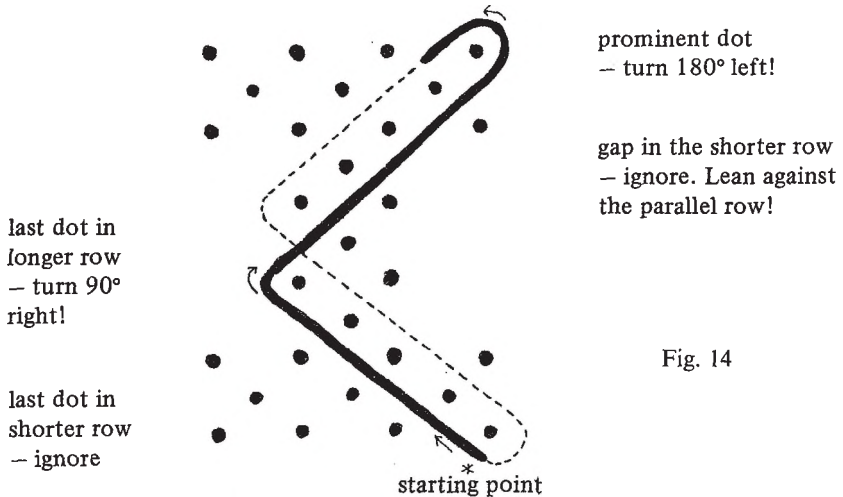


Fig. 14

The reader can get the feel of these unwritten laws by redrawing some of the *tusona*, either on sand or on paper. He will discover that there are no choices for the ‘straight line’. There is only one predetermined path it can take.

(b) Wavy line. The second accepted mode of behaviour for lines is totally different from the first one. Found in some *tusona* of type A, it is serpent-curved and proceeds in the following manner: it passes between the dots of either a horizontal or vertical row in serpentine or ‘slalom’-type movement. For example:



Fig. 15

As a consequence of the specific spacing of the basic interlocking dots in a *kasona* this line always moves in a horizontal or vertical direction, never diagonally. Thus it links, or connects, the longer distances between the dots, while the straight line (see above) moves diagonally linking the shorter distances.

(c) Roving line. Curved lines may also assume quite a different function. In some *tusona*, long roving lines occur which surround the whole structure, traversing wide areas of empty space before returning to the screen of dots, e.g. the roving line in the *kasona* of “*Mukanda*”.

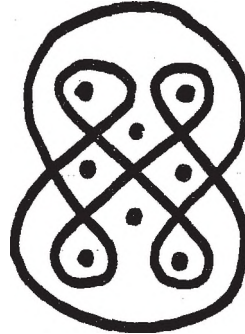
It is the type of line, straight, wavy or roving, which determines the final shape of a *kasona*. There are several figures which have the same number and layout of dots, but



differ in the type of line which gives them the final shape. "*Katuva vufwati*" and another *kasona* which we have not considered yet, reproduced below, are both based on eight dots, six basic ones and two interlocking; in number and layout of dots these are identical. And yet they are different in shape and size, due to the different paths of the line. A comparison of "*Katuva vufwati*" with "*Liswa lyavandzili*" will make this observation clear.

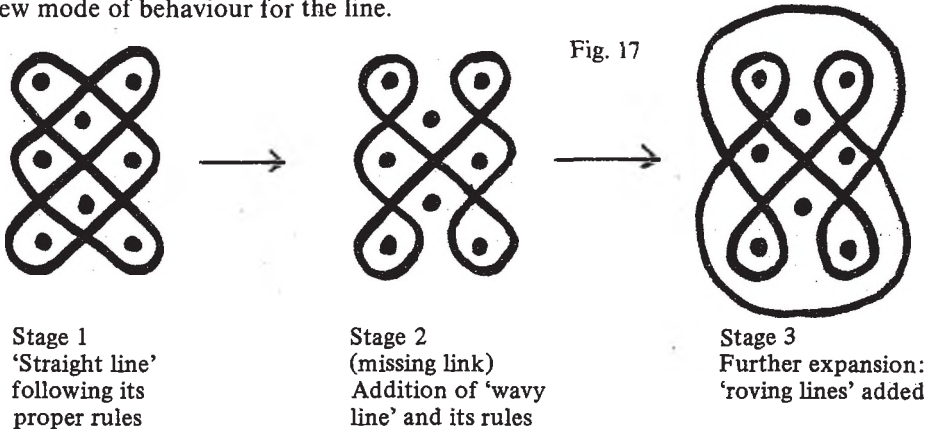


Fig. 16 "*Katuva vufwati*"



"*Liswa lyavandzili*"  
(the nest of the *vandzili* birds)

While in "*Katuva vufwati*", the route of the line can be explained and predicted by the rules which we have discussed for the 'straight line' (under (a) above), in "*Liswa lyavandzili*" all three modes of behaviour for the line, straight, wavy and roving, appear in an intriguing combination, leading to an absolutely regular and symmetrical shape. The only way we can structurally understand this *kasona* seems to be by trying to find a 'missing link' between the two, because they are obviously related. Then each structure will seem to be a development from the previous one by the introduction of a new mode of behaviour for the line.



The greatest surprise for me was when I discovered that Stage 2, which I arrived at purely from abstract principles of construction, exists as an actual *kasona*. I did not see it in Kabompo District, Zambia, but it was documented among the Cokwe of Angola by two authors, Hamelberger (1951) and dos Santos (1961) and has a meaning similar

to our "*Liswa lyavandzili*". This suggests that I was on the right track in trying to construct an intermediate form.

As is evident from Fig. 17, the mode of behaviour of the line at each point in its path can be clearly defined (whether 'straight', 'wavy', or 'roving'). Stage 3 is obtained from Stage 2, by a simple but effective expansion technique. On both sides of Stage 3, left and right, the wavy line is 'broken' and the roving lines commence. Instead of curving around the next dot (as in Stage 2), the line then proceeds into 'empty space', describing a wide half circle before coming back to the screen of dots on the opposite side.

Our point of departure in this investigation was the idea that most *tusona* are not only complex geometrical structures, but that their complexity presupposes the existence of mathematical experience in this cultural area. Whether this experience is empirical, theoretical, or intuitive is a question that may be fascinating but is really irrelevant from the viewpoint of the culture concerned. The dimensions of Luchazi mathematical thought can not easily be slotted into any of the categories cultivated in European languages. It is mathematics in *tusona* that determines the distinctive behavioural rules for the layout of the dots and the drawing of the lines. Regularity and order is the hallmark of this graphic tradition, to the extent that it is possible to reconstruct forgotten *tusona*.

To understand the geometry of *tusona* it is important to remember that the dots which form the layout should be considered as a surface, rather than as mono-dimensional particles distributed over a plane. The former is, according to my experience in Kabompo District, the way a Luchazi eye looks at a *kasona*. Dots and lines form a surface on the sand, a continuum of marks and empty areas. Only by perceiving the figures in this way can the intrinsic regularities of *tusona* be discovered. We were surprised by the irregularity of the total number of dots in *tusona*, but looking at them as 'surfaces', we suddenly discover that even those with seemingly irregular (even prime numbers) of dots are based on hidden regular form numbers. In other words *tusona* possess something like a deep structure. Numbers such as 12 or 24 (the very form numbers so important in African expressive cultures) appear with particular frequency.

For example, the *kasona* "*Kambava wamulivwe*" (Fig. 6) seems to be composed of 22 basic and 12 interlocking dots. This gives a total of 34 dots, which are then circumscribed with a single line, rejoining itself after an intriguing course over the whole figure. At first the number 22 is surprising, a mathematical puzzle. Why should the total of 34 (which can only be divided by 2 and the prime number 17) form the skeleton of such an interesting geometrical shape? And why is it that this particular *kasona* requires a most complex and labyrinthine path for the single line? The line performs no less than 15 curves on its way, before returning to its start. Why does it function so perfectly within the framework of such irregular numbers?

Looking more closely, we discover that the layout of the basic dots in this *kasona* can be appreciated in a different manner, provided that we look at them as 'surfaces', and that they can be considered as forming two rectangles of the same size, overlapping at two points. Each of these rectangles constitutes the very regular constellation of  $3 \times 4 = 12$  dots. (Fig. 18)

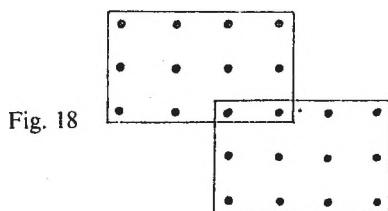


Fig. 18

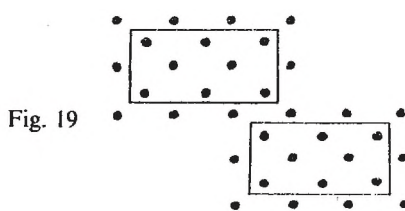


Fig. 19

Since the two rectangles overlap by two dots, the latter have to be counted twice to obtain from the total number the form number of the deep structure. It now becomes clear how the portentous but structurally insignificant numbers 22 and 34 come about.

Inside the conjoined rectangles, the interlocking dots also form surfaces, namely two further rectangles of 6 dots each. Since they do not overlap their summary number 12 is preserved. They are half the size of those formed by the basic dots. (Fig. 19)

Thus “*Kambava wamulivwe*” really has a deep structure of  $18 \times 2 = 36$  constituent elements which are amalgamated so that two dots count for four. It is this amalgamation or overlapping between ‘deep structures’ (consisting basically of multiples of 6) which seems to provide the mathematical clue as to how a single line can travel right through the structure, isolating all the dots and safely returning to itself.

So we can define this *kasona* as consisting of two bodies of dots laid out equidistantly over a rectangular surface, each governed by the internal structure:  $3 \times 4 + 2 \times 3 = 18$  dots, with two dots of the outer horizontal row overlapping. The total structure is defined by the simple numbers 2, 3, 4 and their multiples.

What is important then in the structural make-up of these *tusona* is not so much the (total) number of constituent dots, but the structure of the surface patterns they form. A dot may belong to more than one pattern at a time, to two overlapping entities. In counting the ‘real’ total number such dots should be counted twice, if they form part of two entities. For a structural analysis of *tusona* it is important to consider the number of dots in **each** surface entity.

It can now be shown practically that all the *tusona* of Formal Type A which can be circumscribed by a single straight line a) are proliferations of the  $(3 \times 2) + 2 = 8$  basic structure, i.e. the figure known as “*Katuva vufwati*” or “*Kangano kanthyenu*”; b) contain two or more such basic structures anchored together by one or more dots.

“*Katuva vufwati*” is indeed the embryonic structure of all the *tusona* of Type A1 and of a good number of other types. The most complex figures such as “*Kambava wamulivwe*” or “*Tunwenu vwala vwetu*” can be understood as proliferations of this embryonic structure.

It is now possible for us to construct or reconstruct various *tusona*, some of which we have never seen, but which must have existed at some time or place, because they are part of the system.

The root *kasona* of “*Kambava wamulivwe*” is really a ‘6-form’, a rectangular layout of  $3 \times 2$  dots in which two more are inscribed, giving a total of 8. Since it is basically a 6-form, anchoring is only possible between the basic dots of the two overlapping ‘rectangles’. The interlocking dots can never be anchored. How *tusona* can be created from two or more such 6-forms overlapping by one dot is shown in Fig. 20. As in the root form, a single line will do to isolate the dots, even in the most extended proliferations.

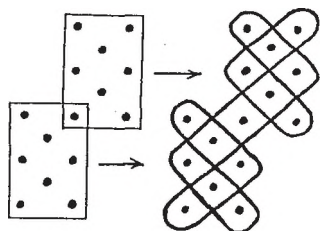


Fig. 20a

Fig. 20b

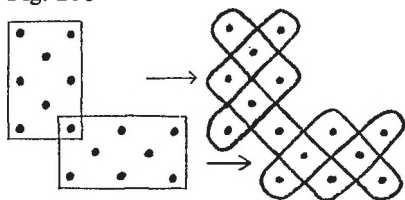
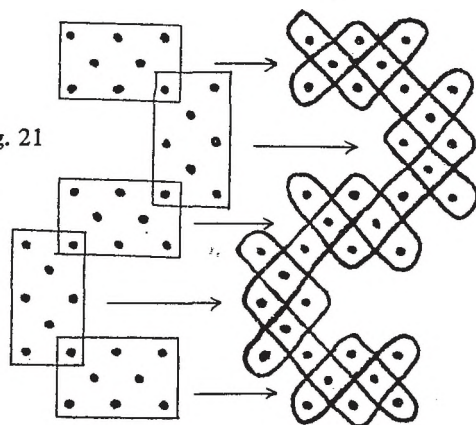


Fig. 21



It is possible to create infinite proliferations of anchored 6-forms and it is predictable that they can all be circumscribed by a single 'straight' line, for example Figs. 21 and 22.

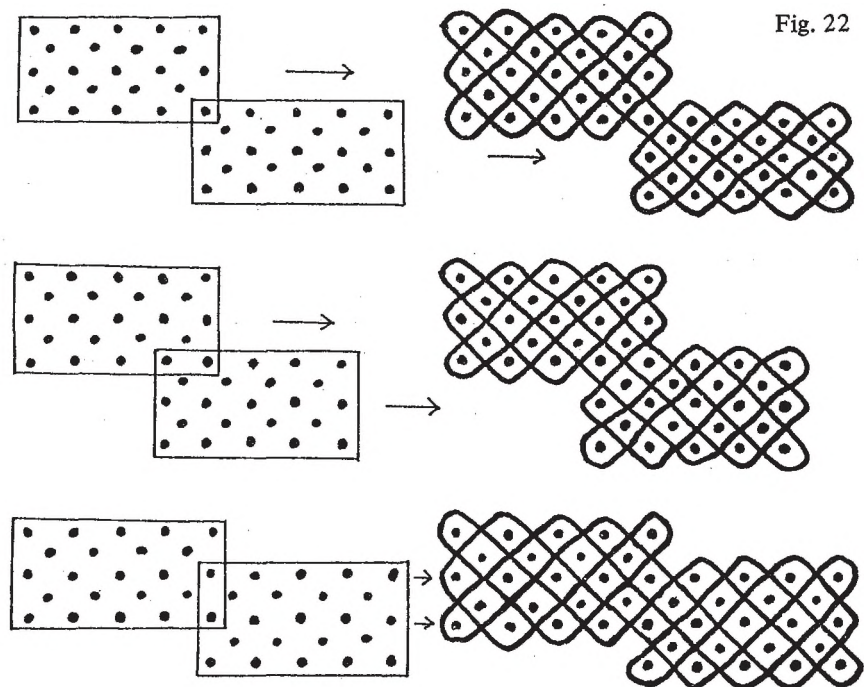
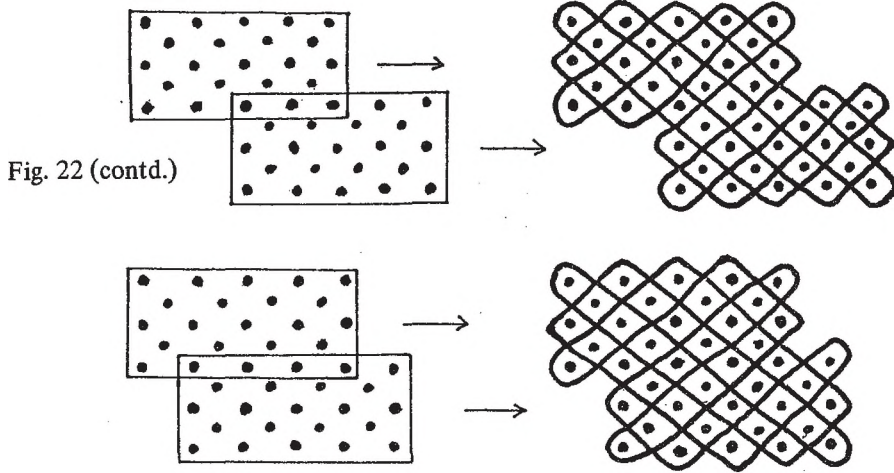
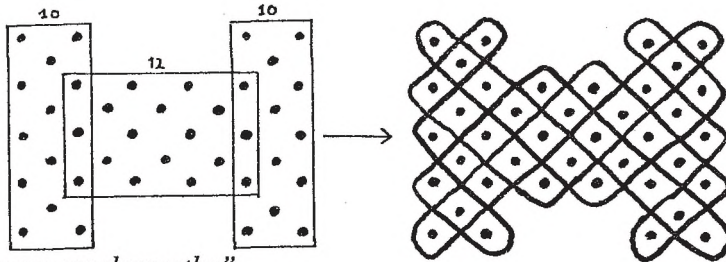


Fig. 22





“*Tunwenu vwala vwetu*”, one of the most intriguing *tusona* of Formal Type A can thus be explained as a proliferation of the embryonic 6-form and its compound derivatives. It is built up entirely of compound derivatives.



The reader who is familiar with certain basic principles in the shaping and composition of African music must have heard something like a ‘bell ring’ all through our discussion of *tusona*, and not only because of my perhaps suggestive use of terms like ‘interlocking’, ‘inherent patterns’ etc. Moreover, students of African music have been aware for a long time that in pre-20th century African musical traditions such as the now obsolete royal music of Buganda, handed down from anonymous composers of the past, there are often very strict regularities with little margin for improvisation. The approach of the ancient composers of African music may have been totally different from that of anyone nowadays, but one can feel, for example, within the contours of the Kiganda musical system (cf. Kubik 1969) an almost obsessive preoccupation with **absolute relationships**, so that once a basic part is composed, the rest can be deduced nearly automatically. In this particular culture the pitch series of the basic and interlocking parts are so interdependent that hardly two or three notes could be changed without destroying the system; a third part is then deduced entirely from the two basic ones. I remember, when I first stumbled upon this, it was a ‘culture

shock' of decisive consequence for my future understanding, like walking through the space/time window of a science fiction time journey. I have only had one other similar experience: in 1973 when I first saw the *tusona*. While my reactions may be subjective and therefore redundant as a scientific statement, it must be acknowledged on the other hand that occasionally human beings can intuitively detect the wave-lengths of connected channels. The 'déjà-vu' experience which caught me in Zambia/Angola suggested that there existed in some forms of African creativeness a path allowing a composer of either aural or visual configurations to become as it were an onlooker during a process in which — guided by an unknown force — his hands moved nearly automatically, drawn by the internal logic of the process itself. This is not necessarily comparable to states of trance or spirit possession, but it is like reaching into a psychic stratum where direct off-prints of something very deep in us become available. And such off-prints may materialize with incredible speed; hence the self-assertion and speed with which an expert *mukakusona* can create a figure, and the speed with which a Muganda of the old guard of court master-musicians could reconstruct an interlocking part he had forgotten.

But let us return to an approach with which the majority of academically trained readers will probably feel safer. Synaesthetic interest in *tusona* in relation to African music may be justified in view of the following parallels:

1. The presence of 'form' numbers in both realms: in African music quite normally, where we call them cycle numbers, and in many *tusona*. In "*Vamphulu*" and "*Kambava wamulivwe*" it is 24, in some more complicated ones it is composite according to how the rectangles of the deep structure are anchored together. But note, as said before, that the form number in *tusona* cannot be obtained by simply counting all the dots: one has to count the number of basic dots in each invisible rectangle. In "*Vamphulu*" for example the basic parallel rows have  $2 \times 6 = 12$  dots, but two pairs cross each other. In "*Kambava wamulivwe*" there are two invisible rectangles anchored together, each with 12 dots, while in "*Tunwenu vwala vwetu*" there are three, yielding a form number of 32 dots. Many form numbers in the *tusona* are nothing but multiples of the basic 6-form. As in African music, 12 and 24 seem to be particularly important.
2. 'Doubling in pairs' is the next trait linking the aural with the visual field: in the *tusona* we have the impressing of dots with first and third fingers in parallel rows; in many kinds of African instrumental playing, for example xylophone music, we have parallel movement of two beaters over the keyboard in octaves ('male' and 'female' voices) or other intervals.
3. The principle of equidistance is also basic and appears as a structuring element both in the aural and visual field. Both basic and interlocking elements in the *tusona*, as well as in many forms of African instrumental composition, are laid out in equispacial rows. In accordance with the ambiguity, or the synonymous nature, of spatial and temporal concepts in many African cultures, the equidistance principle when realised in 'time' leads to tone-rows consisting of equal-spaced sound impacts (notes). The most outstanding examples of instrumental music composed in this manner can be found in the log xylophone music of southern Uganda (*amadinda*, *embaire*), in some log

xylophone music of northern Mozambique (*mangwilo*, *mangolongondo*) and in *timbrh* (lamellophone) music of the Vute in Central Cameroon.

4. The principle of interlocking is a further parallel guiding the construction of *tusona*, as well as of African music of many regions. The *tusona* use what we call in music a duple-division type of interlocking.

5. In both realms there are abstractive or structuring devices. In the *tusona* the lines combine certain rows or sequences of dots into patterns, creating oscillating configurations. This is paralleled in music partly by phrasing and accentuation, but also by a predilection for overall patterns which facilitate or encourage their restructuring by the ear, during which new patterns seem to emerge. Both in the *tusona* and in many types of African instrumental music there are puzzle effects, here visual, there aural, or what I have termed 'inherent patterns'.

While it has become clear that *tusona* of type A flourish upon abstract principles of a mathematical nature similar to those in some older traditions of African music, it is startling to discover that the strongest similarities are not found between *tusona* and the music in their own eastern Angolan culture. This music is very much governed by asymmetric time-line patterns and other compositional devices not found in the *tusona*.

Over a thousand km away, on the other hand, there are musical cultures, one certainly very ancient, the other not yet historically assessed, in which the same principles work so neatly that one could even visualize compositions from those cultures with a *tusona*-style notation system. These are the royal music of Buganda on the one hand (see Kubik 1969) and *timbrh* music of the Cameroun grasslands on the other (Kubik in Simon, Ed. 1983). Some of our modern notation for xylophone music from Buganda using dots only (dropping flags and stems) has a fortuitous similarity with *tusona* and a certain puzzle quality (cf. Kubik 1964:154, 1982:148). When I was doing some of these notations I had no idea that a graphic tradition such as *tusona* existed.



Fig. 24 a) Total image of composition "Basubira malayika" (akadinda) reproduced from Kubik 1964:154



b) Total image of composition "Ssematimba ne Kikwabanga" (amadinda) reproduced from Kubik in Simon 1983:148.






The parallels in the process of structuring, or composing, an *amadinda* xylophone piece and a *kasona* can hardly be overlooked. First, there is a basic series of equal-spaced points or dots. In the xylophone styles mentioned this is a series of single strokes performed by one player. This series is performed 'double': 'in pairs' as parallel

columns in the *tusona*, in music as parallel octaves. Next, in the *tusona* there is the interlocking series of dots, also equal-spaced. This corresponds to the interlocking series of strokes performed in these xylophone styles by the second player, who 'falls between' the first one. Finally, there is a process of associating or grouping the dots of both series. In *tusona* it is done by lines, in Kiganda music there is both accentuation and an abstracted pattern which combines certain notes of the two basic series. The result in both cases is those fluctuating puzzle-like **gestalts** which we have earlier called inherent or subjective patterns. The inherent patterns emerging from the total structure of an African instrumental composition then stimulate the listener to fill them with a content: words, text phrases etc. **Concrete** meaning is projected into them. The inherent patterns emerging from some of the *tusona* also suggest a content: a figure, a picture, an idea, a situation, a story. Inherent patterns emerge subjectively as visual or aural images to the onlookers or participants. They are structurally contained, i.e. inherent, in the total configuration, but cannot be traced **as such** by any objective measuring apparatus. However, they are not hallucinatory either, but a result of gestalt-hearing or -seeing, based in the neuro-physiology of the human perceptual apparatus itself. Their fluctuating, oscillating quality, i.e. their ability to change, and, as everyone has experienced with picture-puzzles, to shift dimensions without any effort of will-power, comes from the fact that human perception itself constantly adjusts its projection of scanning patterns onto the external stimuli. The evidence of inherent patterns in abstract configurations such as the *tusona* may be a most consequential finding for cultural research, because it shows that the African discovery, unparalleled in any other culture of the world, of how to make use of the reactions of the human perceptual apparatus by deliberately creating configurations which **must** 'decompose' and reconstitute as 'inherent patterns', encompasses both the aural and visual realm. It is not only an outstanding feature of several types of African music, but as we now know it also occurs in the visual field in at least one large Central African culture area.

Comparison of construction methods and terminology in *tusona* of Type A and *amadinda* xylophone music

CULTURE AREA	Lunda cluster E. Angola / NW. Zambia	Interlacustrine cluster Lake Victoria (Uganda)
ETHNIC GROUP	VaLuchazi	Baganda
LANGUAGE	Luchazi	Luganda
CULTURE COMPLEX	<i>Tusona</i> ideographs, Type A	<i>Amadinda</i> xylophone music
SOCIAL CONTEXT	Esoteric male tradition of elders who have attained the highest level of education	Esoteric male tradition in the framework of court music for the Kabaka of Buganda
PERCEPTUAL REALM	Visual	Aural
HISTORY	Ancient, becoming obsolete	Ancient, now extinct (in its original context)



<p>I. LAYOUT</p>    <p>DIAGRAM</p>  <p>TRANSCRIPTION</p> <p>TERMINOLOGY</p>	<p>Equal-spaced series of double-row parallel dots – two fingers held at equal distance apart act simultaneously, moving basically away from body First and third finger of the right hand are used, omitting the second between them</p>   <p><i>kusona</i> (draw, write)</p>	<p>Equal-spaced series of notes in parallel octaves – two beaters held at equal distance apart strike simultaneously, moving laterally over the keyboard Left and right hand beaters are used, striking in <i>myanjo</i>, omitting four keys between</p>  <p>4 . 5 . 2 . 4 . <u>5</u> . <u>2</u> . etc.</p> <p><i>okunaga</i> (start a series of notes)</p>
<p>II. LAYOUT</p>   <p>TRANSCRIPTION (resultant image)</p> <p>TERMINOLOGY</p>	<p>Equal-spaced series of interlocking dots, duple-dividing the basic series The dots are single, not doubled</p>  <p><i>kusunonwena</i> (write between)</p>	<p>Equal-spaced series of interlocking notes, duple-dividing the basic series The notes form 'double rows' in parallel octaves</p> <p>4 1 5 4 2 3 4 1 5 4 2 3 etc.</p> <p><i>okwawula</i> (separate, divide)</p>
<p>III.</p>  <p>TERMINOLOGY</p>   <p>TRANSCRIPTION</p>	<p>Delineating the dots by drawing encircling lines</p> <p><i>kusita kasona</i> (erect the walls of a <i>kasona</i>)</p> 	<p>Phrasing the structure a) by sharp accentuation <i>okusita ebyondo</i> (erect corners)</p> <p>b) by picking out and duplicating an inherent pattern <i>okukoonea</i> (to knock on the top two keys)</p> <p>. 1̄ . . 2̄ . 4 1 5 4 2 3 etc. 4 1 5 4 2 3</p>
<p>IV.</p> <p>INHERENT PATTERNS</p>   <p>STRUCTURES</p>	<p>result from the total structure, generate subjective visual associations, determine the theme of the projected content, on which the <i>mukakusona</i> elaborates verbally</p> <p>Many of the structures are regular in form number and based on proliferations of a 6-form</p>	<p>result from the total structure, generate subjective word associations, suggest words (content) for theme of the song and text variations (<i>ebisoko</i>), on which the singer elaborates</p> <p>Many of the structures are regular in form number and based on themes of 12, 18, 24 (rarely also 25, 27, 35 notes in the <i>okunaga</i> part)</p>

These parallels, as I said earlier, are discernible from an 'etic' standpoint. But in a sense some kind of corroboration also comes from 'emic' research, namely the fact that in spite of the geographical distance and the visual/aural crisscrossing, the terminology for composing a *kasona* and a Kiganda xylophone piece also display some parallels although the two Bantu language cultures, Luchazi and Luganda, are only remotely related. This is perhaps better shown in the form of a table (see above).

We do not have any explanation for the parallels except possibly in the antiquity of these Bantu language zone traditions, both of which are known to be of a certain antiquity and stability over a considerable period. Some of the Kiganda court music compositions played until recently can be traced back at least to the last decades of the 18th century through compositional and content analysis, correlated with the genealogy of the *basekabaka* (dead kings). If antiquity is significant, it could also help explain the esoteric nature of the traditions and their survival in only a few widely separated areas of Africa. Because we are talking about remnants of ancient African cultures, a third area where similar construction principles appear in music could well fit into the picture. I am referring to *timbrh* lamellophone music of the Vute in the Cameroun grasslands. If we correlate these three areas with stages 1, 2 and 3 of the dispersal of the Bantu-speaking peoples, then the three traditions look like leaves dropped behind on a long path. Some people of Central Cameroun were previously classed as 'Semi-Bantu' speakers, a notion now obsolete, but they are relatively close to the supposed Bantu nuclear dispersal area. What distorts this picture, however, is that Vute informants claim that the style of *timbrh* music which I recorded there in 1964 and 1970 is 'modern'. It is the construction principles of this 'modern style' that are identical with those of the *amadinda* music of Buganda: the use of equi-spatial tone-rows, octave pairs, duple-division interlocking, creation of inherent patterns etc. (with the exception of the *okukoonera* or abstracted part). Whether *timbrh* music is really 'modern' in its construction principles or only 'modern' in the songs, is impossible for me to say at the moment. The possibility cannot be excluded that an ancient technique which may have lain dormant in the area for some time has merely been revived in 'modern' *timbrh* music.

There is obviously something common in **approach** in the more ancient Bantu expressive traditions which have survived, and it is valid across the visual/aural threshold: a practically identical method of creating patterns. One characteristic which sets these traditions apart from many 20th century products (in music and visual arts) is the strict, almost constructivistic building technique. Each tiny component of a whole is designed to be an essential, irreplaceable element with multi-lateral relationships. In *amadinda* and *akadinda* music of Buganda not one note can be replaced without a specific reason. Slight variation does occur, if a different text is to be suggested. In the *tusona* too there is no margin for arbitrariness. Each component of the whole is clearly defined and there are strict rules of conduct. In the *tusona* it is the 'behaviour' of the circumscribing lines, in Kiganda xylophone music it is the compositional rules (cf. Kubik 1969). This gives both traditions a unique cohesiveness and finality. Though variation is used, there is hardly any improvisation. All the configurations are composed, both in the musical and the graphic traditions.

It is possible, of course, for cultural scientists to ignore or overlook the structural parallels and concentrate, in the case of the Kiganda tradition, purely on the **song** and

its words which the instrumental structures are intended to recreate, and in the case of the *tusona* on the verbal content, i.e. the explanatory part (*kulumbununa*). At first glance it may appear that this is the most desirable path towards understanding both traditions, because it is endorsed by persons in the cultures concerned. There is, however, a deeper structural level, which the adherents of these cultures do not necessarily need to verbalize, or perhaps no longer verbalize.

*Tusona* ideographs and *amadinda* compositions are not merely 'art' or 'music' in the Western sense. They are little closed systems of functional and causal relationships, little universes without exits. The minds who created them must have been researchers in the basic sense of the word. By creating the self-contained mini-universes of these configurations they also created mini-replicas of what our macro-universe may ultimately be like. They discovered abstract relationships which are not man-made, which come about and exist without human deliberation. And it must have become an immense passion once these ancients were on the track of such discoveries. The infinite proliferations in both traditions are proof enough of a persevering experimental spirit behind them.

### Notes

1. Pearson uses an obsolete disjunctive orthography for the Ngangela languages. In modern orthography for Luchazi (the language from which he actually quotes) the appropriate sentences should be written: *ntunda kwaili*, *ntunda inahiti*, *hakatete*, *kulutwe*, and *munima*.

2. Dos Santos (1961) claims that they may be engraved on objects such as calabashes etc. without, however, providing any data. Marie-Louise Bastin is very doubtful about Dos Santos' statement, and I have no evidence from my research area. She wrote to me in fact (Nov. 17, 1981): "Je n'ai jamais relevé de *sona*, du type écrit sur le sable, dans la décoration des objets Tshokwe, comme le suggère Eduardo dos Santos."

3. Until recently *tusona* have not been studied scientifically. Their existence usually escapes researchers. They were first reported, it seems, from north-eastern Angola by Hermann Baumann (1935), followed by independent observation and detailed discussion of some of them in Hamelberger (1951, 1952) and Dos Santos (1961) on the basis of new material collected among the -Chokwe. More recently, Rev. Emil Pearson in his book, *People of the Aurora*, came out with a large collection of *tusona* which he calls "sandgraphs" in English, observed in the 1920s during his missionary work in Kwandu-Kuvangu and Muxiku Provinces of Angola.

My own work on this subject began in 1973 on the Zambian side of the border, in Kabompo District, Northwestern Province, a region which belongs to the Eastern Angolan culture area and is mainly inhabited by -Luvalé, -Luchazi and -Chokwe peoples. I worked here exclusively among Luchazi speakers, a language which I had started to learn in Angola in 1965. The forefathers of the Zambian - Luchazi had migrated from Angola to their present area only from the beginning of the 20th century onwards.

My visit in 1973 was the second to this region (having spent six months there in 1971) and it took place in the company of a Zambian researcher in oral literature, Kayombo kaChinyeka, author of a book in Luchazi and English (see bibliography). During two more, longer, visits to Kabompo District, in 1977/78 and 1979 under a research affiliation with the Institute for African Studies, University of Zambia, I was able to collect most of the material compiled in my book *Tusona — Luchazi ideographs* (in press). In 1982 I was able to do some comparative study in Angola, on invitation from the Secretaria de Estado da Cultura and the Departamento Nacional de Folklore, Luanda. Financial aid for the Zambian and Angolan field-work was obtained from the Foundation for the Advancement of Scientific Research (Fonds zur Förderung der Wissenschaftlichen Forschung) Vienna, in the larger framework of my research projects No. 2792 and 4210.

Apart from my own continuing work on *tusona*, a Zairean cultural scientist, Nange Kudita wa Sesemba, Ph.D. Bruxelles, has recently embarked on a new field-study of *sona* (Chokwe language, sing. *lusona*) in Zaire. Some of the mathematical implications of this tradition have also been studied recently. I sent a few *tusona*, mainly from what I collected myself in N.W. Zambia, to Wolfgang Jaritz, a mathematician at the Institute for Mathematics of the Technical University in Graz (Austria) and he came up with a paper applying the laws of a ball on a billiard table to the path of the single *tusona* line (Jaritz 1983).

Another attempt at a mathematical analysis of *tusona* — in this case the analogous *sona* tradition found among the -Chokwe of Angola — has just come to my knowledge. (Marie-Louise Bastin personal communication). For the degree of Doctor in Pedagogy, Maria Teresa Vergani de Andrade Armitage, who has repeatedly worked in Angola, is presenting a

dissertation to the Faculté de Psychologie et de Sciences de l'Éducation at the University of Geneva (Switzerland): *Analyse numérique des idéogrammes tshokwe de l'Angola: expressions symboliques du nombre dans une culture traditionnelle africaine*.

4. It may be of great historical significance that this *kasona* can also be seen on a raffia cloth of the -Kuba in Zaire, far from our present-day *tusona* distribution area. It is in the British Museum and is said to date back to the eighteenth century (See photograph in Zaslevsky 1979, 108).

## References

BASTIN, Marie-Louise

1961 *Art Decoratif Tshokwe*. Lisboa.

BAUMANN, H.

1935 *Lunda*. Bei Bauern und Jägern in Inner-Angola. Ergebnisse der Angola-Expedition des Museums für Völkerkunde, Berlin. Berlin.

1954 "Vorläufiger Bericht über Felsbilderfunde in Süd-Angola", *Paideuma*, Vol.6, No.1.

KaCHINYEKA, K.

1973 *Vihandyeka vya mana — Sayings of wisdom*, Acta Ethnologica et Linguistica Nr. 30, Series Africana 8. Wien.

ELLIOTT, J.

1979 "The relationship between painting and scripts", in Justine Cordwell (Ed.): *The visual arts, plastic and graphic*. The Hague: Mouton Publishers.

ERVEDOSA, C.

1980 *Arqueologia angolana*. Luanda: Ministério da Educação República Popular de Angola.

FRANCA, C.

1953 "As gravuras rupestres do Tchitundo-hulo (Deserto de Moçâmedes)", *Mensário Administrativo*, No. 65/66. Luanda.

HAMELBERGER, E.

1951 "Écrit sur le sable", *Annales Spiritaines* 61e ann. Paris.

1952 "A escrita na areia", *Portugal em Africa*, Vol. IX.

JARITZ, W.

1983 "Über Bahnen auf Billardtischen oder: eine mathematische Untersuchung von Ideogramme angolischer Herkunft", *Mathematisch-statistische Sektion*, Research Centre A-8010 Graz, Austria, Steyrergasse 17, Bericht nr. 207. Graz.

JUNG, C.G.

1950 *Gestaltungen des Unbewussten* Zurich: Rascher Verlag.

1974 (and M.-L. von Franz, Joseph L. Henderson, Jolande Jacobi, Anela Jaffé): (2nd ed.) *Man and his symbols*. London: Aldus Books, Jupiter Books.

KUBIK, G.

1964 "Xylophone playing in Southern Uganda", *Journal of Royal Anthropological Inst.*, Vol. 94, Part 2.

1969 "Composition techniques in Kiganda xylophone music with an introduction into some Kiganda musical concepts", *African Music*, Vol. 3, No. 3. Corrigenda in *African Music*, Vol. 4, No. 4. 1970. Supplementary remarks in *African Music*, Vol. 5, No. 2. 1972 (Letters to the Editor, pp. 114-5).

1975 "Kulturelle und sprachliche Feldforschungen in Nordwest-Zambia, 1971 und 1973", *Bulletin of the International Committee on Urgent Anthropological and Ethnological Research*, No. 17.

1978 Review of Emil Pearson's "People of the aurora", (San Diego, 1977) *Review of Ethnology*, Vol. 5 No. 11-14.

1981 *Mukanda na makisi — Circumsision school and masks*. Double LP record with commentary. Museum Collection Berlin (West) MC 11, Ed. Artur Simon. Berlin.

1982 "Erziehungssysteme in ost-und zentralafrikanischen Kulturen — Forschungsansätze, -methoden und -ergebnisse", *Mitteilungen der Anthropologischen Gesellschaft in Wien*, CXII.

1977 (with F. Balyebonera, E. Kongola, A. Lyoba, A.M.T. Mabele and J.S. Mugangala): *Recording and classification of oral literature in Tanzania and some other parts of Africa*. Papers presented during the Seminar on Oral Literature, Sept. 20-26, 1976. Dar es Salaam: Goethe-Institut.

*Tusona - Luchazi ideographs*. A graphic tradition practised by a people of West-Central Africa. Wien-Föhrenau: Verlag. E. Stiglmayr. (in press)

MUBITANA, K.

1970 "Form and significance in the art of the Lunda, Luvale, Luchazi and Chokwe of Zambia. A Boasian approach", *Zambia Museums Journal*, Vol. 1.

MURDOCK, G.P.

1967 *Ethnographic Atlas*, University of Pittsburgh.



PEARSON, E.

1977 *People of the aurora*. San Diego: Beta books.

PHILLIPSON, D.W.

1977 *The later prehistory of eastern and southern Africa*. London: Heinemann Educational Books Ltd.

REDINHA, J.

1948 "As gravuras rupestres do Alto Zambeze e a primeira tentativa da sua interpretação", *Publicações Culturais do Museu do Dundo*, No. 2. Lisboa: Companhia de Diamantes de Angola.

1975 *Etnias e culturas de Angola*. Luanda: Instituto de Investigação Científica de Angola.

dos SANTOS, E.

1961 *Contribuição para o estudo das pictografias e ideogramas dos Quílicos*. Estudos sobre a Etnologia do Ultramar Português, Vol. 8, No. 84.

SIMON, A. (Ed)

1983 *Musik in Afrika*. Mit 20 Beiträgen zur Kenntnis traditioneller afrikanischer Musikkulturen von A.M. Dauer, L. Gerhardt, H. Jungrathmayr, G. Kubik, A. Simon, H.H. Wängler und 2 Cassetten. Museum für Völkerkunde, Berlin-West.

TRACEY, A.

1970 *How to play the mbira (dza vadzimu)*. Roodepoort, S.A.: International Library of African Music.

VERGANI de A. ARMITAGE, M.T.

1981 *Analyse numérique des idéogrammes tshikwe de l'Angola. expressions symboliques du nombre dans une culture traditionnelle africaine*. Dissertation. Faculté de Psychologie et de l'Education, Université de Genève (Suisse).

ZASLAVSKY, C.

1979 *Africa counts*, Number and pattern in African culture. Westpoint, Conn.: Lawrence Hill.

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