

# Roulette decoration on African pottery: technical considerations, dating and distributions

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## Abstract

The study of roulette decoration on African pottery has received little attention from archaeologists, with the result that a useful tool for culture historical reconstruction is going to waste. In this paper, a classification and description of various types of roulettes and some of their characteristics are put forward, and rouletting is distinguished from other techniques of impression with which it may be confused. The archaeological and ethnographic distribution of rouletting is then examined. The ethnographic evidence is found to be insufficiently precise and the archaeological evidence scanty and often of doubtful reliability. It is tentatively concluded that the earliest appearance of 'cord' rouletting was in the later Neolithic of the southern Sahara and that it may date from post-Meroitic times in the Nile basin. Carved wooden roulettes are first found in the early Iron Age Nok 'culture' of Nigeria. Rouletting starts much later in eastern Africa, where there is some reason to associate it with speakers of various branches of the Nilotic languages.

## Résumé

L'étude de la décoration par roulette sur la céramique africaine ayant jusqu'à maintenant peu attiré l'attention des archéologues, ce trait est resté sous-exploité pour la reconstruction de l'histoire culturelle. Cet article propose une classification et une description de certains types de roulettes et de leurs caractéristiques. Nous distinguons également entre décoration faite par roulette et d'autres techniques d'impression avec lesquelles elle est parfois confondue. Les répartitions ethnographiques et archéologiques de cette technique sont alors étudiées. Il s'avère que les témoignages ethnographiques n'ont pas la précision souhaitable, et que les données archéologiques sont à la fois peu abondantes et souvent d'une fiabilité douteuse.

Dans l'état actuel des connaissances, l'apparition de roulettes en 'cordelette' semble remonter au Néolithique récent dans le Sahara méridionale et ne s'introduire dans le bassin du Nil qu'après la période méroïtique. Les roulettes en bois sculptées sont attestées pour la première fois dans la civilisation de Nok de l'âge du fer ancien au Nigeria. La décoration par roulette débute beaucoup plus tard en l'Afrique de l'est, où l'on a quelque raison de supposer son association avec les représentants de plusieurs rameaux des langues nilotiques.

It is generally acknowledged that the morphology of pottery reflects in some way the cultural affiliations of its makers and, to a lesser or different extent, that of its users. Among the attributes of pottery, decoration, being essentially non-functional in strictly utilitarian terms, is the most likely accurately to reflect social distinctions. How to interpret observed variations in decoration or in typology in general is of course a major concern of historical reconstruction but is not the subject of this paper. Here I address myself to a consideration of one technique of decoration, rouletting, and make some rather broad observations on its geographical and chronological distribution in Africa, with particular reference to East Africa and Nigeria where I have first-hand experience of the ceramics.

In the course of this study it has become increasingly apparent that many workers' observations and descriptions of decorative techniques in general are inaccurate and unclear, and may lead to mistaken conclusions. There is also a tendency to concentrate on motif and layout of decoration at the expense of technique, whereas all three are equally important, and in some cases, notably with very fragmentary material, technique may be of greater diagnostic value. As a case in point, closer attention to technique could help to bring some order to the often bewildering range of decoration on neolithic ceramics.

These observations apply with special force to the study of rouletting in Africa in both archaeological and ethnographic contexts. There is a tendency among archaeologists to describe as rouletting any complex pattern of impressions that is not obviously comb stamping (and even some that is!), without serious consideration of the implement used or how it was applied. 'Cord rouletting' in particular has become a residual or dustbin category in which distinctions have become confused either in primary observation or in ambiguous description. Failure to observe differences in pattern is compounded by vague use of terms such as twisted, knotted, plaited, cord impressed, fibre, grass and the like, not only in English but also in the French and German equivalents. Some examples are cited below.

In contrast to the situation in Africa, a number of workers in the United States and Japan have carried out detailed studies of cord rouletting on Woodland and Jomon ceramics respectively, developing a sophisticated system of identification and analysis. The latest and most comprehensive study is by Hurley (1979), who gives an exhaustive catalogue covering apparently every possible permutation of twisted fibre strands. Against that standard, the very broad classification used here may seem overly crude, but the current quality of the African data renders finer definitions useless for purposes of wide-ranging comparison. Hurley's work is of limited application here; while very useful for the classification of roulettes made of twisted string or cord, it does not cover other common African forms of roulette.

Our first step must be to establish some definitions and primary categories of roulettes and their characteristics relevant to the African material. A roulette is a roughly cylindrical object, usually quite small, that is rolled over the surface of wet clay to leave a continuous band of impressions that repeat themselves at each revolution.

The practical and aesthetic implications of the technique are of some interest, although they have not been analysed either by archaeologists or ethnologists, at least in Africa. Rouletting provides a rapid and easy way of texturing the surface of a vessel, which treatment when applied all over may have practical advantages in making the vessel less slippery to handle, and in increasing its surface area to improve heat absorption in cooking or evaporation in cooling. The economy of effort involved compares favourably with more

laborious techniques such as incision, punctation or even stamping. Rouletting is thus well-suited to manufacture of pottery on a large scale. From the aesthetic point of view, it may be said that roulettes are generally best suited to produce bands or areal treatments rather than more restricted motifs or panels. Although a wide variety of pleasing effects can be achieved, all have the element of mechanical repetition that may offend the sensibilities. In short, rouletted decoration can be boring. Thus although the technique offers practical efficiency, its adoption and degree of use might well vary with the circumstances, organisation and intensity of local potting industries, as well as with local taste. On the other hand there is craftsmanship in the manufacture of the roulettes themselves, involving considerable ingenuity and manual skill, while the reconstruction and reproduction of roulettes from archaeological evidence presents a fascinating study in itself.

Evidence on the use and design of roulettes comes from both ethnographic and archaeological sources. Where a potter can be observed at work, there is obviously no difficulty in identifying the implement used. Valuable background information can also be obtained as to its maker, the materials and techniques used, and possibly the history of use if this is not veiled in antiquity. Where we have only the impressions of roulettes on archaeological specimens or on ethnographic material divorced from its context, the study is not so easy. It is often difficult to reconstruct the instrument used to give a particular effect, especially on small sherds where the pattern of repetition cannot be followed. Complications and variations are caused by overlapping impressions, occasional clogging of the roulette with clay, or its different expressions depending upon the pressure applied and the plasticity of the clay. Such difficulties can often be resolved if the sherd is large enough. A plasticine impression of the sherd may help, but practical experiment and trial and error are often the only approach and may not produce unambiguous results. The researcher must arrive at a conception of a three-dimensional object from a negative impression and the development of a cylinder on a plane surface. In some cases the ingenuity of the prehistoric potter continues to defeat that of the archaeologist.

### **Classification of roulettes**

We propose the following categorization of roulettes:

- 1) unmodified objects,
- 2) rigid roulettes,
  - a) carved wooden,
  - b) clay or carved stone (e.g. cylinder seals),
- 3) flexible roulettes,
  - a) string,
  - b) strip, and
- 4) composite roulettes.

These categories are described below, but it may be noted here that the purpose is to provide a systematic classification of clearly defined types to replace existing terms such as *cord*, *fibre*, *plait*, etc., which have been used with varying connotations by myself and others, resulting in confusing ambiguities.

*Unmodified objects* are mainly of natural origin. The most commonly used is a maize cob with the grains removed that is rolled back and forth to produce confused overlapping reticulate

impressions (Fig. 1). This is used especially in West Africa, for example among the northern Yoruba, and has the archaeological advantage of being a chronological indicator, since maize is a relatively recent introduction from the New World (Willett 1962). Caution in identification is however necessary since experiments in Ibadan have shown that superficially similar effects can be achieved by certain flexible strip (knotted bark or 'frond')

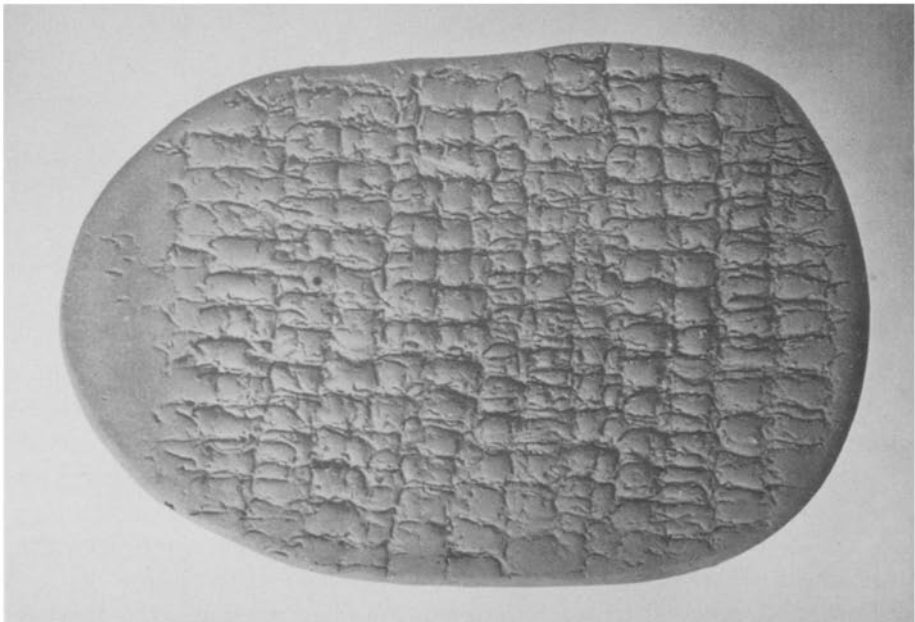
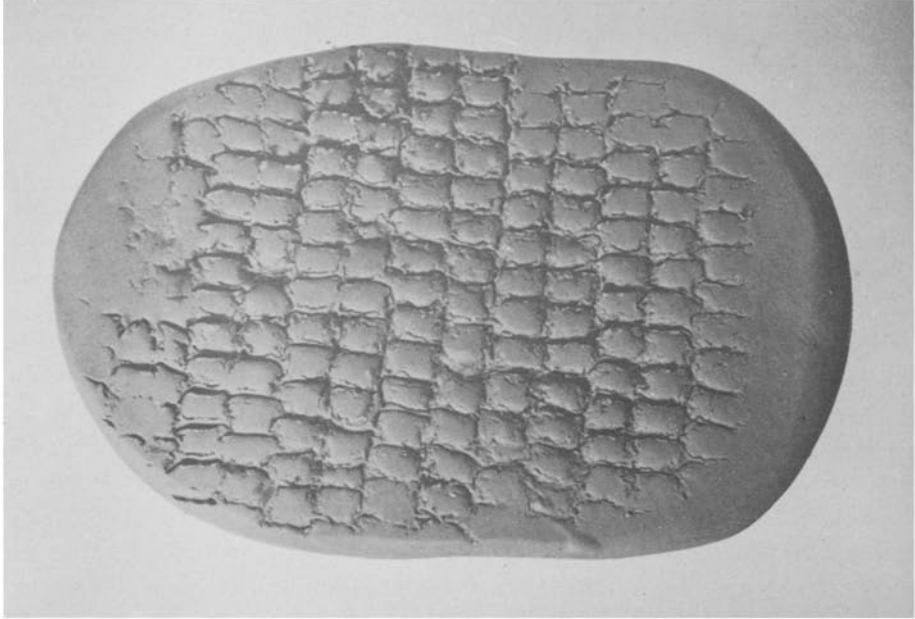


Figure 1 Maize cob rouletting: 1. single; 2. overlapping.

roulettes (Azere 1978). Drost (1967) reports a number of instances of the use of other objects, as does Connah from Benin and in the Lake Chad region of Nigeria (Connah 1975, 1981). Linares de Sapir (1971:37) records the use in Senegal of a spiky marine shell.

As an example of non-natural objects, Josette Rivallain (pers. comm.) reports that the potters of northwestern Ivory Coast have replaced flexible string roulettes with old springs from an alarm clock, bicycle or other source. Decorated metal bangles are also used to impress patterns by the Gbaya (David and Vidal 1977) and other peoples (Drost 1967:171–72), though they are probably not used as true roulettes since it would be impractical to roll them over the pot surface without removing and replacing them at least once a revolution. For East Africa, I am not aware of any instances of natural objects used as roulettes at present or in the past except for a report that a maize cob is sometimes used by the Bukusu (Simiyu Wandibba pers. comm.).

*Rigid roulettes* can only be used on a surface which is flat or convex to the long axis of the implement. The class with which we are almost exclusively concerned in sub-Saharan Africa is the carved wooden roulette, a cylinder into which various patterns are carved (Fig. 2), or less frequently otherwise indented. The size may vary from perhaps 5 or 6 cm long and 1 cm in diameter (southern Yoruba), down to some examples from Nana-Modé in the Central African Republic which must have been less than 1 cm long and 5 mm in diameter (David and Vidal 1977:33).

The carved patterns on these roulettes are generally rectilinear and geometric and imply the use of a sharp knife, presumably of iron although a flake of fine-grained stone like obsidian could also be used. However in the case of one of the sherds which I studied from Nana-Modé, the roulette would have been extremely difficult to make with a knife and I successfully reproduced it by burning with a red hot iron; a drill may have been used to make other roulettes at the same site. David and Vidal (1977) go into some detail on the manufacture and motifs of the roulettes from this region.

Unlike maize cob and most flexible roulettes, carved roulettes are best suited to producing sharply defined bands of decoration, but are sometimes used for areal texturing as among the southern Yoruba. This type of roulette is also the easiest to reconstruct since it gives clear, often geometric, impressions and the solid medium is not susceptible to much subtle variation, though overlaps and clogging of the roulette with clay may cause some difficulty in interpreting small sherds.

Patterned cylinders of clay, stone or ivory are best known, perhaps only known, in the form of cylinder seals, which are of course technically roulettes even though they were probably not used in pottery decoration. The only materials relevant here are seals and impressions from A-group sites in northern Sudan described by Björkman and Säve-Söderbergh (1972) and used for sealing storage jars. Interestingly, on the one 'ceramic seal' illustrated, the pattern is in relief, suggesting that the wet clay cylinder had been rolled over an existing incised or impressed pattern before baking. It is in one sense fortunate that the use of baked clay roulettes was not developed, since the possibilities for producing puzzling effects would be almost limitless.

*Flexible roulettes* present the greatest complexity of effect and hence should have the greatest potential for the identification of prehistoric cultural entities. The complexity has, however, apparently baffled or discouraged the few archaeologists who have dealt with such material, with the result that this potential has yet to be realised. These roulettes have tended to be

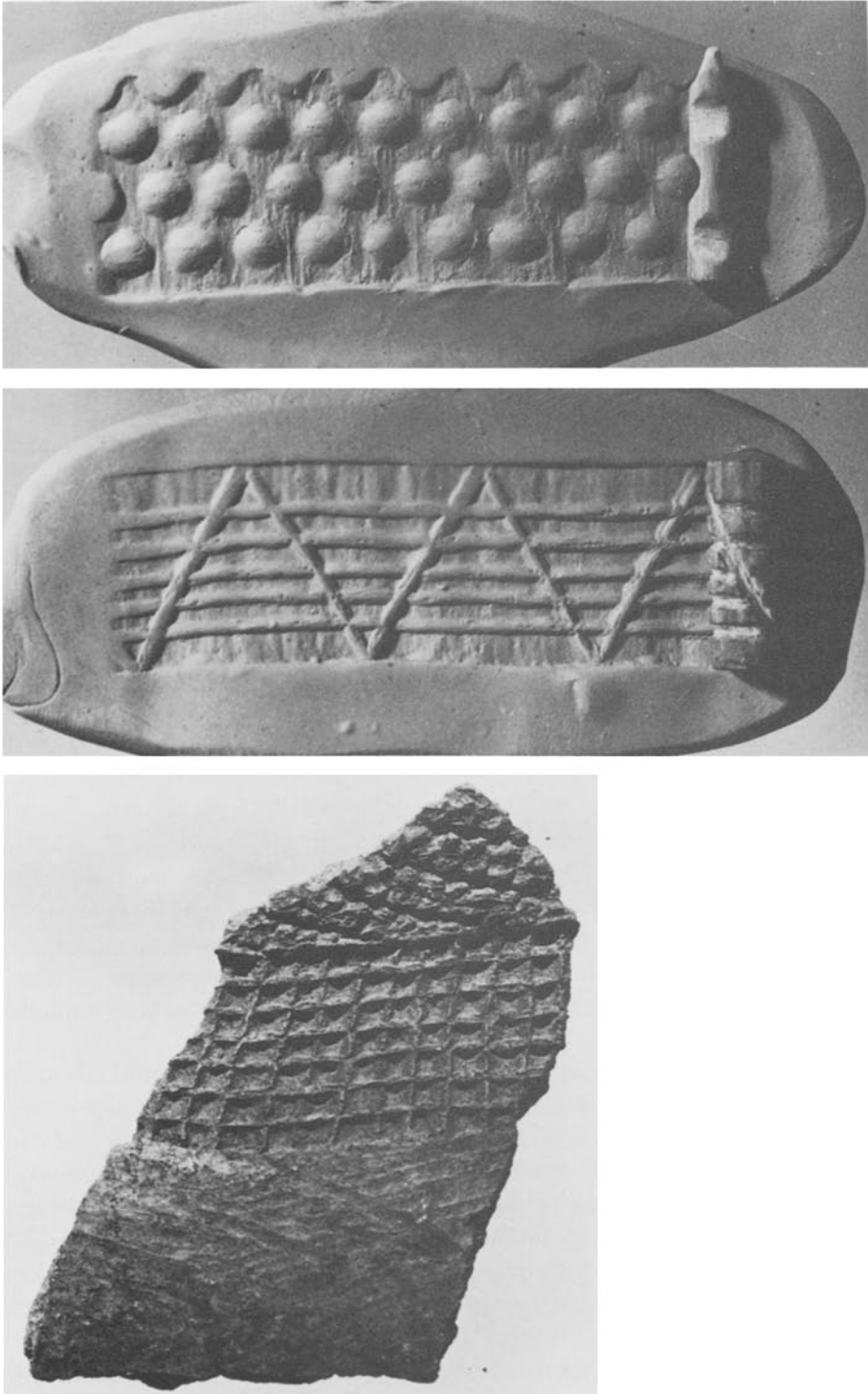


Figure 2 Carved roulettes: 1. mamillated, modern Bukusu, Kenya; 2. barred single chevron; 3. lattice or checker pattern (with knotted strip rouletting above), recent IA, Busia, Kenya.

regarded by many workers, and still are by some, as a single category, which makes it hard to study their distribution in time and space. Even where distinctions have been made, most authors, myself included, have tended to focus either on the material from which the roulette was made or, more commonly, on the manipulations used to fashion it; very rarely has the trouble been taken to identify and describe either very clearly. For useful results, it is clear that both attributes must be considered together.

A flexible roulette is made from one or more strands or elements. A basic division may be made between roulettes formed from *round*-sectioned elements for which we propose the term *string* and those made from *flat*-sectioned elements or *strips*. The effect of this distinction may be readily observed on archaeological material even when the technique of manipulation is not immediately apparent. Manipulation can be divided into two main classes, *twisting* and *knotting*, the latter term being a simplification which is taken to include plaiting and braiding.

The flexible string roulette is made from a round-sectioned strand formed of fibres of various kinds or a grass/reed stem. (The northern Yoruba sometimes use a piece of cloth which gives a similar but coarser effect.) In the most common form, the string is twisted, doubled over and retwisted, usually at least twice, to form a short cord. This can be called a *twisted string roulette* (TGR). When rolled on the wet clay the TGR leaves a series of oblique lines of rounded impressions which resemble separate impressions of a double stranded cord (Fig. 3). However, in the roulette impression, the individual rounded micro-impressions left by the component strands form a wide angle with the line of the major parallel linear elements; in a direct string impression this angle is significantly narrower, as shown in Figure 3:1. The impressions of the fibres from which the string was made are often visible in the individual micro-impressions. As with any roulette, the pattern of minor irregularities will be repeated at each revolution, though the flexible nature of the roulette may itself produce non-repetitive irregularities that would not occur in the case of a rigid roulette. Twisted roulettes and their resulting impressions vary with the nature and thickness of the string, the tightness of the twist, the number of times it is doubled and retwisted (ply) and the direction of twist (left or right, referring to the final twist direction of the roulette which will appear reversed in the impression) (Fig. 3:1-4).

*Knotted string roulettes* (KGR) (Fig. 4) are documented from West Africa, though they have not yet been studied or analysed in detail (S. McIntosh, pers. comm.). String may also be used in a composite roulette (see below).

Roulettes made of *strips* take much of their character from the stiffer, flatter medium which may be a strip of palm leaf, papyrus bark, cane, or, nowadays, plastic baling tape or even thin metal. Such strips may be knotted or plaited, plaiting (or braiding) implying the incorporation of several elements woven together, and knotting the use of one or more elements tied in a series of knots. We have included plaiting within the general category of knotting, since the number of elements may be difficult to detect from the impression and knotting appears to be more common and widespread. It is felt preferable to emphasize the contrast between twisting and other types of manipulation rather than introduce the possibility of further error and confusion by excessive sub-division; where workers are certain of their identification, suitable distinctions can be made so long as they are clearly described and illustrated.

The flat section of the strip produces a roulette with an intricate surface incorporating curved planes and sharp edges. The most common form is shown in Figure 5 and is made from a single strip looped back through itself to give a roulette with a pentagonal cross-

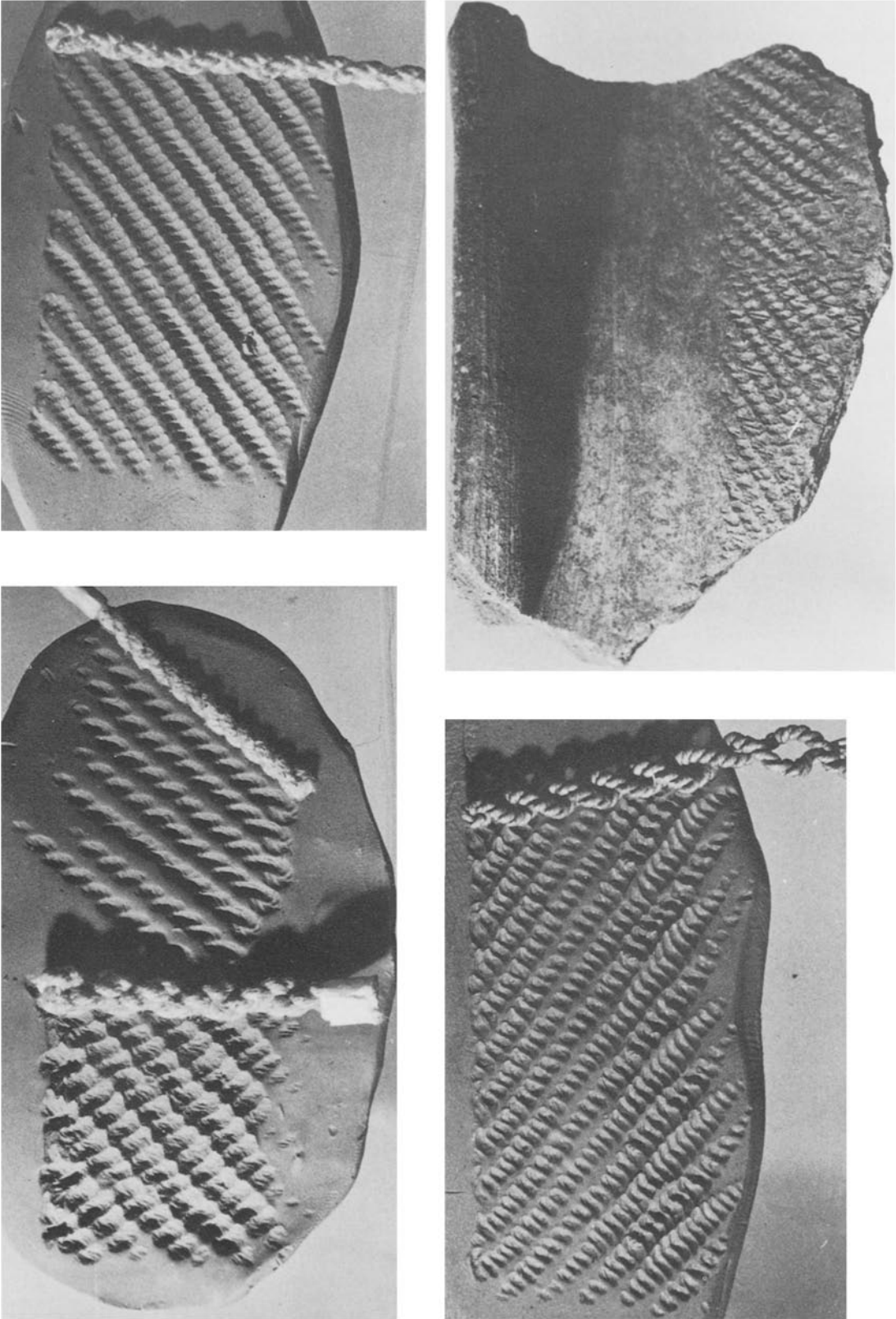


Figure 3 Twisted string roulettes: 1. simple impressions (right) and rouletted impression (left) of the same type of tool (note that the string has a left-hand twist which when doubled and retwisted gives a right-hand twist to the roulette); 2. right-hand twisted string roulette in finer string; 3. left-hand twisted string roulette of grass, modern Marakwet, Kenya; 4. right-hand twisted string roulette on recent IA sherd, Busia, Kenya.



section that can be termed a *knotted strip roulette* (KPR). The example illustrated (Fig. 5:1) produces oblique parallel lines of impressions as does the TGR but the individual micro-impressions are generally angular and quite distinct from the rounded nodes of the latter. Other types of knotted (or plaited) strip roulettes on the other hand may produce vertical or horizontal rows of impressions. The same knotting technique is shown in Figure 4:1 in string

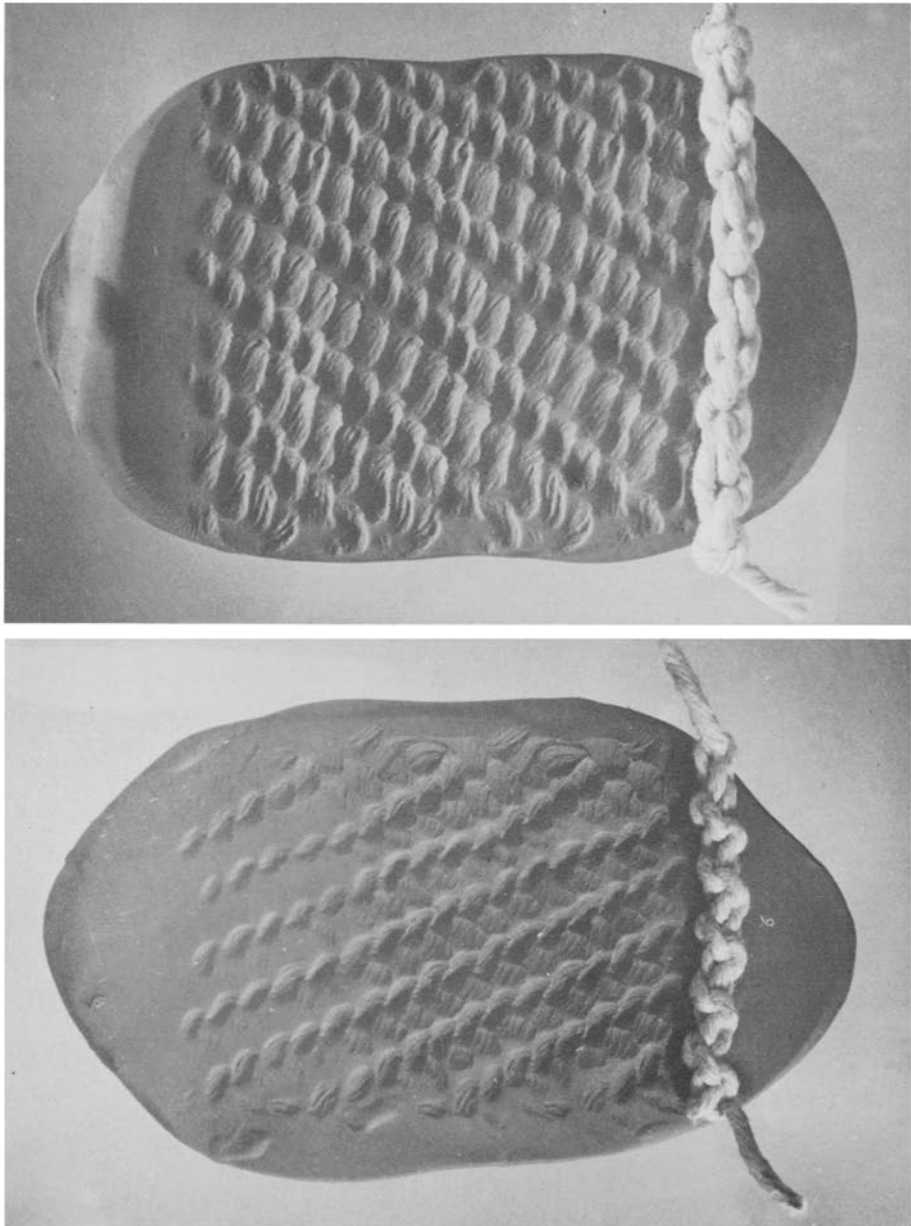


Figure 4 Knotted string roulettes. The two examples use the same string and the same knotting technique in opposite directions; the different orientation, tightness and relative depth of the micro-impressions is due to the combination of the twist direction of the string and the knotting direction; no. 1 is knotted with the twist and no. 2 against it.

and in strip in Figure 5; the impressions illustrate the contrast between the cord and strip media. With one knotting technique, variations in effect are given by the thickness and stiffness of the material used and the tightness and direction (left or right) of knotting. In Kenya the KPR appears to be almost the only strip roulette used, but I have found a single undated sherd in western Kenya which I have been able to reconstruct as what might be

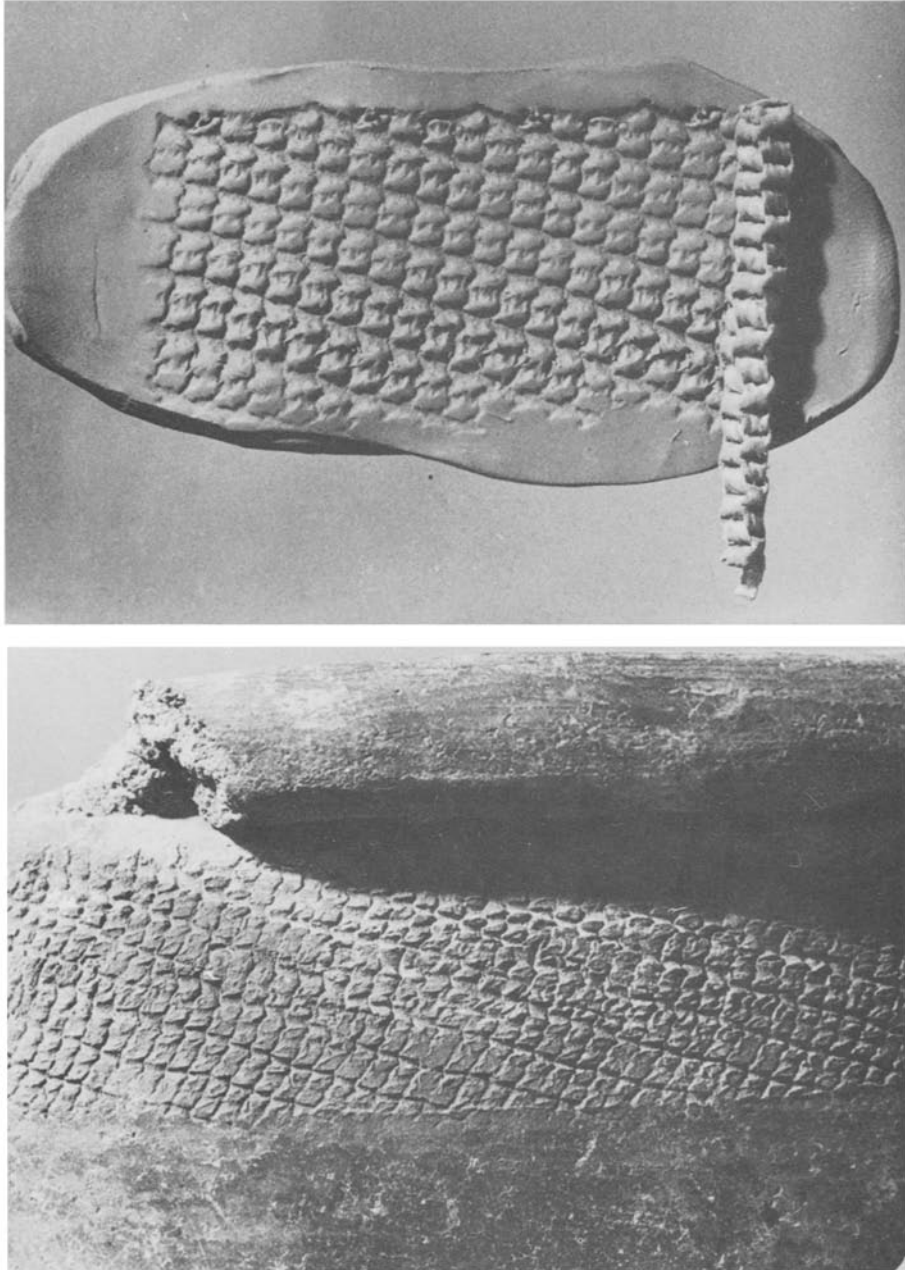


Figure 5 Knotted strip roulettes: 1. modern Bukusu in plastic baling tape; 2. recent IA sherd, Busia.

called an ‘accordion pleat’, an almost square-sectioned roulette made from four interwoven strips (Fig. 6). In West Africa there is much greater variety of strip roulettes in the archaeological material, most of which remain to be identified and analysed in detail. Some of these may be difficult to distinguish from composite roulettes. KPRs have previously been referred to as plaited cord roulettes (Soper and Golden 1969; Soper 1971), knotted cord roulettes (Soper 1979) and plaited fibre roulettes (e.g. David and Vidal 1977; David *et al.* 1981—some of the latter however appear likely to be mat-impressed, although the published photographs are indecipherable).

*Composite roulettes* comprise two or more elements: a single or multiple more or less rigid vertical component, and flexible elements (string or strip) wrapped, woven or knotted round it. Multiple vertical elements constitute ‘warps’ and allow basketry techniques such as twilling and twining to be adapted to roulette manufacture. The potential range of complicated effects is very wide and some certainly occur in Ghana at Daboya and at Jenne-jeno in Mali (Frank Kense and Susan McIntosh pers. comms), while others are described by de Meulemeester (1975). The simplest form is the cord-wrapped stick (Fig. 7) which gives almost horizontal parallel cord impressions when rolled; the *peigne fileté souple* (see below) would give the same effect if rolled rather than impressed.

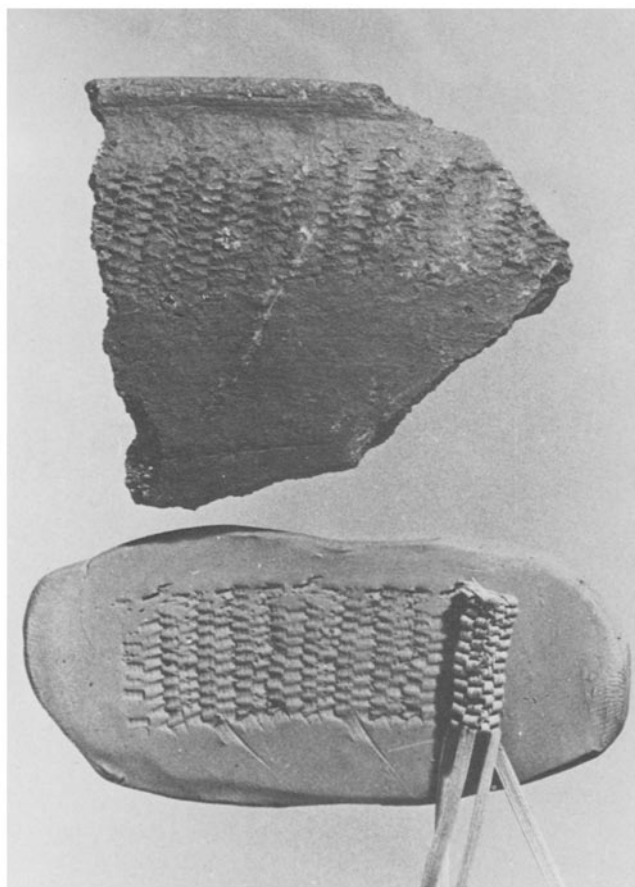


Figure 6 ‘Accordion pleat’ strip roulette (below) and IA sherd from Busia.

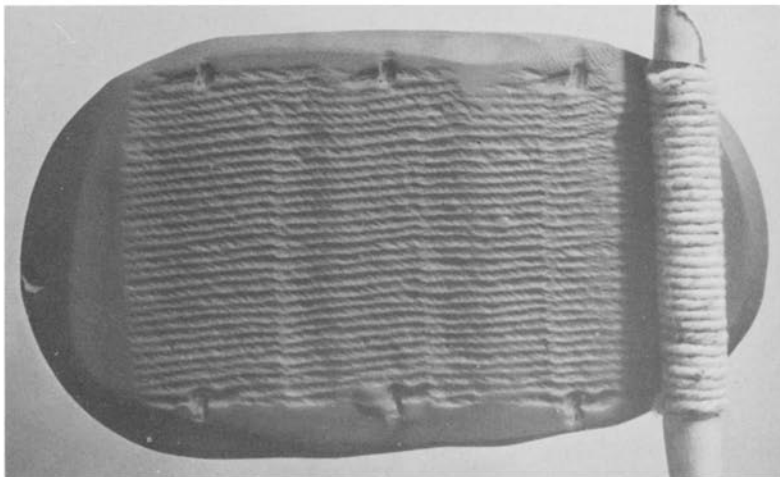
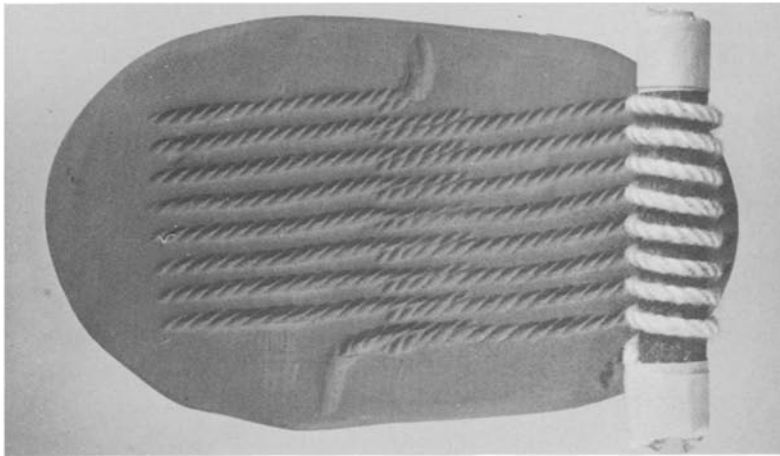
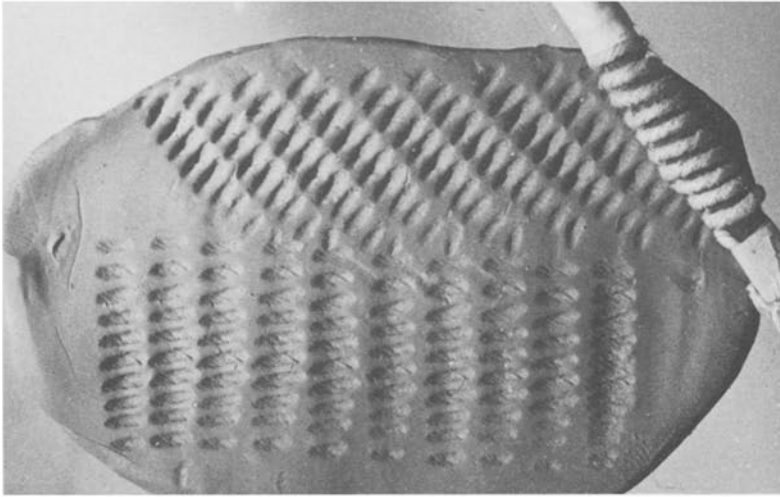


Figure 7 Cord-wrapped sticks: 1. simple impressions; 2 and 3. composite roulettes, showing different string sizes and spacing.

### **Techniques with comparable effects**

Superficially similar effects may be produced by a number of other impression techniques or implements involving similar raw materials to those used in making flexible roulettes. The most notable of these are described below.

1. Mat impression is widely used in the southern Sudan, where the pot is built on a mat of grass or string and the soft clay takes up the negative impression in a more or less deliberate and systematic way (Fig. 8:1). Mat decoration on small sherds may be difficult to distinguish from flexible rouletting unless the observer is alert to the possibility and has some knowledge of the range of weaves involved, but on larger pieces the pattern of overlaps should make the technique clear.

2. String impression refers to individually applied impressions of a string, usually twisted. In this case the spacing will be, however slightly, irregular and the orientation may be in any direction. Examples from central Tanzania are illustrated by Odner (1971:160–61, Figs 5 and 6).

3. Some forms of stab-and-drag or round-toothed ‘comb’ impressions may resemble rouletting, as for example on Nderit and Kansyore wares in East Africa. A careful study of spacing and repetition should facilitate identification, though again it may be difficult on small sherds.

4. In the Neolithic of the Sahara, decoration apparently identical to TGR has been ascribed by French archaeologists to a ‘peigne fileté souple’, conceived as a twisted string wrapped spirally around a flexible core (Fig. 9) and used to make parallel or rocked impressions (Camps-Fabrer 1966). As with string impression, the spacing and orientation would rely on the eye and hand of the potter without the stereotyped repetition of a roulette. While some Saharan pottery may be decorated with such an implement, the sherds illustrated by Camps-Fabrer show great regularity and a consistently oblique orientation more characteristic of the use of a TGR as described above. The vessel illustrated as Plate LI:4 of the above reference shows horizontal bands of oblique ‘cord impressions’ in alternating directions, the top left/bottom right band having a Z-twist and the top right/bottom left band an S-twist. Two different instruments must thus have been used, which would hardly be necessary if the impressions were made individually; on the other hand, exactly this effect would be achieved by the use of two TGRs with right and left hand twists. It is of incidental interest that I have been able to reconstruct the decoration on a number of early Neolithic sherds from East Africa as having been made with just such an instrument as the ‘peigne fileté souple’ described by Camps-Fabrer, though the effect does not in fact resemble TGR (Fig. 9:2). Other examples will be cited in the discussion of dating below.

As with mat impression, it is possible, even likely, that the implements used in the other techniques described above were not necessarily made specifically for the task of pottery decoration but may have had some other primary function. Experiment or ethnographic analogy might therefore lead to the reconstruction of artefacts not otherwise preserved in the archaeological record.

### **Ethnographic distribution of roulettes**

Drost (1967:167) gives the ethnographic distribution of corn cob, wooden and flexible roulettes in Africa. His map shows two main areas of roulette distribution in general, in the

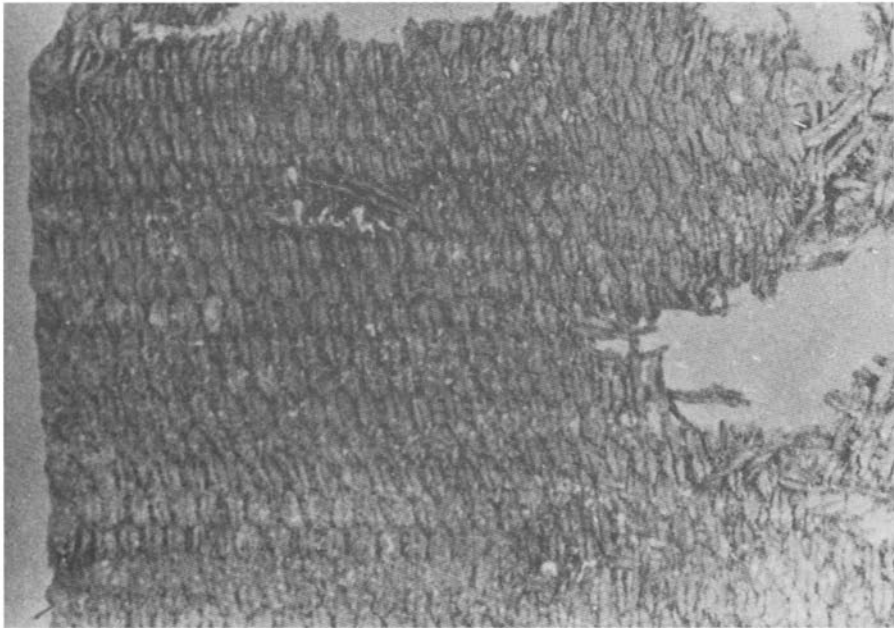
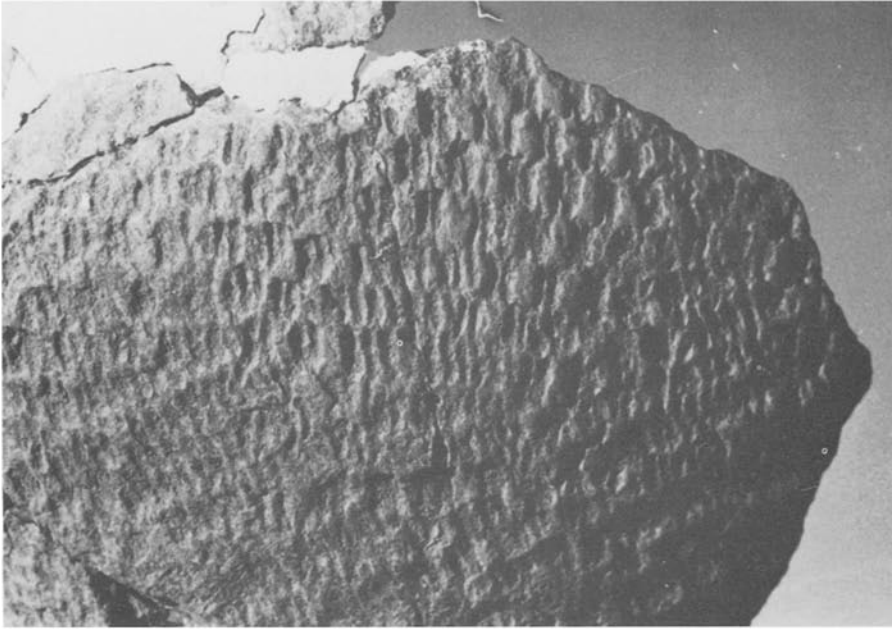


Figure 8 1. mat-impressed sherd, Jokpel, Southern Sudan; 2. sack fabric from Ma'den Ijafen (after Monod 1969).

southern part of West Africa and the interlacustrine region. A glance through his other distribution maps, however, shows that he has hardly any data for the Sahara and north Africa, very little for the Nile Valley and again very little for the area between the Nile Valley and Cameroon. One can therefore not be sure whether the discontinuity between the two suggested concentrations is genuine, or whether the distribution is in fact continuous. He

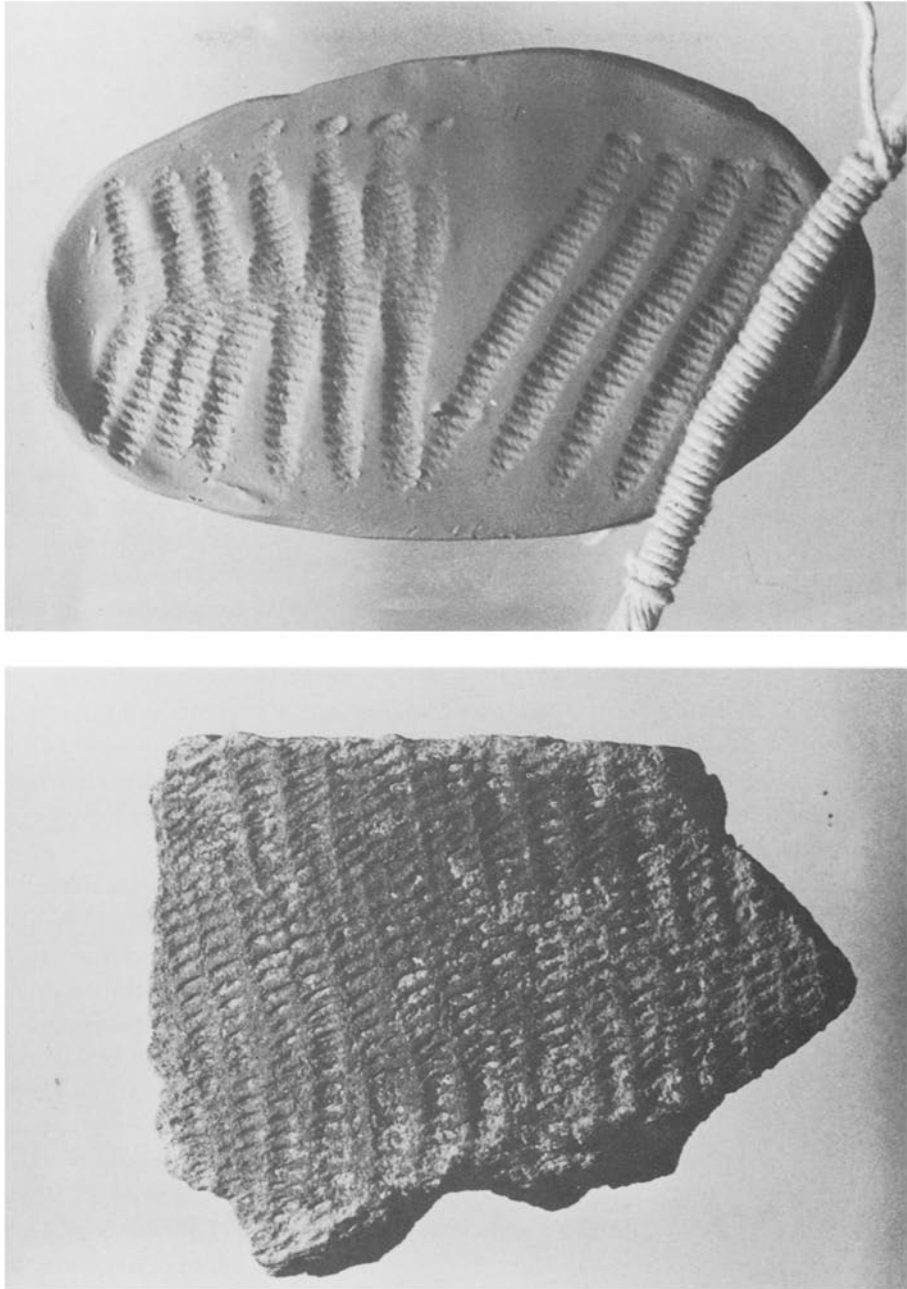


Figure 9 *Peigne fileté souple*: 1. reconstruction in string and impressions; 2. neolithic sherd from Salasun, Kenya.

does however have data for the areas to the south, and it is clear that rouletting is not in use in the southern part of the continent. The southernmost occurrence seems to be among the Hehe of south central Tanzania; to the west it is very rare south of northern Zaïre, there being none for example in the Congo pottery published by the Musée du Congo (1907).

Drost treats flexible roulettes as a single entity; indeed the published sources would not

have allowed him to distinguish consistently among them. A prime example of such confused observation is Blackburn's account of Okiek pottery (1973:Plate XII) which illustrates a roulette in use with a photograph of a KPR being rolled on the surface of a pot clearly decorated with a TGR!

### **Roulettes and archaeology**

Pottery is one of the most sensitive indicators of cultural differences in later periods of prehistory. Within the overall typological classification of African pottery, the various forms of roulette decoration offer criteria for subdivision of series that must have significant implications for the identification of past cultural groupings.

As an example of the potential use of roulettes at even a crude level of classification, the case of Old Oyo (Oyo Ilẹ) in western Nigeria may be cited. This site, the capital of the historic Oyo empire of the northern Yoruba, was occupied from ad 1000 or earlier up to 1836, and shows two main phases of occupation which may or may not have been separated by a period of abandonment. Here TGR occurs throughout both phases; strip roulettes are restricted to the first phase and maize cob roulettes, as might be expected, to the later one. Out of tens of thousands of sherds recovered from the site for both phases, less than 20 are decorated with carved wooden roulettes, which would suggest they are imports. This situation may be contrasted with Ife, the 'holy city' of the Yoruba some 160 km to the south, where carved rouletting formed the most common type of decoration during the 'classical' period of Ife art and culture dated around the 12th to 14th centuries ad. While the significance of these differences is not clear owing to inadequate information from intervening and surrounding areas, the differences themselves are clearly defined even at this broad level of classification.

The use of maize cob rouletting as a chronological marker has been mentioned above. Stanton and Willett (1963) studied roulette impressions on potsherds from Old Oyo and Ife, claiming that impressions both of maize cobs (without the grains) and of ears (with the grains) were present. They admit that the use of the whole ear is much less common and that 'in some cases it is difficult to be sure whether a maize ear or a plait of string or grass has been used', but seem confident about their identification. I have not studied any Ife pottery, but among the very numerous sherds from Old Oyo I have not seen any which I would regard as maize ear rather than a broad TGR, perhaps made of cloth rather than string. Where discernible, the consistently oblique orientation of the rows of impressions reinforces this view and is indeed displayed in their Figure 2. This is characteristic of TGR when rolled horizontally, but would imply *oblique* rolling of a maize ear which could not give a horizontal border unless subsequently smoothed over. A study of the overlaps of the runs of rouletting, whether horizontal or oblique, would settle this point conclusively.

It has already been noted that the use of natural objects as roulettes does not seem to occur in Kenya with the exception of Bukusu. It is very rare in East Africa as a whole, though Drost mentions a couple of cases of the use of sections of corn *stalk* in Rwanda and the Ituri forest of Zaïre. Similarly no archaeological occurrences have been noted in East Africa.



*Origins and possible diffusion of roulettes*

As long ago as 1934, Braunholtz noted the ethnographic distribution of rouletting (undifferentiated) on the upper Nile and in East and West Africa. He speculated on a common source on the upper Nile, perhaps in imitation of mat-impressed pottery, whence there could have been diffusion south up the Nile and around Lake Victoria and westwards along the caravan route to Lake Chad. Recent work by David *et al.* (1981) and Robertshaw and Mawson (1981) in the southern Sudan has failed to show any use of rouletting before the Iron Age, which on the few currently available dates could start as late as the mid-first millennium ad. On present evidence it looks as if mat-impression and twisted string rouletting started at about the same time and may have been associated (P. Robertshaw pers. comm.). Taken with the data from the Nubian area cited below, it seems likely that any diffusion would have been from the west to the Nile.

An interesting snippet of information has emerged from the present study which could lend tentative support to Braunholtz's (1934) speculation of caravan connections in whichever direction, though the evidence involves mat impressions rather than roulettes. One reconstructable pot from the site of Jokpel in the southeastern Bahr el Ghazal area of the Southern Sudan bears the impression of a mat with a distinctive double stranded weave (Fig. 8:1) identical to a piece of sack (Fig. 8:2) preserved with the abandoned cache of brass rods and cowrie shells at Ma'den Ijafen in the western Sahara dated to the twelfth century ad (Monod 1969). A distance of some 4000 km separates the two sites. The Jokpel site is undated but has a similar sequence to that of Bekjiu where mat-impressed pottery is present between about the seventh and twelfth centuries ad (I am grateful to Peter Robertshaw for the information on Jokpel and Bekjiu). Possibly, however, this may turn out to be a common and widespread type of coarse textile weave.

The distribution of carved roulettes in Africa has been studied by David and Vidal (1977) from both the archaeological and ethnographic perspective. It extends from Ghana and Nigeria in West Africa in a continuous band across the centre of the continent to Uganda and just into western Kenya. Carved wooden roulettes are also found in parts of the southeastern Sudan, where they are likely to have been recently introduced (N. David pers. comm.). Certain motifs are found over the whole of this area so that patterns used for instance in Bungoma in western Kenya can be matched in Uganda and right across to Nigeria, where at least one of them (Fig. 2a) occurs in the Nok culture in the first millennium bc (Fagg 1972). On the basis of present distribution and the very scanty archaeological evidence and dating, David has linked the spread of carved rouletting to the eastward spread of speakers of Adamawa-Ubangian languages from the Central Nigeria/Cameroon area, postulating that in recent centuries it diffused, initially from Ubangian speakers, to neighbouring peoples. Thus in Uganda it has been borrowed for example by Nilotic Lango and Acholi and in Kenya by the Bantu Bukusu. In the past it was more widely spread around Lake Victoria, since sherds showing this technique are found near the shores of the lake in the Busia district of Kenya, the Mwanza area of Tanzania and around Entebbe. The earliest known occurrence of this type is, as mentioned above, in the Nok culture of Nigeria, while it is dated to the seventh/eighth century ad at Nana-Modé in the C.A.R. It has not yet been adequately dated from archaeological sites in East Africa but has not been found in early contexts and seems unlikely to have been used there before about the fourteenth century. The wide and

continuous distribution of individual motifs supports the idea of a concerted spread, though it may be noted that the range of patterns that can be carved on a small cylinder is somewhat limited so that some chance convergence is not inconceivable.

A consideration of the archaeological distribution of flexible roulettes is bedevilled by the failure of most workers until recently to distinguish between the different types even at an elementary level. Most of the earlier reports of Iron Age sites and pottery in East Africa suffer from this failure (e.g. Posnansky 1961, 1967, 1968, 1969; Sutton 1966; Sutton and Roberts 1968; Chapman 1966), and most refer to a roulette of 'knotted grass' to describe both TGR and KPR. Illustrations in the reports give some idea of the nature of the roulettes used, but since not all sherds are drawn one cannot be confident of the absence of unillustrated types. The first clear distinction between the classes was made by Soper and Golden (1969:42), though Sutton and Roberts (1968) had noted a difference in the 'intensiveness' of the rouletting between two stratigraphic horizons at Uvinza without attributing it to a technical distinction in the roulettes themselves.

It is not appropriate here to give a site by site analysis of the presence or absence of various types of flexible roulette, but is worth examining some of the earliest claimed occurrences in various areas, even though we find the evidence and identification unsatisfactory in many cases. For a starting point, one may turn to David and Vidal (1977:44) who consider the earliest occurrence of rouletting and list 'fibre rouletting' at the following sites: in the Khartoum Neolithic at Shaheinab (quoting Arkell 1953); at Guli, 225 km south of Khartoum, in the fourth millennium bc (quoting Adamson, Clark and Williams 1974); in the Tenelean Neolithic at Adrar Bous in the fourth millennium bc (quoting Clark, Williams and Smith 1973); and at Karkarichinkat in the second millennium bc (Smith 1974).

If the Nile Valley references are considered first, it may be noted that in fact none of the sherds so lavishly illustrated in the Shaheinab report looks convincingly rouletted, while Arkell (who shows evidence of careful consideration of decorative techniques) nowhere mentions rouletting in the text. Arkell (1949) does however report sherds decorated with twine wound round a stick and applied so as to imitate basketry at Early Khartoum; this would appear to be directly comparable to the *peigne fileté souple* described above. The Guli pottery is not illustrated but the decoration is described as horizontal rows of impressed dots, some executed with a comb (catfish spine or stamp) and others again with a rolled cord or grass roulette '(compare ref. 2, plate 29:2)'. Reference 2 alludes to Arkell's (1953) Shaheinab report where Plate 29:2 illustrates sherds decorated with various rocker stamp motifs but no rouletting. Since a flexible roulette would be unlikely to produce horizontal rows of impressions, I take leave to doubt the presence of rouletting here on the evidence presented.

Hays (1971) also deals with the Neolithic of the northern Sudan without making mention of rouletting. He does however claim that in about half of the cases the dotted wavy line motif was obtained by cord impression though without explaining how this could be used to produce a series of sinuous parallel lines. Two of his categories are labelled woven mat and linear mat, again without explanation. For the same general area, the report on the site of Jebel Moya (Addison 1949), regarded as mainly Meroitic in date, again illustrates no convincing examples of flexible rouletting. Addison does ascribe some decoration to carved roulettes but, of the examples illustrated, some would certainly seem to be fine and regular dentate rocker stamping. Others have some resemblance to rather fine and intricate carved roulette motifs but, so far as it is possible to judge from the photographs, the repetition is not

sufficiently exact to confirm this. The presence of carved rouletting at Meroë itself is reported by Addison and also by Crowfoot (1926a and b), but it is not mentioned by Adams (1964) in his classification of Meroitic pottery. Roulette decoration is also absent from the Meroitic and A-group pottery published by Nordström (1972), apart from the occurrence of cylinder seals noted above.

If these examples can be considered representative of Neolithic to Meroitic pottery in the middle Nile region, the presence of rouletting of any sort down to at least the end of Meroitic times must be considered unproven.

Turning to the Saharan region, we find that Clark *et al.* (1973) again do not illustrate the Tenelean pottery from Adrar Bous and say simply that decoration is 'mostly impressed before firing with triangular stylus, bird bone, reed, finger nail, comb-stamp or stylus, cord or roulette'. Smith's report on Karkarichinkat (1974) also goes into little explanation of the decorative techniques. 'Rouletting' occurs in 18 out of 37 motifs listed in his Table III, but the types of roulette are not specified apart from their direction or orientation: 'roulette at right angles to rim', 'straight roulette', 'oblique roulette'. From the illustrations it would certainly seem that TGR is present (presumably as 'oblique roulette', though some of this seems likely to be comb-stamping), but without fuller explanation I am doubtful if some of the other motifs described as rouletting are in fact so. Smith also describes a 'knotted' roulette in a sense different from that used here; this motif is a deeply impressed band of interlocking S-shaped string impressions superimposed on shallow TGR, and is produced by knotting one strand of the roulette over the other, one or more times in the length of the roulette. Five radiocarbon dates for Karkarichinkat range from  $1670 \pm 80$  bc to  $2010 \pm 160$  bc.

Petit-Maire *et al.* (1983:108) in describing pottery from Neolithic sites in the northeastern area of northern Mali say: 'Decorations related to the wavy-line and dotted wavy-line types are also found; they were probably made by rouletting.' Dates range from the mid-seventh millennium to the early fourth millennium bp, but the material is not illustrated. Wavy-line motifs elsewhere were not, so far as we know, produced by rouletting techniques.

Flexible rouletting is also probably present in the Tichitt Neolithic sequence (Munson 1968), where 'fabric or basket markings' are characteristic of the second, Khimiyu, phase. 'Cord or fabric marked surfaces and a band of neat diagonal cord impressions below the lip' appear in Goungou phase 3 and continue to phase 6. 'Cord-wrapped stick stamped patterns' occur in Arriane phase 7; and 'a small cord marked bowl' in Akjinjeir phase 8. The Khimiyu phase is dated to around the fifteenth century bc and Akjinjeir has two dates bracketing the mid-first millennium bc. I have not seen illustrations of this material but it sounds as if a variety of roulettes could be represented. 'Neat diagonal cord impressions' are likely to be TGR, but one cannot hazard a guess at the others.

Most of the other references to the Saharan Neolithic available to me, e.g. Camps (1982), do not refer to any rouletted decoration, except for Mauny (1972) and that only for Western Sahara. Nor do these references mention the *peigne fileté souple*.

At the site of Daima in northeastern Nigeria (Connah 1981), the long sequence is divided into three broad periods: Daima I starting around 500 bc, Daima II from *ca* ad 50 (? first use of iron), and Daima III from *ca* ad 700. 'Plaited cord rouletting' and 'miscellaneous roulettes' are present from the beginning, twisted cord rouletting coming in only in Daima II and carved and 'nodular' rouletting in Daima III. The nature of the plaited cord and miscellaneous roulettes is not described in the text and cannot be identified from the illustrations so

we are little the wiser as to what types occur in the Neolithic phase. From Connah's Figure 4.9, nos 15 and 16, it would appear that 'nodular' applies to the impression rather than the roulette itself. Both types are also known from North Cameroon and have been identified by N. David (pers. comm.) as varieties of KPR.

In Chad, Bailloud (1969) has proposed a sequence of pottery styles for Ennedi in which the first two stages, Ouagif and Telimorou, are said to belong to the final Bovidian Neolithic of the first millennium bc. Ouagif materials are characterized by bands or triangles filled with very fine dotted decoration 'sans doute obtenu à l'aide d'une roulette dentée'. This is not illustrated, but it is said to have striking parallels with C-Group pottery that is not known to be rouletted, so most likely some kind of comb-stamping is involved. The Telimorou style is decorated on the body with oblique comb-stamping or often with the *peigne fileté souple*, and only one body sherd among those illustrated resembles TGR. In the Chigéou, early Cameline, phase of the early Iron Age, *peigne fileté souple* is said to become more important but again only one sherd resembles TGR. By the late Cameline (recent Iron Age) Gwele phase, all the sherds would appear to show TGR though still described as *peigne fileté souple*.

In the Djourab, Coppens (1969) reports two phases of 'céramique cannelée', in the first of which the 'channels' are 'faite à la cordelette'—presumably meaning string-impressed. The succeeding Haddadian phase belongs to the full Iron Age and the larger pots appear to be decorated with TGR. The Neolithic pottery of Borkou (Courtin 1969) appears to be similar to that of the Djourab but the 'cannelures' are said to be made with a *peigne fileté souple*.

From these accounts one is left in some doubt as to whether rouletting really occurs in the Neolithic in the area north of Lake Chad.

In eastern Africa, the earliest <sup>14</sup>C dates for flexible rouletting (apparently TGR) come from Rwanda around the eighth and ninth centuries AD (Van Grunderbeek *et al.* 1983; van Noten 1982:73) and for Kenya/Tanzania probably in the early second millennium ad; one or two possible earlier occurrences of TGR in Kenya remain to be confirmed and elaborated, such as isolated sherds at Salasun, rare occurrences on 'Kisii Soft Ware' (Bower 1973) and a couple of sherds at Gatung'ang'a (Siiriäinen 1971). Still to be dated is a possible early ware in Busia and Bungoma in western Kenya that is characterised by necked pots with TGR on thickened rims and multi-directional parallel grooving on the body. No rouletting has been identified in the East African Neolithic or Early Iron Age.

In Kenya, TGR is typically used by the Kalenjin peoples of the highlands west of the Rift Valley and is generally applied in single bands around the rim/neck or in vertical stripes on the neck/shoulder and on vertical loop handles; it may also be applied to the top of a squared lip. These characteristics were previously more widespread in Kenya and may be found on archaeological material throughout the Rift Valley and east of it in the Nairobi area, much of the material being ascribed to Lanet ware.

KPR is, or was until recently, more restricted to western Kenya where it is used by the Luo and also the Luyia (both of whom also use TGR on some vessel types such as small food bowls). It is typically applied all over the body of the vessel, usually excluding the rim/neck, though in the case of the Luyia Bukusu and the Teso the body is left plain and the rim/neck decorated with KPR and carved wooden roulette. Luo and Luyia pottery, almost indistinguishable to the lay eye, is now being traded throughout most of Kenya.

The present distribution of flexible rouletting in East Africa thus suggests a fairly close correlation with Nilotic speakers, Western Nilotes with KPR and Southern Nilotes with

TGR, while comparison of dating and distribution with linguistic reconstructions would suggest that this correlation may also hold good in the past. (I would not agree with the suggestion by Ambrose (1982) that Lanet ware is to be ascribed to Eastern Nilotes.) Against this I am informed by Nicholas David that at the present time the Western Nilotic Dinka Tuich around Wun Rok in the Southern Sudan use only TGR, while the Central Sudanic-speaking Moru use only KPR. Bantu speakers who use rouletting are almost all restricted to the interlacustrine area with the exception of the Hehe of central Tanzania, so the technique is unlikely ever to have been practised by any common ancestral Bantu group.

Whether the correlation with Nilotic speakers can be extrapolated backwards in time and beyond the East African area to a broader Nilo-Saharan context is a question that needs to be pursued further. For the time being, one may point tentatively to the possibility of Nilo-Saharan linguistic affiliations for some of the later Neolithic peoples of the southern Saharan region where techniques of flexible rouletting seem likely to have originated.

I end with a plea for more careful identification, description and illustration of all forms of impressed decoration but especially of rouletting. For illustration, clear and well-reproduced photographs provide the best method. Accurate drawings can provide sufficient basis for identification but require very high quality, specialised draughtsmanship which is hard to come by and usually expensive. Prime examples of excellent draughtsmanship are the work of Mmes Berger and Bale of the Tervuren Museum (e.g. van Noten 1982; Fig. 37). Simpler conventional representation can show only the layout and the pattern of major elements in a motif; for flexible and unmodified roulettes it is inadequate by itself but can be combined with photographs or detail drawings showing the range of motifs and variation, given certain identification and precise description. Convention may be more usefully employed for carved wooden rouletting where the pattern is usually clear-cut; this was attempted by David and Vidal (1977) but was largely frustrated by very poor reproduction.

Given reliable identification and analysis, we shall be in a better position to plot distributions and associations in time and space and to use decoration as a more precise means of tracing cultural connections.

### ***Acknowledgements***

I am grateful to a number of friends and colleagues who have either shared the fascination of playing with little bits of wood and string or have been motivated by the sterner necessity of making sense of their ceramic assemblages; among them are Nic David, Susan Keech McIntosh, Frank Kense, Simiyu Wandibba, Justina Azere and Elsbeth Court. I should also like to thank Nic David, Harry Merrick, Simiyu Wandibba, John Sutton and Peter Robertshaw who kindly read a draft of this paper and made many helpful suggestions, some of which are incorporated and others of which will require a series of further papers to follow up.

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