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1. Introduction

Archaeologists who apply themselves to the task of interpreting ancient African remains always run into the same fundamental problem: that of the sources. Indeed, African history written by Africans themselves is post-colonial, whereas history preceding this period, written by "foreign" Arab or Western observers, is more often than not scanty and too frequently partial. As for oral traditions, they rarely instruct us on the direct understanding of archaeological remains and what's more generally deal with relatively recent archaeological periods. On the other hand, linguistics and particularly population genetics are helping to shed light on the understanding of African past, especially where population movements are concerned.

This lack of a "domain of reference" (such as historical sources, for instance) prompts the archaeologist to confront the past with the present, be it conscious or not. Resorting to ethnoarchaeology, archaeologists can take the liberty of projecting observations made on present-day populations with ancestral traditions into interpretations of ancient remains, especially on a continent of long-lasting traditions. Such a procedure is possible thanks to "regularities" expressed as general rules which depend on environmental or behavioural constraints that one can find between two groups of individuals - such as between two villages or two populations or even between a contemporary human group and a past one. Nevertheless, it is necessary to distinguish "general" regularities from "restricted" regularities. "General" regularities allow, for instance, identification of the technique used to assemble pottery by examining traces left by tools - whatever the culture or region. "Restricted" regularities can only be applied within a precise geographical or social context, such as the identification of an ethnic group from a particular type of pottery (Huysecom 1992).

We have been studying pottery manufactured by women potters in the Inland Niger Delta since 1989, within the "Mission ethnoarchéologique suisse en
Africque de l'Ouest (MESAO), carried out by the University of Geneva with the "Human Sciences Institute" and the "National Museum" in Bamako (Gallay & Huysecom 1989; 1991; Gallay et al. forthcoming). Such a study demonstrates that their ware presents certain "regularities" which can be explained thanks to examination of the mechanisms by which they are generated.

In this paper, our wish is to illustrate the possibilities of ethno-archaeology offers in the clarification of an archaeological problem, taking as an example clay pestles. A first attempt at such an approach was carried out in 1992 (Huysecom 1991-1992). Since then, field-work has been done on another two occasions in Burkina Faso and Mali, thus bringing in additional information and allowing us to complete our study.

2. "Archaeological" tools

2.1. Description

Terracotta instruments of a general truncated cone shape or even cylindrical have been found on a number of occasions on excavations or surveys. To make understanding easier, these instruments will be termed "terracotta pestles" of which there seem to exist two types.

Type I

Type I has the shape of a truncated cone. The small extremity, for prehension, is either cylindrical (Fig. 1: 5), shaped as a "cabochon" (Fig. 1: 1, 2) or as a truncated cone (Fig. 1: 6, 11). The top of this extremity is rounded (Fig. 1: 1, 6) or flattened (Fig. 1: 11, 13). All these tools have convex bases. A very particular discovery was a pestle found in Koibe Bouna, which has been incised and impressed with intertwining grooves (Fig. 1: 12). According to Fr. Treinen-Claustre, the bases can also be decorated with "small cavities, subcircular alveoles or irregular ovals arranged hazardously or in parallel rows" (Treinen-Claustre 1982: 123). These features are of great interest; they have left their blueprint on the inside of a certain number of vases found in association (see 2.3).

The thirteen published specimens have a mean height of 80 mm (ranging from 42 to 164 mm), have a maximum diameter at the base of 80 mm (ranging from 48 to 112 mm) and a maximum diameter at the top of 40 mm (ranging from 18 to 72 mm). Hence, their dimensions vary, the biggest being 164 mm in height. We also calculated two indexes: A, which is the diameter of the top divided by that of the base, multiplied by 100 and B, the diameter of the base divided by the height, multiplied by 100. The mean indexes A and B for type I is 49 (ranging from 29 to 64) and 108 (ranging from 68 to 155) respectively. This implies that the top is generally twice as narrow as the base; the diameter of the base is about the same size as the height.

Type II

Type II is cylindrical and rather thick-set. Its edge can be straight (Fig. 2: 1), slightly concave (Fig. 2: 8) or convex (Fig. 2: 10). Certain shapes are almost
like truncated cones (Fig. 2: 11) though without the "prehension" characteristic of type I. Edges are sometimes impressed with alternatively left and right plaited fibre rosettes (Fig. 2: 3) or mats (Fig. 2: 2, 7); herring-bone patterns impressed with "estique" (Fig. 2: 1) and digital impressions (Fig. 2: 7) are also often found on these edges. Some of the specimens are painted in red (Fig. 2: 4).

The few samples we discovered in Kafu Ouro and Kafu Ouro Koro are well-baked and contain quite a fine temper (of less than 2 mm in diameter) made of chamotte and hematite. The 11 instruments we measured have a mean height of 67 mm (ranging from 40 to 88 mm) and a mean maximum diameter of 50 mm (ranging from 64 to 126 mm). Dimensions are therefore quite constant. Index A fluctuates around 100 whereas B has a mean value of 146 (ranging from 110 to 210), revealing specimens whose heights are equal to 2/3 of the maximum diameter.

2. Geographical, cultural and chronological context

All these tools come from what is the present Sahelian area or its northern semi-desert boundaries (Fig. 3). So far, we know of five countries in which such tools are to be found: Niger, Nigeria, Tchad, Mali and Burkina Faso.

Niger and Nigeria

In Niger and Nigeria, pestles have been found on local Early Iron Age sites (Huysecom 1987: 181-182). In Niger, one of them (Fig. 1: 7) was found at Tegel N'Agar site. It is 100 m in diameter, where it was associated with iron dress, possible tent location remains and midden pits. The object was in fact found in one of the pits (Grebebart 1985: 263-267). Cast iron was customary amongst Early Iron Age (or "Fer I") populations who lived within unfortified villages, in circular houses made of clay or branches (sometimes reeds) covered in clay. Their economy is not well known (Grebebart 1988: 160ff.). We also have the oldest radiocarbon date taken from coal associated with a terracotta pestle on the Tegel N'Agar site: 110 B.C. (2000 ± 90 B.P., Gif-14/72; "Radiocarbon calibration program" 1986, Quaternary isotope lab, University of Washington).

The two Nigerian instruments (Fig. 1: 8, 9) were discovered in the Dajama mound (ca. 4 ha or 25 a) where G. Connah unearthed bases of circular habitants with banco walls, potsherd pavements, graves and store-pits (Connah 1981: 146-163). Breeding (bovidae, ovisdae and capridae), hunting, fishing and iron metallurgy were the habitants' main activities. Relatively speaking, clay metalurgy were found between the Neolithic economy level I (hunter-fishers who also breed) and level III in which appear copper and copper alloy metallurgy (Connah 1981: 99-196). Datings from level II are nevertheless more recent than those from Tegel N'Agar, spanning the middle of the VIIIth century to the end of the VIIth century A.D. (1500 ± 670 B.P., F-2371, to 1520 ± 190 B.P., F-2943).

Tchad

Pestles seem to be absent from Early Iron Age sites in Tchad but are plen-

tiful in mid-Iron Age sites. The blooming of "Haddadian culture" is a characteristic of the "classical" phase of this period (Coppen 1969: 1420-1423); today, local inhabitants believe these old populations to be the ancestors of the present-day Haddads while Y. Coppen describes them as "oriental invaders with a bent for blacksmithing" (quoted by Trinien-Claustre 1982: 170). Indeed, most of the metallurgy is intensively. This craft could have been brought from Méroc, the town from which they may come from, although Shinnie asserted that no clay pestles have been found there (in litt. 9.10.1992 -). Besides this activity, these people devoted themselves mainly to cattle breeding, hunting, fishing, mollusc gathering and perhaps agriculture as indicated by the numerous silos, milling stones and handstones. The habitat lay-out is not well known. Burial places are grouped into necropoli outside the villages.

Contemporary Tchadian sites in which pestles were found are very diverse. Two categories can be distinguished depending on whether slag is present or not.

Presence of slag

- in mound sites ("site 49": Trinien-Claustre 1982: 27) in which children's jarcollins were found amongst the bases of furnaces and tuyères (Toingour, Fig. 1: 1; Haard et al. 1963: 435-442; Trinien-Claustre 1982: 23);
- in flat sites ("sites 12 and 60": Trinien-Claustre 1982: 19, 29-30), furnished with slags, the remnants of hearths and, interesting fact, surfaces altered by fire and said to be pottery combustion areas (Kebir Bosa, fig. 1: 2, 12: TrinienClaustre 1982: 24, 120-124);
- in blacksmiths' settlements isolated on mounds (site 13 and Bahlub IV: TrinienClaustre 1982: 19 and 32);

Absence of slag

- in mounds (sites 55 and 107: Am Kozari, Trinien-Claustre 1982: 26, 28 and 38);

Pestles were still being used in the final phase of the mid-Iron Age. The most interesting site is undoubtedly Maleldings's where a necropolis, situated on a slight mound, held about twenty tombs. Out of eight tombs excavated, seven enclosed pestles; three of them (Fig. 1: 4, 5, 6) were found in one exceptional grave (t. 2, fig. 4) accompanied by a skeleton in a lateral extended position, arms folded on its chest and knees bent as well as particularly remarkable perforated terracotta cylinders. These tombs were thought to be male, due to the lack of stone necklaces. On the other hand, it is of interest to note that the only tomb in which such a necklace was found (t. 1) is also the only one which didn't yield any instruments (Haard 1969: 192; Haard & Bascuat 1963: 442-451; Trinien-Claustre 1982: 110-114, 123). Assigning a sex to these tombs seems unreliable and,
though the carving of stone necklaces is related to the absence of pestles, one could also conceive that men of the Tchadian Iron Age wore such ornaments in the other world, whereas women potters were buried with their instruments. Clay associated with pestles from three sites of the Tchadian mid-Iron Age, Bahali IV, Kebir Bosa and site 4, revealed six datings. They span the middle of the 11th and the end of the 11th centuries A.D. (from 1350 ± 100 B.P., Gif-4194, to 1170 ± 90 B.P., Gif-4195) and seem to be contemporary with those from level II in Daima, Nigeria.

Finally and still in Tchad but to the south of the lake, these instruments have been found in Goufeli and Makari (Fig. 1: 3, 10, 11), two sites occupied during the Late Iron Age and the historical period (during the "Sao II" phase,

Burkina Faso

Findings made in the West of Burkina Faso seem to be related to those of the Bandiagara cliffs.

Three kilometres from the village Tou, two slightly truncated pestles were found during an "excavation" in a small mound surrounded by six small rounded hillocks which formed a sort of circle of about 20 m in diameter. A very brief description of a 0.50 m stratigraphy has been done but the location of the pestles has not been given. They were found with pounding material, polished stone axes, a ceramic cup, a few iron objects such as spear- and arrow-heads, coiled bracelets and rings. Excavating conditions were very bad but it seems to be an ancient place of worship used until recently by the forefathers of current Dogon villagers (Schweegefer-Hefé 1969: 111-125).

Twenty km to the North of Tou, we were lucky to find 12 clay pestles in Kain Ouro Koro, an abandoned village. This site built on a large sandy dune stringer stands out thanks to a group of hillocks made of sherds and laterite gravel. These are situated next to refuse heaps full of iron dross and next to the bases of low furnaces for processing iron ore. Ten of these pestles belong to the cylindrical type II form and 2 to the truncated type I form. Furthermore, 10 of the clay pestles are in the slag zone or near the bases of the low furnaces; the other two were picked up on the edge of the settlement. All were found with numerous sherds. We also found a few iron or quartz beads and an iron arrow-head.

After questioning the leading citizens, blacksmiths and village chiefs of Kain and Kain Ouro, we found out that Kain Ouro Koro was in fact the primitive site of what is now Kain. Kain was founded by a Tellem-Kurumba by the name of Kain, after the reign of King Kanka Moussa (1307-1332). Incidentally, ethnic groups of this region believe the ancient Tellem to be the ancestors of the present Kurumba, stressing the fact that the latter used to live on the Seno plain and the cliffs of Bandiagara. Tellem means "the ancient" in a number of tongues in West Burkina Faso. After having founded Kain, Aloué Quindo, a Dogon of a Tellem father and a Tellem mother, is said to have come from Koro - situated in the Seno plain - to settle in the region. This resulted in a war between the Dogon and the Tellem-Kurumba. After the latter's defeat, the Dogon stayed up to the XIXth century leaving shortly before the arrival of the French, around 1891. The Dogon moved a few kilometres down the road to found what is now known as the village of Kain. In 1970, part of the population, which had turned to Islam, seduced. They came to live near Kain Ouro Koro and founded what is presently the village of Kain Ouro. Such briefly recounted facts are very precious for the understanding of the peopling of this region. Furthermore, they allow us to attribute our pestles to the Tellern-Kurumba or Dogon people of the XIVth to the XIXth century. A number of these objects were discovered just outside Kain Ouro village, out of an archaeological context. Indeed, present day women potters use pestles picked up from ancient sites.

2.3. Accompanying pottery

In the following paragraphs, we will attempt to draw the principal characteristics of pottery found with the clay pestles mentioned above.

Painted "Haddadian" pottery has to be dealt with separately. It is thought to be one of the most outstanding successes of prehistoric sub-saharan Africa. These are narrow-based truncated goblets (Fig. 5: 7) and bowls, generally hemispherical in shape (Fig. 5: 6). They are painted in black with a red slip. Geometrical, or more rarely, figurative features frequently cover the whole of the body. They are never impressed. Sizes vary from 8 to 16 cm in height, 12 to 30 cm in maximum diameter and 0.4 to 0.8 cm in thickness. On studying the traces, one can see that this painted "Haddadian" pottery is made from fine coils wedged one on top of the other from the inside (Trénèze-Claustre 1982: 95).

The more common pottery associated with pestles from Niger, Nigeria and Tchad all have hemispherical bases (Fig. 5: 1, 2, 3). Feet are absent and flat bases very rare. Some exceptional forms are found; the most surprising are perforated cylinders of the kind found in the Malelinga graves (Fig. 4: 2). Sizes vary from 10 to 40 cm in height and 10 to 50 cm in maximum diameter. The sides are thin, 0.3 to 1.5 cm - depending on the size of the recipient. The clay - when described - is generally well-kneaded, homogeneous, prepared with a fine temper well spread into the bulk. Incised lines (Fig. 5: 1, 11; Teguef N'Agar, Daima and Toundjou), rare impressed wheels (Fig. 5: 2; Daima), very rare raised relief decoration (Fig. 5: 3; Daima) and twisted stringing rosette very slightly impressed (Fig. 5: 1, 3, in the different regions) can be observed on decorated vases. Decoration with a string rosette is usually limited to the upper part of the body (Fig. 5: 4, 8) but can exceptionally cover the bottom or even the whole of it (Fig. 12: 3; Teguef N'Agar and Daima).

Traces have also been observed on the surface and inside the vases. Those visible on the outside are mat prints (Fig. 5: 2, 8, 9, 10). Such marks generally cover only the lower part of the body but can, on rare occasions, cover the whole of it as in the case of bowls. Small impressed cavities can sometimes be seen on the inside of vases (Fig. 5: 9; common pottery of the mid-Iron Age in Tchad). These impressions are made by clay pestles whose "active" surfaces are decorated (see 3.1.3). Such traces seem to be limited to the lower half of the body.

Pottery found with clay pestles more to the West, in Mali and Burkina Faso, generally have different shapes. In Pégué-Na, Tou and Kain Ouro Koro, very characteristic cups with feet are found (tripods or quadrupods, Fig. 6: 1, 5), frequently decorated with a knotted string rosette or twisted string rosette. Bedaux took much interest in this type of vases and reflects that it is widespread in...
Fig. 6. Pottery associated with "archaeological" clay pestles from Mali and Burkina Faso.

the whole of the Niger valley (Bedaux 1980: 247-258; Bedaux & Lange 1983: 19-24). These cups are found with small hemispherical vases to which a ring-shaped foot has been added (Fig. 6: 2, 4); the lip is often grooved. In Kaïn Ouoro Koro, pottery is abundant. The most represented forms are big jars with an external lip. Decoration is done with twisted string roulettes, alternatively left and right plaited roulettes, wooden roulettes, incisions and mat impressions. The presence of cups with feet in El Ouahadi is questionable; it seems that none were found in the grave. Pottery, customarily covered with a bright red coating, has a rounded base (Fig. 6: 6-12). Decorations can consist of impressions done with a twisted string roulette (Fig. 6: 6), grooves (Fig. 6: 8) or impressions done with a comb combined with a twisted string roulette (Fig. 6: 9). It is interesting to note...
that the outside surfaces of the bottom of this pottery shows mat prints (Fig. 6:6). Bedaux points out the internal depressions caused by the pestles in Pégat-Na (Bedaux & Lange 1983: 25).

3. Clay pestles: characteristics and meaning by way of ethnological and ethnoarchaeological studies

3.1. Description

A various number of ethnological or ethnoarchaeological studies have helped to shed light on the use of terracotta tools within current African populations. We have called these tools clay pestles. However, terminology varies with authors. In English, the word pestle (for example Arkell 1939: 80) or more infrequently hand-beater (Nicholson 1931: 188), earthenware beater (Crowfoot 1924: 21) or arvel (Haaland 1978: 50) is used. In French, we use designations such as lisseoir à poignée (Lecheuf 1962: 47-48), cabochons (Huard et al. 1963: 440), ptilons (Huard & Baccq 1963: 444), tampons (Le Roux 1969: 332; Gallay & Savain-Dugerdil 1981: 90; Treinen-Claude 1982: 120f.), percuteurs (Listy 1990: 106-107; Gallay & Huyscom 1991). The most common German designations are Stössel (Krieger 1961: 365) or more infrequently Tonschlegel (Gees-Tronich 1991: 414).

Clay pestles always seem to be made in terracotta mixed with chamotte. Only Arkell (Arkell 1939: 80) found a few made out of dried unbaked clay, in the Sudan. This is surprising. Indeed, it is difficult to imagine such objects resisting occasional violent strikes. As for the archaeological instruments, two types of clay pestles can be distinguished.

Type 1

Type 1 (Fig. 7, 8) is massive and looks like a truncated cone. Its section is always carefully circular. The small upper part - for prehension - is swollen into the shape of a cabochon (Fig. 7: 1, 2, 3); however, it can also simply be cylindrical (Fig. 7: 11; Fig.: 8: 3, 5) or even narrowed down to resemble a slight truncated cone (Fig. 7: 6, 8). The top is either rounded (Fig. 7: 1, 3, 13) or flattened (Fig. 7: 7, 9) and can be slightly cup-shaped (Fig. 7: 6, 8, 12). The base is always spherical, a large majority convex (Fig. 7: 1, 2, 3), some exceptionally concave (Fig. 7: 4, 5).

Sizes vary. However, we only have precise data from Mali, the Inland Niger Delta (42 items measured by MESAO), Dogon Sanyété (2 instruments drawn by Gallay & Savain-Dugerdil 1981: Fig. 3) and North of Burkina Faso (4 pestles described by Listy 1990: 106 and 2 others measured during MESAO).

The mean dimensions of the pestles found in the Inland Niger Delta are the following: total height, 91 mm (ranging from 45 to 136 mm), maximum diameter of the base, 80 mm (ranging from 44 to 130 mm), maximum diameter of the upper part, 51 mm (ranging from 24 to 76 mm). The four pestles measured by

Fig. 7. Type 1 clay pestles currently used in the Inland Niger Delta area (Northern Bambara: 1-6; Northern Sonome: 7-13).
A (51) of both Sanyéré objects is close to that found in the Delta, the mean index B (127) is higher, indicating short samples with a very wide base. In the same way, the mean indexes of both Dogon pestles found in Burkina Faso are much taller than those of the Delta, thus ratifying their massive character (B=70; B=160).

An object with a unique history, form and function (Fig. 7: 6) and to which we will refer later (3.3.), has not been integrated, intentionally, into the last paragraph. Indeed, its indexes A (16) and B (188) place it in a distinctive category of pestles. A number of type I pestles can be partially or totally painted in red in the Inland Niger Delta (Fig. 8: 3, 4, 6, the colour comes from iron-oxide clay dilution). And last but not least, let us mention a unique specimen whose upper part was incised with a wooden rod (Fig. 7: 1). This was made by F. Serri-Tangara, a Bambara woman potter in the North of Sanaferé.

**Type II**

The second type of clay pestle (Fig. 9 & 10) is generally squat and cylindrical. The edges can be concave (Fig. 9: 1, 10: 8, 9, 10), linear (Fig. 10: 5) or convex (Fig. 9: 2, 3, 11). A number of them have profiles close to truncated cones (Fig. 9: 13-14; Fig. 10: 13-16) or never reach the characteristic silhouette of type I. Their section is always perfectly circular and their base always convex.

Dimensions vary. We have precise data for the 23 instruments found in the Inland Niger Delta and 30 others found in North-West Burkina Faso (MESAO Mission). One sample from the North of Burkina Faso (Lisy 1990: 106) is added. The mean height of these 54 items is 71 mm (ranging from 46 to 94 mm) and the mean maximum diameter, 91 mm (ranging from 59 to 123 mm). Index A equals approximately 100 (due to its cylindrical form), whereas mean index B is 132 (ranging from 102 to 200). This points to rather squat objects, whose heights are never bigger than their maximum diameter or are never equal to less than half of this diameter.

One must mention the originality of some of the decorations on certain type II pestles. Mats (Fig. 10: 4) or fingers (Fig. 10: 2, 3, 8) are used to leave impressions on some edges. The upper parts are sometimes decorated with incisions or impressions left by fingers or a rounded rod (Fig. 9: 9-16). Women potter of the Inland Niger Delta told us that these marks were in fact signatures which allowed them to recognise their instruments. Pestles are often painted in red (Fig. 9: 1, 2, 4) or sometimes striped red (Fig. 9: 11).

At this point, a number of rules and trends can be stated, especially with regard to the shape (concave or convex) of the bottom of pestles. This depends on the technology used and will be described in chapter 3.3. (R8, R9 and T2).

Other slight variations do not seem to be related to precise type I populations or functions. For instance, F. Nyaro-Samasséku, a Northern Somono woman potter from Kohassa, makes clay pestles with "cabochoon", cylindrical or truncated tops indifferently. Likewise, cup-shaped tops are made by Northern
Some of the measurements mentioned above show the diversity of sizes. No conclusion can be drawn showing some kind of relationship between the size of a pestle and a population. Take for instance the 19 pestles made by F. Kayentao-Gadiaga, a woman potter from N'gourema, which show great diversity almost spanning both extremes. In fact, it will be shown in chapter 3.3 that these variations are due to the different stages in the making pottery. A potter can use instruments of a different size by changing his or her movements, depending on the desired size of the recipient. A survey of women potters - in particular, K. Konaré-Konaré from Sanaféré and F. Kéré-Kéré from Kaïkan-Boro in Mali, and Y. Niangali-Bamadjo and Y. Niangali-Anguiba from Kain-Ouro in
Burkina Faso - who possess different sized pestles, taught us that while small instruments (Fig. 8: 6) are used indifferently during the stages of manufacture, those which are bigger (Fig. 8: 1 and Fig. 10: 14) are used for precise actions. The diameter of a clay pestle chosen to model the body of a vase is in harmony with the latter's size. A more ample description will be done in 3.3. (49).

The clear-cut typological division between types I and II doesn't make much sense when in the field. Indeed, potters who use type II instruments - the Fulani from the Inland Niger Delta, the Dogon and the Mossi from Burkina Faso - also use type I instruments! This only demonstrates that their use is thought of as identical (like A. Gadiaka-Sango from Ngouréma). Only certain women Dogon potters living on the Western fringe of Burkina Faso and certain Fulani women potters from the East and the South of the centre of the Inland Niger Delta seem to use, exclusively, type II clay pestles. It is not outrageous to suppose that ancient contacts between the two groups could have been made. This could explain the unusual use of type II by these groups.

As for the decorations, though some of the incised designs (such as Fig. 9: 10, 13, 14, 16) seem to be very local, red painting is widespread and can be found within the Somoono and Bambara populations of the North, the Fulani in Mali and the Dogons in Burkina Faso. No regularities can be singled out.

3.2. Geographical and cultural context

Field surveys and bibliographical research show that clay pestles are currently spread in an area restricted to the Sahelian or sub-Saharan zone (Fig. 3): from Mali, where they are to be found in the North and the centre of the Inland Niger Delta (MESAO, the most norther point is the village Koubli, 14° 24'N / 4° 52' O) to the Sudan, in the region of Omdurman (Crownfoot 1924: 21; 15° 39'N / 32° 25'E). Although surveys in the Southern part of the Inland Niger Delta and the savana (Mali, Northern Guinea and South-West Burkina Faso) revealed a total absence of this tool south of the Sahelian/sub-Saharan border - at least in Western Africa. Such a widespread use of clay pestles in the Sahel zone implies that they are used by different populations (Drost 1967; Baumann 1979).

Thus, we found them amongst four populations in the Inland Niger Delta: the Fulani, the Northern Bambara, the Northern Somoono and the Songal. The Fulani are mainly cattle breeders, more or less sedentary since the beginning of the XIXth century. The Northern Bambara are essentially sedentary agriculturists, live in areas sheltered from floods and good for sowing cereal (Pielies 1954). The Somoono and the Songal fish and grow rice; they are generally sedentary but sometimes travel quite far (more than 100 km) to other fishing grounds.

In Somyére, pestles are used by the Dogons who live in a Fulani ethnical "isolate" and cultivate millet and sorghum (Galay & Sauvain-Dugerdil 1981: 57ff.). More to the South, the Dogons who live on the North-West fringe of Burkina Faso also use clay pestles. Being mainly cultivators, they keep close contact with the Fulani, the Kurumba and the Mossi (MESAO observations; Girault 1938: 3-39).

North of Burkina Faso, clay pestles have been observed in a number of sedentary cereal-cultivator populations in the Fulani neighbourhood: the Lyela (Schott 1860: 9ff.), the Kurumba (Stiolo 1886: 24ff.), the Mossi (MESAO and Lass 1990: 2ff.) and the Guinname (Gleis-Trenich 1991: 414ff.). Not far from this region, sedentary cultivators - Djirma of the Niger - living on Fulani territory and related to the Songal, also use these instruments (personal communication Klaus Schmidt). The same goes for a few ethnic groups in North-West Nigeria, who are sedentary agriculturists and farmers belonging to Fulani groups such as the Zorunawa (Nicholson 1931: 187ff.), or Hausa groups such as the Zunafawa (Krige 1961: 362ff.) and the Adurawa (Nicholson 1929: 45ff.).

In Tchad, pestles seem to be used by the Haddad, sedentary or semi-nomadic craftsmen and hunters, who have been breeders since the beginning of the century (Le Rouvré 1989: 377ff). More to the South, in the Northern Cameroon, different sedentary ethnic groups of cultivators - the Hilo, the Mafa, the Mahus, the Saitor, the Covok and the Mafa-Madr - also use them (personal communication, Nicholas David and his film "Demeure des Esprits: pots et personnes dans le nord du Cameroun", Department of Communication Medias, University of Calgary, 1991; David et al. 1988; Stenner & David forthcoming). A. J. Arkell also mentions the use of pestles more to the East, in the Sudan, by the Darfur Tama (Arkell 1939: 79, see also Haaland 1978: 49ff.), sedentary cultivators of millet, beans and corn. They also keep small herds close to the village, the whole year round (Le Rouvré 1989: 152ff.). Potters from Darfur seem to have emigrated towards Omdurman, which explains why one finds pestles up to this region of the Nile valley (Crowfoot 1924: 21).

In all observed cases, clay pestles are used exclusively for the making of ceramic recipients. Furthermore, this craft is usually done by the women (Northern Bambara, Northern Somoono, Fulani, Songal, Djirma, Dogon from Burkina Faso, Kurumba, Mossi, Zorunawa, Haddad, Tama, Omdurman and in the North of the Cameroon), on rare occasions by the men (Dogon Somyére, Zunafawa) or by both (Guinname, Lyela, Adurawa). As a rule, blacksmiths' wives are potters and use pestles as is the case for the Songal, Haddad and Sudanese Tuma blacksmiths, the Mossi saaba, the Bambara amnu of the North, the Dogon djemé from Burkina Faso, the Kurumba ayalba, the Somoono káglágu of the North, the few Fulani wayáhâ and Northern Cameroon populations.

Woman potters can also be weavers (the Songal weavers, the Fulani nuubálâ and the occasional Haddad weavers), coopers (the few Fulani lawlé and perhaps some Haddad) and, exceptionally, cobblers (a few Fulani sakuelle and Haddad cobblers). When this craftsmanship is done by men, either independently or with the women, potters do not belong to what is called "caste" groups but their main activity is agriculture. Potters who use clay pestles and who are
from an environment in which this kind of work is exclusive to women belong to "casted" social groups whereas men potters accompanied or not by women belong to what the Africans call "noble" social groups.

Sites in which pestles were used are sedentary habitats, either villages or towns. Pottery can be made in the courtyard (Kichamba), the entrance-hall (Sindigul), a room used as a specialised workshop (Korienza), occasionally in one of the rooms (Babi), exceptionally in a lane opposite the house (Bangoo) or even in a specialised area outside the agglomeration, seen only once in Nambéane. It seems therefore that the use of clay pestles is limited to sedentary settlements. Yet let us not jump to hasty conclusions, A. Le Roux and A. Le Roux implied that such an activity took place on encampments ("... dans un cadran qui longe le toit de la hutte ou de la tente", Le Roux 1989: 382).

As a consequence of geographical scattering, a few regularities emerge:

R1: If in the presence of clay pestles, then the population belongs to the Sahelian or sub-Saharan area. Three regularities (R2, R3 and R4) emerge from a socio-economic study of clay pestle users:

R2: If in the presence of clay pestles, then these are tools used in the making of pottery.

R3: If in the presence of clay pestles within a blacksmith's, a weaver's, a cobbler's or a cooper's surrounding, then one is in a "casted" social group where pottery is exclusive to women.

R4: If in the presence of clay pestles used by men, then one is in a social group termed "noble".

Examples such as the Guin Mandinka, the Lyola and the Abarawa force us to weaken such assertions we would be tempted to postulate, despite their exceptional character. We therefore present here a trend, that is to say a statement which cannot be considered as a regularity because one or more counter-examples are known, even though most of the observations converge. We then have to postulate a trend, and not a regularity, despite the exceptional character of examples from the Guin Mandinka, the Lyola and the Abarawa. Indeed, though observations tend to converge, at least one counter-example is known: T1: If in the presence of clay pestles, then one is most probably in a group where there is a sexual differentiation in activities.

As for the relationship between clay pestles and habitat, we have never found clay pestles outside workshops. This is sometimes because of some kind of "taboo". The following regularity can be stated:

R5: If in the presence of clay pestles, then one is close to a potter's workshop. Before we infer a regularity which links these instruments to sedentarism, we are awaiting details from Tchad. In the meantime, we can state the following "restricted" rule:

R6: If in the presence of clay pestles within a habitat in Mali, Niger, Burkina Faso, Nigeria, the Northern Cameroons or the Sudan, then it is a permanent habitat.

On the other hand, it seems impossible to establish any kind of relationship between the presence of a clay pestle and the spot where it is used; this seems to depend on the time of day or the potter's mood. Finally, surveys led in a number of countries allow us to postulate the following "restricted" rule:

R7: If in the presence of clay pestles in Mali, Niger, Tchad, the Northern Cameroons and the Sudan, then one is in a habitat where one or more of the following trades are plied: blacksmith, weaver, cooper or cobbler.

3.3. Technological context

As we have just mentioned, clay pestles are used exclusively in the making of pottery. Surveys lead within the "Mission ethnoarchéologique suisse en Afrique de l'Ouest" (MESAO) revealed a number of distinct techniques (Houssin & Mayor in press). We found that clay pestles were used for only two of these techniques, termed "pounding in a concave shape" technique and "casting on a convex shape" technique.

The "pounding in a concave shape" technique

This technique seems to be particular to many populations of the Sahelian area and the Nile valley, with a few variants. First, the potter prepares a ball of clay in which he or she adds a large amount of a fine temper (charcoal or dung, depending on the region) so as to obtain relatively dry clay necessary for the pounding technique. Hammering with a clay pestle can improve the homogeneity of the clay ball.

Potters have previously dug out a depression in the ground. Its sides are neatly equalised and smoothed. The depression can be used as such (Mossi and Kurumba) or covered with matting (Songhal, Zoramawa, Haddad, Tama and on rare occasions the Fulani), fitted with a wooden cast (Fig. 13b; most of the Fulani, the Bambara of the North, the Songhai, a few Zama Traorwa), a dried unbaked clay cast (Fig. 13c; all the Northern Somono, exceptionally the Northern Bambara and the Fulani), on rare occasions a terracotta cast (Adara, Zama Traorwa, Palani, Guin Mandinka) and even the broken base of a vase (Dogon from Burkina Faso). On very rare occasions, a mat is spread flat on the ground (Palali).

The actual assembly of the recipient follows, of which only the main steps are described.

Once the potter has placed the clay ball in the depression (bare depression, cast or mat), she or he hammer it vigorously, thinning it to shape the bottom of the vase (Fig. 11a). This is done most often with a clay pestle. A potter can exceptionally use a handstone, as is done by the Dogon from the Sanga region in Mali (Bedaux 1986: 124) or a tool in the form of a "household bread" as is done by the Egyptian Fellah (Blackman 1948: 125). On very rare occasions, a polished wool pestle is used by certain Sudanese ethnic groups, such as the Nuba (Crowfoot 1924: 20). Less vigorous hammering is then applied, either by
Fig. 12. Potter using the "casting in a convex manner" technique, shown with a wooden cast, with the edge cut away, exposing the clay cake to the atmosphere. (After Gossens & van der Veen 1981, pl. 3.)

Fig. 13. Tools used in the making of vases with a clay pestle:
- a. wooden palette (Peul); b. wooden cast (Peul); c. unbaked clay cast (Northern Sonoon tradition); d. convex clay cast (Northern Bambara); e. convex clay cast (Northern Bambara); f. convex clay cast (Northern Bambara); g. wooden palette (Sanyé Dég, after Gossens & van der Veen 1981, pl. 3.)
keeping the same instrument or by using a smaller one while the potter tilts the vase into the bare depression, cast or flat and turns it with jerked movements (Fig. 11b). If the potter has a series of different-sized pestles, he or she will use the one adequate for the size of vase desired (Haddad, Northern Somono, Northern Bambara, Fulani, Mossi). Thus, in Kain Toro, a Dogon potter (Y. Niangali-Anguba) uses pestles from 6.3 to 7.4 cm in diameter for vases 14.8 to 19.5 cm in diameter, one pestle 7.7 cm in diameter for vases ranging from 25.2 to 26.4 cm in diameter and alternative hammering with pestles of 9.5 and 10.4 cm in diameter for a vase 42.7 cm in diameter. Once a potter has reached the top of the vase's body, in some cases the pestle is held inside, in the fashion of an anvil, and the outside is hammered with a wooden palette (Fig. 11c; 13a: particularity Fulani women potters, more rarely potters from other ethnic groups).

The neck of the vase and on fewer occasions the top of the body (as is the case for the Mossi), are made with coils once it has been dried. Sometimes the vase is placed onto a tournette (Mossi, Northern Somono, Northern Bambara, some Songhi, very few Fulani). From time to time, potters continue to use a pestle, either as a counterweight by placing it in the vase while its turning, more rarely as a hammer, or as an anvil to equalise the sides by hammering the top of the body with a wooden palette. Very exceptionally, they smooth the inside of the vase with a clay pestle; this is particular to a few craftswomen.

"Casting on a convex shape" technique

We defined this technique after surveys led within Bambara populations although it is common to many other populations in regions situated south of the Sahelien area.

Pestles are sometimes used for this technique in the north and the centre of the Inland Niger Delta, in particular by the Northern Bambara and occasionally by a few Fulani potters to make special shapes. This casting technique is particular in that casting is done, precisely, in a convex cast, with a clay cake to form the bottom of the vase and a mobile plate to make the top of the body and the neck.

The potter prepares a clay cake soft enough to be shaped easily. The clay is usually mixed with a chamotte temper. A bit of pottery or, more rarely, a small vase-shaped terracotta cast (Fig. 13d-f; only in the North of the Delta) is then placed upside down - thus forming a convex shape - onto a tournette (Northern Bambara or the Fulani - mainly for small shapes) or directly on the ground. The potter then places the clay cake on top of the cast and models it or strikes it gently with a hardstone, a wooden palette or a clay pestle (Fig. 12).

When using a clay pestle and if the vases are small, we have observed the use of very characteristic concave-based pestles (Fig. 7: 4, 5) by the Northern Bambara and a few Fulani from Sénoussa and Sandérié. The use of a clay pestle is exclusive to this stage of the casting technique. We must also signal what seems to be the sole example of a unique object in the hands of a Northern Bambara woman potter (M. Dembélé-Balo of Bougna). It is a sort of "clay pestle" (Fig. 7: 6) of the potter's own invention, used to decorate the bottom of a vase with the impression of a net. When questioned, the potter explained that her mother did not use such an instrument. She had created it in 1987 to replace flat stones usually used for the same purpose.

Once moulded, the vase is taken out of its cast to dry. Dried, the unfinished pottery is turned upright on a mobile plate - which can be a large sherd as in the South or a tournette on the North of the Delta - and the body is fashioned with coils.

During a mission in Mali, A. Gallay observed a variant of the casting technique typical of the Sanyéré (Gallay & Sauvain-Dugerdil 1981: 86-91). To begin with, the potter places a clay cake on upside down pottery which itself is directly on the ground (as before) or on a small mound of earth. The clay is then moulded by "putting" it first with a hardstone, then with a wooden palette (Fig. 13g) thus shaping the bottom of the vase. After removing it from the cast, it is left to dry. Once dried, it is placed the right way round on a small mound of dry earth. The body is then modelled with coils. It is at this stage and only here that a clay pestle is used as an anvil while the palette is used to hammer the outside of the body. Simultaneously, the vase is turned in jerked movements. The neck is shaped by applying a coil in the shape of a ring on the top of the body.

Upon examination of these two techniques, we realised that clay pestles are used in different ways. In fact, clay pestles are essential for the flowing technique where, from the preparation of the clay to the completion of a vase, they are in turn used as hammers (both ends can be used), anvils, counterweights or even for smoothing. We have never observed the use of instruments, other than a clay pestle, which could be used as a hammer or an anvil.

On the other hand, in the casting technique, a clay pestle is used only in one step and only as one kind of tool (a hammer in the Inland Niger Delta, an anvil by the Sanyéré Dogon). Besides, taking into consideration the casting technique as a whole, the use of a clay pestle seems exceptional and unique to the Bambara in contact with a Fulani surrounding or, likewise, to the Fulani in a zone where Bambara influence predominates. Indeed, the Southern Bambara who live outside such a zone only use hardstones as hammers - which is just as effective.

We can thus be led to believe that concave-based clay pestles are the consequence of convex-based pestles from the moulding technique, adapted to the casting technique. In fact, we will see that the "Bambaras" borrowing of clay pestles from the "Fulani" is confirmed by linguistics. Probably the same happened with Sanyéré potters, a Dogon isolate within a Fulani environment, as has been confirmed by designs on their ceramic (Gallay & Sauvain-Dugerdil 1981: 140).

A number of regularities can be drawn from what has been described. From the observation of the use of different forms and sizes of pestles, the following two rules can be stated:

R1: If a clay pestle has the profile of a concave base, then this instrument is used in the technique which consists of shaping the base of pottery on a convex mould.
R9: If a clay pestle with a convex base has large dimensions, then this instrument is used for the initial hollowing out of the clay or during different steps in the making of big vases. In the future, it would be useful if the border between big and small instruments were defined, using for instance "the size of a clay pestle related to the size of the vase it is used for" combined with the vernacular used for each recipient (big vase, normal vase, small vase). Furthermore, the following trends can be stated thanks to the exceptional use of some convex-based instruments during the casting technique:

T2: If a clay pestle presents the profile of a convex base, then this instrument is most probably used either as a hammer for the shaping of the base and the body of the pottery - by hammering on a concave surface - or as an anvil held inside the vase while the top of the body is being hammered. Other trends can be stated but they cannot be considered as "regularities" because of the "counter-example" of the technique used by the Banban and the Sarnyéd Dogon.

T3: If in the presence of clay pestles, then one is probably confronted with pottery made with the "pounding in a concave shape" technique.

T4: If in the presence of clay pestles, then one is most probably very close to depressions in the ground, used to make pottery.

Considering what has been said above, it seems apposite to state the following trends:

T5: If in the presence of clay pestles, then one is most probably in a social group situated within Falami influence.

In the meantime, we do not know where the "pounding in a concave shape" technique originated; currently, this technique seems to be very frequently associated with the area covered by theFalami.

3.4. Associated ceramics

Since clay pestles are a characteristic of the pounding technique, we present here the ceramic forms obtained by it.

The recipients generally have simple forms with hemispherical bases (Fig. 14-15). They are sometimes finished off with feet (Fig. 14: 8; 15: 6), when potters use a mobile plate which is generally a tournette. Some pottery with a very particular role or meaning is also sometimes found - such as stools, hearths, oil lamps or recipients for a wedding trowseam.

Dimensions can be quite large, up to 45 cm high and 52 cm in maximum diameter. A survey led by A. Mayor on a sample of 278 vases from the Delta, made by the pounding technique gave a mean index "height multiplied by the maximum diameter and divided by two" of 24.78 (with values ranging from 8.5 to 47.4; Mayor 1991).

In return, the sides are always relatively thin, from 3 to 12 mm thin, depending on the size of the vase, with a mean value of 6.7 mm (measurement taken from the middle of the body from a sample of 140 vases of the inland Delta of the Niger). In fact, the pounding technique can make very fine pottery. The thinness of the sides and very dry clay generally do not allow decoration other than paint. Infrequently, necks or the bases of necks are impressed with a string roulette or a impressed flange. On very exceptional occasions, bodies can be slightly impressed with a string or plated roulette (Northern Sonomo), or even with a spring (previously a plated roulette) rolled on a thin layer of barbotine (Mossi). Such very dry clay needs special preparation; a large amount of very finely sieved temper is used - the grains are rarely more than 2 mm in diameter.

This pounding technique is readily identifiable on potsherds. Indeed, besides the flaky texture of the clay, wooden moulds or mats leave a number of embossed traces on the outside of the base and the body, which in the case of wooden or terracotta moulds are negative imprints of faults or fissures. Clay
pottery does not enable us to claim that other techniques do not leave external prints (matting, for example). For this reason, the following regularity has to be restricted:

R11: If pottery presents external traces identified as those left by matting or a wooden or unbacked clay concave mould, then it was fashioned with a clay pestle used in the "pounding in a concave shape" technique.

At this point, we can only add a trend since a "counter example" was found in Bahr, in the work of a Fulani woman potter.

T6: If pottery fashioned by the "pounding in a concave shape" technique has been completed with feet, then the last step was done on a tournette.

Finally, it must be stressed that our surveys in Mall show that typology on its own is not sufficient to identify the technique which was used. Indeed, in the whole of the Inland Niger Delta, a number of "fashionable" shapes are copied by potters who use completely different techniques. Such fashionable shapes could be perfume-burners, what are called "doctor" water jars or copies of metal ovens.

3.5. The contribution of linguistics

We were interested to know how the pounding technique originated and questioned a few women potters from the Inland Niger Delta who use this technique. By they Fulani, Northern Sonfoo, Northern Bambara or Songhul, the craftwomen invariably answered that the tradition had been brought down from their ancestors and that the neighbouring population had simply copied them.

Since clay pestles are a basic component of the pounding technique, we thought it would be interesting to compare the vernacular used by different potters (the terms have been transcribed according to Brauner 1974: 160f.)

Most of the Fulani potters (29 out of 41 questioned in 17 different villages), belonging to the maabu, suaali, wassyal, or lawal "castes", use the word dunnyârâ sometimes associated with the epithet maawo (big) or pommori (small). In some cases, the words are accentuated in the middle, hence dunnyârâ (8 potters of 41, in 5 villages). To the north of the Delta, it can sometimes be pronounced dunnyâ (3 potters of 41, in 3 villages). Only one Fulani potter from Sindugho in the centre of the Delta pronounced it dune. Although it seems to have the same root as the other pronunciations, we have not found other examples. These designations are typically Fulani. R. Leger was kind enough to confirm this. He broke the word into dunny (world, ground, earth) and re (object) and according to him, it could mean "instrument which makes from earth".

The Northern Bambara use dunnyârâ mainly (6 potters out of 9 questioned in 8 different villages) which is equivalent to the Northern Fulani version. Only one potter used dunnyârâ - the preferred designation of the Fulani from the Delta. A slightly different one is dunnya which seems to have developed within the western border of the Northern Bambara territory, for example in Mayel Borgou and Ousamougou. Dunnyârâ and dunnyârâ have indeed been borrowed from the Fulani and neither sound like nor mean anything in Bambara. As for Donnag,
though it sounds Bambara, it has no meaning in this language. It is probably a local adaptation of duna, used by the Sinedug Fulani potter. We are therefore forced to note that the Northern Bambara do not have their own designation to describe the tool used in this technique. Though the Northern Bambara generally seem to have learnt this technique from the Fulani North of the Delta, some "western" families towards Muyel Borgou seem to have learnt it from Fulani potters in the Sinedug region - both regions are joined by the Niger river. Surveys should be lead for cross-examination and confirmation.

Songhay potters use duna, a variant of the "Northern" Fulani vernacular term (2 potters of 6 questioned in 6 villages). Nevertheless, there is a tendency to replace the prefix dun by din (dinyar: 1/6; dinyar: 2/6). This is closer to the Songhay pronunciation but has no meaning in their language. Though observations are few, it seems plausible to say that the Songhay acquired this technique from the Fulani, North of the Delta where these two populations are in constant contact. One Songhay woman potter from Banga used the word dundunyè; we have not been able to cross-examine this and it was impossible to determine whether it had a particular meaning in Songhay. All we can say is that it has the same root as the Fulani one and that it is reminiscent of dununè used by the "Western" Bambara from the North.

Finally, the Northern Sonomo, who also use the pounding technique, call a pestle a dunubè (2 potters of 4 questioned in 4 different villages), a duna (1/4) or a dunubè (1/4). A very brief survey showed that such a designation does indeed sound "bobo" (Sonono language) but has no meaning. This has to be confirmed. Nevertheless, these designations also have the same root as the Fulani din and it seems probable that the Sonomo also borrowed this term and technique from the Fulani potters. It seems, therefore, that in the Inland Niger Delta, the "pounding in a concave shape" technique is indeed Fulani origin and has been borrowed by neighbouring populations.

We have little data from other regions where this technique is used. In Nigeria, the Zamfara area use dununyè (Kriege 1961: 363) which is close to dundunyè and dununè, used by some Songhay and some Bambara from the Inland Niger Delta, respectively. In the Sudan, A. J. Arkel mentions that Tuna populations use the vernacular duga (Akhell 1939: 90). According to R. Leger, duga and the Fulani duniyar: 1/6 have the same origin. This could point to a common technological origin.

On the other hand, other ethnic groups use different designations, such as mudug used by the Ondrunam potters (Crowfoot 1924: 21) or jugball by the Galmance (Gelis-Tromich 1991: 414). The Mossi from the Western part of Burkina Faso use tiba (from tiba, meaning to tap softy), sometimes pronounced tibba (Listy 1990: 106) and has become tibba for their neighbours, the Kurumba (Stoesel 1966: 246). The Dogons from the Western fringe of Burkina Faso use the word tuma (literally "small stone") sometimes preceded by lega (literally "small stone in earth") and often used in a periphrasis such as nya danga

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f ma turu ("small stone to make little pots for cooking it"). Turu f is also used by the Sanyeré Degou in a deformed way: tuu (Gallay & Savrain-Dugerdil 1981: 90). This should be studied in depth and analysis systematically carried out to understand the meaning and origin of such diverse designations.

Let us mention one last example of a Bambara woman potter who had been given a clay pestle by a Northern Sonomo colleague. This event is further described in 3.6. Not knowing the pestle's original designation, the Bambara potter baptised it da gosilan (literally "which hits pottery"). Such a periphrase is interesting and shows how difficult it is to create a new word in one's own language in order to describe an object outside one's own culture. In the same way, the Bambara potter from Bouna who had invented a special concave-shaped pestle to decorate her pottery, named it da bumbun ("which moulds pottery").

In the present state of research, we can postulate that the "pounding in a concave shape" technique used by Fulani casters from the Inland Niger Delta and a number of other groups in close contact with the Fulani, possibly travelled thanks to the displacement of Fulani themselves or by craftsmen who accompanied them in their displacements. This strengthens our trend, TS, relating clay pestles to the Fulani sphere of influence. As for the Sanyeré Degou, the instruments they use have most probably been borrowed from the Fulani tradition and their designation rebaptised into local dialect. Presently, we still have to solve the case of the Mossi, the Burkina Faso Degou, the Kurumba, the Galmance and the Ondrunam potters.

3.6. The causes of diffusion

Now that the ethnographical and ethnarchaeological data have been described, it is interesting to understand the spreading of the use of clay pestles. We do not wish to present here a theoretical study of the different kinds of diffusion; instead, we will illustrate two kinds by describing explicit examples we observed.

Our first example is situated in the centre of the Inland Niger Delta, in Siraititi. In this village, the potter M. Konaté-Kounaré, both a blacksmith's (nana) daughter and widow, uses two completely different techniques depending on the desired form: the "casting on a concave shape and convex shape technique". Her ware is sold to the outside in a regional market in Djermé, 8 km from Siraititi. Around 1960, she met a Northern Sonomo colleague who gave her the kind of clay pestle she used in the pounding technique. Eversince, M. Konaté-Kounaré has been using this instrument in the casting on a concave shape technique. She first fashions the clay carefully in a ceramic cast placed on the ground. Whereas this is usually done with fingers, she uses a clay pestle. She then places the clay-coated cast onto a tournette and then proceeds in the traditional way. Unacquainted with the Sonomo vernacular for clay pestle, she baptised hers da gosilan (see 3.5).
Here is an example of diffusion between two women potters from two distinct regions, belonging to two different ethnic groups using two divergent modelling techniques. Nevertheless, this is a very restricted type of diffusion since only the tool was handed over but neither the name, nor the technique for which it was conceived, nor even its function. Indeed, its initial use was as a hammer or an anvil to pound dry and dense clay. Here, it is used as a "mixer" to fashion soft clay, without hitting it. This sole example only shows that such a diffusion has small chances of being of durable consequence. 70 year-old M. Konaté-Kumari has never made copies of this tool and his daughters do not use it ("too unconventional" for them?).

Two complementary examples illustrate the second type of diffusion. Again in the centre of the Inland Niger Delta in the village of Kokassa, women potters from a Southern Sonomo blacksmith's caste (Kogukata) once made pottery only using the "casting on a concave shape" technique. Around 1935, F. Nyafo-Sammassou, a Northern Sonomo woman potter, herself a blacksmith's daughter, came to the village to marry. She is from Wandika, a village 100 km North of Kokassa, where she learnt the pounding and casting techniques, as is the custom for the Northern Sonomo.

F. Nyafo-Sammassou brought with her three clay pestles. With them she fashioned pottery she called waginkwala ("Wandika vase") common north of the Delta but unusual in Kokassa. This kind of pottery became successful amongst the Fulani in the surrounding areas and other Kabassa potters came and borrowed these pestles they then called dundé (a contraction of the Northern dundébe) and learnt the pounding technique.

Today, a number of Sonomo potters from Kokassa also occasionally make pottery usually termed mubwekula ("Fulani weaver vase") of "Fulani tradition" which they sell exclusively to the Fulani, in market (Ouémé in particular), encampments, neighboring villages or at their home. This was confirmed by one of our surveys in Hogel Kortji, one of the Fulani hamlets situated 5 km from Kokassa. A large number of these kinds of vases were used (39% of the pottery) despite outrageous costs (5 to 10 times more expensive than a Sonomo vase of the same size, according to our informant). Hence, as a result of exogamy, we are faced with the diffusion of technology between a number of potters of the same ethnic group but from different regions, where one group masters an additional technology unknown to the other. The transfer is total. Indeed, not only the object, its name, its initial function and accompanying technique are passed on to the other women, but also specific shapes typical of the technique and which are spread in the neighbouring population. This diffusion is nevertheless restricted. In truth, those three pestles have for the one never been copied. Diffusion is thus done only by "borrowing" material. On the other hand, the resulting shapes are not used by the producers but only made for a small "emigrated" part of the population (in the concrete case of the Fulani).

The following and last example is the same kind of diffusion but has a totally different impact.

North of the Inland Niger Delta two neighboring villages can be found separated by a wide ditch: Kakania-Bozo, populated by the Bozo and the Northern Sonomo, and Kakania-Peul, populated by the Fulani, mainly. Beforehand, the Sonomo potters from Kakania-Bozo only used the "casting on a concave shape" technique. Fishing was plentiful and Sonomo fishermen preferred to store the fish oil in the dense and waterproof-sidew Fulani vases made with the pounding technique. Consequently, they went to buy a great number of these vases from a Fulani potter, established in Kakania-Peul and who practised the pounding technique using a clay pestle on a wooden cast. D. Kewl-Bilakore, equally a Northern Sonomo potter, came to Kakania-Bozo to marry around 1940. She came from Bango, a village 47 km to the North-East, where she learnt both the pounding and the casting technique. Her arrival seems to coincide with the beginning of the economical recession; fishing was less plentiful due to unfavourable climatic conditions. Accordingly, the Sonomo made less use of the Fulani vases for storing fish oil; they probably also had less money to buy them. Thereafter, potters from Kakania-Bozo sought the help of D. Kewl-Bilakore to introduce them to the pounding technique and indirectly to the use of clay pestles they called dundé, as in Bango. Today, the pounding technique is widely used by the Sonomo potters of the village and production abundant within all compounds (a Sonomo compound, in which a count was done, produced 42% of Sonomo pottery assembled using the pounding technique). This is the same kind of diffusion as that found in Kokassa. However, the passing on of technology in Kakania-Bozo was more successful; clay pestles thrived and what's more production was adopted by the potters themselves. It is very probable that the Fulani vases' reputation of impermeability has a lot to do with it. Note that it needed the arrival of a potter from a fairly remote village but from the same ethnic group to spread a technology. Before, Sonomo potters never thought of copying the Fulani potter on the other side of the ditch, only 50 m away.

We thus conclude that different events have caused the diffusion of the use of clay pestles and indirectly the diffusion of associated technology, in particular contacts made at the market and the custom of exogamy. As such, transfer of technology is not assured of success. A number of factors play a part, namely ethnic compatibility, the existence of a potential market, different economical pressures or the acceptance of new products by the producing families.

4. The meaning of "archaeological" instruments and interpreting them

The following chapter is divided into two. To begin with, we will draw up a list of archaeological data. Then we will draw analogies between past and present cultural materials to interpret archaeological remains using the regularities and trends previously defined.
that these past and present instruments not only come from the same geoclimatic environment but also from populations who were at a same techno-economic level, we can compare those archaeological objects with current clay pestles.

Previously stated regularities and trends complete our interpretation. Converge-based clay pestles found on archaeological sites were indeed only used for the making of pottery (R2), most probably using the "pounding in a concave shape" technique (T3). In all likelihood, they were used as hammers, pounding the vessel's base and body into shape or as anvils which were held inside the vase whilst the top of the body was being hammered (T2). Some of the big-sized pestles, measuring up to 164 mm in height, were used for the initial pounding of the clay lump or during different assembly steps in the making of large vessels (R9). We can even specify that these pestles belonged to populations related to the Sahelian or sub-Sahelian area (R1) and, what is more, probably to the Fulani sphere of influence (T5). There is probably sexual differentiation in craftsmanship (T1); most of these instruments found on sites where iron was crafted were used by women belonging to a "coted" social group (R5).

In permanent habitats, at least in Niger and Nigeria (cf. R6), where clay pestles were found, the chances of finding, at least in Niger and Tahd, blacksmiths, cobblers, weavers' and coopers' workshops, are high (R7). Potters' workshops must have been nearby (R5). They are probably discernable thanks to depressions in the ground, which were originally used to support pottery (T4).

We have thus been able to give prehistoric pestles a social and technical meaning by resorting to ethnoarchaeology. Without this stratagem, archaeology alone could not have generated such an interpretation.

5. Conclusion

In this paper, we hope to have shown the importance of ethnoarchaeology - the science where a research worker actually interprets archaeological facts - in dealing with African prehistory, particularly during its last phase.

We thus believe that archaeologists should be aware, henceforth, of the problems which exist in trying to interpret ancient remains, so as to give ethnoarchaeologists the possibility of solving them, as long as the characteristic long-lasting traditions are still preserved in African cultures.

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