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# The Pre- and Protohistoric *Togué* of the Niger Alluvial Plain, Mali

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*The Inland Niger Delta in Mali is scattered with thousands of tell-like dwelling mounds that testify to the rich archaeological heritage of this attractive occupation area. The results of archaeological research suggest an occupation history of more than two millennia in which large urban settlements such as Djenné-Djeno and Dia play a central role. Regional surveys have revealed primary information on the vast rural hinterland of these extensive cities, but little is known about the structure and evolution of this considerable settlement system. The aim of the re-examination of 128 sites in the southern part of the Niger alluvial plain was to obtain an understanding of intersite relations based on sites' chronological, functional, socio-economic, and hierarchical differentiation and their participation in different trade networks. For the research it was crucial to find a method to date the last occupation period of the sites using surface remains. The results of the study emphasise the former occupants' preference for the most elevated landscape units close to fertile pastures, good cultivation grounds, and extensive fishing potential for their settlement sites. The occupants' ability to distribute and exchange agricultural surplus for luxury goods – imported via regional, inter-regional and trans-Saharan trade networks – is impressive, showing that they were able to compete with occupants of the large urban centres. Although the rural sites were much smaller than Djenné-Djeno and Dia, they were well connected. The rural hinterland apparently played an important role in most of the great West African empires. Population densities of the Inland Niger Delta were high for a long time, until the trade routes changed in the 15th century* AD *and the region became socio-politically unstable. This led to the abandonment of settlements, first around the urban settlements, and later also in the rural hinterland. The present-day occupation of the region is only a poor reflection of its impressive past.*

## INTRODUCTION

For three months a year the alluvial plain of the Niger in Mali is an oasis in the dry Sahelian landscape. Comprising an area of 50,000 km$^2$, this inland Delta attracts various ethnic groups, each supporting themselves in their own way, as farmers, fishermen, or pastoralists. In the past millennia a series of expanding kingdoms flourished in West Africa, south of the Sahara. The kingdoms of Ghana, Mali, Gao, Segou, and Macina all covered parts of the Niger alluvial plain. The numerous archaeological sites tell us that this area is not only an attractive occupation area today, but was also so in the distant past.

Six geomorphologically and hydrologically defined landscape units can be distinguished within the Inland Niger Delta (McIntosh 2005, 58; Makaske 2007) (Fig. 1). Whereas some of these areas are still active parts of the alluvial plain, others have degenerated into inactive delta areas. The entire Inland Niger Delta is scattered with thousands of tell-like occupation mounds that are known as *togué* or *toguéré* (sing., Pula toponyme) (Mauny 1961; Bedaux *et al.* 1978; 1994; 2005; McIntosh & McIntosh 1980; 1986; Haskell *et al.* 1988; Raimbault & Sanogo 1991; MacDonald 1994; McIntosh 1995; Insoll 1996; Togola 1996). These earthen mounds are the result of the accumulative remains of former occupation, consisting of mudbrick debris as well as domestic

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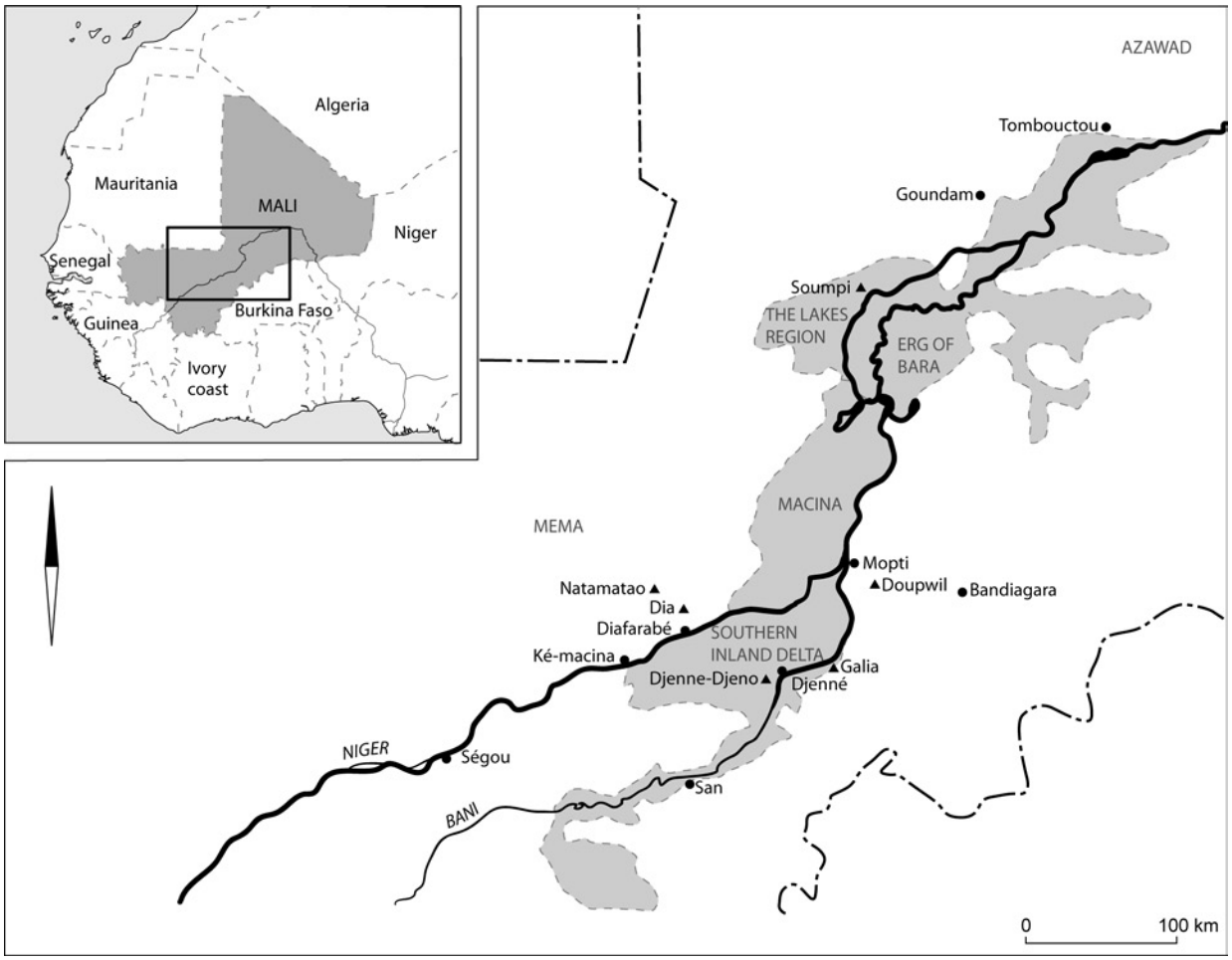


Fig. 1.
The Niger Inner Delta, Mali

refuse. The surfaces of the abandoned sites are scattered with artefacts and often walls and structural remains are still visible. Most of the *togué* are abandoned archaeological sites but some are still occupied and form the present occupation of the area. The density of these *togué* is highest in the southern Inland Niger Delta. Two key questions are raised by the occurrence of such a large number of sites; how was the settlement system they represent structured and how did it evolve?

Following the first systematic archaeological excavations of *togué* Galia and Doupwill (Bedaux *et al.* 1978) and extensive research in and around the town of Djenné (McIntosh & McIntosh 1980; McIntosh 1995), a regional survey was launched under the heading of *Projet Togué*. Between 1989 and 1991, 966 sites were inventoried within an area of 2000 km$^2$ (Dembélé *et al.* 1993). This region will be referred to as the macroregion. The project formed part of a national survey of archaeological remains in Mali and was carried out by the Institut des Sciences Humaines, with support from the Dutch University of Groningen. The research resulted in a reconstruction of the occupation history of several sites, a description of the local material culture, and a distribution map of the sites in the southern Inland Delta. Although the research was



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of great importance in gaining a better understanding of the archaeological history of the region, a few research questions remained unanswered.

*Projet Togué* yielded an impressive survey of sites, but little information on how those sites were related. What factors influenced the settlement pattern; could the socio-economic identity of the former occupants be inferred, and what trade contacts were there between individual sites? Essential information needed to answer the question of how the sites were related is the dating of the sites.

The archaeological excavations focused on urban centres, such as Djenné-Djeno, and later also Dia, well-known towns and their immediate surroundings that are mentioned in the oral tradition and historical sources. But how did these urban centres relate to their extensive rural catchment area? What part did this agrarian hinterland play in the region's urbanisation? Was it perhaps the economic basis for the powerful medieval West African kingdoms?

Re-examination and sampling at some of the sites detected in *Projet Togué* with the specific aim of finding answers to these questions and expanding the know-how previously obtained, has led to a better understanding of the relationships between the sites. This region will be referred to as the microregion.

## RESEARCH STRATEGY

In preparation of the fieldwork, 150 sets of aerial photographs were studied stereographically (Dembélé *et al.* 1993). Stereoscopic aerial photo research is restricted in that it can only help in detecting elevations in the landscape. Settlements that did not involve an artificial elevation, such as temporary camps, are not detected with this method. It is likely that our settlement system included such settlements. It was, nevertheless, decided to use this research strategy because temporary camps are difficult to detect with other methods too, and stereographic research offers an opportunity to cover a large research area in an efficient manner.

Variation in the morphology of the *togué*, their situation on the various geomorphological units, and their clustering along water courses or in groups, played an important role in the selection of sites for re-analysis. The microregions selected for the research all lie in the rural hinterland of the southern Inland Niger Delta. The research focused on the *togué* to the south of the village of Nantinoré and the archaeological ribbon occupation along the river Tokouyaoro around the village of Soye. Some small-scale additional surveys were carried out around Toguéré Ladikouna and at an exceptionally large site that lay partly buried beneath the village of Kolonqui (Figs 2 & 3).

The archaeological sites were identified in the field on the basis of the following criteria.

1. Site morphology: an anthropogenic elevation usually has clearly defined outlines and is higher than natural elevations with less regular outlines, such as levees. Sites that were abandoned long ago and have since undergone substantial erosion; sites that were occupied for only a short length of time and sites on dunes are, however, difficult to distinguish from natural elevations.

2. Surface finds representing several categories of materials besides pottery: the fact that the research area is still occupied by sedentary and nomadic pottery-producing groups sometimes makes it difficult to distinguish between present-day refuse and archaeological objects. Houseplans and/or burial vessels and/or iron slag are reliable indicators of an archaeological site.

3. The existence of a local name for a site and/or the occurrence of a *toguéré* in the regional oral tradition confirm(s) an abandoned settlement's historical role.

This way natural and anthropogenic elevations were distinguished.

Each site was first subjected to a general inspection with the aim of gaining an impression of its shape, height, represented find categories, and plans of structures. Features such as houseplans, kilns, burial vessels, and flat graves were drawn and the mound's state of preservation and its situation in the landscape were also described. Secondly, the dwelling mounds were divided into different sectors on the basis of their dimensions and all rim sherds with a profile of at least five centimetres were randomly collected in those sectors. The rim fragments were collected in order to obtain as much information as possible on rim and



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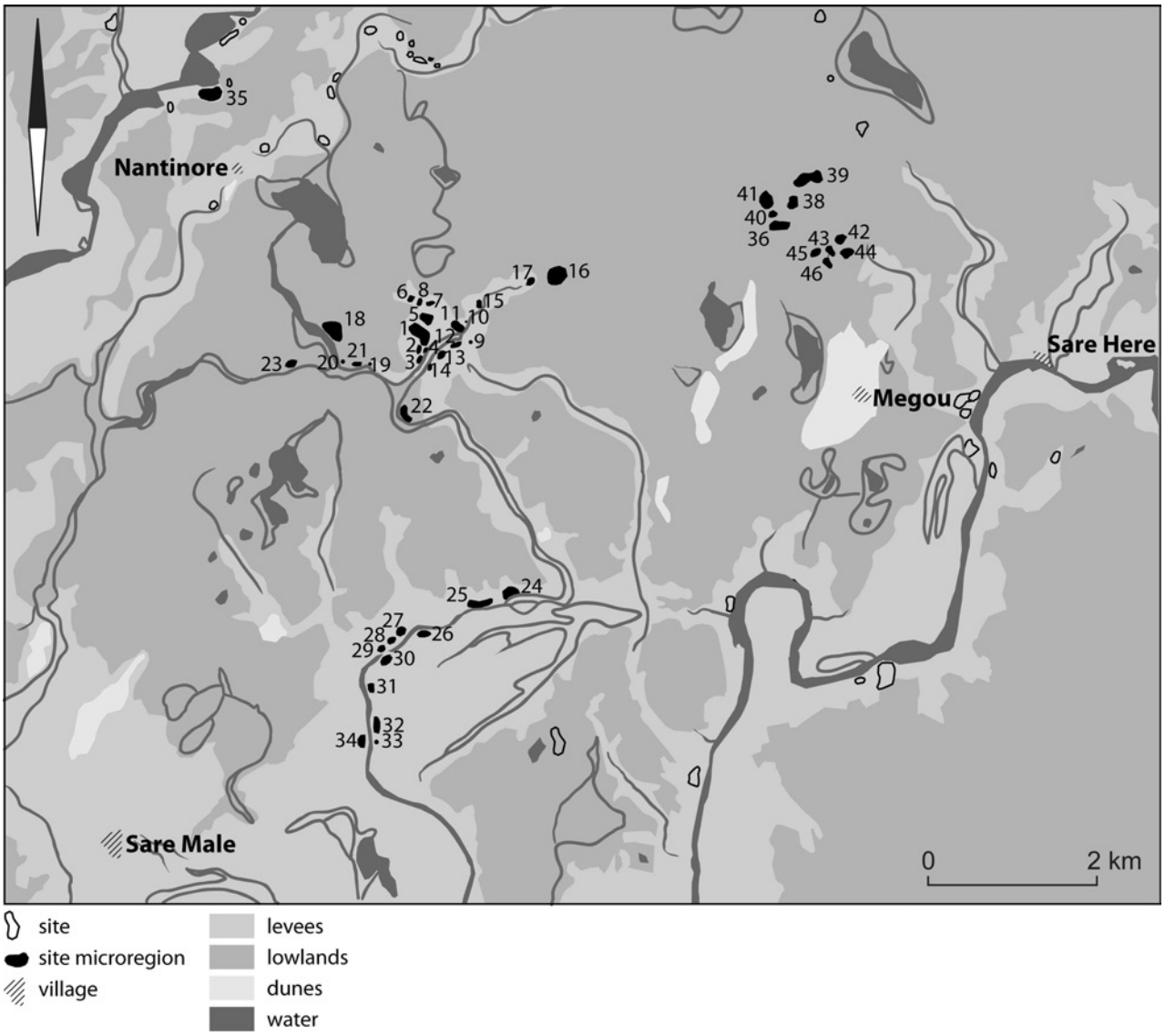


Fig. 2.
Microregion to the south of the village of Nantinoré

vessel type and decoration. As the ratios were to be expressed in percentages, it was decided to collect at least 100 rim fragments at each site, so that each sherd would represent at least 1%. This way the representativeness of the pottery sample and the comparability of the individual sites would be guaranteed. The sherds were left at the sites. A complicating factor is that phase-specific pottery types are rare in the southern Inland Niger Delta, where the different occupation periods distinguished are based primarily on the ratios of different types of pottery and not on their presence or absence (Bedaux *et al.* 1978; Gallay & Huysecom 1989; McIntosh 1995, 157 & 163; Schmidt *et al.* 2005, 252). Thirdly, artefacts other than pottery were collected from all over the surface of each mound. A selection was then made on the basis of their relevance with respect to answering the defined research questions.



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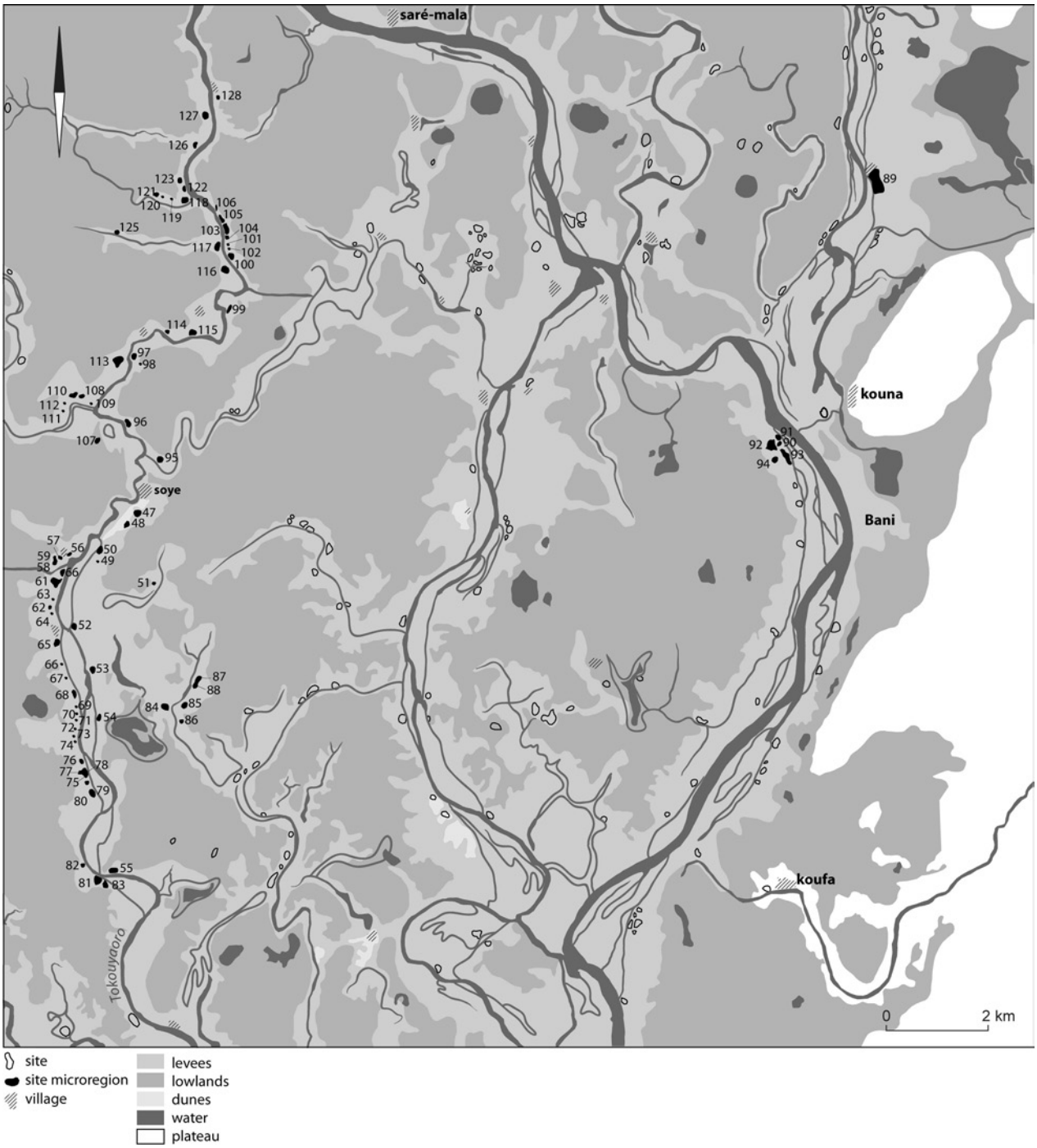


Fig. 3.
Microregion along the river Tokouyaoro, the Ladikouna cluster (90–4) and the site near Kolonqui (89)



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## CHRONOLOGICAL DIFFERENTIATION

Establishing the chronological differentiation of the surveyed sites is essential for understanding how the sites relate to one another. Working with surface finds restricts dating to the last occupation phases. The dates obtained can nevertheless be used to demonstrate contemporaneity of sites and establish chronological differentiation. The last occupation phases of the settlements were dated with the aid of phase-specific artefact types and pottery found on the surface. The first tell us in which period a settlement was definitely occupied. In this case the pottery tells us only the latest period when a site was occupied, and so provides a *terminus ante quem*.

The most influential post-depositional factors that have affected the visibility and composition of the surface remains are looting and water erosion. The precipitation involved in heavy downpours during the rainy season, from May until October, cannot all be absorbed into the ground, leading to the formation of streams. Those streams wash away the fine matrix of the top layers, leaving behind the heavier material. The flowing water also wears out deep gullies. In those gullies remains from older occupation layers are exposed and become mixed with younger remains. So over the centuries water erosion has affected the composition and spatial distribution of large and small, light and heavy, and young and old surface remains (Dembélé *et al.* 1993).

The visibility and composition of the surface remains are also greatly affected by increasing looting of archaeological sites by treasure hunters. These activities are prompted by deteriorating local living conditions, caused partly by increasing drought, and are encouraged by the growing interest of museums, galleries, and private collectors of ancient Malian 'art' in the West (Sidibé 1995; Panella 2002). This has aggravate the scale of the problem and, at the same time, the looting is being more systematically organised. Although it is illegal to excavate archaeological sites without official permission in Mali, 45% of the sites investigated in 1991 were found to have been affected by looting. In the case of 28% of the mounds the damage was limited to the effects of small-scale pits dug by individual treasure hunters, but 17% were badly affected by large-scale organised pillage (Dembélé *et al.* 1993). Only sites that still play an active role in the daily life of the local population – as a cemetery or place of offering – or sites that feature prominently in the local oral tradition run a lesser risk of being looted.

In total, 128 of the sites detected in the *Projet Togué* were re-examined. Phase-specific artefacts were found at 39 of them. At 85 sites sufficient surface pottery was collected for an extensive pottery analysis. As the present occupants of the Inland Niger Delta still actively collect artefacts to sell at markets we may assume that the original numbers of artefacts among the surface remains were much higher.

### *Phase-specific artefacts*

Three polished stone axes were found at the re-examined sites. They clearly resemble amulet axes from Asselar and In Koufa and could well belong to the Late Stone Age (LSA) tradition[1] (Gaussen & Gaussen 1988, 94 &103; MacDonald 1998). The polished axes represent an exceptional category within the homogeneous surface finds of the sites in the southern Inland Niger Delta. There are no records of other finds of polished axes from this region. They were probably made in the period preceding the currently known Iron Age occupation of this region[2], like the Ndondi Tossokel facies of the Dhar Tichitt tradition in the Méma region, and used secondarily at a later stage as an amulet or as a currency (Fig. 4) (MacDonald 1996).

Spindle whorls are often found in archaeological excavations and surveys in West Africa (Schmidt & Bedaux 2005). Spindle whorls were found lying at the surface of 20% of the re-examined sites (Fig. 5). The small, light examples were used mainly in spinning yarns of fine materials such as cotton, while the heavy larger ones were used to make yarns of coarser materials such as wool and camel/dromedary hair (Barber 1991, 52; Bedaux 1993, 456).

The earliest cotton finds of Dia date from the oldest occupation layers (8th century BC–0), but they are fairly rare. Cotton is represented in large quantities only from the 10th century AD onwards (Murray 2005). From Arabic sources it is known that cotton was grown in the lands of the Sahel during the kingdom of Ghana at the beginning of the 2nd millennium (Levtion & Hopkins 2000, 144–5). Around the same time, cotton tissues were produced in the Falaise of Bandiagara (Bolland 1991).The cotton fabrics that were produced in leading production centres such as Timbouctou, Djenné, and Dia were sold at local markets and via trans-Saharan trade (Levtzion 1973, 179).



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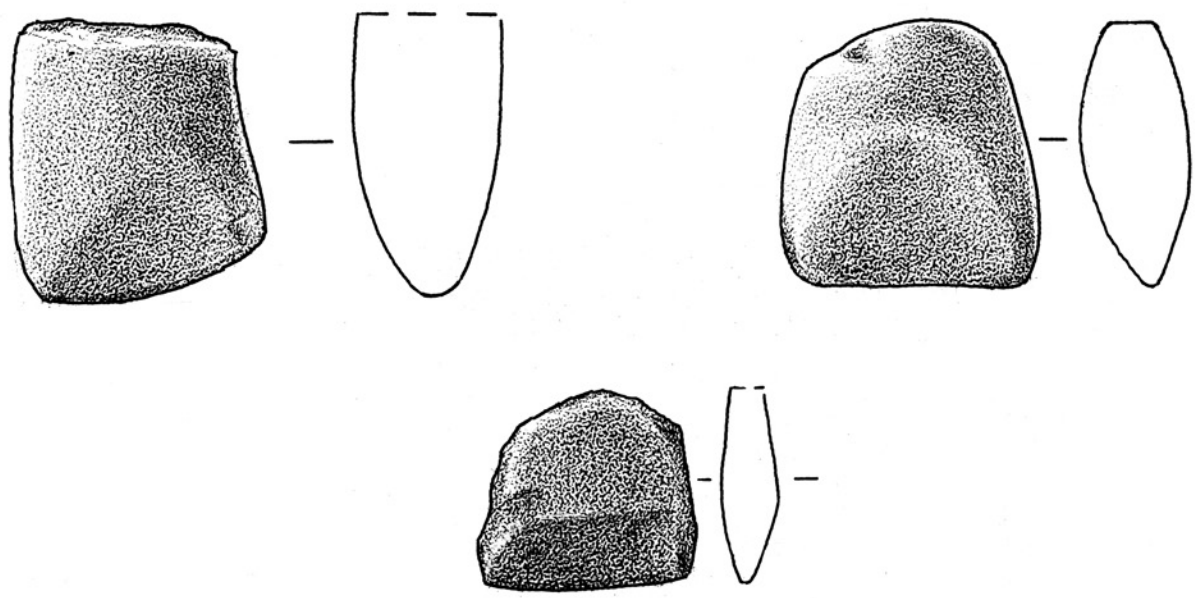

Fig. 4.
Polished stone axes from the sites 48, 49, & 26 (scale 1:2)

Cowries are found mainly on and around the Maldive Islands in the Indian Ocean but they also occur in other reef areas. From the 10th century onwards they were imported into West Africa via trans-Saharan trade to be used as currency or for decorative purposes (Mauny 1961, 420–1; Johnson 1965; Monod 1969; Togola 1996). After the arrival of the first Europeans, in the 15th century, the trans-Saharan cowry trade largely moved to the coast (Connah 1987, 147). Cowries went out of use as currency around 1900. Cowries were found at 5% of the re-examined sites.

Ornaments include lip plugs, beads, bracelets, and rings were also recovered. The sources and times of introduction of the materials employed provide useful information on trade contacts and the periods of occupation of the settlements.

Earthenware beads were found at many sites in various occupation layers (Gaussen & Gaussen 1988, 121; Togola 1993, 109; McIntosh 1995, 216; Insoll 2000, 102; Schmidt 2005b). Beads made of sandstone, quartz, quartzite, diorite, granite, schist, rock crystal, tufa, marble, and carnelian come from more restricted sources. The closest source of the sandstone found in the Inland Niger Delta is the Bandiagara plateau and the Boulel Ridge (Mauny 1961, 57; McIntosh 1995, 247; Togola 2008, 41). Beads of harder materials were from the LSA onwards produced by specialist bead makers in the north of Mali (Gaussen & Gaussen 1988, 179). According to Al-Bîrûnî, the rock crystal will have come from Basra in Iraq, but Al-Dimashqî quotes Egypt, Venice, and the Maghreb as sources (Lewicki 1967). The sources of the tufa and marble have not yet been identified. Neither is it clear where the carnelian came from. Many authors assume that carnelian does not occur in Africa and that it must have been imported from the Gulf of Cambay in India. The carnelian beads are assumed to have made their way into West Africa via Arabian trade in the early 15th century (Mauny 1961, 58; Connah 1987, 179; DeCorse 1989; Insoll & Shaw 1997; Insoll 2000, 102). Arabic sources however claim that the source of carnelian, *tasi-n-samt*, does lie in West Africa (Lewicki 1967). That the trade in carnelian began earlier than previously assumed is demonstrated by a LSA carnelian bead industry at Ilouk (Gaussen & Gaussen 1988, 177–8). Where the carnelian used there came from is not known, but the



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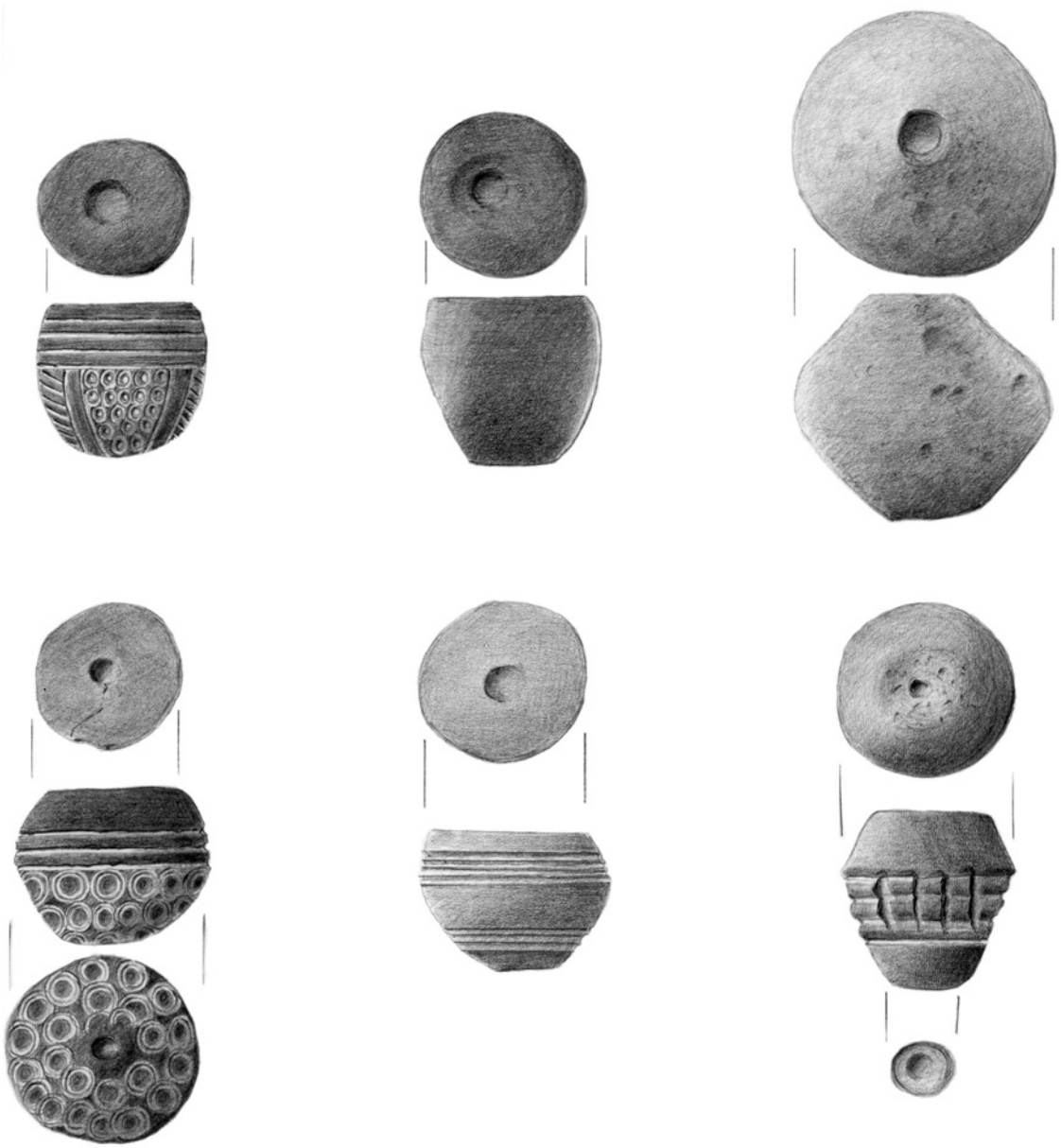

Fig. 5.
Spindle whorls from sites 99, 98, 53, 51, & 30 (scale 1:1.5)



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Adrar-n-Ifoghas is a more likely source than the Gulf of Cambaya. Glass beads were imported from three different areas. The beads with dates around the 9th century probably came from the Near East or the Islamic world (DeCorse 1989). The source of the glass beads with dates around the 15th century is also the Near East or Europe. Only very recently did people in Africa itself, for example the Nupé and Yoruba, start producing glass beads (Mauny 1961, 372; Menzel 1975; Magnavita 2003).

The bracelet remains are of schist and glass. Neolithic schist bracelet industries have been found in Gourma (Gaussen & Gaussen 1988, 253). Only one piece of a green glass bracelet was found. Glass bracelets are known from the 14th century onwards. They were imported from Egypt, with which there were intensive trade contacts, especially after the famous pilgrimage of the Malian king Mansa Moussa in 1324–5. The glass beads found at Teghaza are of later dates and came from the Near East (Mauny 1961, 372).

Lip plugs are made of earthenware or quartz. The use of lip plugs is probably an old tradition that was upheld until very recently (Lhote 1942–3; Gaussen & Gaussen 1962; Bedaux 1988).

The ornament finds also include two fragments of finely polished and finished agate rings. They came from the Idar-Oberstein gemstone industry in Germany which, between 1830 and 1980, produced more than a hundred million agate beads and rings for the African market. With the aid of the catalogue of the Idar-Oberstein gemstone industry one ring fragment could even be identified as production type 9.8.2: an arched ring with an annular groove (Trebbin 1985, 3 & 39).

Pipe fragments were found at 16% of the re-examined sites. At half of those sites they were encountered in large concentrations, especially at the togué near Ladikouna. The earthenware pipes were produced locally. Pipe smoking is associated with the introduction of tobacco into West Africa, so the oldest pipes date from the 17th century (Daget & Ligers 1962; Welling 2000–1; McIntosh *et al.* 2003).

Some of the artefacts, for which the date of introduction into West Africa is known, can be used as 'type fossils', ie, phase-specific artefacts (Mauny 1964). Polished axes represent an LSA tradition. Undecorated spindle whorls were used from the 8th century onwards; cowries from the 10th century; and decorated spindle whorls were first used in West Africa in the 11th century (Schmidt & Bedaux 2005; Mauny 1961, 420–1). Glass beads with dates going back to the 8th century have sporadically been found, but most beads date from the 11th and later centuries (Schmidt 2005b). The *terminus post quem* of glass bracelets is the 14th century, that of pipes the 17th century (Mauny 1961, 372; McIntosh *et al.* 2003). Fragments of agate rings from Idar-Oberstein date from the 19th century (Trebbin 1985, 3). At sites with several phase-specific artefacts, those with the youngest date indicate the last occupation phase. In the case of sites without type fossils, either the site was abandoned before the introduction of the phase-specific artefacts or the artefacts concerned were removed or not found. Most significant in terms of chronological differentiation are decorated or undecorated spindle whorls, pipes, and agate rings. The results of the dating of the sites on the basis of phase-specific artefacts are presented in Table 1.

*Pottery*

Phase-specific artefacts were not found at all the sites and pottery was better represented: 85 sites yielded 100 rim sherds or more, making dating on the basis of surface pottery an alternative dating method. But as the pottery of the Inland Niger Delta is very homogeneous and shows little diachronic change, it is difficult to infer last occupation phases from the surface finds. Differences between phases are determined far more by changing ratios than by changes in the composition of the range of vessel types.

The pottery was coded in the field. Rim types, vessel types, and decoration were each described separately. Each rim fragment was classified under one rim type and one vessel type. So the rim and vessel types together are always 100%. This is not necessarily the case with the types of decoration. Different types of decoration may be combined on a single sherd, so the total score may be higher than 100%, and some sherds are undecorated (Table 2).

It was initially hoped that it would be possible to expand the typological sequence of Djenné-Djeno with information obtained in the excavation at Dia. The pottery research at Dia however showed that the typological sequence of Djenné-Djeno could not be used there and is of only limited regional use (Schmidt *et al.* 2005, 251). Our microregion criteria therefore had to be formulated on the basis of the closest typological sequence available: that of



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TABLE 1 DATES OF THE SITES BASED ON PHASE-SPECIFIC ARTEFACTS

| *Site code* | *Polished axes* | *Undec. spindle whorls* | *Cowries* | *Dec. spindle whorls* | *Glass beads + bracelet* | *Pipes* | *Agate ring* | *Date introduction, century AD* | *Period* |
|---|---|---|---|---|---|---|---|---|---|
| 48 | • | • | • | • | • | • | • | <8th | early |
| 19 | • | • | • | • | • | • | • | 8th | middle |
| 21 | • | • | • | • | • | • | • | 8th | middle |
| 83 | • | • | • | • | • | • | • | 8th | middle |
| 29 | • | • | • | • | • | • | • | 8th | middle |
| 68 | • | • | • | • | • | • | • | 10th | middle |
| 103 | • | • | • | • | • | • | • | 10th | middle |
| 118 | • | • | • | • | • | • | • | 10th | middle |
| 41 | • | • | • | • | • | • | • | 11th | middle |
| 65 | • | • | • | • | • | • | • | 11th | middle |
| 4 | • | • | • | • | • | • | • | 11th | middle |
| 122 | • | • | • | • | • | • | • | 11th | middle |
| 55 | • | • | • | • | • | • | • | 11th | middle |
| 84 | • | • | • | • | • | • | • | 11th | middle |
| 107 | • | • | • | • | • | • | • | 11th | middle |
| 49 | • | • | • | • | • | • | • | 11th | middle |
| 2 | • | • | • | • | • | • | • | 11th | middle |
| 51 | • | • | • | • | • | • | • | 11th | middle |
| 54 | • | • | • | • | • | • | • | 11th | middle |
| 34 | • | • | • | • | • | • | • | 11th | middle |
| 81 | • | • | • | • | • | • | • | 11th | middle |
| 121 | • | • | • | • | • | • | • | 17th | late |
| 94 | • | • | • | • | • | • | • | 17th | late |
| 9 | • | • | • | • | • | • | • | 17th | late |
| 92 | • | • | • | • | • | • | • | 17th | late |
| 16 | • | • | • | • | • | • | • | 17th | late |
| 26 | • | • | • | • | • | • | • | 17th | late |
| 96 | • | • | • | • | • | • | • | 17th | late |
| 91 | • | • | • | • | • | • | • | 17th | late |
| 1 | • | • | • | • | • | • | • | 17th | late |
| 30 | • | • | • | • | • | • | • | 17th | late |
| 35 | • | • | • | • | • | • | • | 17th | late |
| 53 | • | • | • | • | • | • | • | 17th | late |
| 97 | • | • | • | • | • | • | • | 17th | late |
| 106 | • | • | • | • | • | • | • | 17th | late |
| 99 | • | • | • | • | • | • | • | 17th | late |
| 117 | • | • | • | • | • | • | • | 17th | late |
| 93 | • | • | • | • | • | • | • | 19th | late |
| 90 | • | • | • | • | • | • | • | 19th | late |



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TABLE 2 DATES OF THE SITES BASED ON SURFACE POTTERY

| | | *Rims %* | | | | | | *Shape %* | | | | | | *Decoration %* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Site code* | *N =* | *Simple rims* | *Outturned rims* | *Inturned rims* | *Ledged rims* | *T-rims* | *Phase* | *Open* | *Closed* | *Potlid* | *Plate* | *Carinated* | *Phase* | *Painted* | *Twine 6/7* | *Twine4* | *Twine1* | *Stamped* | *Phase* | *Ceramic phase* | *Period* |
| 48 | 154 | 68 | 32 | 0 | 0 | 0 | 1&2 | 19 | 64 | 6 | 6 | 4 | 1&2 | 1 | 23 | 21 | 1 | 0 | 1&2 | 1&2 | early |
| 43 | 169 | 69 | 31 | 0 | 0 | 0 | 1&2 | 39 | 20 | 25 | 0 | 16 | 1&2 | 15 | 65 | 48 | 1 | 0 | 1&2 | 1&2 | early |
| 25 | 492 | 76 | 24 | 0 | 0 | 0 | 1&2 | 40 | 22 | 10 | 0 | 28 | 1&2 | 19 | 43 | 44 | 4 | 0 | 1&2,3 | 1&2 | early |
| 31 | 157 | 84 | 16 | 0 | 0 | 0 | 1&2 | 36 | 18 | 19 | 2 | 25 | 3 | 12 | 42 | 47 | 3 | 0 | 1&2,3 | 1&2,3 | early |
| 87 | 266 | 70 | 29 | 0 | 1 | 0 | 3 | 16 | 26 | 21 | 14 | 23 | 3 | 33 | 17 | 37 | 17 | 0 | 3 | 3 | early |
| 46 | 286 | 68 | 30 | 0 | 1 | 0 | 3 | 15 | 20 | 20 | 16 | 28 | 3 | 34 | 11 | 26 | 28 | 0 | 3 | 3 | early |
| 68 | 222 | 71 | 28 | 0 | 1 | 0 | 3 | 13 | 19 | 26 | 12 | 30 | 3 | 39 | 5 | 27 | 30 | 0 | 3 | 3 | early |
| 26 | 146 | 73 | 21 | 0 | 4 | 1 | 4 | 22 | 20 | 24 | 7 | 27 | 3 | 27 | 8 | 18 | 20 | 0 | 3 | 3 | early |
| 61 | 377 | 69 | 29 | 0 | 1 | 1 | 4 | 11 | 28 | 24 | 10 | 28 | 3 | 38 | 11 | 43 | 25 | 0 | 3 | 3 | early |
| 42 | 206 | 72 | 24 | 1 | 3 | 0 | 4 | 24 | 19 | 21 | 4 | 33 | 3 | 25 | 31 | 42 | 14 | 0 | 3 | 3 | early |
| 14 | 113 | 59 | 27 | 0 | 14 | 0 | 3 | 17 | 18 | 25 | 14 | 27 | 3 | 0 | 6 | 2 | 35 | 0 | 4 | 3 | early |
| 27 | 378 | 33 | 60 | 0 | 7 | 0 | 3 | 16 | 34 | 17 | 5 | 28 | 3 | 3 | 15 | 5 | 47 | 0 | 4 | 3 | early |
| 18 | 122 | 53 | 35 | 0 | 11 | 0 | 3 | 20 | 15 | 18 | 16 | 31 | 3 | 0 | 6 | 1 | 23 | 0 | 4 | 3 | early |
| 101 | 115 | 79 | 21 | 0 | 0 | 0 | 1&2 | 10 | 18 | 38 | 5 | 28 | 4 | 39 | 16 | 46 | 20 | 0 | 3 | 4? | middle |
| 103 | 210 | 73 | 26 | 0 | 0 | 0 | 1&2 | 16 | 19 | 31 | 7 | 26 | 4 | 37 | 11 | 49 | 13 | 0 | 3 | 4? | middle |
| 44 | 147 | 59 | 35 | 1 | 5 | 0 | 4 | 29 | 27 | 14 | 5 | 24 | 3 | 14 | 29 | 18 | 24 | 0 | 1&2,3 | 4? | middle |
| 32 | 119 | 32 | 65 | 0 | 3 | 0 | 3 | 8 | 61 | 21 | 1 | 9 | 4 | 2 | 2 | 1 | 63 | 0 | 4 | 4 | middle |
| 85 | 142 | 55 | 43 | 0 | 2 | 0 | 3 | 12 | 27 | 30 | 9 | 22 | 4 | 19 | 8 | 17 | 36 | 0 | 4 | 4 | middle |
| 62 | 141 | 61 | 38 | 0 | 1 | 0 | 3 | 4 | 21 | 41 | 12 | 23 | 4 | 16 | 7 | 16 | 28 | 0 | 4 | 4 | middle |
| 34 | 146 | 55 | 37 | 0 | 7 | 1 | 4 | 22 | 27 | 18 | 10 | 22 | 3 | 22 | 7 | 19 | 25 | 0 | 4 | 4 | middle |
| 10 | 106 | 46 | 39 | 8 | 6 | 1 | 4 | 8 | 34 | 22 | 10 | 25 | 3 | 7 | 4 | 0 | 50 | 0 | 4 | 4 | middle |
| 21 | 157 | 47 | 46 | 3 | 3 | 2 | 4 | 8 | 23 | 21 | 22 | 25 | 3 | 4 | 4 | 2 | 20 | 0 | 4 | 4 | middle |
| 19 | 100 | 45 | 44 | 2 | 9 | 0 | 4 | 12 | 28 | 24 | 9 | 27 | 3 | 1 | 3 | 0 | 22 | 0 | 4 | 4 | middle |
| 20 | 115 | 57 | 36 | 2 | 6 | 0 | 4 | 8 | 15 | 31 | 15 | 31 | 3 | 0 | 4 | 0 | 8 | 0 | 4 | 4 | middle |
| 22 | 315 | 62 | 30 | 0 | 7 | 1 | 4 | 16 | 19 | 29 | 7 | 30 | 3 | 11 | 5 | 0 | 19 | 0 | 4 | 4 | middle |
| 28 | 100 | 47 | 46 | 0 | 6 | 1 | 4 | 10 | 37 | 18 | 2 | 33 | 3 | 2 | 7 | 6 | 41 | 0 | 4 | 4 | middle |
| 23 | 100 | 43 | 53 | 1 | 3 | 0 | 4 | 9 | 27 | 10 | 7 | 47 | 3 | 7 | 6 | 0 | 35 | 0 | 4 | 4 | middle |
| 93 | 117 | 62 | 37 | 1 | 1 | 0 | 4 | 15 | 38 | 22 | 7 | 17 | 4 | 29 | 13 | 30 | 27 | 0 | 3 | 4 | middle |

TABLE 2 DATES OF THE SITES BASED ON SURFACE POTTERY

| | | *Rims %* | | | | | | *Shape %* | | | | | | *Decoration %* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Site code* | *N =* | *Simple rims* | *Outturned rims* | *Inturned rims* | *Ledged rims* | *T-rims* | *Phase* | *Open* | *Closed* | *Potlid* | *Plate* | *Carinated* | *Phase* | *Painted* | *Twine 6/7* | *Twine4* | *Twine1* | *Stamped* | *Phase* | *Ceramic phase* | *Period* |
| 60 | 183 | 74 | 24 | 1 | 2 | 0 | 4 | 16 | 34 | 25 | 2 | 22 | 4 | 16 | 11 | 53 | 15 | 0 | 3 | 4 | middle |
| 59 | 100 | 82 | 17 | 1 | 0 | 0 | 4 | 16 | 16 | 35 | 5 | 28 | 4 | 25 | 2 | 36 | 23 | 0 | 3 | 4 | middle |
| 13 | 177 | 46 | 34 | 4 | 14 | 2 | 4 | 24 | 21 | 23 | 13 | 19 | 4 | 8 | 12 | 2 | 34 | 0 | 4 | 4 | middle |
| 75 | 133 | 57 | 39 | 1 | 3 | 0 | 4 | 8 | 38 | 26 | 11 | 17 | 4 | 14 | 12 | 14 | 34 | 0 | 4 | 4 | middle |
| 121 | 106 | 37 | 52 | 3 | 6 | 2 | 4 | 8 | 50 | 26 | 3 | 12 | 4 | 0 | 0 | 0 | 54 | 0 | 4 | 4 | middle |
| 11 | 121 | 43 | 40 | 5 | 9 | 3 | 4 | 16 | 21 | 28 | 20 | 15 | 4 | 18 | 2 | 1 | 41 | 0 | 4 | 4 | middle |
| 123 | 214 | 54 | 35 | 6 | 5 | 0 | 4 | 7 | 35 | 29 | 7 | 22 | 4 | 11 | 11 | 14 | 43 | 0 | 4 | 4 | middle |
| 58 | 217 | 69 | 28 | 2 | 1 | 0 | 4 | 8 | 27 | 30 | 9 | 26 | 4 | 24 | 5 | 19 | 39 | 0 | 4 | 4 | middle |
| 64 | 160 | 67 | 28 | 1 | 4 | 0 | 4 | 11 | 18 | 36 | 13 | 23 | 4 | 13 | 1 | 3 | 39 | 0 | 4 | 4 | middle |
| 12 | 161 | 63 | 25 | 0 | 10 | 2 | 4 | 16 | 19 | 37 | 11 | 17 | 4 | 4 | 9 | 7 | 23 | 0 | 4 | 4 | middle |
| 117 | 236 | 67 | 33 | 0 | 0 | 0 | 1&2 | 9 | 26 | 26 | 5 | 33 | 3 | 39 | 13 | 18 | 22 | 2 | 5 | 5 | late |
| 94 | 105 | 77 | 21 | 0 | 0 | 2 | 4 | 13 | 30 | 36 | 0 | 20 | 1&2 | 30 | 9 | 10 | 15 | 3 | 5 | 5 | late |
| 104 | 121 | 69 | 28 | 0 | 2 | 0 | 3 | 12 | 26 | 28 | 5 | 28 | 3 | 26 | 7 | 23 | 21 | 1 | 5 | 5 | late |
| 33 | 324 | 35 | 54 | 0 | 10 | 0 | 3 | 13 | 41 | 18 | 6 | 23 | 3 | 4 | 6 | 3 | 52 | 2 | 5 | 5 | late |
| 49 | 474 | 65 | 34 | 0 | 1 | 0 | 3 | 15 | 33 | 21 | 8 | 23 | 3 | 25 | 24 | 29 | 21 | 1 | 5 | 5 | late |
| 97 | 124 | 65 | 33 | 0 | 2 | 0 | 3 | 5 | 34 | 27 | 1 | 33 | 3 | 29 | 23 | 2 | 8 | 3 | 5 | 5 | late |
| 37 | 108 | 36 | 63 | 0 | 1 | 0 | 3 | 12 | 31 | 19 | 5 | 33 | 3 | 1 | 4 | 0 | 49 | 3 | 5 | 5 | late |
| 51 | 227 | 60 | 38 | 0 | 1 | 0 | 3 | 7 | 24 | 28 | 2 | 38 | 3 | 0 | 4 | 2 | 56 | 3 | 5 | 5 | late |
| 53 | 268 | 44 | 52 | 0 | 4 | 0 | 3 | 4 | 8 | 23 | 5 | 59 | 3 | 6 | 7 | 1 | 54 | 6 | 5 | 5 | late |
| 30 | 349 | 51 | 44 | 0 | 5 | 0 | 3 | 10 | 17 | 20 | 5 | 48 | 3 | 7 | 7 | 4 | 35 | 7 | 5 | 5 | late |
| 54 | 262 | 58 | 39 | 0 | 2 | 0 | 3 | 5 | 17 | 24 | 11 | 44 | 3 | 26 | 5 | 7 | 46 | 8 | 5 | 5 | late |
| 7 | 100 | 34 | 34 | 9 | 22 | 1 | 4 | 28 | 32 | 14 | 6 | 20 | 3 | 8 | 4 | 0 | 34 | 2 | 5 | 5 | late |
| 9 | 283 | 51 | 38 | 2 | 8 | 1 | 4 | 17 | 22 | 19 | 12 | 29 | 3 | 8 | 5 | 0 | 42 | 1 | 5 | 5 | late |
| 5 | 158 | 37 | 61 | 1 | 1 | 0 | 4 | 9 | 29 | 19 | 14 | 29 | 3 | 7 | 9 | 1 | 51 | 2 | 5 | 5 | late |
| 113 | 524 | 68 | 31 | 1 | 1 | 0 | 4 | 14 | 20 | 26 | 11 | 30 | 3 | 52 | 10 | 36 | 29 | 1 | 5 | 5 | late |
| 100 | 176 | 49 | 43 | 1 | 6 | 1 | 4 | 7 | 28 | 27 | 6 | 32 | 3 | 8 | 5 | 4 | 52 | 1 | 5 | 5 | late |
| 6 | 171 | 41 | 50 | 2 | 4 | 3 | 4 | 13 | 24 | 20 | 11 | 32 | 3 | 9 | 5 | 1 | 43 | 2 | 5 | 5 | late |
| 92 | 166 | 71 | 27 | 1 | 1 | 0 | 4 | 15 | 20 | 24 | 8 | 33 | 3 | 40 | 19 | 1 | 27 | 17 | 5 | 5 | late |
| 122 | 158 | 41 | 51 | 5 | 3 | 0 | 4 | 7 | 30 | 23 | 7 | 34 | 3 | 1 | 1 | 1 | 65 | 1 | 5 | 5 | late |
| 90 | 141 | 81 | 17 | 0 | 1 | 1 | 4 | 8 | 25 | 30 | 3 | 34 | 3 | 47 | 25 | 1 | 14 | 11 | 5 | 5 | late |

TABLE 2 DATES OF THE SITES BASED ON SURFACE POTTERY

| | | *Rims %* | | | | | | *Shape %* | | | | | | *Decoration %* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Site code* | *N =* | *Simple rims* | *Outturned rims* | *Inturned rims* | *Ledged rims* | *T-rims* | *Phase* | *Open* | *Closed* | *Potlid* | *Plate* | *Carinated* | *Phase* | *Painted* | *Twine 6/7* | *Twine4* | *Twine1* | *Stamped* | *Phase* | *Ceramic phase* | *Period* |
| 4 | 256 | 48 | 42 | 4 | 5 | 1 | 4 | 9 | 20 | 13 | 23 | 35 | 3 | 5 | 4 | 1 | 57 | 3 | 5 | 5 | late |
| 106 | 257 | 49 | 46 | 1 | 4 | 0 | 4 | 8 | 19 | 27 | 10 | 35 | 3 | 14 | 6 | 17 | 47 | 3 | 5 | 5 | late |
| 40 | 116 | 45 | 50 | 0 | 4 | 1 | 4 | 11 | 26 | 24 | 3 | 36 | 3 | 1 | 2 | 1 | 51 | 1 | 5 | 5 | late |
| 41 | 220 | 34 | 56 | 1 | 5 | 4 | 4 | 11 | 32 | 16 | 5 | 36 | 3 | 2 | 2 | 0 | 48 | 3 | 5 | 5 | late |
| 83 | 154 | 42 | 51 | 3 | 4 | 0 | 4 | 8 | 29 | 18 | 6 | 38 | 3 | 3 | 5 | 1 | 64 | 1 | 5 | 5 | late |
| 96 | 196 | 60 | 35 | 2 | 3 | 0 | 4 | 10 | 23 | 23 | 7 | 38 | 3 | 8 | 4 | 7 | 37 | 4 | 5 | 5 | late |
| 2 | 129 | 54 | 36 | 2 | 4 | 5 | 4 | 14 | 15 | 25 | 8 | 39 | 3 | 3 | 7 | 2 | 29 | 2 | 5 | 5 | late |
| 29 | 218 | 50 | 41 | 1 | 6 | 1 | 4 | 9 | 26 | 22 | 4 | 39 | 3 | 12 | 6 | 5 | 45 | 2 | 5 | 5 | late |
| 116 | 165 | 58 | 36 | 3 | 4 | 0 | 4 | 7 | 22 | 20 | 10 | 41 | 3 | 6 | 0 | 5 | 56 | 5 | 5 | 5 | late |
| 55 | 127 | 51 | 43 | 1 | 5 | 1 | 4 | 8 | 28 | 19 | 4 | 41 | 3 | 19 | 9 | 3 | 45 | 8 | 5 | 5 | late |
| 16 | 232 | 41 | 55 | 3 | 2 | 0 | 4 | 7 | 27 | 16 | 8 | 42 | 3 | 3 | 13 | 0 | 47 | 1 | 5 | 5 | late |
| 118 | 278 | 53 | 42 | 1 | 3 | 0 | 4 | 3 | 22 | 24 | 9 | 42 | 3 | 5 | 2 | 1 | 62 | 3 | 5 | 5 | late |
| 107 | 187 | 59 | 35 | 1 | 4 | 1 | 4 | 8 | 13 | 29 | 6 | 44 | 3 | 3 | 5 | 2 | 47 | 4 | 5 | 5 | late |
| 1 | 734 | 55 | 42 | 1 | 1 | 1 | 4 | 7 | 20 | 22 | 6 | 45 | 3 | 15 | 14 | 1 | 30 | 3 | 5 | 5 | late |
| 84 | 350 | 55 | 43 | 1 | 2 | 0 | 4 | 2 | 18 | 28 | 3 | 48 | 3 | 3 | 6 | 2 | 58 | 2 | 5 | 5 | late |
| 81 | 174 | 51 | 44 | 1 | 3 | 0 | 4 | 4 | 23 | 16 | 8 | 49 | 3 | 6 | 2 | 2 | 53 | 3 | 5 | 5 | late |
| 2 | 131 | 52 | 41 | 5 | 2 | 0 | 4 | 8 | 12 | 25 | 5 | 49 | 3 | 2 | 4 | 4 | 45 | 5 | 5 | 5 | late |
| 39 | 395 | 54 | 40 | 0 | 3 | 3 | 4 | 11 | 13 | 18 | 9 | 49 | 3 | 9 | 6 | 6 | 40 | 8 | 5 | 5 | late |
| 99 | 178 | 53 | 44 | 1 | 2 | 0 | 4 | 6 | 15 | 24 | 3 | 52 | 3 | 1 | 7 | 1 | 53 | 3 | 5 | 5 | late |
| 38 | 193 | 54 | 43 | 0 | 2 | 1 | 4 | 9 | 13 | 18 | 7 | 53 | 3 | 2 | 3 | 1 | 45 | 6 | 5 | 5 | late |
| 35 | 364 | 39 | 53 | 1 | 6 | 2 | 4 | 6 | 14 | 23 | 1 | 56 | 3 | 4 | 8 | 1 | 38 | 2 | 5 | 5 | late |
| 105 | 272 | 73 | 26 | 0 | 1 | 0 | 3 | 10 | 22 | 31 | 7 | 29 | 4 | 29 | 13 | 27 | 23 | 1 | 5 | 5 | late |
| 91 | 138 | 72 | 25 | 0 | 2 | 0 | 3 | 12 | 19 | 38 | 7 | 24 | 4 | 26 | 15 | 1 | 21 | 9 | 5 | 5 | late |
| 65 | 351 | 44 | 52 | 3 | 2 | 0 | 4 | 5 | 34 | 26 | 10 | 25 | 4 | 2 | 2 | 1 | 56 | 2 | 5 | 5 | late |
| 24 | 119 | 53 | 37 | 2 | 8 | 0 | 4 | 15 | 29 | 27 | 7 | 22 | 4 | 7 | 11 | 2 | 17 | 1 | 5 | 5 | late |
| 126 | 165 | 52 | 41 | 3 | 4 | 0 | 4 | 10 | 24 | 29 | 14 | 23 | 4 | 7 | 8 | 12 | 50 | 1 | 5 | 5 | late |
| 63 | 124 | 59 | 39 | 2 | 1 | 0 | 4 | 2 | 18 | 40 | 23 | 16 | 4 | 7 | 2 | 19 | 32 | 1 | 5 | 5 | late |

Djenné-Djeno (McIntosh & McIntosh 1980; McIntosh 1995). But this sequence involves a chronological limitation, because it stops around AD 1400 (McIntosh 1995, 156). Many of the re-examined sites yielded pipes, implying that they were abandoned later. We therefore had to complement the sequence with a Phase V.

The following criteria, phases and terminology are based on McIntosh & McIntosh (1980) and McIntosh (1995):

1. The range of rim types became more diverse with time. Phase I/II (250 BC–AD 350) is characterised by a limited number of rim types: exclusively simple and outturned rims. The pottery of Phase III (350–850) has ledged rims, but does (so far) not include vessels with T or inturned rims. Characteristic of Phase IV (850–1400) is a great diversity of rims, including T and inturned rims.

2. The decisive factor with respect to vessel types is the ratio of the different forms. Phase I/II is characterised by predominantly open and closed types and the almost complete absence of plates. The pottery of Phase III includes more carinated types than pot lids, but they are always combined with plates. Pot lids are the dominant type in the pottery of Phase IV.

3. As far as the decoration of the rim fragments is concerned, the pottery of Phase I/II is characterised by twisted cord roulettes (Twine 6/7; Fig. 6a) and that of Phase III by accordion-plaited strip roulettes (Twine 4; Fig. 6b) combined with painted decoration. Standard 2- or 3-cord-plaited roulettes (Twine 1; Fig. 6c) were particularly popular in Phase IV. Rim sherds with stamped decoration were found neither at Djenné-Djeno nor at togué Galia and Doupwil. So stamped decoration would appear to be a distinguishing feature of the pottery of Phase V, from the period after 1400.

Each site was attributed to a specific phase on the basis of each of these three variables: rims, vessel types, and decoration. Subsequently the three series were combined. In the case of attribution to different periods, two identical attributions were taken to be decisive. In the case of several periods the most recent was chosen. As Phase V was only represented by

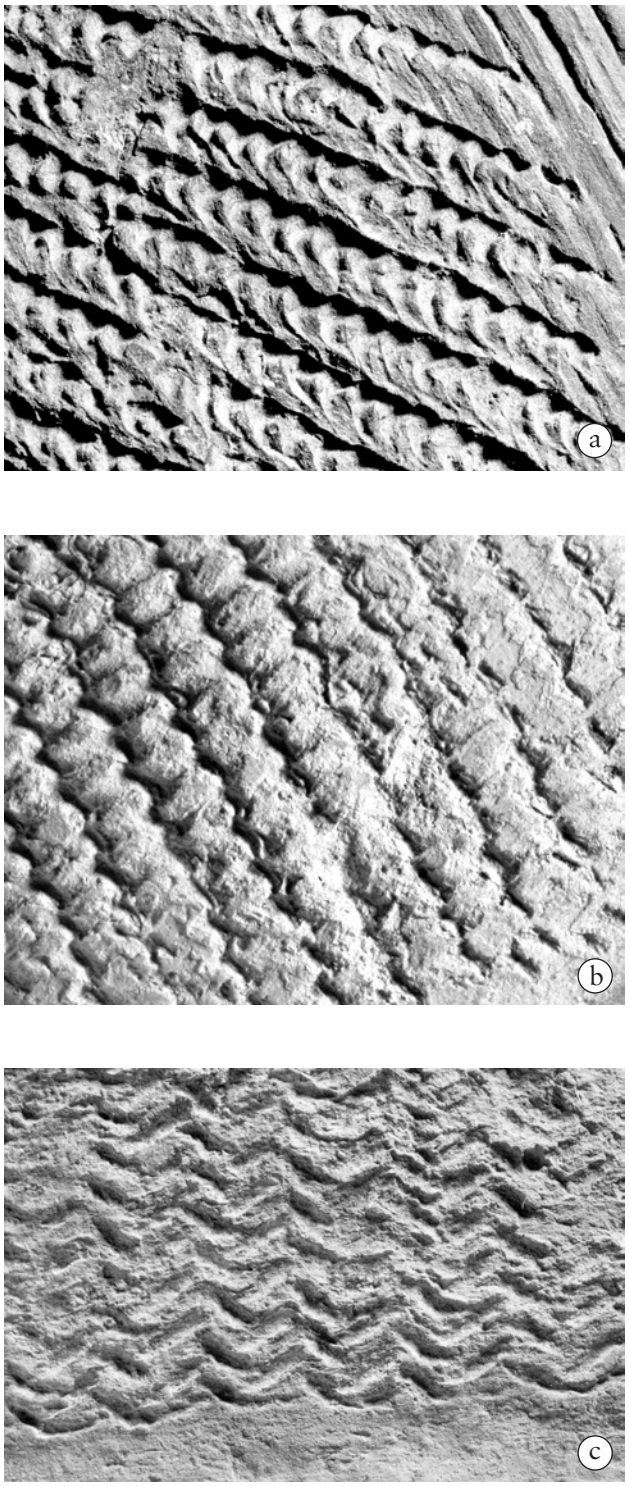


Fig. 6.
a) Twine 6/7; b) Twine 4; c) Twine 1



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decoration, precluding a double score, the presence of stamped pottery was taken to imply a date in the late period (Table 2).

*Periodisation of the sites*

In most cases one of the two dating methods or a combination of the two led to a date for the last occupation phase, and it proved to be possible to infer chronological differentiation between the individual sites. In four cases there was a discrepancy because the phase-specific artefacts were of more recent date than the surface pottery.

Three periods were distinguished. The periodisation is unfortunately fairly coarse, including periods that lasted for several centuries. The earliest period, before the 8th century, is characterised by the absence of phase-specific artefacts and by pottery of Phases I/II and III. At 11 sites the occupation was limited to this period. The middle period, from the 8th to the end of the 14th century, is characterised by the occurrence of spindle whorls, cowries and/or glass, and by pottery of Phase IV. At 24 sites occupation came to an end in this period. The distinguishing features of the late period, the 14th–19th centuries, are pipes, fragments of agate rings, and stamped pottery. With a total of 50 sites, this period is the best represented (Table 3). The present occupation of the region is, of course, the most recent occupation phase. The only site whose date could be stratigraphically checked is Toguéré Ladikouna, which was excavated by the Instituut des Sciences Humaines in 1994. The radiocarbon dates of the most recent occupation layers agree with the outcome of the dating method described above.[3]

Comparison of the results of the surveys around the urban centres of Dia and Djenné-Djeno and those in the rural hinterland showed that the majority of the sites around the towns were abandoned in the middle period and those in the hinterland, on the contrary, in the late period (McIntosh & McIntosh 1980, 382; Schmidt 2005d). We may assume that living conditions around the large urban centres deteriorated after the collapse of the Mali Empire, prompting the population to move elsewhere. Apparently the consequences of the collapse affected the towns earlier than the rural areas.

The three most important settlement clusters – Ladikouna (90–94), Sonon (1–14), and Megou (36–46) – each show a different chronological range. Ladikouna consists of a group of occupation mounds that were all occupied until the late period. Sonon is different in that it includes one site that was abandoned at an early stage, a few sites that were abandoned in the middle period, and sites that were abandoned in the late period. The cluster in the lowlands beyond the levees near Megou comprises three sites that were abandoned early and five that were abandoned late. Only one site was abandoned in the middle period.

## FUNCTIONAL DIFFERENTIATION

Is it possible to distinguish functional differentiation between the sites, besides chronological differentiation? During the survey it was found that almost all the potential elevations in the stereo photos were archaeological sites. Irrespective of their height, which was sometimes quite insignificant, or their atypical appearance, the mounds that were found to consist of loam will at some time have supported mudbrick buildings, implying that they are anthropogenic in origin – even mounds that yielded only few surface remains. But did the mounds in question all bear actual settlements?

*Burial mounds and cemeteries*

The excavation of the El Oualadji mound by Desplagnes in 1904 showed that some of the archaeological sites in the Inland Niger Delta are burial mounds (Desplagnes 1951; Raimbault & Sanogo 1991, 253). When we consider only morphology, tumuli can be characterised as small, tall, squat mounds with steep flanks. In a survey it is, however, difficult to determine a mound's original morphology due to erosion, which may be quite substantial (Raimbault & Sanogo 1991, 253 & 257). In the *Projet Togué* research area (N=834) only a small number of sites (N=8) could be identified as such. It is likely that none of the re-examined sites are specifically burial mounds.

Two burial traditions can be distinguished in the research area: burial in earthenware vessels and inhumation in flat graves. Burial vessels projecting from the eroded surface were found at 87% of the re-examined sites (Fig. 7). The custom of burying the deceased in vessels was very common throughout the



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TABLE 3 FINAL PERIODISATION OF THE SITES

| *Site code* | *Phase-specific artefacts* | *Period (phase-specific artefacts)* | *Ceramic phase* | *Period (surface pottery)* | *Overall period (centuries AD)* |
|---|---|---|---|---|---|
| 48 | <8th | early | 1&2 | early | <8th |
| 68 | 10th | middle | 3 | early | 8th–end 14th? |
| 19 | 8th | middle | 4 | middle | 8th–end 14th |
| 21 | 8th | middle | 4 | middle | 8th–end 14th |
| 103 | 10th | middle | 4? | middle | 8th–end 14th |
| 34 | 11th | middle | 4 | middle | 8th–end 14th |
| 83 | 8th | middle | 5 | late | 14th–19th |
| 118 | 10th | middle | 5 | late | 14th–19th |
| 2 | 11th | middle | 5 | late | 14th–19th |
| 4 | 11th | middle | 5 | late | 14th–19th |
| 41 | 11th | middle | 5 | late | 14th–19th |
| 49 | 11th | middle | 5 | late | 14th–19th |
| 51 | 11th | middle | 5 | late | 14th–19th |
| 54 | 11th | middle | 5 | late | 14th–19th |
| 55 | 11th | middle | 5 | late | 14th–19th |
| 65 | 11th | middle | 5 | late | 14th–19th |
| 81 | 11th | middle | 5 | late | 14th–19th |
| 84 | 11th | middle | 5 | late | 14th–19th |
| 107 | 11th | middle | 5 | late | 14th–19th |
| 122 | 11th | middle | 5 | late | 14th–19th |
| 1 | 17th | late | 5 | late | 14th–19th |
| 9 | 17th | late | 5 | late | 14th–19th |
| 16 | 17th | late | 5 | late | 14th–19th |
| 30 | 17th | late | 5 | late | 14th–19th |
| 35 | 17th | late | 5 | late | 14th–19th |
| 53 | 17th | late | 5 | late | 14th–19th |
| 91 | 17th | late | 5 | late | 14th–19th |
| 92 | 17th | late | 5 | late | 14th–19th |
| 94 | 17th | late | 5 | late | 14th–19th |
| 96 | 17th | late | 5 | late | 14th–19th |
| 97 | 17th | late | 5 | late | 14th–19th |
| 99 | 17th | late | 5 | late | 14th–19th |
| 106 | 17th | late | 5 | late | 14th–19th |
| 117 | 17th | late | 5 | late | 14th–19th |
| 26 | 17th | late | 3 | early | 14th–19th? |
| 29 | 8-11th | middle | 5 | late | 14th–19th |
| 121 | 17th | late | 4 | middle | 14th–19th? |
| 93 | 19th | late | 4 | middle | 14th–19th? |
| 90 | 19th | late | 5 | late | 14th–19th |

entire southern Inland Niger Delta and beyond (Bedaux *et al.* 1978; McIntosh & McIntosh 1980; Curdy 1982; Stössel 1983; Kiethega *et al.* 1993; Sanogo 1994). Burial vessels were found in concentrations (as a cemetery) on the *togué* and in association with structural remains. Burial vessels are large storage vessels that were secondarily used for burial (Bedaux *et al.* 1978). Often only the rim of the vessel was visible at the surface, but the presence of human bones then confirmed the presence of burial vessels.

Flat graves were encountered at 26% of the re-examined sites. The eroded inhumations were likewise found in clusters or in association with structural remains. Exceptionally large numbers of inhumation burials were found at two sites in the immediate vicinity of Soy. The local population associates this cemetery with a historical battle, the battle of Noukouma, which is said to have been fought here on 21 March 1818 (Bâ & Daget 1984, 36). The orientation of the deceased could only rarely be determined but, in some cases, it appeared to reflect an Islamic burial tradition. Today, people still often bury their dead in abandoned nearby settlements. So burials that are visible at the surface may also represent a period of re-use of an abandoned occupation mound.

Burial in vessels is known to be a pre-Islamic tradition which is assumed to have been replaced by inhumation in a flat grave with an Islamic orientation. However, burial vessels and flat graves have often been found together (Bedaux *et al.* 1978; McIntosh 1995, 66–7). The practice of burial in vessels continued into the late period. This could imply that this region was late in converting completely to the Islamic faith, or that the transition was a gradual process, with the two customs being practised side by side for a long time. Interestingly, in the region around Dia, burial in vessels seems to have played a much smaller role in the burial tradition than elsewhere and inhumations, with and without an Islamic orientation, seem to be more common (Schmidt 2005d).

### *Ritual function*

Sites with a specific ritual function, such as Toguéré Natamatao, are difficult to distinguish from other sites on the basis of morphological features (Polet 2005). It is not certain to what extent a site may have been used exclusively for ritual purposes, or whether



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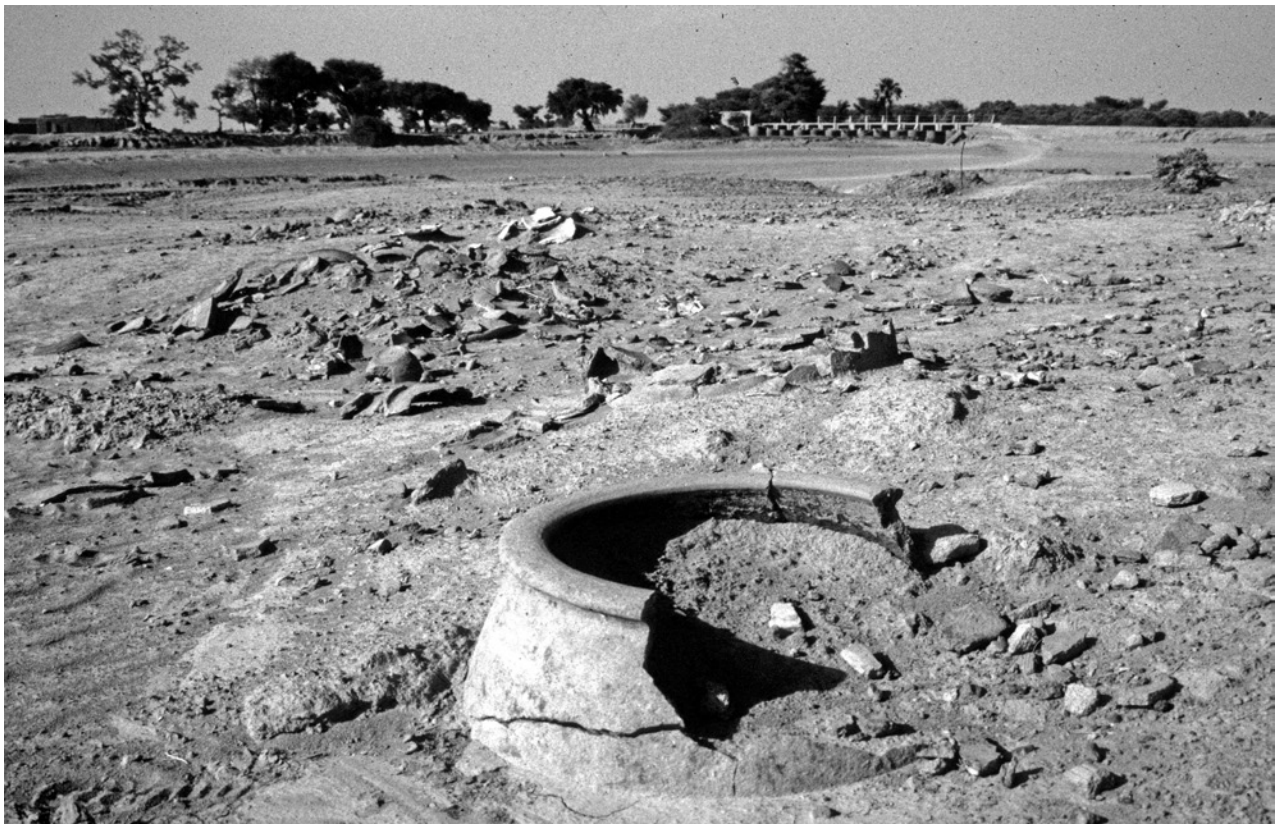

Fig. 7.
Burial vessels, pottery scatters, and erosion at site Kaniana

the settlements included a sacred component. For the time being such a sacred component may be assumed to be defined by the presence of earthenware statues which, in the survey, were found predominantly at looted sites (Fig. 8). The sites in question were all occupation mounds.

The earthenware statues are the reason why archaeological sites are looted. Because various sites were re-examined in the survey it was possible, for the first time, to assess the rate at which the local archaeological remains are being affected. In 1991 the extent to which the sites in our microregions were affected by looting was well below the regional average of 45%. Within only five years these arrears were, however, made up at an alarming rate: looting in the microregions by individual treasure hunters rose from 13% to 31%, while illegal digging by organised groups increased from 5% to 25% (Panella *et al*. 2005).

*Special-activity sites*

The survey yielded considerable evidence of iron production and ironworking in settlement contexts. Iron slag was found at 80% of the re-examined sites. Raw bloom, kilns, crucibles, and bellows are evidence of local iron production or metalworking. The only indisputable iron kiln was found at one of the sites belonging to the cluster around Toguéré Sonon; it is comparable with the kiln of type 1 of Soumpi SMP 3 (Chièze 1991). Another settlement site contained visible evidence of early forges. Iron and bronze objects are often difficult to distinguish from present-day contamination.

Exceptions as far as iron production in settlement contexts is concerned are small sites in the immediate vicinity of a larger site that were covered with vast quantities of iron slag. They appear to have been special-activity sites. The reasons why the activities concerned were carried out beyond the boundary of



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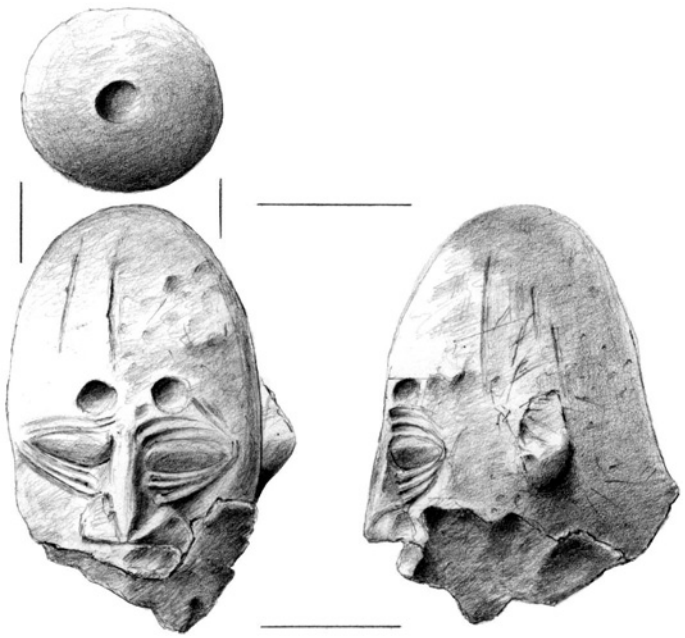

Fig. 8.
Head of earthenware statue from site 101 (scale 1:2)

the settlement may have been practical or sacred.

The earliest colonists of the southern Inland Niger Delta, in the last millennium BC, were already familiar with the craft of ironworking. Iron objects were found in the earliest occupation layers at both Djenné-Djeno and Dia (McIntosh & McIntosh 1980, 74; Schmidt 2005a). But ore suitable for iron smelting does not occur naturally in the Inland Niger Delta, so ore or iron must have been imported. The closest source of iron to Djenné-Djeno is in the Bénédougou area, approximately 75 km south-west of the city (McIntosh & McIntosh 1988). Iron production seems to have been associated more with the availability of the necessary technical know-how and craftmanship than with the proximity of a source of iron (Coulibaly & Chièze 1993).

*Built structures*

The structural remains yield information on the internal structure of the settlements. The remains of circular and rectangular structures were found at 27% of the re-examined sites. These were made of cylindrical (*djenné-ferey*) or rectangular (*toubabou-ferey*) sundried mudbricks. From oral tradition it is known that *djenné-ferey* were used in the town of Djenné until around 1930, when masons switched to *toubabou-ferey* (LaViolette 2000, 71). The occurrence of rectangular mudbricks at *togué* whose last occupation phase has been dated to the early, middle, or late period, however, shows that rectangular mudbricks were introduced at a much earlier stage elsewhere in this region. The frequency of rectangular mudbricks among remains from the late period is, however, substantially higher.

Walls built of *djenné-ferey* vary in width from one to five mudbricks. In the case of the walls built of rectangular mudbricks it is not only the number of bricks that varies (from one to three), but also their positioning (horizontal or diagonal). The most obvious factors that will have played a role in the variation of the thickness of the walls are the weight of the roof structure, the presence or absence of upper floors, and safety considerations. We may assume that progressive erosion will have caused the visibility of structural remains to decrease at the surface of sites that were abandoned at an early stage. Among the occupation sites there are, however, sites from all periods that were found to be devoid of structural remains, whereas some sites that were abandoned in the earliest periods did contain such remains.

The absence of a frame of reference makes it difficult to interpret the round and rectangular structures. Many factors have influenced the appearance of the remains, and the plans encountered may represent buildings with different functions, but the associations needed to determine those functions are absent. The only structures whose function is not open to doubt are three mosques. The presence of a *mihrâb*, a prayer niche, and eastward orientation of the buildings show that the plans are those of Islamic prayer houses. The last occupation phase of the sites in question was dated to the late period (14th–19th century; Fig. 9).

One of the sites (no. 106) was found to contain an exceptional concentration of building plans. No fewer than 28 round and rectangular plans were observed within an area of 35 by 23 m (Fig. 10). The plans are probably contemporaneous because the surviving remains differ little in height and the plans do not



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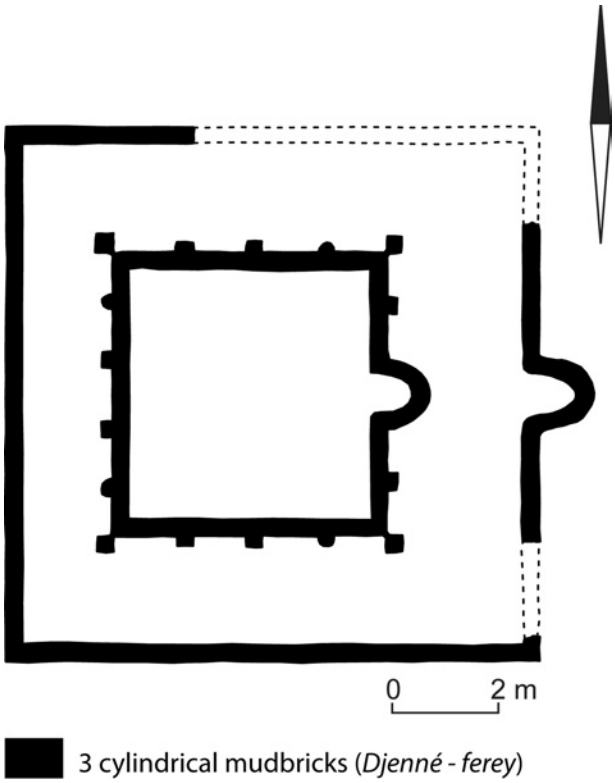


overlap; many are indeed connected to one another by walls. Those walls and the building plans together represent several structures surrounded by yards. One of the yards contained nine circular and square plans of different dimensions. There is only one entrance to the yard. So the internal layout of the settlement was based on a yard system. At this site, too, the last occupation phase – and hence the buildings – was dated to the late period.

In addition, the remains of small round structures were found at 6% of the re-examined sites. These structures had a maximum cross-section of 1.5 m and their floors were covered with a layer of ash. The structures were smoking hearths of nomadic fishermen who still regularly visit this region today. The hearth remains that were found at the surface are sub-recent, and younger than the underlying occupation layer. They were built by migrating fishermen during secondary use of the sites and tell us nothing about the socio-economic identity of the former occupants.

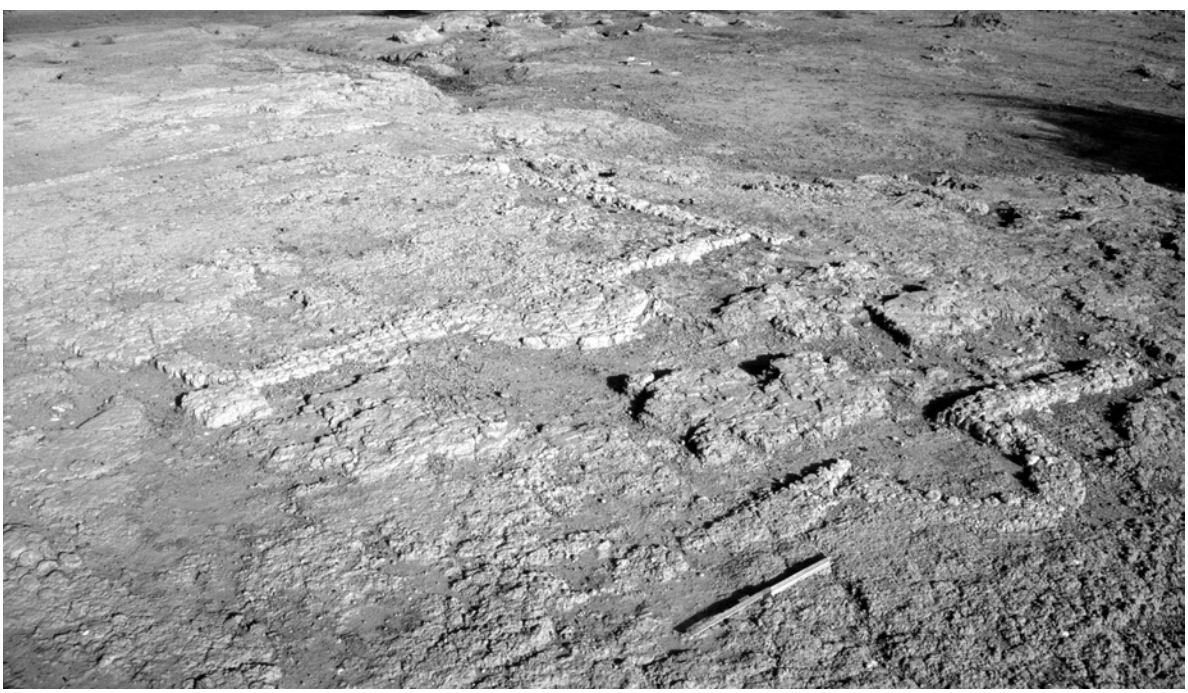

Fig. 9.
Plans and remains of the two mosques at site 99



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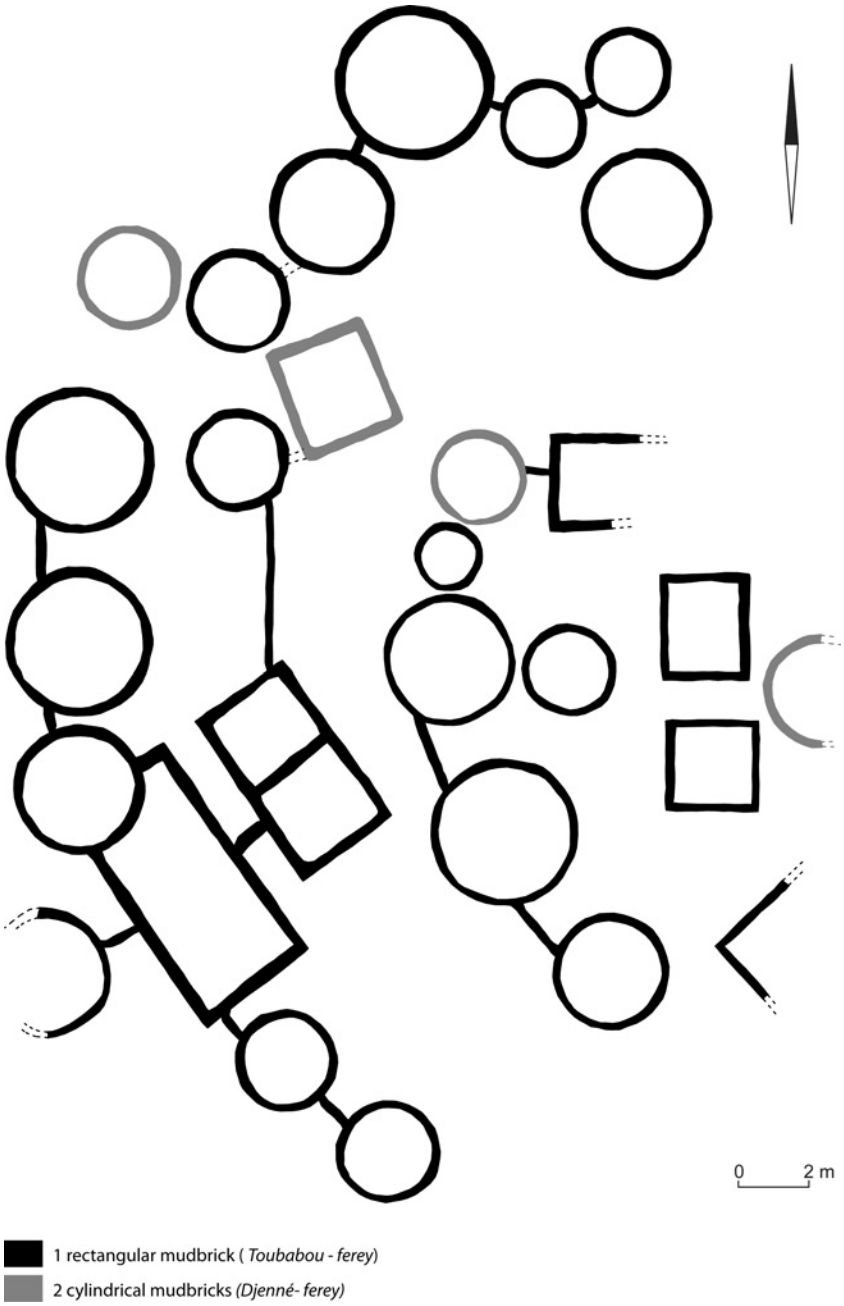


Fig. 10.
Houseplans at site 106



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Fig. 11.
Distribution pattern of the togué in relation to geomorphology (N=853). See Fig. 2 for key to shading

SOCIO-ECONOMIC DIFFERENTIATION

Information obtained on the sites in *Projet Togué* was combined with information on the position of sites in the landscape and their proximity to water, to see whether these factors may have played a role in the selection of the sites.[4] The *Projet Togué* database was used for this analysis (N=853) and showed that only on the active levees is the number of sites higher than expected. In total 63% of all the sites are contained in the levees which account for 29% of the overall area (Fig. 11). The levees in question are the most elevated landscape units. It is not surprising that people chose to settle at these sites in a delta area that is submerged for three months a year (Fig. 12). The majority of the other sites lie in the lowlands beyond the levees. The low percentage of togué on the plateau adjoining the floodplain shows that they are a delta-bound phenomenon.

The sites in the lowlands must have been affected more by the rising water levels during the flood periods than the other sites. At these sites it may have been necessary to artificially raise the natural ground level. This phenomenon is indeed observable in the composition of the section of Toguéré Doupwil (Bedaux *et al*. 1978). The average height of the sites in the lowlands is, however, the same as that of the sites in the rest of the Inland Delta (2.4 m).

In the drier part of the year close proximity to water is a prerequisite for survival. Waterways will also have constituted an important infrastructure



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Fig. 12.
View of the Ladikouna cluster (90–4)

connecting the individual sites. So it is not surprising that 82% of the sites in the macroregion lay within 300 m of water (Fig. 13). They reflect a preference for permanent waterways over periodic ones. Proximity to water will, of course, also have been an influential factor in the preference for levees.

Other factors that may have played a role in site selection, besides proximity to water and a desire to keep one's feet dry, may have been the subsistence practices of the former occupants. The lowlands will have been ideal for the cultivation of rice, the dunes for that of millet, and the levees will have been most suitable for growing sorghum (McIntosh 2005, 63). Fishermen will have wanted to live close to the water's edge while cattle farmers will have needed pastures. The site selection pattern is most in accordance with the cultivation of sorghum (on the levees) and the cultivation of rice and/or cattle keeping (in the lowlands). The situation of sites along water courses is poly-interpretable, the possible decisive factors being communication, water supply, and fishing. The small number of sites in the dunes could be attributable to the detection method employed: sites are difficult to detect in this area by means of stereo photography. On the other hand the absence of water courses, and hence accessible drinking water, may well have deterred the former occupants of the region from settling in the dunes.

The artefacts, unfortunately, provide little extra information. Querns meet a general need and are not restricted to farmers. The fact that the number of quern fragments found at sites in the lowlands (54%) is slightly higher than that found at sites on the levees (37%) has little significance. Net sinkers were equally distributed at sites on all the geomorphological units. They, moreover, represent only one specific fishing method. Other fishing methods – using dams or traps – are difficult to demonstrate. In the survey they were found at 38% of the sites but they are only very rarely found in excavations (Bedaux *et al.* 1978; Schmidt 2005c; McIntosh 1995, 234). So the many net weights found among the surface remains must be associated with the activities of (sub)-recent nomadic fishermen, like the afore mentioned smoking hearths.

There is little archaeological evidence to tell us more about the origins of the present specialist niche system (Gallais 1967; 1984), in which socio-economic and socio-ethnic backgrounds are closely linked.



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Fig. 13.
Distribution pattern of the togué in relation to open water (N=853)

## HIERARCHICAL DIFFERENTIATION

The dimensions of the *togué* are a good starting point for obtaining an understanding of the hierarchical differentiation of the sites. The morphological characteristics of the sites are their height, length, width, and shape. Height and shape were taken as rough indicators of the duration of occupation and the size of the population, respectively. These data had to be interpreted with some caution, however. Site formation factors and differences in population density, continuity of occupation, and the use of building materials other than mudbrick may affect the extent to which morphological data are comparable.

It was not possible to use a fixed reference level in the Inland Delta, so the quoted heights of the togué are not absolute, but relative to the surrounding flat land. The longest side of each mound was taken as the length. The width is the largest dimension perpendicular to the longitudinal axis. As for the shape, a distinction was made between round, oval, and irregular. The areas of the sites were calculated by combining the length, width, and shape.[5] Information on the composition of the settlement system was obtained by combining height and size (Fig. 14). In the



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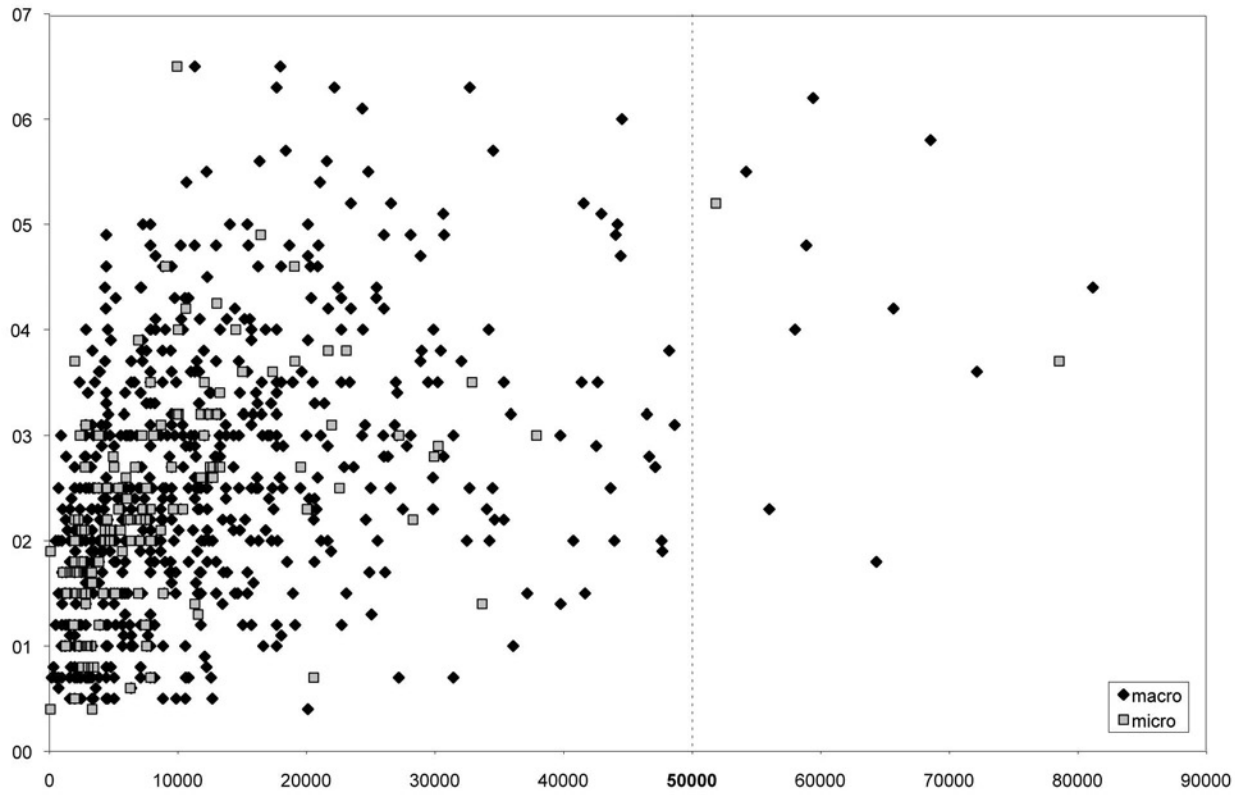


Fig. 14.
a) Relations between size ($M^2$) and height (M) of the microregion (N=127) at two scales

macroregion, a large group of small sites was distinguished and the number of large sites is relatively small. The three largest sites, toguére Djenné-Djeno, Diaabé, and Kaniana[6] (see Fig. 14b), are to be found in the immediate vicinity of Djenné.

In the microregion, the hinterland of these large sites, it was possible to combine site size with chronology. Before the 8th and after the 14th century abandoned sites were relatively large, with maxima of 2.9 and 5.1 ha[7]. In the intermediate period the abandoned sites were much smaller, with a maximum of 1.2 ha. The site near Kolonqui in the microregion (89: 7.9 ha) is the tenth largest site in the macroregion. A settlement system differentiated in terms of site dimensions had already evolved during the early period, before the 8th century. With time, the larger sites in the rural hinterland grew only slowly in size. This led to an increasing gap between the exceptionally large centres (Djenné-Djeno, at 33 ha, and the Dia complex, at 100 ha) and the surrounding rural areas.

The sites arranged in a ribbon along the river Tokouyaoro differ from one another predominantly in terms of their dimensions and show virtually no clustering. Remarkably few very large settlements are found; the majority of the sites are medium-sized. If, however, size is not the only decisive factor and a clustering of sites may also represent an urban structure – as proposed by McIntosh (1998; 2005, 111) – this would change things. Several medium-sized sites together may have constituted an entity that exceeded the individual sites in size. But this would



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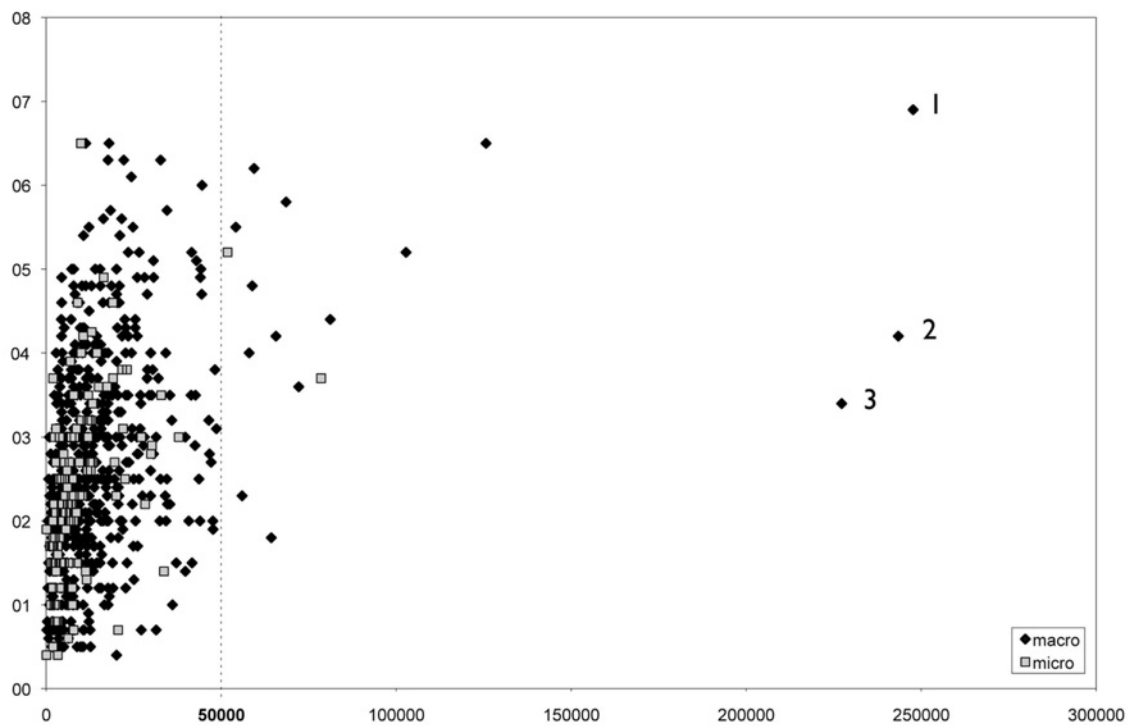


Fig. 14.
b) 1. Djenné-Djeno, 2. Diaabé, 3. Kaniana

imply that the sites were interlinked, to distinguish them from the others. We may only regard a polynuclear cluster as a distinct unit if the sites show some form of functional, socio-ethnic, or socio-economic differentiation. An example of such a polynuclear cluster is to be found in Dia: Dia-Shoma and Dia-Mara yielded differently composed find assemblages but their occupation histories are closely linked (Schmidt *et al.* 2005; Bedaux *et al.* 2005). If clustering was caused, for example, by limited availability of land suitable for occupation, then we should regard the cluster simply as a collection of individual sites. Two clusters, the sites around Toguéré Sonon and a cluster of sites in the lowlands near Megou, were distinguished in the Nantinore microregion.

## TRADE

Three complementary trade networks are traditionally distinguished in West Africa: the trans-Saharan, (inter)-regional, and local trade networks (Giri 1994, 69). These networks complemented one another: the trans-Saharan trade was dependent on efficient regional and local networks. The trading towns were the links in this chain. They were strategically positioned, for instance at intersections of trade routes, along navigable waterways, or in a wealthy catchment area. The towns in the southern Inland Delta meet all these conditions. The origins of the raw materials of which the surface finds are made tell us to what extent the former occupants of the togué had access to the different trade networks. Only the re-examined sites that could be dated (N=85) were



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included in the analysis. The relatively limited archaeological deposition of prestigious objects, their visibility, and the fact that they are still actively collected today indicate that the percentages represent the lower limits. There will probably have been many more prestigious objects originally.

*Local and regional trade networks*

The local trade networks consisted of local markets that sold mostly locally produced agrarian produce and consumer goods. Everyone had access to these markets, where the goods were traded by barter. The local trade network left no archaeological traces and can only be inferred indirectly, via absence of evidence of other networks. Fortunately none of the datable sites in the microregion was restricted to the local network and they all yielded evidence pointing to other networks. The regional trade networks were expansions of the local markets involving products from outside the home region. Besides agrarian consumer goods they also included raw materials such as iron ore and sandstone querns, both of which came from regions directly adjoining the southern Inland Delta. Of the re-examined sites, 52% participated in such regional trade networks.

*Inter-regional trade network*

As the distances between the production areas and the markets increased a need arose for middlemen, traders, and means of payment. The traders constituted an independent group that developed a trade network spanning the entire western Sudan. The activities of these Mande-speaking Islamic traders, who are also known as *Wangara*, peaked around the mid-14th century (Levtzion 1973, 132; Perinbam 1974). The inter-regional trade network boomed under the protection of the rulers of the various West African kingdoms, who benefitted economically from the transactions by levying taxes (Tymowsky 1974). In return they secured safe conditions for the traders and made sure that the trade routes remained readily passable. It was not until the days of the Mali Empire that the Sahel and Sudan were integrated in a single monetary system in which cowries became the general currency (Levtzion 1973, 122–3). Participation in the inter-regional trade network presupposed the availability of a currency. With the distances between the sources and the markets being much greater it is more likely that the goods were traded via a network of exchange systems than via direct barter. In the microregion, 24% of the re-examined sites were involved in this inter-regional trade network (Table 4). Apparently, traders and a commonly accepted currency were not prerequisites for inter-regional trade networks, because the archaeological evidence shows that sites from the early period also formed part of this exchange network.

*The trans-Saharan trade network*

The trans-Saharan trade network was a connecting link between the West and North African kingdoms. Goods from North Africa were introduced into the West African inter-regional trade network and distributed via the trading towns of the northern Sahel. This made it possible to capitalise any surpluses and turn them into scarce prestige goods that an elite could use to distinguish itself (Tymowski 1974).

The oldest trade route crossing the Sahara emerged in the 6th century. This was the western route, which began in southern Morocco and ended in Ghana (Swanson 1978, 173–4). With time, the trade route shifted eastwards, causing the old trading towns along the western route to go into decline and enabling new towns, such as Djenné, to evolve into important centres of commerce (Devisse 1972). One of the most important products that was introduced into West Africa via the Sahara was salt (Alexander 1993). From Timbuktu the salt was transported along the Niger by canoes to Djenné, where it was broken into smaller pieces and sold on. Other commodities that were transported to West Africa were textile, metals, ornaments, glass, cowries, perfume, books, horses, weapons, and small numbers of white slaves (Giri 1994, 110–1; Levtzion & Hopkins 2000, 169; Levtzion 1973, 173 & 180; Ly 1981). Of the objects found at the sites in the microregions it is particularly the ornaments made of glass, rock crystal, and agate that testify to participation or involvement in this trade network. The most important basic merchandise that West Africa had to offer in exchange for the imported goods was gold and slaves. The arrival of the Portuguese along the coast of West Africa internationalised trade in the coastal areas (Giri 1994, 141). The Inland Delta was not at first affected by this emerging trade but, with the passing of time, the trans-Saharan trade declined and commercial activities moved to the coast. Distant products made

TABLE 4 TRADE NETWORKS

| | | | *Inter-regional* | | | | | | *Trans-Sahara* | | | *Trade* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Site code* | *Geomorphology* | *Overall period* | *Sschist* | *Quartz* | *Granite/diorite* | *Marble* | *Carnelian* | *Bronze* | *Rock crystal* | *Glass* | *Agate* | *Gegional* | *Inter-regional* | *Trans-Sahara* |
| 94 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 19 | low | middle | • | • | • | • | • | • | • | • | • | • | • | • |
| 23 | low | middle | • | • | • | • | • | • | • | • | • | • | • | • |
| 24 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 27 | levee | early | • | • | • | • | • | • | • | • | • | • | • | • |
| 100 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 31 | levee | early | • | • | • | • | • | • | • | • | • | • | • | • |
| 42 | low | early | • | • | • | • | • | • | • | • | • | • | • | • |
| 38 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 25 | levee | early | • | • | • | • | • | • | • | • | • | • | • | • |
| 33 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 58 | levee | middle | • | • | • | • | • | • | • | • | • | • | • | • |
| 65 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 84 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 91 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 92 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 118 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 4 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 83 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 113 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 9 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 96 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 16 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 34 | levee | middle | • | • | • | • | • | • | • | • | • | • | • | • |
| 35 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 53 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 54 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 117 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 1 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 26 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 29 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 81 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 30 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 2 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 99 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 49 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 97 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 106 | levee | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 90 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |
| 93 | low | late | • | • | • | • | • | • | • | • | • | • | • | • |



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their way to at least 24% of the sites in the rural hinterland, as well as to the well-known urban centres such as Djenné and Dia. There must have been considerable wealth, probably based on agricultural surplus, to cater to this luxurious taste in goods. The high density of these prestige objects testifies to a well-functioning distribution network.

Almost all the sites that formed part of the trans-Saharan trade network were abandoned in the late period. There is a general connection between the size of the sites and the level of their participation in the trade networks: the larger the sites, the higher the probability that they participated in a larger-scale trade network. The largest datable site in the microregions (5.2 ha), however, had access to the regional network only, while the smallest site that participated in the trans-Saharan network measured only 0.4 ha. It would seem logical that sites in the larger-scale trade networks will have been situated predominantly on the active levees, as such a situation would have granted them good access to waterways. In actual fact, only half of the sites that participated in regional trade lie on levees. In the case of inter-regional trade the ratio is 1:3, and two-fifths of the sites that were involved in trans-Saharan trade lie in the lowlands. Perhaps the waterways were, in terms of infrastructural facilities, a less important factor in site selection than initially assumed (Tymowsky 1967). Another possibility is that the wealth needed to participate in this trade network was an equally important factor, and that that wealth was also to be found at the sites in the lowlands.

## CONCLUSION

The Inland Niger Delta in Mali is scattered with thousands of archaeological sites. Relatively little is known about the structure of their settlement system and how it evolved.

This research has shown that, in the southern Inland Niger Delta, the rural hinterland of urban centres such as Djenné and Dia consisted of a large settlement system of permanently occupied sites, most situated on the highest landscape units and within 300 m of water. The settlement system was structured according to the sizes of the settlements, their locations on the different landscape units, the ribbon or clustered distribution of the sites, and their access to the different trade networks.

The source of the Inland Niger Delta's wealth was its natural resources. The distribution of sites is most probably related to the cultivation of sorghum and rice and/or cattle keeping, but shows little archaeological evidence for the origins of the present-day specialist niche system, in which socio-economic and socio-ethnic backgrounds are closely linked. Not only did the rural hinterland 'feed' the large West African kingdoms, but it was also an important market for prestige goods from extensive trade networks. Traders and a common currency were no prerequisites for inter-regional trade networks, however, because the archaeological evidence shows that sites already formed part of this exchange network at a very early stage. Cities had no monopoly on luxury goods because the trans-Saharan trade network did not only include well-known urban centres such as Djenné and Dia, but also extended to many sites in the rural hinterland. Although Dia and Djenné are the only important centres mentioned in historical and oral sources, in an archaeological respect they appear to differ from other sites in terms of size only.

After the 15th century conditions deteriorated in the Inland Delta. Trade routes moved and the power of the Mali Empire over the Inland Delta gradually decreased, aggravating the region's socio-political instability. The ultimate outcome of this was that many settlements around the large towns were abandoned. The rural hinterland had a natural buffer, enabling it to hold out longer. Nevertheless, the present population density of the Inland Niger Delta is but a faint reflection of the region's wealth in the past.

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*Endnotes*

1. The term Late Stone Age is preferred here – 'Neolithic' remains a contentious term in West African archaeology.
2. the generally accepted date range for polished axe is *c.* 1200–700 BC.
3. GRN 23025: 155±25 BP: cal AD 1662–1953; Pretoria curve.
4. The detailed geomorphological information was inferred from the map of the southern Niger Inland Delta by



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Makaske (1998). The limits chosen for the research area are the Niger on the north-west, the tarmacced road from San to Mopti on the east and the edges of the map on the south and south-west. This information is available exclusively for the settlements lying within these limits.

[5.] The formula for calculating the area of a circle was used for the round sites. The area of the oval sites was calculated with the aid of the formula for an ellipse. As for the areas of sites with unclear outlines: ten widely different irregular sites were digitised, after which their areas were automatically calculated. The areas were then calculated once more using length and width data of the same sites and the formula for calculating the area of an ellipse and a square. Comparison of the results showed that those obtained with the formula for calculating the area of a square differed least from the most detailed digitised area. The next step was to calculate a constant for correction, which ultimately led to the formula length x width x 0.72141.

[6.] Measurements based on the observations made during Projet Togué (Djenné-Djeno = 24.8 ha, Diaabé = 22.3, and Kaniana = 22.7 ha).

[7.] The largest site, at Kolonqui (7.8 ha) is still partly occupied.

## BIBLIOGRAPHY


Alexander, J. 1993. The salt industry of West Africa: a preliminary study. In T. Shaw, P. Sinclair, B. Andah & A. Okpoko (eds), *The Archaeology of Africa; food, metals and towns*. 652–7. London: Routledge

Bâ, A.H. & Daget, J. 1962. *L'Empire Peul du Macina*. Abidjan: Les Nouvelles Editions Africaines (1984 reprint)

Barber, E.J.W. 1991. *Prehistoric Textiles, the Development of Cloth in the Neolithic and Bronze Ages*. Princeton: University Press

Bedaux, R.M.A. 1988. Tellem and Dogon material culture. *African Arts* 21(4), 38–45

Bedaux, R.M.A. 1993. Les plus anciens tissus de l'Afrique de l'Ouest. In Devisse (ed.) 1993, 456–63

Bedaux, R.M.A., Constandse-Westermann, T.S., Hacquebord, L., Lange, A.G & Waals, J.D. van der. 1978. Recherches archéologiques dans le Delta intérieur du Niger. *Palaeohistoria* 20, 91–220

Bedaux, R.M.A., Dembélé, M., Schmidt, A.M. & Waals, J.D. van der. 1994. L'archéologie entre Bani et Niger. In R.M.A. Bedaux & J.D. van der Waals (eds), *Djenné: une ville millénaire au Mali*, 41–53. Leiden et Gand: Rijksmuseum voor Volkenkunde et Martial

Bedaux, R., Polet, J., Sanogo K. & Schmidt, A. (eds). 2005. *Recherches archéologiques à Dia dans le Delta intérieur du Niger (Mali): bilan des saisons de fouilles 1998–2003*.Leiden: Mededelingen van het Rijksmuseum voor Volkenkunde 33

Bolland, R. 1991. *Tellem Textiles: archaeological finds from burial caves in Mali's Bandiagara Cliff*. Amsterdam, Leiden and Bamako: Mededelingen Rijksmuseum voor Volkenkunde, Leiden 27

Chièze, V. 1991. La métallurgie du fer dans la zone lacustre; archéologie-archéométrie. In M. Raimbault & K. Sanogo, *Recherches archéologiques au Mali. Les sites protohistoriques de la zone lacustre*, 449–72. Paris: ACCT-Karthala

Connah, G. 1987. *African Civilizations*. Cambridge: University Press

Coulibaly, E. & Chièze, V. 1993. Histoire du fer. In Devisse (ed.) 1993, 334–43

Curdy, Ph. 1982. Tiébala (Mali): un complexe céramique du VIe siècle après J.-C. *Archives Suisses d'Anthropologie Générale* 46(2), 183–98

Daget, J. & Ligers, Z. 1962. Une ancienne industrie malienne: les pipes en terre cuite. *Bulletin de l'IFAN* B24, 12–53

DeCorse, C.R. 1989. Beads as chronological indicators in West African archaeology: a re-examination. *Beads* 1, 41–53

Dembélé, M., Schmidt, A.M. & Waals, J.D. van der. 1993. Prospection de sites archéologiques dans le Delta intérieur du Niger. In Devisse (ed.) 1993, 218–32

Desplagnes, L. 1951. Fouilles du tumulus d'El Oualedji (Soudan). *Bulletin de l'IFAN* B13(4), 1159–73

Devisse, J. 1972. Routes de commerce et échanges en Afrique occidentale en relation avec la Méditterranée. Un essai sur le commerce africain médiéval du XIe au XVIe siècle. *Revue d'Histoire Economique et Sociale* 50(1 & 3), 42–73, 357–97

Devisse, J. (ed.). *Vallées du Niger*. Paris: Réunion des Musées Nationaux

Gallais, J. 1967. *Le Delta intérieur du Niger: étude de géographie régionale*. Dakar: Mémoire de l'IFAN 79

Gallais, J. 1984. *Hommes du Sahel, espaces-temps et pouvoirs. Le Delta intérieur du Niger 1960–1980*. Paris: Flammarion (Collection Géographes)

Gallay, A. & Huysecom, E. 1989. *Ethnoarchéologie africaine. Un programme d'étude de la céramique récente du Delta intérieur de Niger (Mali)*. Genève: Rapport

Gaussen, M. & Gaussen, J. 1962. Aperçu sur les divers facies néolithiques du Tilemsi et nouveaux objets en quartz poli. *Bulletin Société Préhistorique Française* 59, 98–108

Gaussen, J. & Gaussen, M. 1988. *Le Tilemsi préhistorique et ses abords; Sahara et Sahel malien*. Paris: Editions du Centre National de la Recherche Scientifique

Giri, J. 1994. *Histoire économique du Sahel: des empires à la colonisation*. Paris: Karthala

Haskell, H., McIntosh, R.J. & McIntosh, S.K. 1988. *Archaeological Reconnaissance in the Region of Dia, Mali*. Final report to the National Geographic Society

Insoll, T. 1996. *Islam, Archaeology and History. Gao Region (Mali) ca AD 900–1250*. Oxford: British Archaeological Report S645/Cambridge Monograph in African Archaeology 39

Insoll, T. 2000. *Urbanism, Archaeology and Trade. Further Observations on the Gao Region (Mali). The 1996 Field Season Results*. Oxford: British Archaeological Report S829

Insoll, T. & Shaw, T. 1997. Gao and Igbo-Ukwu: beads, interregional trade and beyond. *African Archaeological Review* 14(1), 9–23

Johnson, M. 1965. A note on cowries. *University of Ghana, Institute of African Studies Research Review* 2(1), 37–40

Kiethega, J.-B., Sidibe, S. & Bedaux, R.M.A. 1993. Les pratiques funéraires. In Devisse (ed.) 1993, 425–40

LaViolette, A. 2000. *Ethno-archaeology in Jenné, Mali. Craft and Status among Smiths, Potters and Masons*.Oxford: British Archaeological Report S838/Cambridge Monograph in African Archaeology 49

Levtzion, N. 1973. *Ancient Ghana and Mali*. London: Methuen

Levtzion, N. & Hopkins, J.F.P. (eds). 2000. *Corpus of Early Arabic Sources for West African History*. Cambridge: Cambridge Historiae Africanae, Series Arabica 4

Lewicki, T. 1967. Les écrivains arabes du Moyen Age au sujet des mines de pierres précieuses et de pierres fines en territoire africain et de leur exploitation. *Africana Bulletin* 7, 49–68

Lhote, H. 1942–1943. Découverte d'un atelier de perles néolithiques dans la région de Gao (Soudan français). *Bulletin Société Préhistorique Française* 39 and 40, 277–99, 24–35

Ly, M. 1981. L'empire du Mali aux XVe et XVIe siècles. In *Le sol, la parole et l'écrit. 2000 Ans d'histoire africaine. Mélanges en hommage à R. Mauny*, 595–612. Paris: Bibliothègue d'Histoire d'Outre-Mer NS Etudes 5–6

MacDonald, K.C. 1994. *Socio-economic Diversity and the Origins of Cultural Complexity along the Middle Niger (2000 BC to AD 300)*. Unpublished PhD thesis, Cambridge University

MacDonald, K.C. 1996. Tichitt-Walata and the Middle Niger: evidence for cultural contact in the second millennium BC. In G. Pwiti & R. Soper (eds), *Aspects of African Archaeology: Papers from the 10th Congress of the Pan-African Association for Prehistory and Related Studies,* 429–40. Harare: University of Zimbabwe Publications

MacDonald, K.C. 1998. Before the Empire of Ghana: pastoralism and the origins of cultural complexity in the Sahel. In G. Connah (ed.), *Transformations in Africa: essays on Africa's later past,* 71–103. London: Cassell/Leicester University Press

Magnavita, S. 2003. The beads of Kissi, Burkina Faso. *Journal of African Archaeology* 1(1), 127–38

Makaske, B. 1998. *Anastomy Rivers: forms, processes and sediments*. Utrecht: Drukkerij Elinkwijk

Makaske, B., Vries, E. de, Tainter, J.A. & McIntosh, R.J. 2007. Aeolian and fluviolacustrine landforms and prehistoric human occupation on a tectonically influenced floodplain margin, the Méma, central Mali. *Netherlands Journal of Geosciences* 86 3), 241–56

Mauny, R. 1961. *Tableau géographique de l'Ouest africain au Moyen Age, d'après les sources écrites, la tradition et l'archéologie*. Dakar: Mémoires de l'IFAN 61

Mauny, R. 1964. Les fossiles directeurs en archéologie ouest-africaine. In J. Vansina, R. Mauny & L.V. Thomas (eds), *The Historian in Tropical Africa. Studies presented and discussed at the Fourth International African Seminar at the University of Dakar, Senegal (1961)*, 257–64. Oxford: International African Institute and Oxford University Press

McIntosh, S.K. (ed.). 1995. *Excavations at Jenné-Jeno, Hambarketolo, and Kaniana (Inland Niger Delta, Mali): the 1981 season*. Berkeley, Los Angeles and London: University of California Monograph in Anthropology 20

McIntosh, S.K., Gallagher, D. & McIntosh, R.J. 2003. Tobacco pipes from excavations at the Museum Site, Jenne, Mali. *Journal of African Archaeology* 1(2), 171–99

McIntosh, S.K. & McIntosh, R.J. 1980. *Prehistoric Investigations at Jenne, Mali*. Oxford: British Archaeological Report S89/Cambridge Monograph in African Archaeology 2

McIntosh, S.K. & McIntosh, R.J. 1986. Archaeological reconnaissance in the region of Timbuktu, Mali. *National Geographic Research* 2(3), 302–19

McIntosh, R.J. 1998. *The Peoples of the Middle Niger*. Oxford and Malden, Massachusetts: Blackwell

McIntosh, R.J. 2005. *Ancient Middle Niger: urbanism and the self-organizing landscape*. Cambridge: University Press

McIntosh, R.J. & McIntosh, S.K. 1988. From siècles obscurs to revolutionary centuries on the Middle Niger. *World Archaeology* 20, 141–65

Menzel, B. 1975. Notizen zur Herstellung von Fritte-Perlen in Ashanti (Ghana). *Abhandlungen und Berichte des Staatlichen Museums für Völkerkunde Dresden* 34, 159–72

Monod, Th. 1969. Le Ma'den Ijâfen : une épave caravanière ancienne dans la Majâbat Al-Koubrâ. Actes du 1r Colloque International d'Archéologie Africaine, Fort-Lamy 1966. *Etudes et Documents Tchadiens Mémoire* 1, 286–320

Murray, S.S. 2005. Recherches ethnobotaniques. In Bedaux *et al.* (eds) 2005, 386–400

Panella, C. 2002. *Les terres cuites de la discorde : déterrement et écoulement des terres cuites anthropomorphes du Mali. Les réseaux locaux*. Leiden: CNWS Publication 113

Panella, C., Schmidt, A., Polet, J. & Bedaux, R. 2005. Le contexte du pillage. In Bedaux *et al.* (eds) 2005, 15–25

Perinbam, B.M. 1974. Notes on dyula origins and nomenclature. *Bulletin de l'IFAN*. 36, B4, 676–90

Polet, J. 2005. Natamatao (Thial) : archéologie d'un site pillé. In In Bedaux *et al.* (eds) 2005, 431–44

Raimbault, M. & Sanogo, K. (eds). 1991. *Recherches archéologiques au Mali: les sites protohistoriques de la Zone Lacustre*. Paris: ACCT-Karthala

Sanogo, K. 1994. Les modes d'inhumation dans la Boucle du Niger. In J. Kawada (ed.), *Boucle du Niger: approches multidisciplinaires*, 71–89. Tokyo: Institut de Recherches sur les Langues et Cultures d'Asie et d'Afrique

Schmidt, A. 2005a. Métaux. In Bedaux *et al.* (eds) 2005, 257–62

Schmidt, A. 2005b. Parure: perles, labrets, bracelets, pendentifs et cauris. In Bedaux *et al.* (eds) 2005, 263–81

Schmidt, A. 2005c. Objets divers en terre cuite. In Bedaux *et al.* (eds) 2005, 311–4

Schmidt, A. 2005d. Prospection régionale autour de Dia. In Bedaux *et al.* (eds) 2005, 401–22

Schmidt, A. & Bedaux, R. 2005.Fusaïoles. In In Bedaux *et al.* (eds) 2005, 282–7

Schmidt, A., Arazi, N. & Bedaux, R. 2005. Stratigraphie et chronologie. In Bedaux *et al.* (eds) 2005, 177–89

Schmidt, A., Arazi, N., Keita, D., Heiden, M. van der & Linde, S. van der. 2005. Les concessions. In Bedaux *et al.* (eds) 2005, 125–42

Schmidt, A., Arazi, N., MacDonald, K., Cosme, F. & Bedaux, R. 2005. La poterie. In Bedaux *et al.* (eds) 2005, 191–256

Sidibe, S. 1995. The fight against pillage of Mali's cultural heritage and illicit exportation: national efforts and international cooperation. In *Illicit Traffic of Cultural Property in Africa,* 109–16. Paris: ICOM

Stössel, A. 1983. Urnenbestattung und Weltei-Mythologem im West- und Zentral-Sudan. *Paideuma* 29, 45–65

Swanson, J.T. 1978. *The Not-yet-golden Trade: contact and commerce between North Africa and the Soudan, to the eleventh century A.D*. Unpublished PhD dissertation, Indiana University

Tymowski, M. 1967. Le Niger, voie de communication des grands états du Soudan Occidental jusqu'à la fin du XVIe siècle. *African Bulletin* 6, 73–95

Tymowski, M. 1974. La ville et la campagne au Soudan Occidental du XIVe au XVIe siècle. *Acta Poloniae Historica* 29, 51–79

Togola, T. 1993. *Archaeological Investigations of Iron Age Sites in the Méma Region (Mali)*. Unpublished PhD dissertation, Rice University

Togola, T. 1996. Iron age occupation in the Mema region, Mali. *African Archaeological Review* 13, 2, 91–110

Togola, T. 2008. *Archaeological Investigations of Iron Age Sites in the Mema Region, Mali (West Africa)*. Oxford: British Archaeological Report S1736/Cambridge Monograph in African Archaeology 73

Trebbin, C. 1985. *Achate, geschliffen in Idar-Oberstein: Amulette, Schmuck und Zahlungsmittel in Afrika*. Idar Oberstein: Museum Idar-Oberstein

Welling, M. 2000–1. On the significance of local clay pipes for African archaeology: presenting new finds and a typo-chronology from Mali. *Newsletter Department of Pottery Technology* 18–19, 83–116