A tale of two floodplains: comparative perspectives on the emergence of complex societies and urbanism in the middle Niger and Senegal valleys

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Floodplains have always had a special place in the study of human social complexity. Particularly in the case of floodplains in otherwise arid regions, the consequences for human society of access by agriculturalists to a vital, localized resource – water – are revealing by their contrast with surrounding areas. For many reasons, among them the discipline’s long-standing preoccupation with pristine cultural developments, no studies were undertaken prior to the late 1970’s of arid-region floodplains in sub-Saharan Africa. The widespread assumption was that cultural complexity in sub-Saharan Africa as a whole was late, and derived, regardless of its geographic situation. The purpose of this paper is to outline the archaeological sequences that have emerged as the result of fieldwork by my husband, myself and others in the two great floodplains of the west African Sahel, the inland Niger delta of Mali and the middle Senegal valley of Senegal. I will show how the sequences revealed by archaeology are dramatically different in the two floodplains, involving precocious site growth and population aggregation during the first millennium AD in the case of the inland Niger delta, and a very decentralized, non-agglomerated population distribution during the same time period in the case of the middle Senegal valley. I will discuss the various aspects of the two floodplains that encouraged these differences and then close with some brief comments on the relevance of these findings to comparative studies of cultural complexity and urbanism.

Many people have contributed to the substantive picture of early complex societies that has emerged from the inland Niger delta of Mali and the middle Senegal valley of Senegal. In Mali, the great tells of the inland Niger delta have been the focus of investigation not only by myself and Rod McIntosh, but also a Dutch team and researchers from the Institut des Sciences Humaines in Bamako. Most recently, our colleague and former student Téréba Togola has demonstrated that the distribution of clustered, apparently urban settlement extends into the now dry areas of the Mémé, to the north and west of the inland Niger delta. In Senegal, our project co-director Hamady Bocoum has conducted fieldwork for the middle Senegal valley project in 1992 and 1993, in addition to co-directing the 1991 excavations. Four Senegalese masters students from the University of Dakar-Cheikh Anta Diop participated in the six-month initial fieldwork phase of the project and write their mémoires de maîtrise on subjects related to the research (Deme 1991). Two of them, Ibrahima Thiaw and Alioune Deme, continue their work as graduate students at Rice University. The Senegal project, in particular, must be considered the product of their collective enterprise in collaboration with Rod McIntosh and myself. Funding for both the inland Niger delta research and the middle Senegal valley research has been provided by the National Science Foundation and the National Geographic Society.
Introductory perspectives

The research we have done since 1977 in the inland Niger delta and middle Senegal valley has demonstrated that both alluvial valleys opened up for permanent settlement at approximately the same time, c. 2000 BP, owing to a widespread dry episode (Lezine 1988; Lezine 1989; Lezine & Casanova 1989) that affected the hydrology of both the Senegal and Niger valleys, which are fed by the same rainfall source in the Futa Jallon highlands of Guinea. The high floods, perennially marshy conditions and active hydrology present in the middle Niger in prior millennia subsided dramatically c. 200–0 BC. Settlements were established first on higher ground, then lower as flood levels subsided further in the first century AD (McIntosh & McIntosh 1995, pp. 61–2). On the Senegal, the river’s discharge also decreased dramatically. Until 2500 BP, the down river half of the present-day middle Senegal valley was a vast delta. But c. 2000 BP, discharge decreased abruptly, to such an extent that salt water flowed over 300 km inland through the Ferlo valley (Monteillet, Faure, Pirazzoli & Ravise 1981). It was at this time that the first permanent settlements were established on levees. This movement into the well-watered valleys of the Senegal and Niger was the final act in an attenuated drama involving southward movement along drainage systems of mixed agriculturalists no longer able to water their cattle or successfully grow crops in the higher latitudes their ancestors inhabited. The similarity of the material culture of the earliest inhabitants in the inland Niger delta and middle Senegal valley suggests that the migrations culminating in the colonization of these two valleys originated in the same or related areas (McIntosh 1995, pp. 362–4). The oral traditions of populations living in these two valleys today point to the upland plateaux of present-day Mauritania as their homeland prior to southward migration. If we look at a map, we see that these plateaux, including the well-known Tichitt escarpment, have drainage systems that lead to the two great floodplains that are the focus of this chapter (Fig. 1). It is likely that, as late stone age mixed agriculturalists on the plateaux encountered increasing difficulty at the end of the second millennium and beginning of the first millennium BC, as attested at Tichitt (Munson 1976; Munson 1981), they gradually moved south along these drainage systems. There are, for example, unambiguous similarities between the post-400 BC. Akreijit phase pottery from Dhar Tichitt and the early iron age (Phase I) pottery from the middle Senegal valley.

Accordingly, we have the approximately contemporaneous colonization, between 250 and 0 BC, of these two great floodplains by distantly related groups. Until our research, the next act in the drama was unknown, owing to the lack of archaeological work within these floodplains on sites of the relevant first millennium AD date. We did, however, understand that events in the two areas took a very similar turn c. AD 900, with the advent of Arabo-Berber traders and Islam. Between 890 and 916, the Arab authors Yaqu’bi, al-Faqih and Ma’adi tell of a powerful kingdom named Ghana, whose king wore skins and whose power came from gold (Levtzion & Hopkins 1981). This kingdom is placed by historians in the Soninke heartland north and west of the inland Niger delta. In 1067, al-Bakri described the king of
Ghana in substantial detail (Levtzion & Hopkins 1981). Although still animist, he now wore
sewn clothes. He commanded a 200,000-man army, and his wealth came from taxes levied on
salt, copper and gold passing through his territory. The slaving raids of Ghana among
neighboring peoples are described a century later by al Zuhri. Thus, a militarily powerful,
trade-dominated Soninke kingdom or confederation had emerged on the margins of the inland
Niger delta between 900 and 1000 AD.

Likewise, on the middle Senegal, the river-based kingdoms of Takrur and Silla are
mentioned by al Bakri, although the kings’ conversion to Islam had already occurred at the
time he wrote. A century later, Idrisi states that Silla belongs to the domains of Takrur, whose
king has pacified the countryside (Levtzion & Hopkins 1981). Gold and slaves are exported,
and the Takruri raid less organized societies, apparently to the south. This chapter focuses on
the intervening period between settlement of the floodplain and the historically documented
trade polities present within or adjacent to these two great floodplains. I begin by summarizing
the evidence for the organization and evolution of the iron age societies inhabiting the regions
we have investigated within these floodplains. The results, which I personally have found
surprising, will be considered within the context of constraints imposed and opportunities
offered by two different floodplain environments. I begin with our work between 1977 and
1987 in the inland Niger delta of Mali, and continue with the preliminary results of work
conducted from 1990 to 1992 in Senegal.

History of research

In 1977, we began work in the inland Niger delta at the archaeological site reputed to be the
initial settlement of Jenné, a town known from the fourteenth to nineteenth centuries as an
entrepôt linking the Akan gold mines in Ghana to the trans-Saharan trade passing through
Timbuktu. We had worked in the early 1970’s at Begho, the Akan terminus of the trade, and it
was the Begho project director, Merrick Posnansky, who suggested Jenné as locus for
research. At that time, west African iron age archaeology was dominated by historically-
derived scenarios for the past two millennia of human occupation on the sub-continent. Sub-
Saharan west Africa was seen as largely stagnant, a condition into which it sank in the Late
Pleistocene, according to Graham Clark’s World Prehistory (1971). Hegel’s view from the
turn of the century that ‘Africa is no historical part of the world; it has no movement or
development to exhibit’ was still current. The social transformations resulting in complex
political and economic institutions were assumed to have taken place late and in response to
contact with traders from the Islamic world in the north and European traders in the south, all
of whom sought gold and slaves as primary export products. The Arab chroniclers from the
eleventh century on were quite explicit about the role of Islam in bringing law, true religion
and commerce to the previously savage peoples of black Africa, and there was no reason to
disbelieve their account in the absence of any substantive archaeological research in the Sahel
zone. The distribution of towns in this zone mentioned by Arab sources from AD 900–1400 was assumed to mirror accurately the development of urban life in black Africa within this time frame, and the pattern of distribution on the north and south margins of the Sahara eloquently proclaimed the *raison d’être* of these commercial towns. Archaeological work from the 1940’s–1970’s at the presumed sites of Awdaghost, Ghana, Takedda, Tadmekka, and Kawkaw did nothing to challenge this assumption (McIntosh Forthcoming a; McIntosh Forthcoming b). The few excavations that took place further south in the Sahel zone prior to 1975 did nothing to dispel the idea of backwater primitives, since excavators hoping to find luxury goods and pretty pots in the mounds they dug were disparaging when they turned up few of the hoped-for objects. In this atmosphere, work aimed at basic culture history and time-space systematics was non-existent. When my husband and I began work at Jenné-jeno in 1977, there was no prior body of data to inform our research. There was no pottery sequence, no descriptions of the mound sites of the inland Niger delta, no idea of how deep the deposits were or what they were like; no idea of how many mounds and other types of sites were present on the floodplain, how they were distributed, what their chronology was. This situation is all too common in sub-Saharan Africa, with the consequence that all this infrastructural detail must be established by the researcher before any of the more interesting questions about processes of change through time can be addressed.

Between 1977 and 1987, we spent a total of fifteen months excavating and doing regional survey in two areas of upper inland Niger delta: thirteen months at and around the major tell site of Jenné-jeno, and two months at the tells around Ja, c. 100 km to northwest. Oral traditions record that the founding Soninke population of Jenné-jeno migrated from Ja. Our research strategy in both areas consisted of carefully controlled excavation at large, deeply stratified sites, followed by intensive foot survey of a randomly generated 50 per cent sample of tell sites and levee transects within a defined study region around the central site. From that research emerged not only a well-developed ceramic sequence for both areas, anchored in absolute time by a large series of C14 dates, but also a preliminary understanding of how Jenné-jeno expanded through time in tandem with the emergence of a regional site hierarchy (McIntosh & McIntosh 1980; McIntosh & McIntosh 1984; Haskell, McIntosh & McIntosh 1988; McIntosh 1995). Analysis of pottery and metallurgical evidence has also permitted some initial insights into shifting social and economic organization. The time period represented by the tell deposits at Jenné-jeno extends from 250 BC, when iron-using peoples established the first permanent settlement at the site, to AD 1400, at which point the site is abandoned. The Ja sequence is less thoroughly known, because the excavation sample is so much smaller, but similarity of the ceramics to those of Jenné-jeno demonstrate that initial occupation was likely somewhat earlier than Jenné-jeno, and continued until c. AD 1000. At that time, numerous sites in the Ja area were abandoned.
Before turning to the excavation and survey results, let us consider the environment of the inland Niger delta, an area of extraordinary productivity and importance in the prehistory and history of the Sahelian zone (Gallais 1967). Every year in August and September, over 50,000 km² of alluvial plain is inundated by floodwaters. This produces a teeming succession of marsh, swamp and grassland vegetation as the waters recede. The best rice-growing soils are to the south. Near Lac Débo, deep basins are common. These are too deep for rice cultivation and support predominantly fisher folk during inundation and, later, a vast number of cattle brought in by transhument Fulani herders to graze on the rich grasslands. Jenné-jeno is located within a short distance of an important deep basin, the Pondori, but it is surrounded by medium-depth floodplain soils that are optimum for the flood cultivation of rice. Jenné-jeno is a classic tell – a huge mound composed of occupation debris – situated in the midst of the rice fields cultivated by the former inhabitants of the site. It is exactly analogous in its situation to its descendant site, the present-day town of Jenné, 3 km to the west.

The inland Niger delta research

Based on controlled excavations at the 33 ha tell of Jenné-jeno, the adjacent 8 ha tell of Hambarketolo and the 41 ha site of Kaniana some 3 km away (Fig. 2), we have been able to establish a four-phase ceramic and cultural sequence for iron age occupation, which extended from 250 BC to AD 1400 at the long-lived sites of Jenné-jeno and Hambarketolo (McIntosh & McIntosh 1980; McIntosh 1995; Table 1).

Phase I/II (250 BC–AD 400)
The earliest occupation attested in excavation comprised iron-smelting debris together with food debris, often associated with fired earth. Daub-covered mat and pole shelters were concentrated in the central sector, where underlying landforms were highest. Flotation and faunal samples show a mixed economy with heavy exploitation of domestic rice, wild Brachiaria, some domestic millet and sorghum, hunting of wild antelope and waterfowl, herding of domestic cattle and ovicapprines, and a significant fishing component. This economy is very similar to the economy in the upper inland Niger delta today and following the admittedly coarse resolution allowed by our data, the economy appears to remain largely invariant from earliest occupation onward at the sites. The single early Phase I burial we recovered is a flexed inhumation unaccompanied by grave goods, dug into sterile alluvium from the first occupation level. The extraordinarily poor state of this individual’s dentition, with carious lesions at the cervical margin of virtually all the teeth, plus the evidence for periodontal disease and the presence of multiple hypoplasias suggests that the incoming populations had endured nutritional circumstances that were quite stressful for them either prior to entering the inland Niger delta or upon arriving, or both. The pottery assemblage comprises a limited number of forms, all with notably small rim diameters. This fact, plus the apparent absence of pottery forms such as large water storage jars and cooking pots, which
become common in the subsequent phase and remain common into the present, suggest that group size was quite small initially. Of great significance is the fact that iron ore and stone, which are absent from the floodplain, are being obtained from earliest occupation from sources at least 50 km distant. By AD 100, the site measures at least 12 ha; by the end of Phase I/II, at AD 400, it measures 25 ha.

**Phase III (AD 400–900)**

Jenné-jeno reached its maximum size of 33 ha. The subsistence economy remained largely unchanged. Import of copper early in phase from sources at least 300 km distant indicate the possible beginning of long-distance trade at the site. By the end of the phase, gold is present from sources 600 km distant. Variety of form and decoration in the pottery assemblage increases substantially, as does vessel size. Houses are now of coursed mud and measure three meters in diameter. Burial ritual is predominantly in funerary urns in cemeteries, but extended and flexed inhumations are also present. Of eleven adult skeletons, eight had no or a single dental pathology (a carious lesion), indicating generally good nutritional status. Grave goods are absent.

**Phase IV (AD 900–1400)**

At the beginning of Phase IV, there is a shift to cylindrical mud brick architecture. Houses continue to be round and approximately three meters in diameter. The first defensive structure, a city wall three meters wide and two kilometres long constructed of mud brick, is built c. AD 900. Terra cotta statuettes appear in domestic contexts embedded in house foundations. Bronze is present initially, replaced by brass from north Africa c. 1000. This coincides with appearance of north African glass beads, spindle whorls and rectilinear houses in cylindrical mud brick. Statuettes become more elaborate and stylistically varied. Among these, warrior and mounted warrior styles emerge. Burial continues in urns and by simple inhumation. Levels of dental pathology appear to increase. Grave goods are absent. From c. AD 1200, settlement retracts until the site is completely abandoned by AD 1400.

**Survey**

Survey was conducted within a study area covering 1100 km$^2$ to the north and west of Jenné-jeno, focusing on areas above the flood level, including tell sites, levees and dunes, where permanent settlement could be supported (Fig. 2). In this region, only a handful of sites were known prior to 1977. In 1977, 404 sites were discovered in course of field-walking or on air photos. Sixty-five of these clustered within four kilometres of Jenné. Of the forty-two sites randomly selected for surface investigation during survey, (focusing particularly on the area within four kilometres of Jenné-jeno, where 32 of the 65 tells present were investigated) three-quarters had Phase IV surface material, indicating abandonment during that phase. The fact that most of these were *tells* over two meters high suggests an occupation that spanned several centuries. Nearly all these sites were located on floodplain soils of medium depth which are optimum for rice cultivation (Fig. 3: note association of sites with marigot channels and...
borders of low floodplain basins), levees and dunes were not favored for permanent occupation until the arrival of the Bambara millet agriculturalists after the thirteenth century. Surface remains on several of the largest sites in vicinity of Jenné-jeno indicate a maximum extent of occupation during Phase III/early Phase IV, and a reduction in the area of more recent deposits before abandonment. These results imply that site density and population reached its peak in late Phase III/early Phase IV, at the same time that Jenné-jeno reached its maximum areal extent. Estimating population size for this period of maximum expansion is difficult, since we don’t have enough information on floor area or numbers of compounds and must use site size as a proxy measure. Based on occupation density per hectare derived from a range of Soninke villages and towns (variation stems from use of two-story residences vs. single story, and amount of non-residential space – e.g. market places) we have the following set of possibilities (Table 2), all reflecting the high residential densities characteristic of the Soninke throughout their wide distribution.

The integrated nature of this town complex is further indicated by the close approximation of site sizes and ranks to the classic rank-size distribution characterizing urban systems (Fig. 4). Moreover, this distribution shows unambiguously that a three-tier settlement hierarchy has emerged by late Phase III, with 2 very large sites > 20 ha, several medium size sites between 8–19 ha, and a large number of smaller sites (Fig. 5). The main points of this sequence to emphasize concern the evidence for early population aggregation and trade and the emergence of a settlement hierarchy (Table 3).

The middle Senegal valley

Let us now take a large leap through space, 1200 km northwest to the middle Senegal valley. From November 1990 to May 1991, we conducted research in a specific study region, using an approach very similar to that employed in the inland Niger delta (McIntosh, McIntosh & Bocoum 1992). More was known about the distribution of sites in the middle Senegal valley, after a pioneering inventory accomplished in the 1960’s and 1970’s by Victor Martin and Charles Becker (1974; 1978; 1984). Thanks in part to their work, we were able to define the area around Cubalel (Fig. 6) as particularly well-suited to our interests in the emergence of complex society because: (1) In addition to containing a high density of known sites it included some of the largest mound sites known from the entire middle Senegal valley, including Cubalel, where the >5 m height promised a lengthy sequence; (2) It encompassed some of the most productive land in the middle Senegal valley floodplain; (3) It is in the strategic central region of the middle Senegal valley where polities seeking to control the wider middle Senegal valley have often placed their capitals historically. Excavation of a large unit and several 3 x 4 m units sunk into five of the eight mounds previously known from Cubalel, plus additional units at three newly-recorded mounds, provided a six meter sequence spanning 800–900 years, from AD 0–100 to AD 900, that is, only a century or so prior to the historically documented
existence of Takrur. A three-phase ceramic chronology was established and anchored in time by nineteen radiocarbon dates.

The picture that emerges of iron age society in the first millennium is very different from that at Jenné-jeno. The material culture is remarkably homogeneous, with little variability at any point in time. This is true for the pottery, which in each phase exhibits only two or three basic rim forms and shows a restricted range of stylistic or functional variety. Studies of the paste and temper indicate technological homogeneity as well (Sall 1991). The same lack of variability is evident in other aspects of the material culture and the same categories of artifacts are present in low frequencies throughout the sequence: stone hammer stones, grindstones and beads, and shell beads. Burnt traces of wattle-impressed daub are present throughout the assemblage, suggesting a largely invariant architectural technology. Luxury or elite goods appear not to exist, and there are no grave goods associated with any of the four adult burials excavated. Iron is the only metal present, fashioned into points, blades, harpoons and fishhooks, without any apparent shift in functional repertoire, until c. AD 900. The mammalian fauna is dominated by ovicaprids throughout, although humpless domestic cattle were also present, along with wild bovids (MacDonald & MacDonald n.d.). Fish are also present in substantial numbers. Paleobotanical material is under analysis and no preliminary details are yet available. Overall, the excavated material signals a conservative, relatively homogeneous small-scale society practicing a mixed economy of herding, fishing, occasional hunting and most likely farming. There is no indication of long-distance or inter-regional exchange prior to c. AD 900. Unlike the inland Niger delta, iron ore and stone are present within easy walking distance of Cubalel, and huge outcrops of iron ore are readily visible from the site itself.

This picture of first millennium middle Senegal valley society is also supported by the results of the intensive survey conducted from January to late April on 100 per cent of the landforms available for permanent settlement in the study area. Within the floodplain basin, these landforms are levees above 10 m above mean sea level (msl); outside the floodplain basin, they are uplands >12 m above msl. The extreme dryness of 1989–90, stemming from a lack of rain and the retention of all floodwaters upriver behind the newly completed Manantali Dam, made for ease of movement across the floodplain and for the best archaeological visibility in years. This helped account for the large number of new sites we were able to find, compared to Martin and Becker’s earlier inventory in the late 1960’s, which stuck fairly close to the two main river roads (Fig. 7). Survey was conducted by teams of three or four individuals walking 50 m apart over the surface of levees 10 m or higher above msl. Four classes of site were identified: (1) extremely dense accumulations of cultural material in mounded settlement sites up to seven meters high; (2) metallurgical sites with numerous furnaces (in one case, over 400) and more significant amounts of other cultural material; (3) extensive surface scatters of sherds and slag, called plages by Senegalese archaeologists, which may be secondarily deposited material; (4) isolated, small metallurgical sites with a very few
furnace bottoms and very little other cultural material on the surface. This final class of site was briefly noted, described and plotted on the regional map, but not investigated any further. For the first three site categories, surface examination consisted of measurement of site dimensions, and recording of information on vegetation, location and proximity of water, topographic situation, current usage of or threat to site. The site was then divided roughly into quadrants, each of which was thoroughly surface walked to record number and position of surface features (house foundations, burnt floors, iron furnaces, slag concentrations) and certain classes of artifacts, including prestige goods (marine shell, stone beads and bracelets, glass, copper, enameled pottery) and production-related artifacts (tuyères, crucibles, casting molds, stone anvils, spindle whorls, net weights, fishhooks, pottery wasters). Comparable coverage and intensity of observation at all sites was assured by walking parallel transects two meters apart through each quadrant. Site investigation concluded with collection of a judgment sample of diagnostic pottery from the entire site surface and a random sample of all sherds within a 4 m² area in each quadrant. These pottery samples permitted the surface assemblages to be placed within the ceramic sequence.

The preliminary results of the survey confirm the general picture provided by excavation: a small scale society that underwent little change throughout the first millennium AD. Site distribution changes little during this time. The sites with Phase I and II material on the surface are distributed along the high levees, with a slight concentration on the Cubalel levee system. In Phase III, we see the same pattern, with the cluster at Cubalel notably elaborated, suggesting perhaps some enhancement of this marigot environment in the later half of the first millennium AD that encouraged higher population densities locally. There is little evidence that these populations became more hierarchically organized, however. Site size distributions for both the group of sites around Cubalel and that around Siouré do not change from Phase I to Phase III, while significant changes occur in Phase IV, concomitant with evidence of trade and contact with groups bringing copper, spinning technology, glass and other exotics into the region (Fig. 8). That some of these influences flowed from Saharan entrepôts including Tegdaoust is highly likely, given the appearance of pottery motifs imitating decorative patterns documented at Tegdaoust.

The evidence suggests that middle Senegal valley societies underwent a major and extremely rapid transformation in scale and complexity between the end of Phase III, dated to the early tenth century AD, and the period of the Takrur Empire, which was historically attested just over one hundred years later. Therefore, we have two very different developmental trajectories attested in the two floodplains, one in the inland Niger delta characterized by early population agglomeration, long-distance exchange and emergence of site hierarchies prior to contact with Arabo-Berber traders at the end of the first millennium, and one in the middle Senegal valley that remains highly decentralized and small-scale until it undergoes rapid transformation shortly after contact (Table 4).
Interestingly, it appears that these two areas embarked on different paths with regard to specialization and aggregation at or soon after initial occupation. Let us consider the nature of the two floodplains to understand why this should have been so. In any arid floodplain exploited for food production, the spatial distribution of several essential land units will be of central interest: non-inundated upland areas for permanent habitation and pasturing of herds during flood season, dry season pasture lands in low-lying wet soils, and soils for cultivation either during or immediately following the flood season. Both the inland Niger delta and middle Senegal valley are surrounded by arid uplands and have levee systems within the floodplain that generally stay dry. Both have floodplain basins of varying depths with are heavily used for cultivation. Yet because the spatial distribution of these landforms is so different in the two floodplains, and because different staple crops are cultivated in the two floodplains, society is organized very differently within them. Jean Schmitz (1986) had some fundamental insights on the nature of these differences, and my discussion is substantially inspired by his observations.

The middle Senegal valley is a narrow, linear floodplain, with an average width of 20 km in the central region, where the basic landforms for cultivation and pasture are highly redundant throughout the middle Senegal valley. Walk into alluvial zone from either the Doué or Senegal main channel, and one encounters levees for settlements and garden culture and low-lying floodplain for recession cultivation of sorghum and dry season pasture. Bordering the alluvium on both sides are uplands where rain-fed cultivation of millet and rainy season pasturing of herds occurs. These three vital zones: (1) upland jeeri, (2) floodplain levees, and (3) flood basins called hollalde, are distributed roughly in bands parallel to the river. A transect cut across the river from jeeri to mid-alluvium will usually include all three landforms (Fig. 9). The middle Senegal valley floodplain thus lends itself to the creation of numerous closely spaced, highly redundant territorial units, called leydi, each containing the intersecting exploitation zones of farmers, fishers and herders. Control of each leydi and decisions concerning the scheduling and use of its pastoral, agricultural and fishing resources is in the hands of an elected lineage head. Landuse and economy among the various leydi is similar regardless of the group holding the land rights. Virtually all leydi in the central zone of the middle Senegal valley will schedule in rotation through the year: recession cultivation of sorghum in the hollalde basins and rain-fed millet agriculture on the levees and bordering uplands by Tukolor warrior and cleric lineages who also keep small herds of stock; fishing and recession cultivation on the slopes of the riverbank by Tukolor fishing lineages; and pasturing of large herds of stock belonging to transhumant Peul on the floodplain after the sorghum harvest. If we look at the scheduling of these various activities by the different groups (Fig. 10), several things are clear: (1) rain-fed and recession crops occur in sequence and can be practised by the same group of Tukolor without conflict; (2) Tukolor fishing groups (called cuballo) can fish and farm simultaneously for part of the year; and (3) the single case of
potential land-use conflict arises in the dry season before the sorghum harvest begins. The Peul herders moving towards the middle Senegal valley for pasture must wait to enter the floodplain in order to avoid damaging the sorghum crop. Close Tukolor-Peul clan alliances and intermarriage plus a common language, Pulaar, help defuse this potential conflict.

In sum, we can note that the subsistence opportunities offered by the middle Senegal valley favor relatively even distribution of population in relatively small territorial units. Schmitz (1986) believes that the knitting together of a seamless economic fabric within and among the *leydi* was greatly facilitated by a common language. Over time, various immigrants to middle Senegal valley, including Moor, Wolof, Serer, and Soninké groups, were absorbed by the anti-ethnic ideology of Tukolor ‘Pulophone society’. As a final, but related point, on the spatial distribution of essential resources in the middle Senegal valley, the presence of essential items such as iron ore and stone within the *jeeri* territory of each unit provided no initial incentive for exchange. Interestingly, the Tukolor recognize no statutory group of traders. Indeed, commerce is conducted largely by strangers: Wolof canoes from the delta, Soninke merchants from the upper Senegal valley, and Moors.

The inland Niger delta provides a strong contrast. It is much larger and wider (100 km), and the features required by the early iron age mixed agriculturalists who colonized the floodplain – upland levees for stock during flood season, good rice-growing soils, and deep basins for dry season pasture – are highly uneven in their distribution. The *leydi* system imported into the inland Niger delta by Tukolor conquerors in the nineteenth century reflects the fundamentally dispersed nature of critical landforms (Fig. 11). Furthermore, if we look at the schedule of subsistence activities attested in the archaeological record at Jenné-jeno, we immediately notice the conflict of flood cultivation of rice with rain-fed cultivation of millet, pasturing of stock during flood, and migration down river for prime fishing as fish return to major channels after floods (Fig. 12). Together with the patchy distribution of various landforms in the inland Niger delta, these scheduling conflicts account for the subsistence specialization we see in the inland Niger delta today. Somono and Bozo fisher folk exploit the river channels and marigots, respectively; rice growing soils are exploited by Nono agriculturalists (Soninke), sandy levees by Bambara agriculturalists; and deep basin pastureland seasonally by the Peul, resulting in an ethnic and linguistic map of great diversity. Gallais (1967; 1984) has documented how the importance accorded to change in ethnic identity in the inland Niger delta reflects concern that everyone’s position in the system of subsistence activities coincide with certain ‘ethnonyms’. Subsistence specialization within a carefully maintained ethnic mosaic, cemented by exchange and alliance, is the dominant pattern in the inland Niger delta, contrasting with the linguistic homogeneity of middle Senegal valley Pulophone society. Although the introduction of Bambara millet growers and Peul transhumant pastoralists occurred within historical memory, beginning in the thirteenth century, undoubtedly disrupting earlier patterns of land use as new layers of specialization were added,
the fundamental symbiosis between fisher and rice grower in the inland Niger delta probably dates to the time of initial settlement. The Nono are considered ‘Masters of the Earth’, and the Bozo, ‘Masters of the Waters’ (Sundström 1972). This functional differentiation between fishers and rice farmers is echoed in foundation traditions for Jenné and Jenné-jeno. I believe it is the economically differentiated substrate on which early iron age society at Jenné-jeno was established. The importance of both rice and large Nile perch from the main channel some distance away in the earliest occupation levels indicates that both these activities, with their conflicting schedules, were taking place at the beginning of the sequence. The need to go well outside the inland Niger delta for essential raw materials such as stone and iron likewise set the stage for Jenné-jeno’s increasing involvement in trade and exchange through time. Increasing specialization through time at Jenné-jeno can be detected in the patterning and distribution of smithing debris, indicating installation of smiths in specific locales or quarters, probably as members of organized specialist-producer groups (McIntosh 1995). The growth of Jenné-jeno as an urban centre is best understood, I believe, in the context of its unusual position within the inland Niger delta in proximity to all the landforms essential for agropastoral production – rice-growing soils, dry and wet season pasture – the necessary emergence of specialized fishing and mixed agricultural productive sectors soon after initial settlement, its command of primary and secondary communication channels, and its expansion of specialized productive sectors through time. Jenné-jeno came to ‘perform specialized functions in relation to a broader hinterland’, following Trigger’s (1972) definition of an urban centre.

Most interestingly for comparative purposes, however, Jenné-jeno does not appear to have emerged within a progressively urbanizing regional landscape. Rather, the agglomeration that we see at Jenné-jeno is an isolated phenomenon within the floodplain, with several large and intermediate sized sites packed within a three-kilometer radius, and no other sites of comparable size found within a thousand square kilometers to the north and west of the site. This contrasts strikingly with the geometrically tidy settlement landscapes predicted by popular models such as Peer Polity Interaction (Renfrew 1986) and Central Place Theory (Haggett, Cliff & Frey 1977), with its lattice of multiple complementary regions. It is not yet entirely clear how we can best understand the changes in social and political organization that accompanied the emergence of this isolated urban site hierarchy. The absence of any evidence for elites or social stratification or even formalized leadership in Phase III is intriguing. Both R. J. McIntosh (1991) and I (S. McIntosh 1992) have proposed the possibility that the population concentrated at and around Jenné-jeno in AD 800 was not hierarchically organized. Rather, it may have been horizontally integrated through numerous complex and cross-cutting associations exercising ritual or secular authority over all or part of the population. As with the ethnographically documented Yakô of southeastern Nigeria (Forde 1964), an acephalous society organized into towns with populations varying between 2000 and 11,000, governmental powers at Jenné-jeno may have been widely distributed among a number of
independent and overlapping agencies. This concept challenges the long-standing tendency in the literature on early urbanism to conflate ‘urbanization’, ‘civilization’ and ‘state’. If we have already appreciated the argument (e.g. Rowlands 1988) that much of the theorizing on the origins of urbanism, civilization and the state has taken the form of a universal monologue disseminated from the West, the importance of this data set to the process of reshaping ideas in a non-Western mold may be clear.

Bibliography:


**Table 1. Summary of the archaeological sequence at Jenné-jeno**
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Site area</td>
<td>12 ha – AD 100</td>
<td>33 ha (maximum extent) by AD 800</td>
<td>gradual contraction after 1100, abandoned by 1400</td>
</tr>
<tr>
<td>Subsist. economy</td>
<td>dom. rice, wild Brachiaria, some sorghum &amp; millet cattle, ovicaprids, antelope, fishing</td>
<td>antelope decline all other elements remain constant</td>
<td>same as Phase III</td>
</tr>
<tr>
<td>Architecture</td>
<td>daub-smeared pole- and -mat huts</td>
<td>banco huts c. 3 m diameter</td>
<td>cylindrical mud brick round huts c. 3 m diameter, c. 900 city wall, c. 1000 rectilinear mud brick houses appear</td>
</tr>
</tbody>
</table>
Exchange trade iron, stone from up to 50 km distant, rare glass beads from Mediterranean sphere copper appears AD 500 (nearest source 300 km) gold present by AD 900 (nearest sources 600 km); painted luxury ware; gold from 1000, north African brass, glass, spindle whorls

Burial single flexed inhumation; no grave goods large funerary urns in cemetery precincts; inhum also practiced; no grave goods; funerary urns in cemeteries or assoc. w/ residences; no grave goods

Symbolic postherd pavements terracotta statuettes warrior styles appear c. 1200

Table 2. Possible range of population at Jenné-jeno

<table>
<thead>
<tr>
<th>AREA</th>
<th>146 persons/ha</th>
<th>221 persons/ha</th>
<th>389 persons/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jenné-jeno (33 ha)</td>
<td>4800</td>
<td>7300</td>
<td>12,800</td>
</tr>
</tbody>
</table>
Jenné-jeno and Hambarketolo (33 + 8.8 = 41.8 ha)

Jenné-jeno cluster (includes satellite sites within 1 km)
(33 + 35.7 = 68.7 ha)

<table>
<thead>
<tr>
<th>Jenné-jeno</th>
<th>6100</th>
<th>9200</th>
<th>16,260</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hambarketolo</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Important aspects of the Jenné-jeno sequence

A. Aggregation trend present from early occupation
   • rapid areal expansion of Jenné-jeno
   • adjacent settlement of Hambarketolo founded soon after Jenné-jeno

B. By AD 800 a regional site hierarchy is present
   • intense clustering around Jenné-jeno
   • population estimates of 10,000-26,000 people within 1 km of Jenné-jeno
   • within study region, large and intermediate size sites unique to Jenné vicinity

C. Interregional exchange for stone and iron ore present in earliest levels
   • long-distance exchange for copper by AD 500

D. Subsistence economy does not change detectably over 1600-year occupation of Jenné-jeno
   • no signs of agricultural intensification

E. Minimal evidence from houses or burials for elites
**Table 4.** Comparison of the inland Niger delta at Jenné-jeno and the middle Senegal valley at Cubalel c. AD 800

<table>
<thead>
<tr>
<th></th>
<th>Inland Niger delta</th>
<th>Middle Senegal valley</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largest site</td>
<td>41 ha</td>
<td>2 ha</td>
</tr>
<tr>
<td>Site distribution</td>
<td>clustered hierarchy</td>
<td>cluster, no hierarchy</td>
</tr>
<tr>
<td>Population estimate</td>
<td>10,000–26,000</td>
<td>&lt;1000 (does not include seasonal population on flood plain)</td>
</tr>
<tr>
<td>Exchange networks</td>
<td>over 600 km</td>
<td>local only</td>
</tr>
<tr>
<td>Burial</td>
<td>no grave goods</td>
<td>no grave goods</td>
</tr>
</tbody>
</table>

**Captions for illustrations:**

Fig. 1: The inland Niger delta, the middle Senegal valley, their common source area in the Futa Jallon, and the drainage towards the two valleys from the plateau region of Mauritania.

Fig. 2: The inland Niger delta of west Africa, showing details of the Jenné region and the location of Jenné-jeno, Hambarketolo and Ja.

Fig. 3: The distribution of archaeological sites in reference to various land forms.

Fig. 4: Rank-size distributions of the archaeological sites (filled squares) within 4 km of Jenné-jeno occupied in c. AD 1000 and the present-day settlements (open squares) of the same area.

Fig. 5: The three-tier settlement hierarchy at Jenné-jeno c. AD 1000.

Fig. 6: Middle Senegal valley, showing the study area.

Fig. 7: The middle Senegal valley project study region. Sites previously inventoried by V. Martin and C. Becker shown as open squares. Sites discovered during the 1990 survey shown in black.

Fig. 8: Site size distributions for sites around Cubalel and Siouré.

Fig. 9: Deep basins (*hollalde*) and levees in the study region, with *leydi* boundaries for the Cubalel sector superimposed (data from Deme 1991 and Schmitz 1986).

Fig. 10: Schedule of floodplain subsistence activities by various groups in the middle Senegal valley.

Fig. 11: Deep basins and levees in the inland Niger delta above Lac Débo, with *leydi* boundaries superimposed (data from Gallais 1967 and Schmitz 1986).
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