

## The Wavy line Pottery in Context

Ahmed A. Elhassan & Abbas S. A. Mohammed-Ali

**Abstract:** Some sixty years have elapsed since the pioneering work of A. J. Arkell on prehistoric sites in the Central Nile region. His work has established the sequence of the late phases of the Stone Age of that region, and stimulated further investigations along the Nile and across the Sahara-Sahel belt resulting in what seemed to form a “culture area” for some, and a “Horizon style” for others. He based his sequence on ceramic industry characterized by a decorative motif known as the “Wavy Line” of two varieties, combed waves, and dotted waves. This paper attempts to place this ceramic industry in its stratigraphic provenance, typological style and chronological frame.

### Introduction

Based on his pioneering archaeological work in Central Sudan during the 5th decade of the last century, on the sites of Khartoum Hospital and Shaheinab (Fig.1), Arkell has established

a cultural sequence of a Mesolithic-Neolithic phase for the central Nile and the prehistory of the Sudan (Arkell 1949; 1953; 1972).

His work has formed the cornerstone for similar investigations across the African Sahara-Sahel

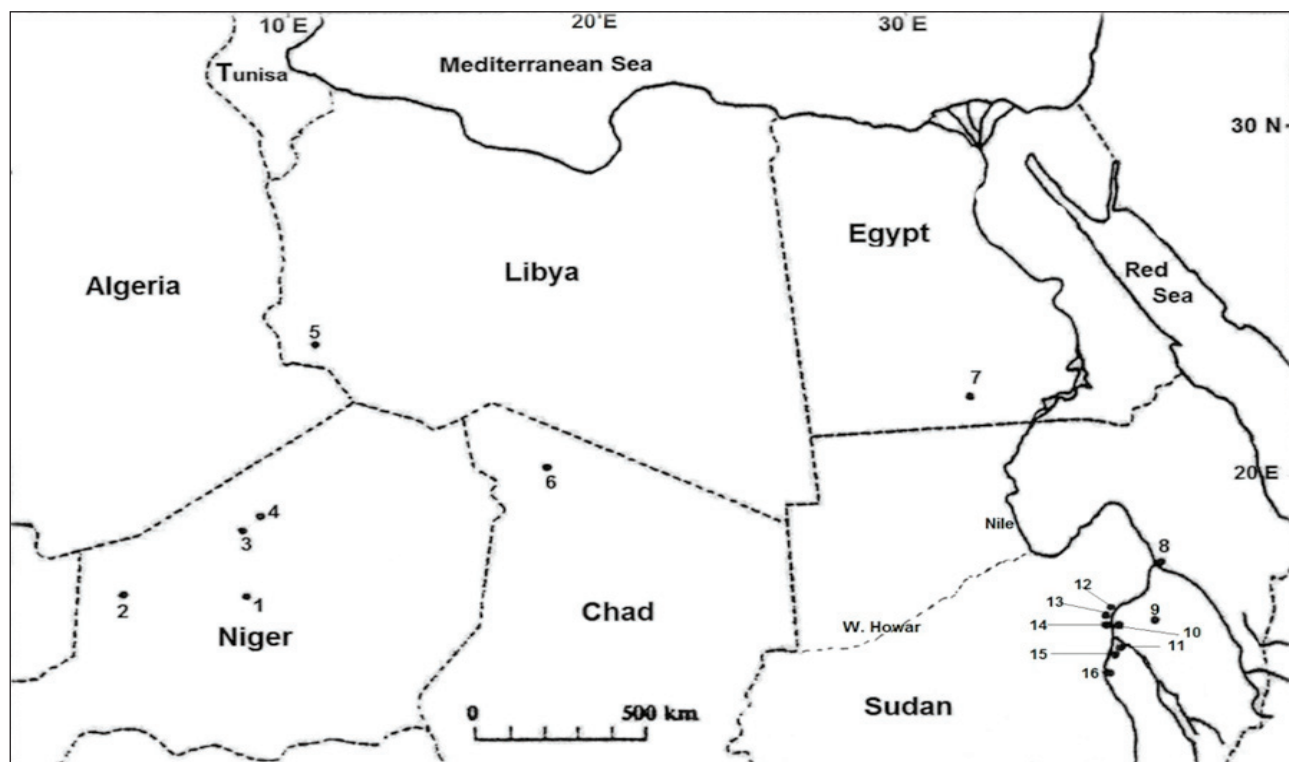


Fig. 1. Major ceramic sites in the Sahara Sahel Belt. Key: 1, Tagalgal; 2, Tamaya Mellet; 3, Temet; 4, Adrar Bous; 5, Wadi Ti-n-Torha; 6, Gabrong; 7, Kiseiba; 8, Atbara; 9, Shaqadud; 10, Kabbashi; 11, Khartoum Hospital; 12, Shaheinab; 13, Umm Marahi; 14, Sarurab; 15, Al-Qoz; 16, Shabona. (After Close 1993: 24, Fig. 3.1 with modifications).

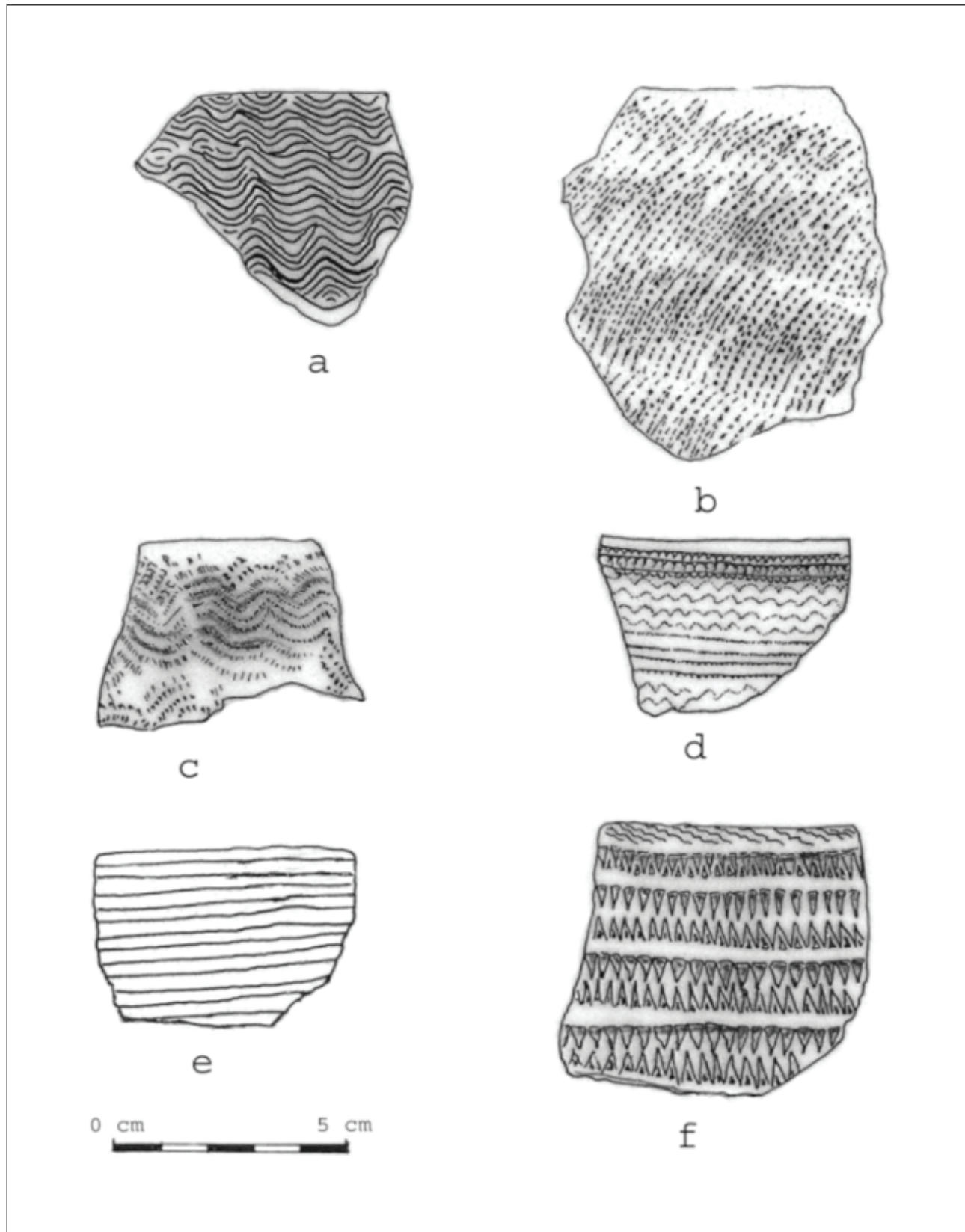


Fig. 2. Some Mesolithic and Neolithic ceramic motifs from the Sahara and the Nile. a) CWL. b) dotted zigzag. c) DWL. d) DWL. e) straight lines. f) triangles

belt from the Ethiopian highlands to the Atlantic coast. Terms such as “Nilo-Saharan Neolithic” and “Neolithic of Sudanese traditions” were circulated in the publications that followed his works (Camps 1969; 1974).

Arkell’s sequence was based on the “wavy line” decorative motif he observed on the ceramics of the two sites of Khartoum Hospital and Shaheinab, and on the stratigraphy of a third near-by site at al-Qoz (Arkell 1953: 97-101) (Fig. 1). However, he did not always adhere to the decorative variable in his classification system (Arkell 1949: 81-95; 1953: 68-76). He accentuated the presence of two sub-types of the wavy line: 1- the Combed wavy line (CWL), termed by some “incised wavy line” (Jesse 2003), even though it was actually combed; and 2- the Dotted wavy line (DWL). He also stated that the stratigraphic sequence of the two “sub-types” as recovered at al-Qoz tends to show that DWL (Fig. 2, c, d) has developed from CWL (ibid: 101).

Since Arkell’s work, tens of “Mesolithic” and “Neolithic” sites were discovered and excavated along the Nile and across the Sahara-Sahel belt with ceramic assemblages showing evidence of CWL and DWL, or one of them (Jesse 2003).

The objectives of these works varied, and so did their methodologies and results. Nonetheless the authenticity of Arkell’s results, on which these works were based, was not yet fully settled, and some of the terms he used, still circulate in the literature causing some confusion in the classifications and comparisons. These include issues in terminology, chronology, etc.

### The Problem

This paper focuses on the issues of stratigraphy, typology and chronology of the two sub-types of the wavy line pottery as these are believed to have formed the diagnostic traits of these two

cultural phases and framed the Mesolithic – Neolithic sequence on the Sahara-Sahel belt at large.

At Khartoum Hospital site both motifs of the WL were present on smoothed surfaces (Arkell 1949: Plates 59-73). At Shaheinab the CWL was absent, and only the DWL was present on smoothed and burnished surfaces (ibid: 68-69, Plate 29). At al-Qoz both motifs were present, but it was not clear whether those had burnished or smoothed surfaces (ibid 1953: 98-100).

As the evidence stands today, one of the earliest African pottery (the WL) that made its appearance in the Sahara-Sahel Belt (Arkell 1949; Camps 1969; Close 1995; Mohammed-Ali and Khabir 2003), was strictly confined to the area from western Algeria to eastern Sudan. The dates obtained from this area preceded any of the surrounding areas. Those from the Savannah to the south, the Mediterranean coast to the north, the western Sahara to the west, or the Ethiopian highlands to the east, were all late. The earliest dates as it now appears from the African Savannah are in the range of the 5th millennium B.P. Those from the Mediterranean Littoral and Lower Nile are in the range of the 7th millennium B.P., and the case is almost the same for the regions east and west of the core area mentioned. Within this area the center of invention remains uncertain, alternating between the Nile and the Central Sahara, as the dates are so close to such an extent that they do not indicate or suggest cultural diffusion from any of the two ends, the Nile and the Central Sahara, with thousands of miles apart (Fig. 1), for a “Horizon Style” (Hays 1971; 1974) to be applied (Magid and Mohammed-Ali 1988). This was what brought about terms like “Saharo-Sudanese Neolithic” and “Neolithic of Sudanese tradition” (Camps 1974; 1969) in the literature. It was later admitted that it was no longer possible to identify the first origin of the technology of

this pottery making (Close 1995: 25).

At a certain stage scholars started to identify two centers based on C14 determinations: one in the Niger, in the Central Sahara, with samples from the sites of Adrar Bous, Tagalagal and Tamaya Temet (Fig. 1). Here, given is a series of early dates ranging between 9550+/- 100 B.P. and 9350+/- 170 B.P. (Roset 1987: 211-234). The other center is on the Central Nile and its samples from Sarurab, Abu Darbain and Umm Marahi (Fig. 1) has revealed another series of early dates, ranging between 9370+/- 110 B.P. and 8240+/- 120 B.P. (Clark 1981; Khabir 1981; 1987; Haaland and Magid 1992; Elamin and Mohammed-Ali 2004). But the earliest WL sites in the vast region between the Niger and the Nile (in Chad, Libya, and western Sudan) revealed dates later than those from the Niger and the Nile (see below).

To approach the above mentioned issue, two enquiries need to be raised: 1- Does the issue under investigation question the origin of the pottery technology, as such? Or 2- Does it question the origin of the WL motif, in particular? What was the relationship between the CWL and the DWL? Was it a development as suggested (Arkell 1972) or a replacement as seen by others (سليم 2013 ; Mohammed-Ali and Saleem, forthcoming).

### Previous Works:

Arkell's investigations and the consequent works conducted in the Central Nile area and the neighboring areas since, at the sites of Sarurab (Mohammed-Ali 1982; Khabir 1987), Saggai (Caneva 1983), Atbara sites (Haaland and Magid 1992), Shabona (Clark 1989), Shaqadud (Marks and Mohammed-Ali 1991) Umm Marahi (Elamin and Mohammed-Ali 2004) and others (Salvatori and Usai 2008; Salvatori 2012; Sadig 2013), showed consistency in their finds with Khartoum Hospital and have shed light on

human hunters-gatherers - fishers communities adapting to Nilotic environment or its adjacent hinterlands relying on riverine and savannah resources.

These sites cover the span of the early and middle Holocene. Their inhabitants were able to develop technology of produce well made, well fired pottery, with high decorative motifs including dotted wavy line, zigzag, dotted straight and banded lines. One of these, the wavy line, whether combed or dotted, is considered diagnostic for these assemblages. The tool kit indicates an economy heavily relying on fishing and hunting but no knowledge of food production. The radiocarbon results obtained from these sites range between the 10th to 7th millennium B.C.

The chronology, classification systems and terminology drawn from Arkell's excavations at Khartoum Hospital and Shaheinab, found their way into most of the later works conducted on the Nile (see above) and for the interpretation of the late prehistory of the Sahara-Sahel belt at large (Hays 1974; Sutton 1977; Phillipson 1985). Yet, the combined outcome of these works has, no doubt, provided knowledge about the cultural adaptations during the early phases of the Holocene and put the Central Nile on the map of prehistoric cultures of the African continent and beyond. Yet despite these great achievements, it left a number of issues unsolved and created others, some of which were mentioned above. Central to this paper is the issue of the stratigraphy of the ceramics on which most of, if not all, the other issues have rested.

In his first excavation at Khartoum Hospital, Arkell states that the site is mostly unstratified because he could not stratigraphically distinguish or identify cultural or natural layers (Arkell 1949: 4). The same is relatively true, for the other sites such as Saggai (Caneva 1983; 1986;

1987) the Atbara sites (Haaland and Magid 1991) and Umm Marahi (Elamin and Mohammed-Ali 2004) (Fig. 1).

In addition, the CWL and DWL were partly interpreted as being components of the same ceramic type represented in two sub-decorative motifs. This is an interpretative perspective which looked at “the forest rather than the trees” as it has focused on the origin of the wavy line, regardless of whether it is combed or dotted.

As the site of Umm Marahi has revealed some of the earliest dates of pottery production in the region, we thought a re-testing may cast light on one or more of these questions and issues.

#### **Testing Umm Marihi (1980 season):**

The site of Umm Marahi was a Holocene settlement, as mentioned above, situated on the top of a flat hill overlooking the Nile, about 36 km north of Khartoum, on the west bank of the Nile. The site was first reported by Crawford in 1951 during a survey he carried in the area of Khartoum and beyond (Crawford 1961). He gave a brief description of the archaeological features on the hilltop; those comprised a stone enclosure of a Neolithic age, traces of huts, and a fort which he attributed to the Meroitic era (Crawford 1953: 39).

At a later date, A. A. Elhassan (1979; 2006) conducted a survey in the area, on and around the hill, and confirmed the Meroitic structures and the presence of the “Neolithic” settlement with stone artifacts and wavy line pottery resembling those recovered by Arkell in the Khartoum Hospital site. Elhassan tested the remains of huts, the structures of the fort and the tumuli graves on and around the hill, which turned out to be of a late Meroitic date (Elhassan 1979; 2006).

Based on these results, Mohammed-Ali and Elamin in 1980 carried out test-excavation in

the Neolithic settlement on the hilltop where a 2X1 meters trench was dug in what seemed an undisturbed part of the settlement. The cultural deposit went to 115 cm below the surface and were dug in 10 cm metric levels. The material recovered showed clear affinities with that of Khartoum Hospital, including both CWL and DWL, stone artifacts and a wide variety of the remains of animal bones (Elamin and Mohammed-Ali 2004). Cultural deposit and stratigraphy of the site were not in situ. Meroitic artifacts and burials found their way into the Mesolithic levels. Two obtained C14 dates were: 8920+-180 BP (T-5300) from level 3, and 8240+- 120 BP (T-5301) from level 11. The dates are accepted for the settlement, and they also substantiated the disturbance of the cultural context, whether by natural or human factors. The CWL and DWL, as noted, showed no clear stratigraphic distinction, though the percentage of the CWL over-numbered that of the DWL in all levels (Elamin and Mohammed-Ali 2004).

#### **Retesting –Umm Marahi:**

On the southern edge of the 1980 trench a 1m x1m testing trench was dug down to the hard rock of the hilltop at a depth of 115 cm, as before. Similar to the results of the test excavation in 1980, the excavated part of the site also showed clear disturbance. It was decided to follow the same excavation system using the 10 cm arbitrary levels in an attempt to correlate them with the 1980 levels to measure the degree of disturbance when the material from the two trenches is compared.

The surface of the site was still glittering with stone debris and broken sherds as before. The pottery was suggestive of the presence of more than one component, Mesolithic and possibly late Meroitic.

The density of the material varies through the levels, but shows clear increase in the

middle levels (between 50-80 cm). The material recovered is comparable to that unearthed in the previous excavation (Ibid). It includes lithic artifacts, potsherds and faunal remains, all reflecting affinities to those recovered from Mesolithic sites in the region (Arkell 1949; Caneva 1983; Mohammed-Ali, Khabir 2003).

The lithic artifacts were made of local material, most commonly rhyolite and quartz, but petrified wood was also used. Grinding tools were made of sandstone. The tool kit includes lunates, various types of scrapers and retouched flakes, but blade production was not recorded.

The ceramic sample revealed handmade pottery built by the coiling of fine clay mostly with sand or crushed quartz with smoothed surfaces. The decorative methods are those frequently applied on Mesolithic vessels: the combed wavy line, dotted wavy line, zigzags, etc. The lack of complete or semi complete pots, bases or rims does not allow for reconstruction of pots. But the size and thickness of sherds indicate various sizes and forms.

The faunal remains consist mainly of fish bones and molluscs, an indication of heavy reliance on aquatic resources. But none of the levels revealed traces of fire places, or structures, such as post-holes, graves or hut foundations.

The material culture recovered from the test pit does not allow making detailed statistical meaningful percentages. Furthermore, a 1x1 m trench and its location on the site do not necessarily provide indicative representation of the distribution of the remains on the site, but the types of remains recovered show affinities with the remains recovered from the previous test-excavation (Elamin and Mohammed-Ali 2004: 97-110).

Two shell samples were collected from the middle and lower levels of the trench, despite the probability of these levels being disturbed.

The dates obtained were: 7720+/- 40 BP from the middle levels and 7580+/- 40 BP from the lower levels (Appendix 1). As regards their stratigraphic provenance and chronological sequence and the disturbed nature of the context, they indicate repeated patterns similar to the previous C14 determinations.

As stated above, the work of Arkell in the Khartoum Hospital site yielded hard well-made and well fired pottery decorated in a number of motifs, most striking of which, was a Wavy Line decoration considered a "type fossil" and a diagnostic cultural element/feature that distinguishes a Mesolithic phase in the Central Nile (Arkell 1949).

In his classificatory system, Arkell employed a decorative motif criterion for the "Wavy Line" and identified its two varieties: the "Wavy Line" as such and "Dotted Wavy Line" variance. For Arkell, these two represented one type rather than two distinctive decorative categories. Accordingly, they were considered contemporary (ibid). At a later stage when the near-by sites of Shaheinab and al-Qoz were excavated (Arkell 1953), two new discoveries were made: 1- The DWL continued in use, as evident at Shaheinab (Arkell 1953: 69, plate 29); 2- Stratigraphically speaking, it was found, as previously stated, overlying the CWL, at al-Qoz site (ibid 101). Although the discovery at Shaheinab was clearly documented as indicated (Arkell 1953), the one from al-Qoz was controversial as the latter site was also disturbed at many parts (ibid: 99).

As regards the wavy line motif (both combed and dotted wavy lines), the excavations and the study of these revealed no proto-type, neither for the motif/s nor for the technology of the pottery production, even though we believe that such a fully developed invention can hardly erupt out of no archetype or a proto-genitor.

This would recall the observation that the

core area of this pottery with its motif/s was uninhabited for a long period of time during the hyper-arid phase of the end of the Pleistocene (c. 20000-12000 B.P.), which predates the invention of this pottery (Adamson 1982: 221-234; Close 1995: 25). During this dry phase the Sahara expanded as far south as the present Savannah belt, and the White Nile turned into unconnected ponds (Adamson 1982: 221-234). In addition, most of the WL and DWL types were of sites disturbed at a later date by Meroitic and post-Meroitic burials, together with erosion, deflation, etc. Such obstacles have made it difficult to follow the flow of the process of development, and hence the reconstruction of the micro cultural sequence of technology (gradual or radical) of this pottery type. In this connection, Rice wrote “finding the ‘earliest’ pottery in any culture area is doubtless a logical and methodological impossibility.... Given our current lack of comprehension of the precise circumstances leading to pottery manufacture, it has been difficult to predict where to look” (Rice 1999: 14). Fortunately, we know where to look. But even that may not be enough to reach a final result, as it all depends on finding what one is looking for!

The test-excavations and the study of pottery collection derived from these excavations, made it possible to cast light on the stratigraphy, typology and chronology of the two sub-types of wavy line pottery.

Stratigraphy comes first. Since the publication of “The Principles of Geology” in 1830 by the British uniformitarianist Charles Lyell, followed by the recognition of “The Age System” set by the Danish museologist Christian Thomsen, and the publication of “Ledetraad til Nordisk oldkyndighed” in 1836, stratigraphy proved to be the most reliable relative dating method in archaeological field studies of the sequence of past cultures (2000: 62-65, 74-75 دانياال). The

method set by Lyell was simple: the upper layer is later in time (younger) than the lower one and that whatever the layer contains is part of its formation. This principle is theoretically sound, but in practice the situation may not follow those principles. Major disrupting element/agents may occur, the most prominent of these are post formation disturbances which would not only reverse the stratigraphy, but mix all its components, cultural and geological, to a level of indiscriminate association of artefacts. Nevertheless, stratigraphy remains a major relative dating method.

As regards the typology of the recovered material, it too is not free of weakness; the typological approach could lead, and did, to errors in forming and interpreting cultural sequences (e.g., chronology). In other words, in drawing chronologies, typology assumes that similarity and contemporaneity are correlated (Whittle 1988: 29-36). In reality, however, that is not always the case. That is to say, classification requires objectives closely linked to selected variables; sometimes the «type» was perceived before the concept of the selection of the term or the application of the measurements. These and other challenges can, and are inherited in archaeological research, and hence may impact on the final results. Archaeology in the Sudan is no exception.

### Discussion:

The Excavations carried out at the sites of Khartoum Hospital and Shaheinab, did not yield distinct stratigraphic or cultural layers which separate the CWL from the DWL. This was partly attributed to the interpretation of both motifs as varieties of one pottery type, and partly to the disturbed nature of the site. This was also true for a number of assemblages recovered from various sites in the Khartoum region (see above, Caneva 1988). At al-Qoz, though it was

claimed that the stratigraphy shows a separate provenance for each (Arkell 1953: 98-99), the sherds per level do not conclusively prove it (square P 40, X38).

Two localities at the site of Sarurab, (Fig. 1) were tested separately (Sarurab 1 and Sarurab 2). The site is located in the middle of a modern village surrounded by a number of houses and showing evidence of disturbance on the surface, and the sub-surface unstratified level revealed an assemblage of Khartoum Hospital type with CWL and DWL. Although the site is clearly unstratified, two dates were obtained from the bottom part of the excavated area, ranging between 9970 $\pm$  110 B.P and 9930  $\pm$  110 B.P (Khabir 1985: 40). The middle part yielded later dates in the range of 6407 $\pm$  80 B.P and 5550 $\pm$  350 B.P (Mohammed-Ali 1982: 173).

No disturbance was observed at the site of Shaqadud S-1B, located c. 50 kms east of the Nile. The excavations of the site revealed a three meters deep of in situ stratigraphy. Indeed the stratigraphy at this site is evidently deeper than any late prehistoric site in the Nile Valley. Here the lower levels (level 61-35: c. 1.5 m from the surface) revealed CWL with other decorative motifs without the DWL. All were made on coarse, well fired ware (Mohammed-Ali 1991: 85-88). Within the middle levels (level 34 upwards c. 1.6 m from top) the CWL was fading out. At the same time, the DWL started to emerge making its earliest appearance in the stratigraphy and continued to appear with other motifs, with a later shift in ware type (See below).

It is worth mentioning here that Shaqadud was discovered during a survey in the early sixties of the last century. It was reported, then, that “wavy line pottery was not found on the surface of the site and it would appear that the wavy line culture (Khartoum Hospital) is not represented here” (Otto 1963: 109).

The site of Awlad el-Imam in the vicinity of Khartoum yielded a ceramic assemblage characterized by the Khartoum Hospital type of CWL pottery, but no evidence of DWL was found (Caneva et al 1993). It was at the site of Kabbashi –A, c. 30 km north of Khartoum (Fig. 1) that CWL was found stratigraphically deposited in a layer below another one containing DWL (Caneva 1987: 55; Garcea 1993: 521).

Based on stratigraphic observations, as evident from the stratigraphic sequence at Shaqadud these findings, show that, the introduction of CWL precedes that of the DWL. In addition, the negative evidence (i.e. the absence) of the DWL in some assemblages at some sites along the Nile and its occurrence in others, without the CWL also indicates that the CWL pottery was introduced before the DWL.

Typologically, at Khartoum Hospital site, both CWL and the DWL were made on smoothed exterior surfaces (Arkell 1949: Plates 59-73). At Shaheinab the CWL was absent and the DWL was made on burnished, unburnished or slipped surfaces (Arkell 1953: Plates 29-35). On seriation basis, Arkell tended to show that the DWL not only succeeded but also developed out of the DCWL (Arkell 1953: 69, Plate 29). Unfortunately, the ceramic assemblage from al-Qoz was not fully described in terms of some of the other ceramic variables, specially its surface treatment. But one plate shows DWL motifs on a burnished sherd (ibid, Plate 38-3). That fact added another complication; namely, whether we are dealing with one or more cultural component/s at al-Qoz.

At Shaqadud S1B we seem to have a much informative and clearer situation. Its deep ceramics did bear cultural deposits reflecting gradual transition of some main ceramic variables (motif, temper, firing, etc.). Here, as mentioned above, the CWL motif characterizes



the lower levels of the site. Typologically, the CWL was made on hard coarse ware with smoothed surfaces. Similarly, the DWL was also characterized by coarse hard smoothed surfaces. Further up the strata, the DWL continued but, shortly before fading out of fashion, its hard coarse ware shifted to friable coarse ware. Thereafter, the ware turned to friable fine with burnished surfaces decorated with Shaheinab type of motifs (incised straight lines, zigzag lines, triangles, etc.) (Fig. 2, e, f) and dominated the scene up to the top levels. In this part of the sequence the DWL was not present (For details of these shifts see Mohammed-Ali 1991: 76-93).

For chronology, as the current evidence stands, the radiocarbon dates from a number of sites point clearly to a center of DWL pottery invention in the Niger in the Central Sahara during the 10th millennium B.P (table 1). The dates obtained precede any dates from any ceramic bearing site in the neighbourhood of the Niger not only for DWL as a motif, but for any technology of pottery making as such.

On the other hand, and on the eastern end of the Sahara Sahel belt, a number of sites, on the Central Nile, have produced CWL pottery from levels lacking evidence for the DWL ranging from the 1st half of the 8th millennium B.P (table 2).

Sites on the Central Nile also have yielded unspecified varieties of WL pottery with evidence of disturbance in stratigraphy together with unclear locations of the C14 samples provenances and their association with one variety or another, ranging in chronology between the 10th-6th millennium B. P (table 3).

Table 4 shows a list of dates from sites amid the region between the Niger and the Nile, namely Chad, the eastern Sahara of Egypt, and western Sudan, showing the earliest appearance of DWL pottery in these areas, all of which are

postdating those from Niger and predating their counterparts on the Nile (table 2). The latter, as shown in table 5, indicates that the DWL made its earliest appearance in the Nile as late as the end of the 7th millennium B.P.

Site provenance	Radiocarbon age (b.p)	Lab No.
Temet	9550+/-100	Paris
Adrar Bous-10	9130+/-65	UW 806
Adrar Bous-10	9100+/- 150	Paris
Tagalagal	9370+/- 130	Paris
Tagalagal	9330+/- 130	Paris

Table 1. The earliest dates from Niger with DWL. (No C. W. L).

Site provenance	Radiocarbon age (b.p)	Lab No.
Shaqadud S. 21	7417+/- 67	SMU 1310
Shaqadud SIB	7785+/- 443	SMU 1736
Awlad el-Imam	7750+/-90	T - 6655

Table 2. The earliest dates from the Nile with CWL. (No DW L)

Site provenance	Radiocarbon age (b.p)	Lab No.
Sarurab 2	9370+/-110	HAR 3475
Sarurab 2	9330+/-110	HAR 3476
Abu Darbein	7410+/-100	T-8624
Shabona	7470+/-240	SUA 2140

Table 3. The earliest dates from the Nile with WL. (unspecified)

Site provenance	Radiocarbon age (b.p)	Lab No.
Tin -Torha - Libya	8640+/-50	R1033 a
Gabrong - Chad	8560+/-120	HV3715
Wadi Shaw 83/117 - W. Sudan	6410+/-350	KN 340
Kiseiba - Egyptian desert	8020+/-70	SMU 913

Table 4. The earliest dates of DWL pottery from the region east of Niger -west of the Nile (No CWL).

Site provenance	Radiocarbon age (b.p)	Lab No.
Kabbashi - A	6150+/-80	T - 6645

Table 5. The earliest dates from the Nile with DW L (No. CWL).

## Conclusion

In his pioneering work in the Central Nile, over sixty years ago, Arkell has established a prehistoric sequence for the Central Nile on which all later works have drawn. Similar to any pioneering work in a region where no previous investigations have been conducted, certain controversial issues must arise, but the work remained a landmark and cornerstone in the research of the prehistory of the Nile Valley and the Sahara-Sahel at large.

In this brief survey, the present paper attempted to address some of these controversial issues in the light of new evidence, and some of the hypotheses postulated since the work of Arkell. The following can be suggested:

1. As can be deduced from the field reports on most sites bearing CWL and DWL ceramic assemblages in the Central Nile, the excavations of those sites revealed a serious state of disturbance. Some of the C14 determinations showed over 2000 years difference in the same site. This may be attributed to the possibility that we are dealing with two components rather than one. At this stage, it could be suggested that, despite the disturbance, any date in the range of 6000 B.P referring to DWL as the earliest appearance of this decorative motif, as shown above, does not predate the end of the 7th millennium B.P.; i.e., no assemblage on the Nile with DWL alone predated the end of the 7th millennium B.P.
2. On the basis of the above, the available dates ranging between c. 10000-6000 refer only to the CWL, and do not date the DWL,

even when both motifs are mixed due to the disturbed nature of the stratigraphy.

3. The DWL was mostly depicted close to the rim of the vessel with or without another motif (e.g. zigzag, mat, etc.) on the lower part of the vessel, but never appeared with the CWL. This may indicate that the two motifs did not co-exist contemporaneously. Even if they did, it must have been for a very short period of time.
4. For ceramic under discussion, attention was particularly given to the motif and the temper, while hardly any attention was paid to surface treatment and ware-fabric variables. These might have had longer life span, but they may contribute to providing clues on the unresolved challenge.
5. Though TL, OSL and EPR as absolute dating methods are not as yet reliable as C 14, attempts should be made to date sherds with the two motifs from the many disturbed sites and compare the results with each other and with any other varieties obtained from the same sites. This can tell whether we are dealing with one or more components and to which of them does the C14 determination belong.

REPORT OF RADIOCARBON DATING ANALYSES			
Sample Data	Measured Radiocarbon Age	<sup>13</sup> C/ <sup>12</sup> C Ratio	Conventional Radiocarbon Age(*)
Beta - 215085 SAMPLE : UM3 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (shell); acid etch 2 SIGMA CALIBRATION : Cal BC 6330 to 6150 (Cal BP 8280 to 8100)	7330 +/- 40 BP	-1.2 ‰	7720 +/- 40 BP
Beta - 215086 SAMPLE : UM4 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (shell); acid etch 2 SIGMA CALIBRATION : Cal BC 6170 to 5990 (Cal BP 8120 to 7940)	7220 +/- 40 BP	-3.1 ‰	7580 +/- 40 BP

Appendix 1. Report of the radiocarbon Laboratory

**Dr. Ahmed Abuelgasim Elhassan:** Department of Tourism and Archaeology, University of Hail, Kingdom of Saudi Arabia.

**Prof. Abbas S. A. Mohammed-Ali:** Department of Tourism and Archaeology, University of Hail, Kingdom of Saudi Arabia.

**ملخص:** لقد انقضى نحواً من ستين عاماً منذ أن كشفت الأعمال الرائدة لأنطوني آركل عن مواقع في منطقة النيل الأوسط، رسمت السجل الحضاري للحقب المتأخرة من العصور الحجرية في تلك المنطقة؛ وألهمت لاحقاً أعمالاً أخرى مختلفة على طول نهر النيل، وعلى امتداد شريط الساحل والصحراء. رأى بعض الباحثين في هذه الأعمال مكوناً "لمنطقة حضارية"، ورأها آخرون تشكيلاً لـ "طراز أفقي"، اعتماداً على نوع من الفخار تميّز بزخرفة من خطوط مموّجة ومتقطّعة. يحاول هذا البحث أن يضع ذلك المنتج الفخاري في محتواه الطبقي وطرازه النوعي وإطاره الزمني.

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