

SUDAN & NUBIA

The Sudan Archaeological Research Society



Bulletin No. 2

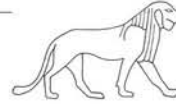
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Front Cover: Ceramic statue of the goddess Beset from Kawa.

Introduction

Vivian Davies

Members will note that this second issue of *Sudan & Nubia* is already considerably larger than the first, a clear signal, I am pleased to say, both of our Society's commitment to fieldwork and of the growing interest in Middle Nile archaeology in general. With the four-year programme of survey in the Northern Dongola Reach completed, we began last season a significant new project at Kawa (see Derek Welsby below), a major Pharaonic and Kushite cult-centre and one of the most important archaeological sites in the Sudanese Nile Valley, now threatened by modern development. At the same time our interest in the hydrological research on the Nile palaeochannels in the Dongola Reach continues (Mark Macklin and Jamie Woodward), and we have also supported archaeological survey both in the Bayuda desert in advance of the building of a new road (Michael Mallinson, Laurence Smith and Dorian Fuller) and at the site of Kurgus, the point where the Egyptians appear to have marked the southern boundary of their empire in the New Kingdom (Vivian Davies and Isabella Welsby Sjöström).

Among our guest contributors, two of our Sudanese colleagues report on valuable rescue projects, one on a site affected by the building of the Shendi-Atbara road (Abdel Rahman Ali Mohamed), the other in the area of the Fourth Cataract, where a new dam is being planned (Mahmoud el-Tayeb). Also under threat is the site of Soniyat in the Debba Bend, now very plausibly identified by a Polish expedition as the 'Tergedum' mentioned in Book II of Pliny's *Natural History* (Bogdan Zurawski). Rescue is also very much the theme of the Egypt Exploration Society's latest excavations at Qasr Ibrim, the last remaining site in Egyptian Nubia, where an unexpected rise in the level of Lake Nasser/Lake Nubia is damaging strata previously thought to be safe, necessitating urgent work on those areas (Pamela Rose and David Edwards). Fortunately there is no such threat to the Wadi Howar, a long dried-up tributary of the Nile, evocatively known as 'the Yellow Nile', where a German research project is producing fascinating new data on changes in environment and shifts in settlement patterns (Birgit Keding). A different kind of research, on the records of an important early traveller, is represented in our final paper (John Ruffle). Lord Prudhoe, its main subject, will be familiar to many of our readers for his association with the two great lion sculptures from Gebel Barkal, which now grace the Egyptian Sculpture Gallery of the British Museum.



Reports

The Yellow Nile: new data on settlement and the environment in the Sudanese Eastern Sahara

Birgit Keding

Introduction¹

'The Yellow Nile' was what Leo Frobenius called the course of the Wadi Howar in 1934; today it is still characterised mainly by yellow sand. Although his theory that the Wadi Howar was a former course of a 'Proto-Nile', crossing the Eastern Sahara to the Mediterranean during the Tertiary periods, has never been confirmed, his concept of the former role of the Wadi Howar and its banks as a settlement area and a thoroughfare in the Libyan desert is gradually being proved true (Frobenius and Rhotert 1934, 14; Frobenius 1934, 58f.). According to new archaeological and geomorphological data, the Wadi Howar could be described as the east-west lifeline of north-eastern Africa in the Holocene, a 'corridor' connecting the Nile valley with inner Africa.

The Wadi Howar is one of the largest dry river systems in northern Sudan and stretches for over 1000 km from eastern Chad to the Nile along the southern fringes of the Eastern Sahara (Fig. 1). The sources of the approximately

1050 km long former river lay in the mountainous region of eastern Chad between Djebel Marra and the Ennedi mountains, at an altitude of 950m. From there, the wadi runs in an east-north-easterly direction along the southern edge of the Sahara and seems to end after 640km in the Djebel Rahib area, at a dune barrier where the valley narrows to a width of 2km (Gabriel *et al.* 1985). Further to the east, the morphology of the former river valley is hardly recognizable, nor is there the vegetation which characterizes the western section, so that the question of whether the wadi continued remained unanswered until just a few years ago. Already in the 1920s, Newbold suspected that the Wadi Howar was a tributary of the Nile during the Miocene epoch (Newbold 1928). Only in the course of the B.O.S. expedition in 1984, which included driving from the Nile valley to Rahib Wells, was it possible to confirm the conjectures of earlier explorers (also King 1913, 278; Almsy 1997, 222) and the suggested interpretation of satellite pictures (Meissner and Schmitz 1983). Subsequent geomorphological and biological investigations (Pachur and Röper 1984; Pachur and Kröpelin 1987; Kröpelin 1993a) also confirmed that the Wadi Howar indeed continues in a west-east direction for another 400km and joins the Nile opposite Old Dongola. With a total length of 2700 km, the Wadi Howar river system was the most extensive catchment system in the south-eastern Sahara during the Holocene and was probably fed by summer rainfall (Pachur and Kröpelin 1987).

The geomorphological and biological investigations prove that during the Early and Middle Holocene water flowed not only in the Upper Wadi Howar but also, at

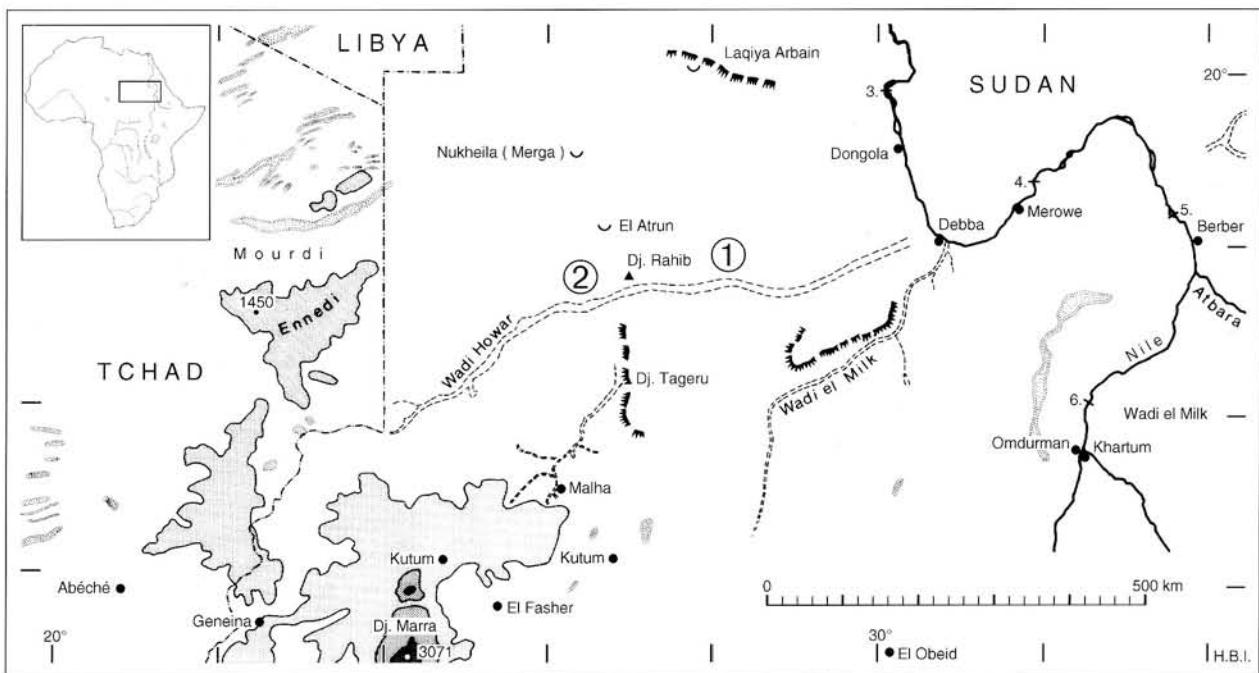


Figure 1. Map of North-western Sudan: 1 – Lower Wadi Howar and – 2 – Middle Wadi Howar.

¹ This article is based on a paper presented at the Annual General Meeting of SARS in September 1997. I would like to thank Dr R. Kuper, Director of the Heinrich-Barth-Institut and the ACACIA project in Sudan, for his support and Beverly Hirschl for correcting my English.

times, in the Middle and Lower Wadi Howar² (Pachur and Röper 1984; Kröpelin 1993b, 252ff.). The river area in those days can be visualised as a chain of lakes fed by local precipitation and separated by a series of dunes (Pachur and Röper 1984; Kröpelin 1993a, 207, 221). The radiocarbon dating of carbonates indicates that this long period of humid climatic conditions, with lakes and pools and their sometimes extensive reedy banks, lasted until three thousand years ago in both the Lower and Middle Wadi Howar (Kröpelin 1993a, 207, 216). These favourable climatic conditions enabled a northward shift of the vegetation zones over some hundred kilometres in the Early and Middle Holocene. During those periods the Wadi Howar seems to have been part of the Sudanic savannah zone (Neumann 1989, 155f.). From 5300 bp onwards the climate started to deteriorate, leading to the present state of the wadi. Today, the Wadi Howar marks the borderline between the arid desert and the thornshrub savannah.

Some Aspects of Earlier Research in the Wadi Howar

The settlement history of the Sudanese part of the Eastern Sahara has rarely been studied. Despite the systematic archaeological investigations undertaken by scholars such as Garstang, Reisner and Arkell in the Sudanese and Nubian Nile Valley, it was not until this century that the Wadi Howar became known to Europeans and appeared on their maps.

At the same time as the geographical 'discovery' of this former river, abundant archaeological material was noticed. The earlier information dates back to 1923 when Major H. C. Maydon, on a shooting trip to the north of the Wadi Howar, noticed pottery – some of it unbroken – in certain areas (Maydon 1923, 39). In the 1920s, the observations and the collection of pottery and axes by Newbold and Shaw gave a first impression of the archaeological richness of this region, of possible connections with the cultures of the Nile Valley in earlier times and of the obviously dramatic changes in climatic and ecological conditions in the Eastern Sahara (Newbold 1924, 61, pl. II, pl. IV; 1928, 165ff.; Newbold and Shaw 1928). Newbold cautiously dated the pottery to Meroitic or earlier periods (before 2000 BC) (Newbold 1928, 166). In 1933 the 11. 'Deutsche (inner-afrikanische) Forschungsexpedition (DIAFE)', conducted by L. Frobenius, reached the Middle Wadi Howar and collected some pottery from sites along the northern bank. Hölscher classified this pottery as probably Nubian C-Group (Hölscher 1955, 55ff.). Unfortunately, these finds were lost during the Second World War. All these results led

to more speculation concerning cultural relations between the Nubian Nile Valley and the Wadi Howar right up until the 1980s (Bates 1970; Rhotert 1952, 87; Hölscher 1955, 57ff.; Arkell 1964, 49ff.; Bietak 1979, 126; Mohammed-Ali 1981, 177).

A systematic archaeological investigation of the Wadi Howar only began with the work done by Cologne University in the 1980s and 90s (for earlier research cf. Hinkel 1979, 130, 139, 141, 143, 145). The Wadi Howar has been one of the main research areas in the Eastern Sahara in both the earlier 'History of the Settlement of the Eastern Sahara' project, known by its initials 'B.O.S.', and the recent special research project ACACIA – 'Arid Climate, Adaptation and Cultural Innovation in Africa', both directed by R. Kuper, who is in charge of the archaeological section of these projects (Kuper 1981; in press.). The major objective of this research is to examine the cultural development of the Eastern Sahara during the Early and Middle Holocene against the background of changing ecological conditions, with the Wadi Howar as the southernmost research area (Kuper 1981). Particular emphasis is laid on the analyses of prehistoric sites along the dry river bed, to determine the changes which have taken place and the function of regional adaptation strategies in times of increasing aridisation, as well as on the role of the wadi as a transit corridor between the Nile and Chad.

Present Research

The field research of the ACACIA project has focussed on two main areas: the Lower Wadi Howar, comprising the 400km long section between the Nile Valley and Djebel Rahib, and the Middle Wadi Howar, the adjoining section west of Djebel Rahib (Keding 1997b). These two areas, separated by the Djebel Rahib mountains and a dune barrier, are characterised by different landscapes and site types.

In the Lower Wadi Howar, the wadi course is not clearly defined, neither morphologically nor by its vegetation. It is a featureless plain of rolling sand with some barchan dunes and occasional rocky outcrops. In this area, two types of site are characteristic: on the one hand, very large sites lie on the plains usually yielding only stone artefacts; and, on the other hand, very large habitats lie on dunes with signs of long-term occupation, as evidenced by the cultural deposits – usually 1m thick – which have yielded the only stratigraphic sequences in the wadi known so far.

The Middle Wadi Howar, on the contrary, is a shallow, sandy depression 8 to 11km wide. A certain amount of vegetation in the wadi bed, including some shau-bushes and acacia trees, exists due to the high water table (Colour Plate I). The wadi bed and banks are covered with a dense scatter of sites with well-preserved ceramics and faunal material, but there are no habitats like those on the dunes.

² According to hydrological, geomorphological and geological criteria, the Wadi Howar is subdivided into three sections: the Lower, the Middle and the Upper Wadi Howar. The Lower Wadi Howar covers the 400km long area between the Nile valley and Djebel Rahib, the Middle Wadi Howar comprises the 400km long following section west of Djebel Rahib and the Upper Wadi Howar signifies the adjoining 250km long region of the upper reaches (Gabriel et al. 1985).

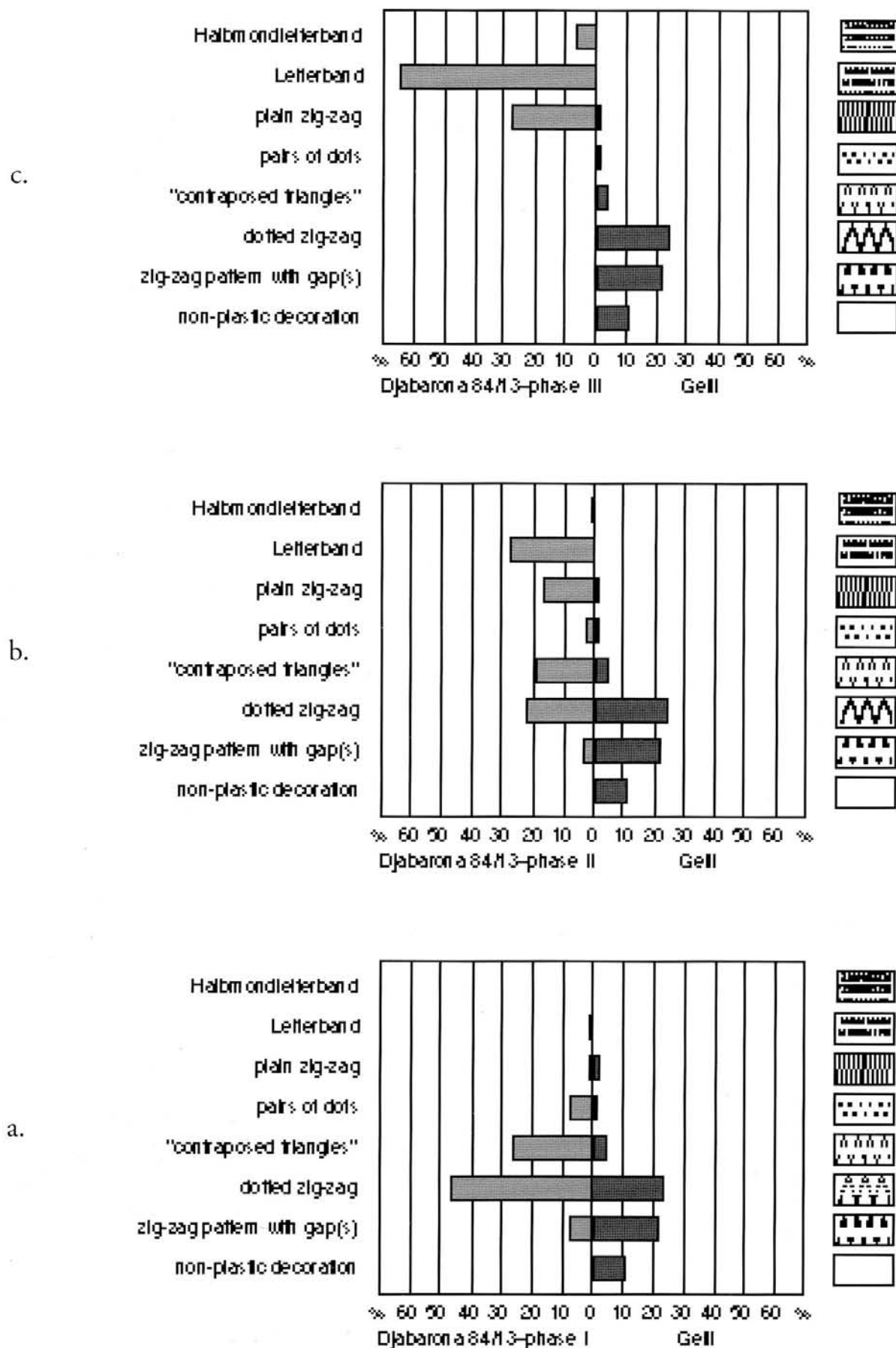


Figure 3. Comparison of the percent frequencies of typical pottery-decoration/patterns from Djabaron a 84/13,

and an increased soil humidity (Kröpelin 1993a, 86f.). The consolidating phase of dune shape and position is thought to have occurred, at the latest, during the humid phase in the sixth millennium BC (Gabriel *et al.* 1985; Richter 1989). As a result of settlement activities over several thousand years, the surfaces of these dunes are covered with millions of artefacts, which protect them from wind erosion and fix them in their original form and position. Soil analysis from the plains between the dunes as well as faunal remains with fish and toad bones indicates a periodically marshy environment (Kröpelin 1993a, 92).

The main spectrum of pottery found on the dune habitats seems to be similar almost everywhere. Dotted Wavy Line ceramics are very common as are the later types of pottery. Analysis of the Dotted Wavy Line (Jesse in press) revealed a homogenous picture of this pottery, fitting into the known Early Khartoum type, spreading east and west of the Wadi Howar. The pottery is quartz tempered, thick walled and well smoothed. All the pots seem to be decorated from rim to base, and there are various kinds of Dotted Wavy Line patterns produced by the rocker-stamp technique (Jesse in press).

Other common features of the dune habitats are dense scatters of stone artefacts, grinding stones, and different types of stone structures. They vary, however, in the extent and range of raw-materials used, which seem to have been largely determined by local outcrops. Evidence for the exploitation of other resources is rare, but the abundant grinding stone may point to an intensive gathering of grains.

In the Middle Wadi Howar the situation is completely different. Very occasional sherds with Dotted Wavy Line decoration are found scattered among the sites, which are dominated by later types of ceramics. Only two large surface sites which are dominated by Early Khartoum type pottery have been found north of the wadi banks in the Middle Wadi Howar on the shore of a former lake, indicated by limnic sediments and freshwater molluscs (Kuper 1981; Richter 1989; Jesse in press). Given faunal remains such as hippopotamus, crocodile, catfish and other fish (Van Neer

and Uerpmann 1989, 332) these sites, Rahib 80/87 and Rahib 80/73, confirm an at least periodically riverine way of life by groups using Dotted Wavy Line ceramics.

Whereas the increasing aridity led to a depopulation of the Lower Wadi Howar and apparently made an even seasonal exploitation economically impossible during the course of the third millennium BC, a remarkable rise in the number of sites can be observed in the Middle Wadi Howar, which continued for at least two millennia.

The Leiterband Horizon

The Early Khartoum and Laqiya type assemblages (for Laqiya pottery cf. Kuper 1986, 131; Schuck 1989, 423; Kuper 1995, 133) – which seem to be in part contemporary (Jesse in press) – are followed in the stratigraphic sequences of the dune habitats of the Lower Wadi Howar by the so-called ‘Leiterband’ pottery type, dated to the third and second millennia BC (Fig. 2) The name of this pottery – now designating a whole complex of cultural traits – comes from decorative patterns characterised by alternating bands of unidirectional triangles and narrow undecorated bands (Kuper 1981, 268ff.) (Colour Plate III).

This pottery – together with its later development, the Halbmondleierband (Plate 2) – is characteristic of about 40% of the known sites in the Wadi Howar. Typical of Leiterband sites are many finds of often well-preserved pottery with varying proportions of Leiterband decoration, and large numbers of bones – almost exclusively cattle with a small proportion of fish bones – as well as transverse microliths and axes of Darfur type (Keding 1997a). Also typical are pits, which have been found in half of all the Leiterband sites. These pits are usually so eroded that their original contents, consisting of pottery sherds and bones, now form dense concentrations of finds on the surface. Beneath these accumulations, with diameters of about 1m, are sometimes the remains of steep-walled pits, up to two metres deep, filled with a fine-grained grey sediment mixed with pottery and bone fragments.

Supra-regional comparisons seem to date the Leiterband Complex from the fourth to second millennia BC. However, absolute radiocarbon dates, all obtained from bone samples from well-preserved or eroded pits, so far only confirm a time span from 5240 to 3740 bp.³ Although a dating of the Leiterband complex in the third and second millennia BC is taken for granted in the following, it would still seem, as will be shown below, that an extension of this dating into the fourth millennium BC is very probable,

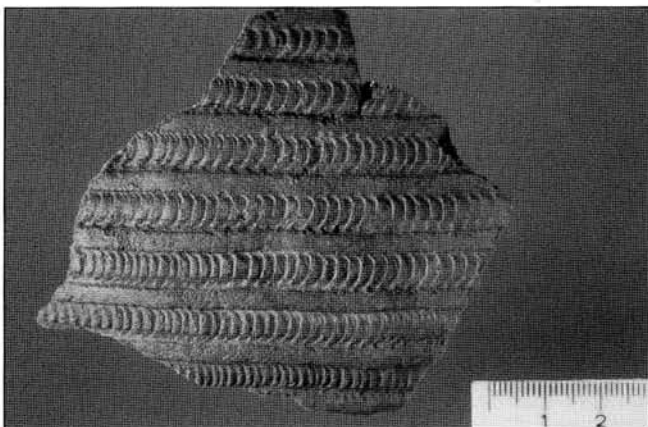


Plate 2. The Wadi Howar. Sherd with Halbmondleierband pattern.

³ Three dates from the Djabarona 84/19 Leiterband site lie between 5240 ± 260 bp / 4052 ± 260 cal. BC (KN-3417) and 4410 ± 120 bp / 3082 ± 175 cal. BC (KN3554). A date from Djabarona 84/12 is 4420 ± 130 bp / 3095 ± 183 cal. BC (KN-3521). Four dates from Djabarona 84/13 lie between 4210 ± 200 bp / 2748 ± 276 cal. BC (KN-3405) and 3570 ± 110 bp / 1880 ± 146 cal. BC (KN-3416) and one date from Site 80/86 is 3740 ± 120 bp / 2111 ± 175 cal. BC (KN-2940).

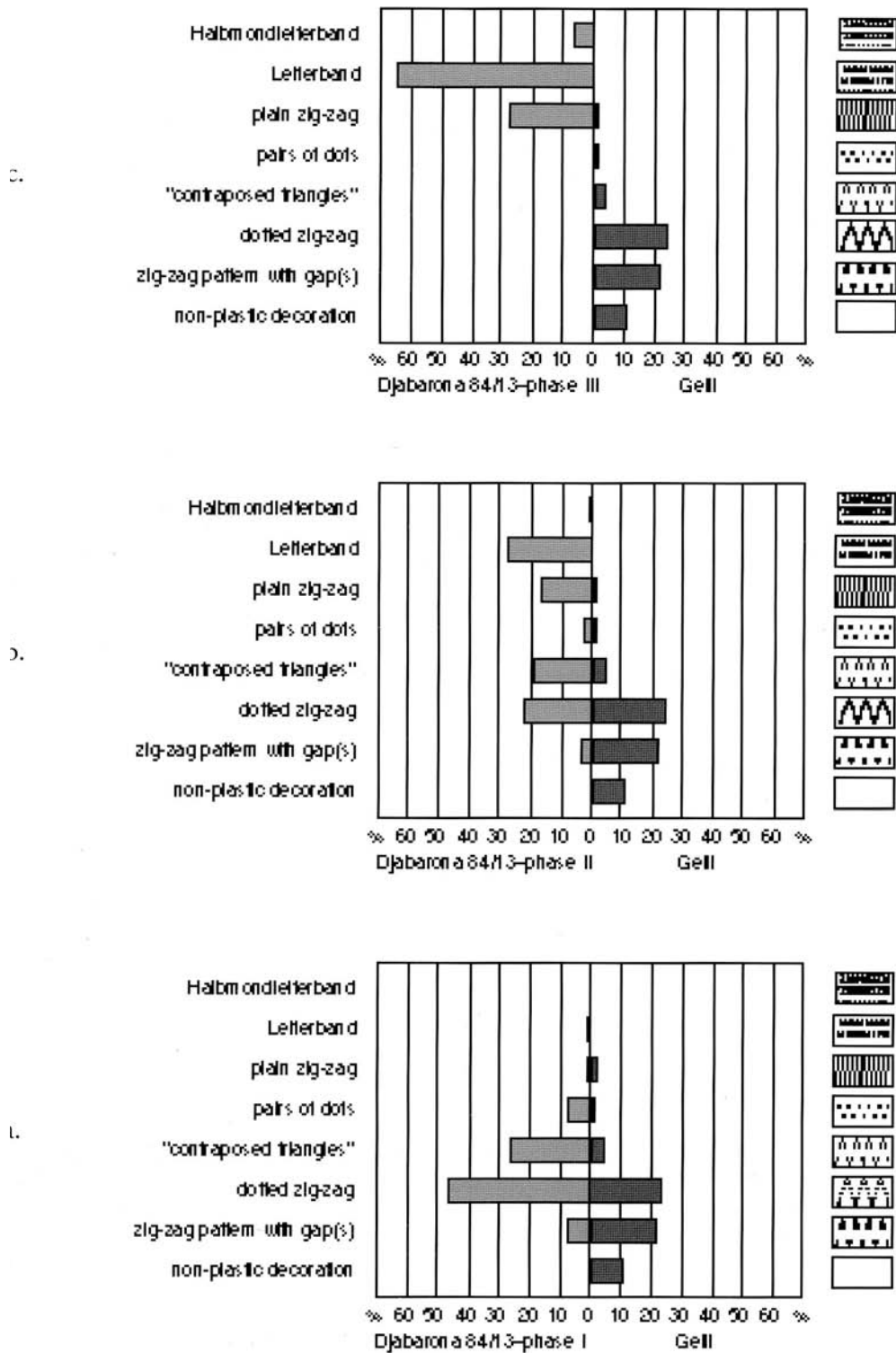


Figure 3. Comparison of the percent frequencies of typical pottery-decoration/patterns from Djabarona 84/13, Phase I (earliest) to Phase III (latest) in the Wadi Howar and from the Khartoum-Shabeinab-site Geili (from Caneva 1988: Tab. 2) in the Sudanese Nile valley.

a) Dj. 84/13, Phase I (Wadi Howar) (left) and Geili (Nile valley) (right).

b) Dj. 84/13, Phase II (Wadi Howar) (left) and Geili (Nile valley) (right).

c) Dj. 84/13, Phase III (Wadi Howar) (left) and Geili (Nile valley) (right).

especially when typological aspects are taken into consideration.

Finds

Since the Leiterband Complex is the most prominent and also best analysed culture in the Middle Wadi Howar, it is appropriate to give a more detailed review of the finds, in particular the pottery.

One of the largest sites of the Leiterband Complex, with the exceptional size of 800 by 1000m, is located on the southern bank of the Middle Wadi Howar on a flat palaeodune, called 'Goz madama' – meaning 'Hill of ceramics' – by today's camel-nomads of this area. A glance at the surface of this site, which was registered under the name of Djabarona 84/13, confirms its Arabic name (Colour Plate IV). The top of the dune at Djabarona 84/13 is covered by over 1000 separate surface concentrations, the contents of eroded pits, consisting of pottery fragments and bones with dense artefact scatters between them.

These features, in particular over 1000 undisturbed pit inventories including abundant pottery material, furnished an excellent basis for the determination of a chronological framework for the third and second millennia. They were found *in situ*, in particular in assemblages, and represent clearly distinguishable time/space units on a site with a presumed long-term occupation. For the purpose of the analysis, pottery from over 200 pits or surface-concentrations was collected, for the most part one sherd per vessel, altogether nearly 3000 sherds from almost 1000 vessels. A general analysis of the pottery shows that the ware is very homogenous in terms of technology and decoration as well as in vessel forms. The pottery is red-brown, thin-walled and tempered almost exclusively with sand. It shows an accurate surface treatment with very occasional remnants of a slip. The limited range of vessel forms is dominated by round-bottomed spherical and bag-shaped pots in various sizes and with no neck restriction. The exterior surface of the vessels is decorated either completely or as far as the belly with horizontal bands, running parallel to the rim. The 110 different body decorations are almost exclusively impressed using a rocker stamping technique, usually with a spatula, a spatula with gaps, a regular-toothed comb or a gap-toothed comb. Typical decorations of the pottery from Djabarona 84/13 are plain zig-zag patterns (Plate 3), dotted zig-zag patterns (Colour Plate V), dotted zig-zag patterns with one or more gaps, 'contraposed triangles' (Plate 4), Leiterband patterns (Colour Plate III) and Halbmondleiterband patterns (Plate 2).

Although all these six patterns principally occur in the same chronological context, there is still a clear shift in preference for these motifs through time. The chronological analyses – using seriations – of the pottery assemblages collected from the eroded pits reveal a subdivision of the ceramics into three phases (Fig. 3 a–c, left). It must be

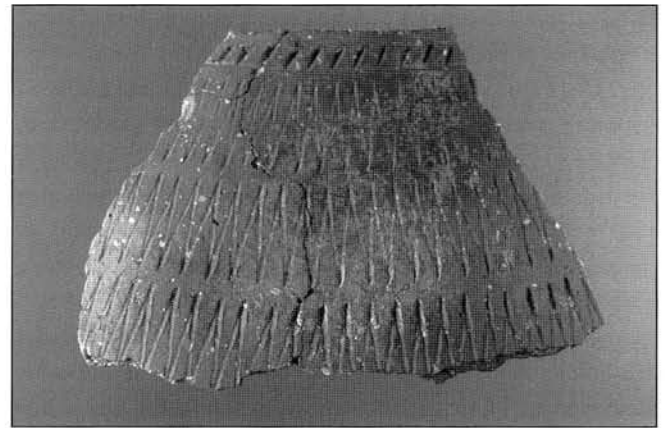


Plate 3. The Wadi Howar. Sherds with plain zigzag pattern.

emphasised, however, that there are no abrupt changes. The transition is smooth and continuous and there does not appear to be any difference in the general morphology of the sherds through time. Phase I (Fig. 3 a, left), the earliest phase, is characterised by pottery with dotted zig-zag patterns and 'contraposed triangles' as well as, very occasionally, zig-zag patterns with gaps or even the earliest plain zig-zag patterns and Leiterband patterns. Phase II (Fig. 3 b, left), comprising the vast majority of the analysed pit-assemblages, includes comparable proportions of ceramics with dotted zig-zag patterns, 'contraposed triangles' and plain zig-zag patterns as well as Leiterband patterns. A gradual increase in the plain zig-zag patterns and Leiterband patterns accompanied by a continuous decrease in the dotted zig-zag patterns and 'contraposed triangles' can be observed. In the later part of Phase II, the Halbmondleiterband patterns occasionally appear. The pottery of phase III (Fig. 3 c, left), interpreted as the most recent period of the whole ceramic sequence of Djabarona 84/13, has a restricted spectrum of ornaments: dotted zig-zag patterns and 'contraposed triangles' have disappeared completely, plain zig-zag



Plate 4. The Wadi Howar. Sherds with 'contraposed triangles' pattern.



patterns and Leiterband patterns predominate with a small proportion of Halbmondleiterband patterns.

The results of this chronological seriation are confirmed by a single stratigraphic sequence in the Lower Wadi Howar. The dune habitat Conical Hill 84/24 yielded a ceramic sequence from Dotted Wavy Line through Laqiya pottery to dotted zig-zag motifs and from Leiterband to Halbmondleiterband decorations in its uppermost levels (Gabriel *et al.* 1985; Kuper 1988, 186; Richter 1989). Furthermore, the horizontal distribution of the various chronological units at Djabarona 84/13 supports the same time sequence. Shifting from north to south, the oldest pits included in the analysis (Phase I) are situated almost exclusively in the northern dune area. Pits belonging to Phase II of the pottery development are distributed in both the northern and southern dune areas, while the latest pottery combinations (Phase III) are almost exclusively in the southern dune area (Keding 1997a, 142).

The cultural background of the Leiterband pottery can first be considered in the light of supra-regional comparisons, which demonstrate a parallel chronological and cultural division into two groups. The decoration of the oldest phase of the Leiterband Complex is very similar to the approximately 500 to 1000 years older Khartoum Shaheinab finds of the Sudanese Nile Valley. This Khartoum Shaheinab or Khartoum Neolithic, as defined by Arkell in 1953, is the prominent archaeological culture of the fifth and fourth millennium BC in the Sudanese Nile Valley, known from sites like Shaheinab, Kadero and Geili (e.g. Shaheinab – Arkell 1953; Kadero – Chlodnicki 1984; Haaland 1987; Krzyzaniak 1991; Geili – Caneva 1988). These people had been the first herders in the region but also exploited seasonally available aquatic and game resources. Characteristic finds are ceramics with rocker-stamp decorations, lunates, gouges and celts, as well as fish-hooks. Since the Khartoum Shaheinab is followed by an archaeological hiatus in the Sudanese Nile Valley, starting in

the third millennium BC and continuing until the Meroitic period, the Wadi Howar sites demand special attention. Here, many sites indicate intensive settlement during this period. The question therefore arises: is the Leiterband Complex the direct successor to the Khartoum Shaheinab and can this be proved by ceramic comparisons?

A comparison between the specific decorations found at Geili in the Nile valley and Djabarona 84/13 from the earliest to the latest phase (Phases I–III) (Fig. 3 a–c) reveals the following results. Both ceramic inventories share primary decorations like the dotted zig-zag pattern, the dotted zig-zag pattern with gaps, the pattern with ‘contraposed triangles’ and the plain zig-zag pattern. On the other hand, non-plastic decorations have no parallels in the Leiterband Complex and Leiterband patterns have not been found in the Nile valley.

On closer examination it becomes clear that most similarities exist between the pottery of Geili and the ceramics of the earliest phase of the Leiterband Complex (Phase I) (Fig. 3 a). This result reveals in fact a strong ‘genetic’ relationship between these two inventories. However, a direct link between the Djabarona 84/13 pottery and the Khartoum Shaheinab ware from a much earlier period than the Djabarona radiocarbon dates cannot be found, despite many similarities. The apparent resemblance between the ceramics of Geili and the earliest phase of Djabarona 84/13 vanishes during the further development of the Leiterband pottery (Phase II) (Fig. 3 b). This increasing dissimilarity reaches its most advanced stage in the youngest phase of the ceramic development of Djabarona 84/13 (Phase III) (Fig. 3 c) with completely different sets of ornaments linked only by the decorative technique.

Whereas the ceramics of the early stages of the Leiterband Complex only match inventories from regions to the east, especially the Khartoum Shaheinab, those of the latest phase coincide largely with the pottery of the adjacent areas to the west of the Wadi Howar, the Ennedi mountains

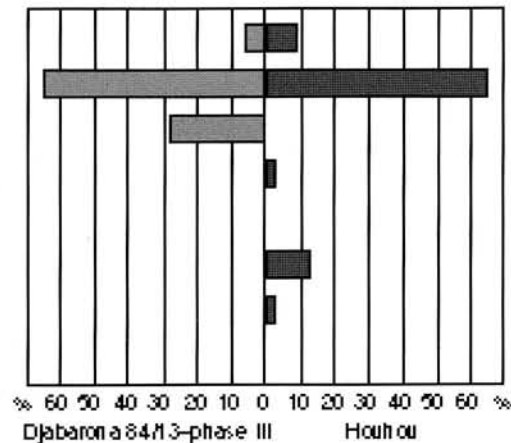


Figure 4. Comparison of the percent frequencies of typical pottery-decoration/patterns from Djabarona 84/13, Phase III in the Wadi Howar (left) and from the Houhou-site in the Ennedi Mountains (right).

(Bailloud 1969) and the eastern Borkou plateau. The archaeological deposits of the second millennium BC, the 'néolithique moyen', of the Ennedi mountains, the eastern Borkou Plateau to Djourab (Courtin 1969) in Chad, are characterised by a pottery type called 'Type Hohou', defined by G. Bailloud in the sixties (Bailloud 1969, 40). This 'Type Hohou' pottery, dated by one radiocarbon date to the third millennium BC, seems to be just a variant of the youngest Leiterband Style in the Wadi Howar, coinciding largely in technological and decorative terms. A comparison between the decoration styles of the youngest phase of Djabarona 84/13 and one Hohou assemblage from the Ennedi mountains (Fig. 4) reveals that both have a very limited number of patterns.⁴ Both comprise almost exclusively Leiterband and Halbmondleiterband motifs and are comparable. However, the typical decorations of the earlier Leiterband phases are missing here.

The results of this analysis, indicating early cultural relations between the Wadi Howar and Nilotic communities in the fifth and fourth millennia BC, suggest that the pottery of the Khartoum Shaheinab was a predecessor of the pottery of the Leiterband-complex (Phase I). Although a direct connection between the ceramics of the Khartoum Shaheinab and the pottery of Djabarona 84/13, Phase I, in the sense of an uninterrupted development, cannot yet be finally proven, a common origin seems to be obvious. Later, when the Lower Wadi Howar dried up and mobility between the two regions decreased, this connection might have been cut. By this time the Wadi Howar pottery tradition had undergone a local development with an increasing orientation towards adjacent areas to the west (from Phase II onwards). At the same time the characteristics linking it to the Khartoum Shaheinab wares were gradually lost so that in the Djabarona 84/13 pottery phase (Phase III) similarities to the older Nile Valley pottery can only be seen in general traits like aspects of decoration technique and form but no longer in the range of decoration.

Whereas the pottery reveals supra-regional connections to the east and west of the Wadi Howar, the stone artefacts of the Leiterband-complex hardly indicate a link with the Khartoum Shaheinab and the 'Type Houhou'. The stone artefacts excavated and collected from the find concentrations consist mainly of transverse arrowheads, a few borers and scrapers made of chalcedony and axes of Darfur type. Such a diversity of transverse arrowheads and these particular forms (Keding 1993, fig. 2), as well as the Darfur axes (Keding 1997a, Taf. 74), have so far only been found in the Wadi Howar and must probably be understood as a regional development due to local economic and ecological conditions.

⁴ I would like to thank the Musée de l'Homme, Paris, especially Prof. H. de Lumley and Dr. M. Perpère, as well as Prof. G. Bailloud, for the permission to analyse the Ennedi material in 1994.

The Economy and ritual aspects

Given the large number of cattle bones found on the Leiterband sites examined so far, it can be assumed that cattle played a dominant role in the economy. Since there is no evidence of well-defined hunting activities and farming, the Djabarona 84/13 finds can probably be interpreted as the material remains of a cattle-herding way of life. Ethnographical analogies indicate that the diet of such cattle herders, especially in humid climatic conditions, would have been based essentially on milk products and cattle blood (Dahl and Hjort 1976, 141–181; Dyson-Hudson and Dyson-Hudson 1970, 170; Galvin 1985, 93). Further evidence from Djabarona 84/13 demonstrates that their diet also included fish (Van Neer and Uerpmann 1989, 332) and – judging from the upper and lower grinding stones found – plant foods. On the other hand, the presence of only a few wild-animal bones indicates that hunting played only a subordinate nutritional role. Ethnographical parallels also show that the numerous microliths, usually considered as a sign of hunting activity, can also be interpreted as tools used to bleed the cattle (Dahl and Hjort 1976, 176), and this function seems more plausible in the overall picture of the finds. Evidence of plant foods is provided by celtis kernels (*celtis integrifolia*), which in the opinion of Neumann may even have been cultivated to a limited extent (Neumann 1989, 141), as well as by the already mentioned large number of fragments of upper and lower grinding stones. Since there is no evidence of cultivated or traded grain, the exploitation of wild plants can be assumed. This, as observed in modern ethnic groups, can even take the form of regular harvesting, using specific methods and tools, or the tending of wild plants in such a way that the herd animals are prevented from entering areas where wild grasses grow abundantly (Tubiana and Tubiana 1977, 18).

Cattle seem to have not only played a predominant role in the diet, but also an important role in the ideological or ritual sphere.⁵ Large numbers of pits were full of almost complete cattle-skeletons together with an abundance of large pottery sherds of nearly complete vessels. These may indicate ritual activities – the pits conceivably being designated as sacrificial pits or cattle burials. Special sites were probably visited for ritual activities – the pits are found in 50% of the Leiterband sites known so far. Some places, e.g. Djabarona 84/13, were obviously used for these activities for hundreds of years, resulting in over 1000 pits filled with cattle bones, representing parts of, or nearly complete, animals but showing almost no traces of butchering.

The Leiterband people led a cattle-herding lifestyle, which seems to have included – at least for some members

⁵ Archaeological examinations indicate that cattle cults were a widely spread phenomenon in the Neolithic and in the following periods of the east Mediterranean region and the Near East, as well as in the Nile valley – especially in Nubia and in Egypt – and in western regions like the Nigerian Sahara during the third and second millennium BC.

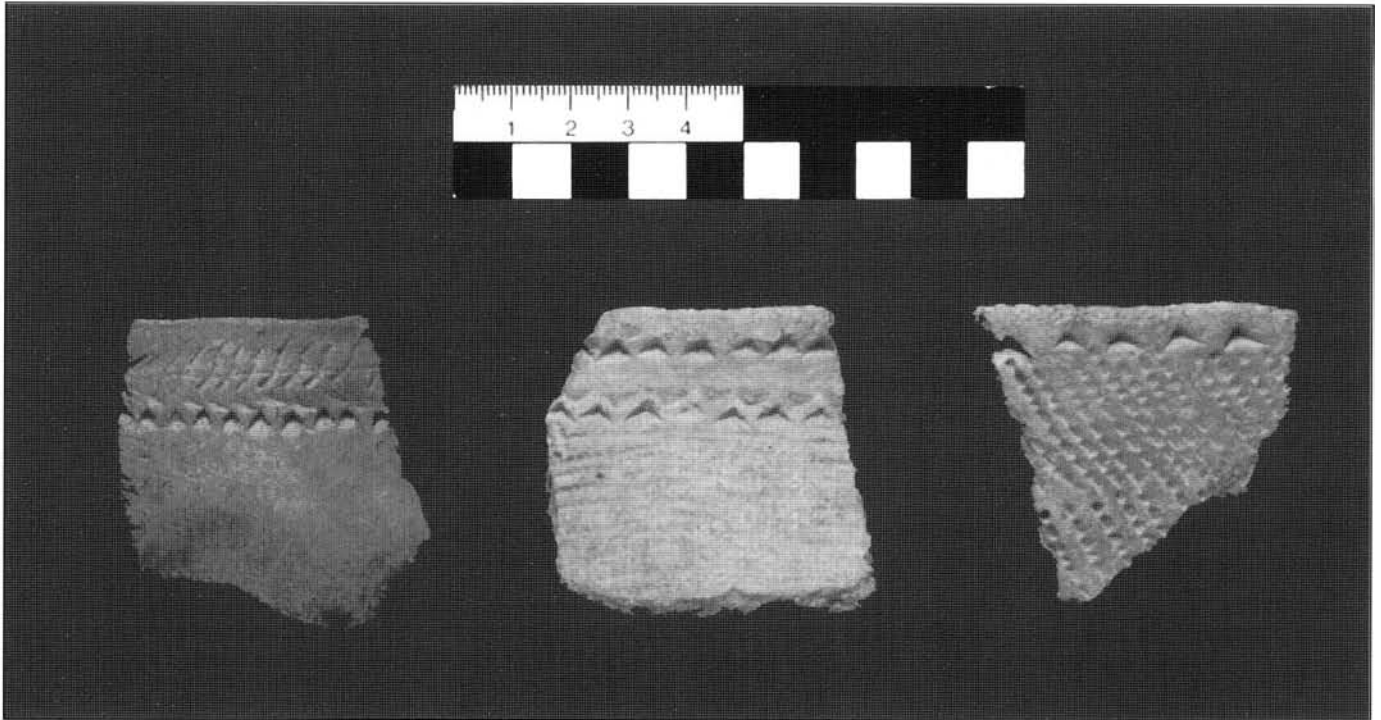


Plate 5. *The Wadi Howar. 'Fine geometric' pottery.*

of the groups – a nomadic existence with seasonal transhumance. Judging from the distribution of pottery and sites in the earliest Leiterband settlement phase, in the fourth and third millennia BC, the transhumance cycles seem to have been limited to the wadi itself. They settled on the dunes of the Lower Wadi Howar – up to 250km west of the Nile valley, but not reaching the Nile – probably during the wet season, and in the Middle Wadi Howar probably during the dry season. In the final phase of Leiterband settlement, around 2000 BC, the wadi seems to have become too dry for cattle. The transhumance, therefore, became supra-regional or there were even population displacements to the adjacent Ennedi mountains, at least 600 km to the west, and the neighbouring Borkou plateau to the north-west. After this final phase the wadi seems to have been abandoned by this group of people, who obviously moved to the adjacent regions to the west.

The Geometric Pottery Horizon

Although the nature of the later settlement of the Wadi Howar is almost unknown – investigations are just beginning – a profound change can be observed in the location and features of the sites, the pottery and stone artefacts, and in the economy. This discontinuity seems to indicate a change to people with different traditions and other ways of adaptation to the increasing aridity around 1500 to 1000 BC, according to radiocarbon dates. The last occupation phase, in the second and first millennia BC, representing about 40% of the sites in the Middle Wadi Howar, is characterised by a dense settlement pattern concentrated in the dry bed of the wadi. The distribution of the sites reveals no

site-free spaces, so that the whole wadi bed seems to have been occupied. The sites are usually small, sometimes located on the shores of ponds. A few graves are scattered on the banks, occasionally forming small groups. The deceased seem to have been buried in a contracted position. Pottery found beside the graves seems to represent offerings.

This occupation phase comprises at least two ceramic facies with different decorations, vessel-forms and temper, which have yet to be fully differentiated. For the time being, they have simply been called 'fine geometric' and 'coarse geometric' pottery. Characteristic of the 'fine geometric' pottery (Plate 5) are a grey-brown surface, an inorganic temper which also contain some organic matter, spherical vessel shapes with only rarely a curved profile, as well as both incised and impressed decorations. The incised decorations frequently include cross patterns, while the impressed decoration consists, in particular, of single triangular impressions and parallel comb impressions which often form geometric patterns. On a regional basis, this inventory is comparable to the ceramics finds from Djabarona 84/1. Supra-regionally, some aspects of the decoration allow parallel material to be found in Wadi Shaw (Schuck 1988, Abb. 3.3, 3.4; 1989, 425, fig. 3.3, 3.4) and, very occasionally, in the Nubian C-Group. Unfortunately, radiocarbon dating is not possible because of the poor preservation of the bone material. However, on the basis of typological comparisons, a date around 1500 BC would seem likely as indicated by an accompanying bone sample from Djabarona 84/1 dated to 3250 ± 60 B.P./ 1500 ± 70 cal.BC (KN-3523).

A differentiation between the 'fine' and 'coarse geometric' pottery is not always easy in individual cases but usually

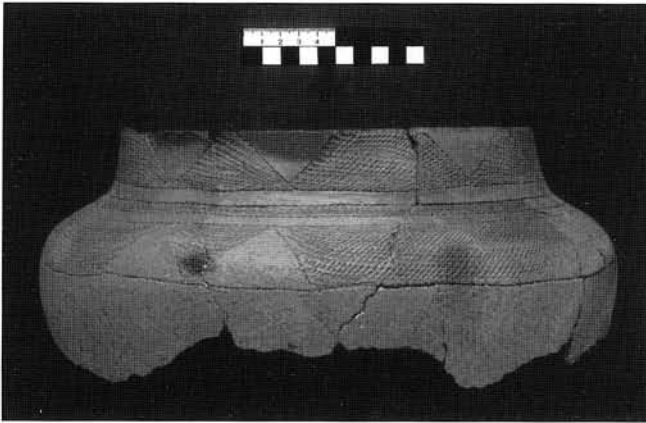


Plate 6. The Wadi Howar. 'Course geometric' pottery.

possible when larger quantities are available. Characteristic of the 'coarse pottery' are a higher proportion of vessels with a reddish surface and organic temper, as well as a larger range of vessel shapes, including dishes and curved-profile vessels – sometimes of considerable size. Decorative techniques and patterns are in general the same as for the 'fine geometric' pottery. Here, too, the most important techniques are incision and impression, with a predominance of geometric patterns and mat impressions (Plate 6). Decoration on the inside of the rim is noticeably more frequent. The chronological and 'genetic' classification of this pottery is still uncertain. It does not derive from any of the older wares, such as the Leiterband pottery. Instead, its technique, shape and decoration demonstrate a break in the ceramic tradition of this area. While definite parallels can be seen between the 'fine geometric' pottery and inventories from the second millennium BC in the Laqiya area, the 'coarse geometric' pottery is not found there. In just a few individual cases, the decorative patterns can be compared with decorative elements on the pottery of the Kerma culture in the Nile Valley, and also with pottery from the Ennedi mountains and Chad Basin to the west of the Wadi Howar. Three radiocarbon dates indicate a period between the middle of the second to the first millennium BC.

Not only the material culture and settlement patterns but also the economy show signs of change. The excavation of Djabarona S96/119 (Colour Plate VI), one of the best preserved sites with 'coarse geometric' pottery, revealed a large hearth with burnt bones of cattle, sheep, goats and game (*gazella dorcas*, scimitar horn-oryx), indicating a change in the economy with an increase in the keeping of small livestock and hunting – both adaptations to the changing climate.⁶

Since sites with 'coarse geometric' pottery are mainly restricted to the Middle Wadi Howar and the only similar supra-regional finds so far are from the mountains of Djebel Tageru, 70 km south of the wadi, possible transhumance cycles seem to have been regionally restricted. After this period the Middle Howar seems to have been abandoned as a permanent settlement area.

Conclusion

In conclusion, it can be said that the Wadi Howar was probably occupied in the Holocene from the sixth to the first millennia BC. Within this period, there was a change in the people's way of life from foraging to cattle-keeping, and later to the keeping of goats and sheep, which can be understood as the result of increasing aridity.

The archaeological evidence from the Lower and Middle Wadi Howar also seems to indicate different environmental developments as well as different cultural influences in both areas. While Dotted Wavy Line pottery, characteristic of the so-far earliest known occupation of the wadi, is found in both areas, it is particularly dominant in the lower wadi area. This pottery of foragers belongs to the widespread 'Early Khartoum Horizon', which extends from the southern Sahara with the Nile Valley to the Atlantic coast. The predominant ceramics of the later phases are of different types and show an increasing regionalisation, with their main focus in the Middle Wadi Howar. For example, the pottery of the cattle-keepers of the Leiterband Complex of the third and second millennia BC reveals intensive contacts with the Sudanese Nile Valley at an early period and close contacts with western regions in its final stages. This reflects and emphasises the function of the wadi as a corridor for people and ideas at those times. However, in the third millennium BC the Lower Wadi Howar seems to have been gradually abandoned. In contrast, the occupation of the Middle Wadi Howar continues until the first millennium BC. In the latest occupation phase the pottery reveals, besides some connections to the northern area, an increasing local development which is probably connected to a growing isolation of the region due to the deterioration of the ecosystem.

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⁶ Identifications by Dr. Hubert Berke, archaeozoologist of ACACIA.



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Plate I. The Middle Wadi Howar from Djebel Rabib seen as a green strip of vegetation on the horizon. (Photo B.O.S. 1984).



Plate II. The Lower Wadi Howar. Dune habitat Abu Tabari S95/2.



Plate IV. The Middle Wadi Howar. View of Djabarona 84/13 with the Wadi Howar to the north. The dense artefact scatter and bone and/or pottery concentrations are typical for this site. (Photo R. Kuper 1995).



Plate VI. The Middle Wadi Howar. View over Djabarona S96/119.



Plate III. The Wadi Howar. Leiterband pottery.

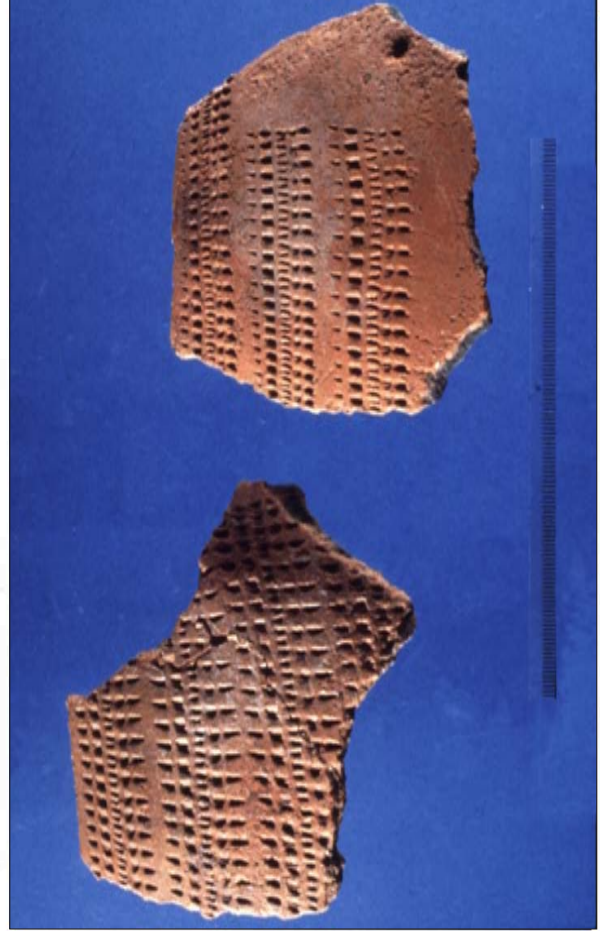


Plate V. The Wadi Howar. Sherds with dotted zigzag pattern.