



Archaeological Reconnaissance in the Nuba Mountains, Sudan

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Geographically isolated, the Nuba Mountains served as a refuge for a variety of African peoples throughout the ages. This is reflected in the amazing linguistic and cultural diversity found in the area. Systematic research has the potential to reveal much about the early history, as well as elaborate upon periods of important historical change only known from fragmentary textual and oral accounts.

The Nuba Mountains and their neighbouring areas have been relatively neglected archaeologically. For decades civil war has prevented any scientific research, but a peace agreement signed on December 31st 2004 has meant that foreigners are now allowed limited access to the hills. In January 2006 an archaeological reconnaissance was conducted in the north-eastern region of the Nuba Mountains.¹ The project was the result of co-operation between The National Corporation for Antiquities and Museums in Sudan and The Institute of Anthropology and Archaeology, Pultusk School of Humanities, Poland.²

The team was accompanied to the Nuba Mountains by Mutwahil Adam Adam from the Sudan National Museum in Khartoum.³ Once outside Khartoum, the main road south leads across the desert with mud-brick villages scattered across the landscape. After crossing the White Nile the route passes through the bustling town of Kosti which sits astride the main north-south and east-west land routes, the latter extending through northern Darfur across Chad and into Nigeria. As one moves further southwest into Kordofan, the barren terrain of the north gradually turns into a landscape of tall grass and isolated trees. The architecture also changes, with small villages of round reed-thatched houses replacing the square mud-brick dwellings of further north.

¹ The members of the team were: Dr Michal E. Bieniada – director, photographic and film documentation; Dr Mahmoud et-Tayeb – director and consultant; Urszula Wicenciak – field documentation; Michal Neska – field documentation; Helen Taylor – field documentation and research.

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³ Although joining the team as an inspector, Mutwahil Adam Adam also helped us a great deal and kindly provided accommodation and hospitality in his hometown of el-Abbasiya.

The plains that characterise most of Kordofan give way to the rocky hills of the Nuba Mountains in the south-east, covering an area of some 50,000km². The name is something of a misnomer, for no actual mountains are to be found there – instead the area is dotted with outcrops, ranging from isolated *jebels* (hills) to huge granite peaks, with upland plateaus that can reach over 1500m above sea level. The varying topography results in micro-environments that support diverse vegetation and wildlife (Ewald 1990, 21).

Vegetation typical of the African savannah is found across the pediplains along with various species of acacia trees. Mimosa trees grow along the fertile banks of the seasonal water courses, *kebeeran*, that channel rainwater running down from the hills (Ewald 1990, 21) and across the region grow enormous baobab trees, often found in the centre of villages, and valued for their fruit whose juice is thought to protect against malaria. The ecosystem of the area has been significantly altered in recent times however. In particular, large animals such as elephants, giraffes, buffalo, lions and antelope have all now disappeared due to factors such as over-hunting and environmental degradation.

The Nuba Mountains are classed as sub-humid (Suliman 1999, 13). Whilst semi-arid in many parts, overall they are relatively lush and fertile compared to neighbouring areas (Colour plate XLIII). The region lies in the savannah summer rain-belt and receives between 400mm and 800mm during the rainy season of May to mid-October (*ibid*), although this varies considerably across the hills (Ewald 1990, 21). The availability of water enables both seasonal rain-fed agriculture and grazing. Agriculture forms the mainstay of the economy for the majority of people who live in the area. The population is estimated at around 1.5 million although it may be substantially greater. The overwhelming majority of the population is made up of ethnic groups very broadly referred to as 'Nuba' (Saavedra 1998, 224). *Baggara* (cattle herders) – mainly Awazma and Misiriya Arabs (Suliman 1999, 13) and Jallaba Arabs and Takari also inhabit the area (Saavedra 1998, 224).

This is the first time archaeological work has been conducted in the region. Indeed, there is a scarcity of archaeological investigation, particularly for the Medieval period, in the areas west of the Nile (Edwards 2004, 252). It therefore seems appropriate to outline research into the available literature in order to place the archaeological remains in their broader regional and historical context.

There are over 50 different 'Nuba' tribal groups, whose cultural practices and social structures vary enormously. In his descriptions of them the anthropologist Nadel (1947) uses such phrases as 'bewildering complexity' and 'cultural complexity'. The existence of this diversity in modern times should be kept in mind when considering the archaeology, for inferences made about one locality in the Nuba Mountains may contrast greatly with the past in another.

Diversity of languages, many of which are mutually unintelligible, is equally great. These have been subdivided

into as many as many as 10 language groups within which are related dialects (Stevenson 1962; 1964). In the absence of archaeological research linguistic analysis provides our main source of information for the very earliest periods in the Nuba Mountains.

The widespread nature of the Kordofanian language group within the Nuba Mountains, coupled with its continuous history of branching, suggest that its development took place within the hills, indicating its ancient origin and continuous usage there (Thelwall and Schadelberg 1983, 226). It is likely that speakers of these languages were among the earliest horticulturalists, inhabiting the Nuba Mountains during the Mesolithic Period (Spaulding 1998, 46). At the other end of the chronological spectrum, the Daju group – whose languages seem to originate in Darfur – are thought to be one of the later immigrant populations. Thelwall postulates that the dialects have their closest connections with the Nyolge or Nyalgulgule of Bahr el-Ghazal, and that groups perhaps moved to the Nuba Mountains as a result of the decline of the Daju kingdom around the 14th century AD (Thelwall and Schadelberg 1983, 225).

From the Medieval period onwards, the history of Sudan is illuminated in some aspects by the accounts of contemporary writers. North Africa was visited at various times by the famous Arab geographers, merchants, explorers, missionaries, pilgrims and adventurers who often wrote down their impressions and accounts of what they saw during their travels.

Unfortunately, before the 17th century few recorded travelling as far as Kordofan, or described relations of outside areas with this region. An exception to this is the remarkable account of Ibn Hawqal (10th century AD), who belonged to what European scholars have referred to as the Balkhî School of Geographers (Tibbetts 1990, 108). Ibn Hawqal visited both the Christian kingdoms of Makuria and Alodia. According to his account the latter had a hinterland referred to as the Land of Aḥâdiyyun, much of which must have encompassed modern day Kordofan (Spaulding 1998, 49). In describing it he writes:

‘One must travel for three days west of the White Nile across a sandy desert region, before reaching a “vast district with innumerable villages, various peoples speaking different languages, which cannot be counted and whose frontier cannot be described”. (Translation by Vantini 1975, 166).

Spaulding points out that such a description would very aptly describe the Nuba mountains, arguing that Aḥâdiyyun must have included Jabal Liri in the south of the Nuba Mountains, since that was the sole source of gold, which along with iron were what made the Land of Aḥâdiyyun valuable (*ibid*). An alternative explanation is that Ibn Hawqal was referring to the Jebel Haraza region of Kordofan, a centre of ancient iron working with ruins of unknown date (Edwards 2004, 252). Such questions, therefore, await further elucidation, through archaeological research.

Following the downfall of the Christian kingdoms in the

13th/14th centuries there is a gap in the documentary record. Judging from later developments, Spaulding postulates that the disappearance of state authority opened Kordofan up to trade, particularly by Arab immigrants, with slaves, gold and camels being the prized commodities (1998, 51). The picture becomes clearer by the 16th century, characterised by the emergence of an array of small kingdoms that grew up in the central region of modern Sudan. The most important of these were the Funj Sultanate centred on Sennar (c. 1500-1821) and the Sultanate of Darfur (Edwards 2004, 256).

In the north-eastern Nuba Mountains a small kingdom, ‘Taqali’, arose, according to tradition, in the late 1500s (Elles 1935, 2), although the timing is a matter of some debate (Ewald 1990, 16). The hills dominated by Taqali coincide with the area of our reconnaissance, and it is to this political entity that many examined remains relate.

The first mention of Taqali dates to the reign of Sennar sultan Bâdî II (1644/5-1681). The Sultan sent a force to the Taqali highlands to quash a rebellion by its *meke* (‘king’), which was concluded when he promised to send annual payments and slaves (Spaulding 1998, 52). Thus Taqali appears to have been tributary to Sennar at this time, although Ewald argues that Sennar’s ‘victory’ was ambiguous and that any control it maintained was probably fairly weak (1990, 40).

Taqali is again mentioned in the 18th century in the context of power struggles being played out on the plains of Kordofan. In the early part of the century, the Musabba’ât, dissidents of Darfur, withdrew into Kordofan, from whence they attempted to secure power. Clashes ensued with Sennar which sought on numerous occasions to repel the invaders with varying degrees of success, although it was the Darfur sultans that ultimately prevailed by the end of the 18th century.

These warring factions looked to the Nuba Mountains as a source of resources and slaves. Trade also seems to have grown significantly during this period. It is within the context of increased raiding and growing outside contacts that Ewald argues the centralisation of power in the Taqali highlands was able to develop. It is asserted that the *Mukeuk* of Taqali acted as brokers with these outsiders, protecting inhabitants who gave allegiance and collecting tribute in return (see Ewald 1990, 44-52 for detailed discussion).

The use of slaves is evidenced from several travellers’ accounts. James Bruce, a Scottish aristocrat, visited Sennar in 1772, where he found Nuba slaves and slave soldiers, many of whom had been taken from Taqali (1790, 419-25). Frédéric Cailliaud, a French mineralogist who travelled through Sudan in the early-1800s, wrote that the population of Sennar was considered to be composed of ‘six classes, so distinct that there is not one individual who does not know to which he belongs’. One such group was referred to as the ‘*abid*’ or ‘Nuba’, derogatory terms for the slaves imported into Sennar from the south and west (Cailliaud 1823, 274).



These accounts indicate that trade in slaves was already established well before the Ottoman invasion of 1820. Both the Sennar Sultans and their Musabba'at enemies are known to have used armies that included slave-soldiers (Ewald 1990, 47; O'Fahey and Spaulding 1972, 328, note 49).

From the Ottoman invasion onwards, however, slave raids reached new highly organised and monstrous proportions. Sudanese slave-soldiers, many of whom originated in Taqali and the neighbouring highlands, constituted a substantial proportion of the Egyptian army from 1821-1925 (Johnson 1989, 73). Pallme, who spent almost two years in Kordofan in the 1830s, documented in detail the sheer scale and ruthlessness of the slave raids of the time. By 1825 the estimated number of slaves captured was around 40,000. By 1839 that number had leapt to at least 200,000 – 'without reckoning the thousands stolen by the Baqqara and bought by the Djelabi...' (1844, 306).

Slave raiding and its effects play a major role in any understanding of the Nuba Mountains. The excesses of these raids had a devastating effect on the people of the region, obliterating the populations of countless villages. Indeed, it is thought that the word 'Nuba' itself, like many other tribal names in Sudan (e.g. Berti, Berta, Burgu), originally meant 'slave' (Arkell 1955, 177-178; Ewald 1990, 46; Johnson 1989, 72).

Religion played a crucial role at this time. Conventional thinking held that non-Muslims, non-Arab speakers or those without Arab ancestry could be 'legitimately' enslaved (Ewald 1985, 273). The Mukuk of Taqali increasingly used their Islamic identity to form protective alliances with slave traders and merchants (*ibid*).

According to oral traditions, the introduction of Islam, still the dominant religion in the north-east hills today, coincided with the founding of Taqali. They tell of a 'wise stranger' who came to the Tegal'arro, half a mile north of el-Hoi (see below) and settled – teaching Islam to the locals and eventually marrying the ruler's daughter, their son becoming the first of the Taqali kings (Elles 1935).

These traditions are still recounted, as we discovered during our reconnaissance. The theme of the 'wise stranger' is one that recurs across Sudan in narratives of Funj origins, in Darfur and Nabtab (Holt 1963, 51-2). Holt postulates that the Taqali oral accounts may well be Islamicised forms of older legends (*ibid*). As Ewald points out, while such oral histories may not relate the historic truth, they can tell us much about the climate in which they were created (see Ewald 1985 for discussion).

The rise of the Mahdist movement in the 1880s cast a fresh shadow over the Nuba Mountains. The Mahdi actually visited Mek Adam in his *hosh* (pl. *baysban*) at Chindorma in 1881. Despite Adam's attempts to maintain his independence, as he had successfully achieved with the Turks, his strategies did not prevail with the militant Islamic Mahdi (Ewald 1990, 118-124). A force was eventually sent under Hamdan abu Anja to subdue the Nuba. In the subsequent

violence over 10,000 Nuba were killed and many more cast into slavery (Suliman 1999, 13)

The Mahdist state was defeated in the 1898 battle of Omdurman by the combined forces of Britain and Egypt. While the resulting Condominium (1899-1955) ended hostilities in the region, its policies disaffected the Nuba in other ways. In an attempt to 'preserve' the hill-dwellers' unique culture, the Condominium closed off the area to outside influences (Saavedra 1998, 225). Nuba were not allowed to leave or live freely in many larger towns. Nuba children received special separate education, and the teaching of Arabic was discouraged. While their traditions, language and oral history remained, with the independence of the Sudan the Nuba Mountains inhabitants were left marginalised and ill-equipped to partake in politics and economics, in comparison to their Arab neighbours (*ibid*).

These changing political circumstances had a huge affect on settlement patterns. Today, villages exist almost entirely on the plains, whereas all the remains we examined were found in the hills. Whilst many factors were involved, the years of vicious slave-raiding were probably the main force driving Nuba into the more defensible and protective hills. The relative peace of the Condominium encouraged many Nuba to gradually move down and farm on the plains. Even so, many preferred to stay where they were, having established homes and spiritual ties with their villages. Whilst it took a good 30 years, central government eventually forced the remaining hill dwellers to move down to the plains where they could be more 'easily managed' (Suliman 1999, 13).

During the civil war in the Nuba Mountains, which lasted from 1985 to 2001, a substantial part of the Nuba people retreated to their hills, in much the same way as their ancestors did. Despite a peace agreement with the central government of Sudan, the political future of the Nuba people is still uncertain.⁴

Results of the reconnaissance

Prior to this reconnaissance, no archaeological work had been carried out in the Nuba Mountains.⁵ The aim of the project was, therefore, to develop an understanding of what

⁴ For a more in-depth discussion of the Nuba Mountains in the last 200 years until the present, the reader is directed to the following website: www.nubamountains.co.uk, and the book *Proud to be Nuba* 2007 by Nanne op't Ende, all revenues from which will be used to benefit the Nuba people and to help them preserve their rich cultural diversity. More photographs and information on other archaeological remains found on this expedition will also shortly be appearing on the same website. A full report of the reconnaissance, with photographs of all finds and sites was submitted by H. Taylor to the Sudan Archaeological Research Society in 2006.

⁵ In late February 1967, Prof. Krzyżaniak and his colleagues, members of a Polish archaeological mission on campaign in Old Dongola, visited the Nuba hills. However, they did not undertake any archaeological work there at the time. http://www.muzarp.poznan.pl/muzeum/muz_eng/nuba.htm Again in early 1986 Dr John Sutton, then director of the British Institute in Eastern Africa, in the

kind of work would be possible, to assess potential logistical problems and to evaluate the possibility of undertaking systematic survey and excavations in the future.

The objectives of the actual reconnaissance work were to examine remains known to locals and investigate their state of preservation, record any associated oral traditions (Plate 1), identify new sites and map all locations using G.P.S. All of these aims were accomplished.

Before the rest of the team arrived in Sudan, Dr Mahmoud el-Tayeb gathered information regarding possible archaeological remains in the areas intended for reconnaissance. Once in the Nuba Mountains, we met with the local authorities in the towns in which we were staying to ensure permission to work in the area and discuss activities to be carried out. Without this continual dialogue and cooperation, work in this region would have been very difficult, if not impossible. All of the local authorities and people we met with were very enthusiastic about the project and keen to help with any future archaeological work.

After arrival in each area we talked with local people, usually elders, to find out about known remains including architectural ruins, graves, pottery scatters, etc. Subsequently,



Plate 1. Mutwabil Adam Adam recording oral traditions.

the team walked through the areas that were thought to be of archaeological significance. All archaeological remains were described and photographed and in some cases sketch plans were drawn and a DVD camera used to record the



Figure 1. Sketch map of the Kingdom of Taqali in the 19th Century (after Elles 1935, pl. 1). By comparing the sites of el-Hoi, Chindorma/Kindora and Tandik it can be seen more clearly how the map relates to the satellite image of the massif (Colour plate XLII).

archaeology and associated oral histories. A separate number was given to each distinct site as defined by concentrations of structures or other archaeological remains. Associated photograph numbers were noted and the exact location defined, using a hand-held G.P.S device. Diagnostic pottery sherds and flints that were found on the surface were collected. Finds have been stored at the office of The National Corporation of Antiquities and Museums, Khartoum.

The reconnaissance concentrated on an area in the North-eastern Nuba Mountains (Figure 1) characterised by a 'V'-shaped massif. This is composed of two hill ranges, each about 56km long, bordered by the Kordofan plains to the north and east. These hills were once home to the aforementioned Post-Medieval kingdom of Taqali (Ewald 1985; 1990; 2005).

A map of 19th century Taqali was published by Elles (1935, pl. 1). This can clearly be seen to correspond with the satellite map marking the sites examined during the reconnaissance (Colour plate XLII). The most prominent archaeological manifestations of Taqali are the royal complexes, or *haysban*. According to Ewald these functioned as the *mek*'s residence and were the focus of public attention (1990, 82). They were located in several locations across Taqali including Tasi, Kalinda, To'dim, Chindorma and el-Hoi.

The king's *hosh* was located in his maternal homeland (Ewald 1990, 81-2), and as a result the primary royal centre moved several times over the centuries. They could be divided into two main functional categories – agricultural estates and residence/fortress (*ibid*, 83). The latter were walled compounds, apparently home to hundreds of slaves called *umana* (*ibid*).

⁵ (cont.) company of Derek Welsby and David Edwards, made a visit to the region, with a view to initiating archaeological research, but unrest forced the project to be shelved.



El-Hoi

The first remains we examined were in the hills referred to as el-Hoi, situated adjacent to the village of Mahalla, around 10km southwest of Al'Abbasiya. According to locals these hills were used as a safe haven during the Mahdist revolt.

We encountered many enclosures, containing several round stone houses. Of most interest was a site higher up in the hills characterised by a number of circular stone constructions, inter-connected to create a central court. They differed from the house remains, for their diameters were slightly wider (approx. 4 to 4.5m) and they lacked entrances. According to local tradition, these are Islamic-period graves, belonging to rulers of the kingdom of Taqali, whose names were Geili Abu Garida; Geili Omara; and Geili Abu Quraun. Elles documented similar oral accounts, asserting that a number of rulers were buried in tombs at el-Hoi, said to still be standing (1935, 8).

According to king-lists, these were the very earliest of the Taqali kings (although see Ewald 1990, 16 for arguments that this was a later invention). Oral histories recorded by Elles (1935, 7) name el-Hoi as the location of the earliest royal *hosh* founded by Abu Garida, and interviews conducted by Ewald also suggest that el-Hoi was one of the older royal *baysban* (1990, 116). A more thorough examination of the area may yet reveal more remains pertaining to this centre. In particular, Elles mentions a large enclosure wall, over 270m in diameter, the remains of which were not encountered during the relatively short time we had to examine the hills (1935, 7).

About 20km west of el-Abbasiyah lies the modern village of Chowgaia (Colour plate XLIV). The surrounding hills are rich in archaeological remains. As we climbed upwards, the usual abandoned clusters of dwellings were found, often with stone mortars with probable grinding stones nearby. Site 13 consisted of 15 such structures, one with burnt clay plaster on the inside of the wall.

Further up the path, we encountered evidence of agricultural terracing (Plate 2). Deforestation and over-



Plate 2. Agricultural terracing in the hills near Chowgaia.

cultivation are likely to have intensified erosion in many areas of the Nuba Mountains. Agricultural terracing can be used in such instances, as well as to stem the down-flow of rainwater (Goldberg and Macphail 2006, 80). We do not know at this stage the date of the terraces observed. The use of the hills as a safe haven would also explain the use of this more labour intensive method of agriculture in many places.

Chindorma

Further up, situated on the highland plateau, we found the remains of Chindorma (Plates 3 and 4). This had been the residence of Adam wad 'Umar (c. 1860-84) until his death during the Mahdiyya (Ewald 1990, 118). Mek Adam maintained his stronghold at Chindorma, located near the homeland of his grandmother Fatna Sabah. His main residence, however, he moved to Kiraya, not far from el-Hoi (*ibid*, 116).

The first structure we came across, according to locals, was the remains of a *khalwa* – a religious school for teaching the Koran. Near this was a podium, on which an 'everlasting fire' would have apparently been kept. Beyond this the reception hall, or *diwan* (Plate 3), was found with parts of the wall still standing to a height of 2m.



Plate 3. Remains of the diwan (reception hall) at Chindorma.



Plate 4. Pottery from Chindorma.

Behind, was a dense settlement of an estimated 40 densely packed, rounded stone structures covered in heavy bush. The buildings were clearly sited in a dominant position, a slope immediately behind the complex giving way to a steep-sided valley allowing views over the entire surrounding area. According to accounts recorded by Elles, Chindorma was said to be 'as large as three men's cultivations, and on occasions filled to overflowing with people' (Elles 1935, 23).

Sinnar

Besides the archaeological remnants pertaining to the royal centres of Taqali, much more recently abandoned settlements could be found scattered throughout the hills. The desertion of at least some of these may reflect environmental changes that have been occurring in the Nuba Mountains. A few kilometres from the modern village of el-Hosh lie the remains of a once densely populated village, Sinnar, home to around 300-400 people. Omda Mustafa Ismail el-Zeibag, Vice-Emir of Rashad (Colour plate XLV), kindly showed us around the area. His grandfather had been the last ruler of this particular settlement enabling him to provide us with valuable information on many of its remains.

The hills were covered in long grass, making ground visibility poor, however a few pottery sherds, both hand and wheel-made, were collected, some characteristic of the Islamic period (Plate 5). Clusters of between five and seven round structures with entrances facing in differing directions were found further up the hill (Plate 6). About 40m from the first grouping a *wadi* was noted, which according to Vice-Emir el-Zeibag is now permanently dry, hinting at one of the reasons for the village's abandonment.

Further on lay the remains of a large wall, built against the slope of a small jebel. According to the Vice-Emir this had been built for defensive purposes. Behind it were struc-

tures, deliberately constructed to look like the remains of granaries, a disguise used to hide weapon stores.

Buildings became denser as we climbed higher, with many of the structures incorporating rectangular elements in their plan. The Vice-Emir pointed out the remains of one large rectangular structure, formerly the religious school or *al-Masad*. In one corner would have been an 'everlasting fire' and in the other, marked by heaped stones and a tree, the founder of the school was said to be buried.



Plate 6. Ruins at Sinnar.

According to the Vice-Emir, the village was abandoned in the early to mid 20th century. There were multiple reasons for this. Cultural change brought new possibilities and education for children, and the village was also proving too isolated in terms of trade. The most critical factor however, was the drying up of water sources.

It is interesting to note that Elles, who visited the north-eastern hills in 1935, also discusses this phenomenon:

'It is said that water in those days [around 50 years ago] was more plentiful and easier to come by ... than it is now, and I am convinced, from quite recent evidence, that the North-Eastern Jebels have, in fact, dried up considerably' (1935, 23).

Semi-arid zones such as the Sahel are particularly sensitive to climatic change, which have been a continual feature of the region (Nicholson 1979, 38). Evidence gleaned from a variety of sources strongly suggests that during the 16th to 18th centuries, the Sahel and Sudanic Africa experienced much more humid conditions than at present, an episode probably synchronous with the little Ice Age in Europe (Nicholson 1978, 39). In the early 18th century, however, the environment began to dry out and by the early 19th century, it seems to be fairly comparable with modern-day conditions (Nicholson 1979, 38).

In the context of diminished rainfall and environmental

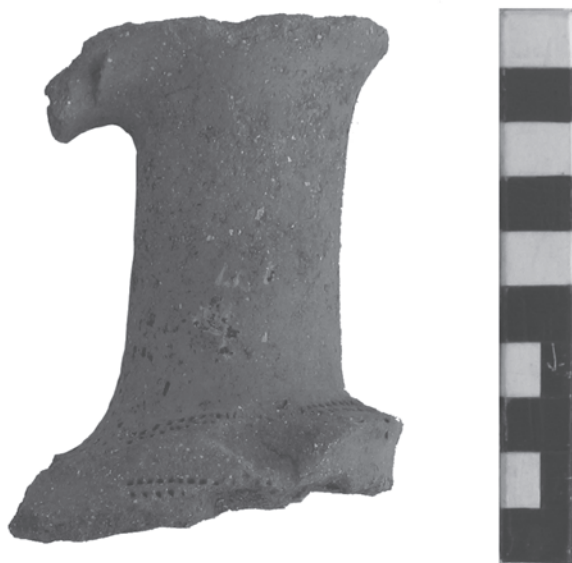


Plate 5. Pottery sherd from Sinnar.



degradation in these marginal zones the fertile Nuba Mountains would have provided an attractive prospect for many peoples.⁶ Minor fluctuations in even earlier periods may well have been one of the causes behind influxes of groups as evidenced by linguistic analysis (Thelwall and Schadeberg 1983, 220). It is clear from these remains and Elles' discussion, however, that the Nuba Mountains have been subject to problems of this kind for at least the last 100 years or so, with environmental degradation apparently causing significant displacement within the hills.

Further archaeological investigation of the Nuba Mountains region is vital to understanding and verifying the history of the area. So far we have only been able to examine a fraction of the Taqali royal *haysban*, and then only in a preliminary fashion. According to Ewald's investigations these played a pivotal role as the foci of royal power providing the Makk's main strongholds in an otherwise loosely controlled kingdom. Archaeological research has much potential to elaborate on information gathered by Ewald from her excellent and exhaustive study of documentary and oral sources (1985; 1990).

Overall, fragmentary written accounts of trade and society provide only part of the story of an area so clearly rich in cultural diversity. Future research and excavations can only confirm and expand upon what little we already know.

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⁶ Decreased rainfall in recent years affecting hydrological systems (Walsh *et al.* 1988) has resulted in Arab nomads retreating to the Nuba Mountains creating much tension which has had serious repercussions (Suliman 1999, 16; Haragin 2003, 12). This exemplifies the importance of even minor environmental changes in such marginal zones.