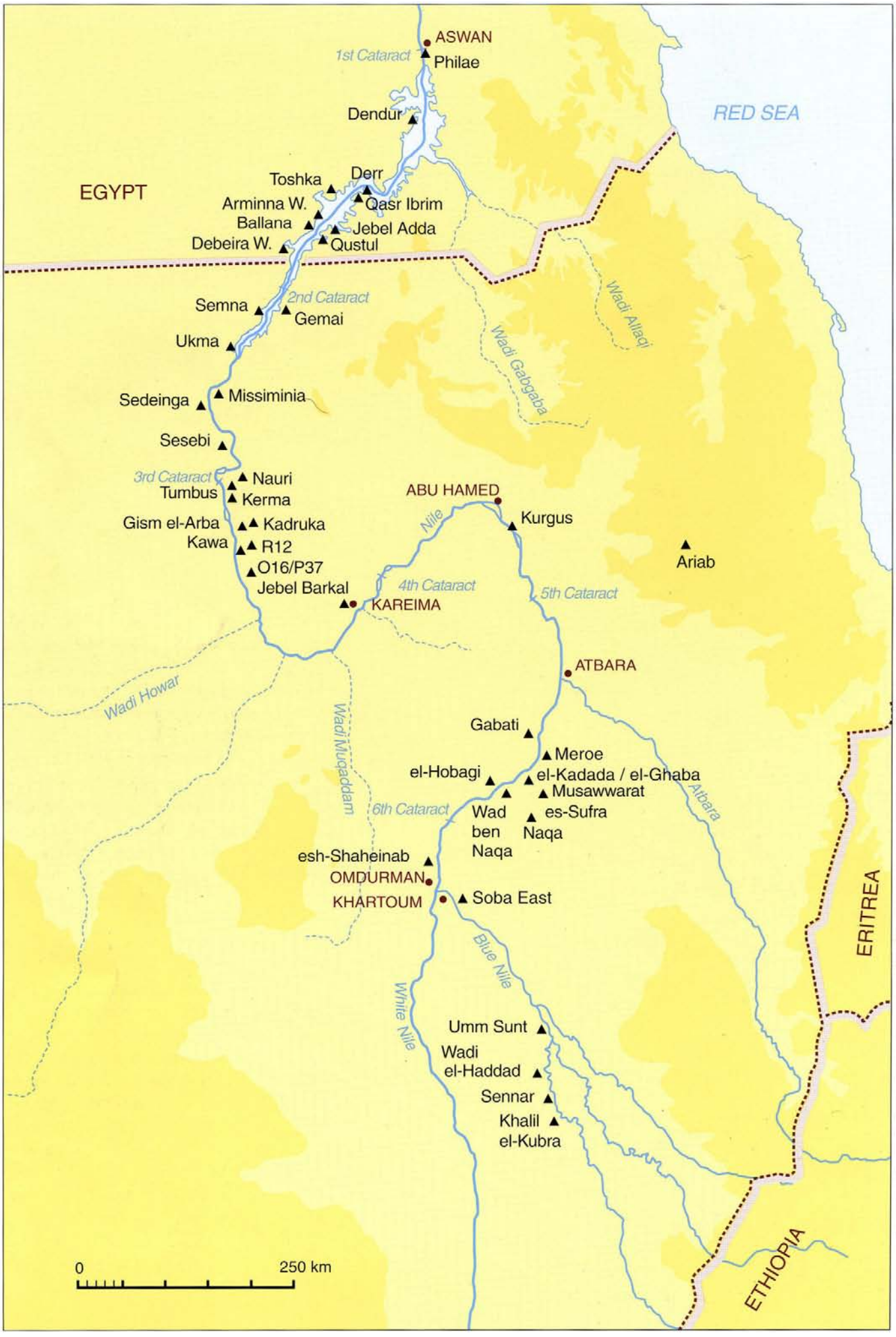
SUDAN & NUBIA

The Sudan Archaeological Research Society

Bulletin No. 5 *2001*


ASWAN
1st Cataract
Philae
Dendur
RED SEA
EGYPT
Toshka
Derr
Arminna W.
Qasr Ibrim
Ballana
Jebel Adda
Debeira W.
Qustul
Wadi Allaqi
Semna
2nd Cataract
Gemai
Wadi Gabgaba
Ukma
Sedeinga
Missiminia
Sesebi
3rd Cataract
Nauri
Tumbus
Kerma
ABU HAMED
Nile
Kurgus
Gism el-Arba
Kadruka
Kawa
R12
O16/P37
Jebel Barkal
4th Cataract
KAREIMA
5th Cataract
Ariab
ATBARA
Wadi Howar
Wadi Muqaddam
Gabati
Meroe
el-Hobagi
el-Kadada / el-Ghaba
Musawwarat
Atbara
6th Cataract
Wad ben Naqa
es-Sufra Naqa
esh-Shaheinab
OMDURMAN
KHARTOUM
Soba East
ERITREA
Blue Nile
White Nile
Umm Sunt
Wadi el-Haddad
Sennar
Khalil el-Kubra
ETHIOPIA
0
250 km

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Contents

Front Cover: Beaker for funerary libation from el-Kadada, chalice shape, with incised geometric decoration, fired clay. Excavation n° KDD 76/3/59.

Introduction

Vivian Davies

The appearance of this, the fifth, issue of the Bulletin coincides with the tenth anniversary of our Society's founding. It has been an extraordinary first decade, remarkably productive in terms both of fieldwork and publication - one in which we have worked closely with our colleagues in the National Corporation for Antiquities and Museums of the Sudan to fill gaps in the archaeological record and meet, wherever possible, the threats posed to archaeological sites by modern development. We have organized and supported eight major field-projects (in Soba East, the Northern Dongola Reach, Kawa, the Shendi-Atbara Reach, Gabati, the Bayuda Desert, the Fourth Cataract, and Kurgus) and published five memoirs (two others are in press at the time of writing), as well as *Sudan & Nubia*, an annual bulletin of reports 'fresh from the field'. Furthermore, we have held each year an international colloquium on current fieldwork and research, and we now additionally host the annual 'Kirwan Memorial Lecture', in memory of our distinguished first President.

The considerable funds needed to carry out this extensive programme have been forthcoming most substantially from the Bioanthropology Foundation and the British Museum, upon whose generosity we continue to rely, as we do also on that of the Society's individual Patrons. We intend to mark the Society's achievements with a special publication to be issued in the coming year. As to the future, the reports in this volume, on sites ranging in date from the Neolithic to the Mediaeval Period, amply demonstrate the huge potential for important new discoveries and scholarly progress in our area of interest, both in Sudan and Egypt, promising a second decade as exciting and rewarding as the first.

Medieval Plant Economy in Middle Nubia: Preliminary Archaeobotanical Evidence from Nauri

Dorian Q Fuller and David N. Edwards

Introduction

The archaeobotany of medieval Nubia is an area of study which is still very poorly developed and, while many of the general characteristics of Nubian subsistence during this period may be inferred through analogies with more recent periods, direct evidence is still very scarce. In central Sudan, our only data come from the excavations at Soba East (Cartwright 1998; Van der Veen 1991; Welsby 1998), while in the north, the only significant studies have been at Qasr Ibrim in Egyptian Nubia. While the conditions of preservation encountered at Soba East were relatively poor, the extremely arid conditions which have prevailed in Lower and Middle Nubia through historic times have allowed for the excellent preservation of organic remains, and in particular desiccated botanical remains. It is very unfortunate that despite the exceptional potential of that region for archaeobotanical research, very little work of any type was carried out in the region prior to the flooding of Lower Nubia following the construction of the Aswan High Dam.

While studies at Qasr Ibrim have produced results of exceptional interest (Adams 1996; Rowley-Conwy 1989; 1994; Rowley-Conwy *et al.* 1997; 1998), they are still of a very preliminary nature. Chronological coverage of samples is uneven and for many periods very little information has been recovered, medieval samples prior to the 'Late Christian' period (*c.* AD 1200-1500) being particularly poorly represented (Rowley-Conwy 1989, 135). Some material has also been recovered there from post-medieval levels, associated with the Ottoman military occupation from the late 16th century.

The material from Qasr Ibrim remains the only significant archaeobotanical information from the region for the medieval and post-medieval periods, periods which are of considerable interest and importance. In the early to mid-first millennium AD, the introduction of the *saqia* waterwheel irrigation is likely to have been a major factor in instigating major transformations in agriculture in Lower/Middle Nubia, supporting new cropping regimes with multiple harvests, in both winter and summer. This in turn may be linked to a qualitative change in the character of settlement in Lower and Middle Nubia apparent from the mid-first millennium AD, with the appearance of extensive dispersed rural settlements. The medieval and post-medieval periods will also have seen considerable changes in agriculture, notably with the introduction of numerous new crops, coming both from the south and north (Rowley-Conwy 1989).

Against this background, one priority of the current Mahas Survey Project, operating around the Third Cataract region in northern Sudan, has been to assess the potential for archaeobotanical studies in the region and where appropriate initiate sampling programmes on sites where suitable deposits are identified. Like the areas of Lower Nubia to the north now lost beneath Lake Nubia, the region is very arid and conditions for the preservation of organic remains, including desiccated botanical remains, are excellent. The survey area also occupies an interesting position as a frontier and a zone of transition between Lower Nubia and central Sudan. For example, during the post-medieval period, this area at the extreme southern end of Ottoman domains on the Nile (Alexander 2000) is well placed for studies of the impact of new crops likely to be entering the Middle Nile, both from Asia and from the New World. While cobs of maize have been found at Qasr Ibrim (Rowley-Conwy 1989, 135) we have no idea as yet when this crop began to be significant in the region. Tobacco also seems to have been widely grown, and used, in the region by the early 19th century (Burckhardt 1819, 140), but while probably entering the region with the Ottoman army, the history of its development as a local crop remains unknown.

There is also potential to compare archaeobotanical evidence with information for agricultural production, and consumption, in recent times. Some recent studies have been made of modern agricultural regimes in the region, providing valuable information on the range of crops and the sorts of cropping regimes practised in small-scale farming in recent times (Al-Batal 1994a; 1994b). Tracing the development of the modern range of crops through time will be a project of some interest. This may be linked to complementary studies, for example relating to the Nubian language (*Nobiin*), which may give indications of the history of some crops in the region. It is already clear that while many crops have local *Nobiin* names and some of these are known from the medieval period, appearing in Old Nubian documents, others do not and are known only by their Arabic names. Some of these may well be quite recent introductions, although in some cases, as with radishes, while their seeds are found in archaeological contexts in Lower Nubia some 1,500 years ago (O'Donoghue *et al.* 1996), they seem to be rarely grown today in the Mahas region, if at all, and a *Nobiin* name for the plant has yet to be identified.

Nauri

The site at Nauri (NAR001) is located on a prominent isolated sandstone peak a few miles upstream from the Third (Kajbar) Cataract (Colour Plate XLIX). The site comprises two main parts, a lower settlement based on a rectangular walled enclosure, and an upper settlement, consisting of

numerous small chambers and rooms constructed on a wide ledge which runs around the hill. Parts of the massive stone walls of the lower site are quite well preserved but the centre of the site has been reduced to a mass of tumbled rubble. Whether it extended much outside the enclosure remains unclear as areas to the north and east are covered by the site of a village occupied until some 30-40 years ago when the inhabitants moved the settlement further away from the river. The ruins are the source of a medieval legal document in Old Nubian (Griffith 1928). Surface pottery includes sherds of 'Classic', 'Post-Classic' and 'Late Christian' wares but much of the more undiagnostic material may be more recent and parts of the settlement may have remained in use through the post-medieval period. Nauri is a named settlement in Evliya Celebi's account of this region in the 1670s (Petti Suma 1964, 442).

During initial survey work at the site in 1990 and 1991, it was noted that many of the rooms and chambers on the upper ledge settlement were infilled with substantial deposits of rubbish and collapsed structural remains, in which quantities of desiccated botanical remains could be seen in exposed sections. One sample was collected at this time (indicated below as sample 0). While no test excavations have yet been undertaken at the site, during the 2000 season (Edwards and Osman 2000) four small samples were collected from two locations where medieval deposits were exposed and are being eroded (indicated below as samples 1 through 4). The preliminary analysis of these samples is reported here.

Samples of desiccated material, between 1 and 2 litres (for samples 1 to 4; sample 0 was less than half a litre), were sieved to separate them into manageable sized fractions and then sorted under a binocular microscope and studied at magnifications between 6x and 40x in order to identify the taxa present. Identification focused on the economic plants, which dominated all the samples, including seed crops and fruits. In some cases further work to refine identification, especially of wild species, can still be carried out. Table 1 lists the occurrence of each species or plant part of each of the five samples.

Identified plants and their significance

As is the case in most agricultural diets the starchy staples of recent and historical diets in the northern Sudan rely on cereal grains, which could be made into gruel, bread or beer. All of the assemblages are dominated by remains of cereals, most prominently sorghum (*Sorghum bicolor*) and barley (*Hordeum vulgare*), as well as evidence for bread wheat, pearl millet (*Pennisetum glaucum*) and foxtail millet (*Setaria italica*).

Both wheat (in this case, free-threshing bread wheat, Plate 1) and barley (in this case, two-rowed hulled barley, Plate 2) are cereals which were originally domesticated in the Levantine region of South-West Asia more than 10,000 years ago and became established in the Egyptian Nile Valley by

Plate 1. Grain and rachis of wheat, free-threshing bread wheat type, from Sample 2.

c. 5000 BC (Zohary and Hopf 2000). These cereals are normally sown in autumn and harvested in spring, which means that they were well-suited to agriculture in the Nile Valley as the late summer/autumn inundation levels receded. Little Neolithic archaeobotanical material has yet been found in the Middle Nile but there have been recent finds of barley deposits in Neolithic graves of the 5th millennium BC at Kadruka near Kerma (Reinold 2000). Further north, the limited evidence from Lower Nubia shows the presence of both wheat and barley in A-Group contexts (Lal 1967), and charred barley grains were amongst finds in C-Group graves at Toshka West (unpublished data). Also throughout the sequence of Qasr Ibrim (*c.* 800 BC-AD 1500) wheat and barley are prominent crops (Rowley-Conwy 1989). In Pharaonic Egypt it was hulled barley which predominated as well as emmer, a glume wheat (Murray 2000). Free-threshing wheats, such as the bread wheat identified here, did not become major crops of the Nile Valley until the Ptolemaic period, while bread wheat

Plate 2. Fertile and sterile spikelets of two-rowed, hulled barley from Sample 4.

Table 1. Identified taxa, with indication of level of occurrence in sample.
+= trace presence (1 or very few seeds), ++= small presence, +++= moderate to high presence, ++++=very high presence/ dominance.

Species and plant part(s)	Sample				
	0	1	2	3	4
Cereals					
Triticum sp. (wheat) grain			+		+
Triticum sp. glume			+		
Triticum aestivum rachis	+		+		++
Hordeum vulgare (barley) grain	++	++	++		+++
H. vulgare chaff	+	+++	++++		++++
H. vulgare sterile spikelet		+++	+++		+++
H. vulgare rachis segment	++	++	+++	+	+++
Sorghum bicolor (sorghum) grain		+			+
S. bicolor bicolor spikelet base	+	+++	+++		+++
S. bicolor husk fragment		+++	+++	+	+++
Pennisetum glaucum (Pearl millet) involucre				+	++
P. glaucum grain					+
Setaria italica (foxtail millet) spikelet		+++	+++		
S. italica lemma/ palea		+++	+++		
S. italica rachis segment w/ bristles		+	++		
Setaria cf. *sphaceleata* type, spikelets/ chaff		+++	+++		
Culm node (grass/ cereal)	+	+	+	++++	
Grain legumes					
Vigna unguiculata (cowpea)		+++	+++		+
Pisum sativum (pea)	+	+	++		++
Lens culinaris (lentil)			+		
Other crops					
Carthamus tinctorius (safflower) seed coat fragment		++	++		+
Ricinus communis (castor) seed coat fragment		++	++		+
Gossypium sp. (cotton) Seed coat fragment		++	++		
Citrullus lanatus (watermelon) seed coat fragment	+	+	+		++
Vitis vinifera (grape) seed fragment		++	+++		++
Phoenix dactylifera (date) fruits/ stones/ parts	++		+	+	+
Ficus cf. *carica* (fig) seeds			++		
Wild seeds, including weeds					
Acacia sp. type seed	++	++	+		++
Small and medium-sized seeds of wild legumes	+		++		++
Malvaceae, *Malva* cf. *Neglecta* seeds			+		++
Capparidaceae, cf. *Cleome* sp. seeds			++		+
Apiaceae type seeds			+		
Wild grass spikelet		+		++	++
Miscellaneous					
Pod fragments from legumes (including cowpea?)		++	+++		++
Unidentified seeds/ fruits/ fragments	+	++	++	+	++
Sheep/goat dung	++	++++	++++		+++
Cowrie shells				+	
Spun string fragments of animal hair (wool?)		+	+		

is present at Qasr Ibrim from the earlier first millennium AD. Both species appear in Old Nubian documents (Nobiin: wheat: *ellee*, barley: *seering*). In general we would expect these species to have been increasingly less important as one moved south towards more tropical settings. Indeed, while both species were prevalent at Qasr Ibrim, wheat is rare in the Nauri

material where barley is common, while at medieval Soba in the area of Khartoum wheat was absent and barley was rare (Van der Veen and Lawrence 1991; Cartwright 1998).

Two other cereals are species native to the savannahs of the Sudan, and it is of interest to understand the processes by which they spread northwards. Pearl millet (*Pennisetum glaucum*) occurs in small quantities. This is an important crop across the savannahs of Africa and is the most drought tolerant cereal. It was probably domesticated in western Africa, presumably earlier than the current evidence from the mid-second millennium BC (D'Andrea *et al.* 2001) as it had also spread to India by this time (Fuller 2001, in press). Some evidence for pearl millet has come from Qasr Ibrim of the post-Meroitic period (Steele and Bunting 1982) as well as medieval Soba (Van der Veen and Lawrence 1991; Cartwright 1998). Sorghum (*Sorghum bicolor* ssp. *bicolor* race *bicolor*) appears to derive entirely from the race bicolor (Colour Plate L), which represents the most primitive and one of the most widespread forms of the crop. This form of sorghum has thick persistent hulls that require extra pounding to separate the grains. At present there is scholarly disagreement about where and when sorghum was domesticated and when it came to be cultivated in Nubia. While some botanists have argued for domestication in the savannah of the Republic of Sudan (Harlan 1995), others have suggested Ethiopia as the centre of origin (Doggett and Prasada Rao 1995).

Despite clear evidence for the use of wild sorghum in the eastern Sahara as early as 6000 BC (Wasylikowa *et al.* 1995) and by Neolithic (Early Khartoum) populations in central Sudan by the fourth millennium BC (Stemler 1990), there is as yet no clear evidence for the processes of domestication.

Evidence for a shift from wild sorghum to domesticated sorghum in the sequence at Qasr Ibrim has been used to suggest that domestication may have been as late as the first centuries AD (Rowley-Conwy 1991; Rowley-Conwy *et al.* 1997), although this is not consistent with evidence that domesticated sorghum had already spread to India by *c.* 2000 BC (Fuller 2001, in press). The evidence from Qasr Ibrim also suggests that the highly-productive and easily-processed variety *durra* is not common until the 'Late Christian' period although it may have first appeared somewhat earlier (Rowley-Conwy 1989, 134). This is of interest in relation to the Nauri material where there is no sign of *durra,* today one of the most prominent cultivated forms of sorghum (Nobiin: *maree*) in the Northern Sudan.

The final cereal type appears to be foxtail millet (*Setaria italica*) together with a related wild/ weedy grass identified as *Setaria* cf. *sphaceleata.* Identification of these grains is complicated by the great similarity between the grains and spikelets of species in the genus *Setaria* (foxtail millets) and some of those in *Brachiaria.* Nevertheless consideration of the pattern of the husk, as well as overall size and shape, suggests that domesticated foxtail millet is present (Colour Plate LI) as well as a different wild species. This wild species could have been present as a weed, although it may have been used as a potential food resource for either people or animals. Some remains of *Setaria* sp. have been identified in organic residues in pots from an early Meroitic cemetery at Amir Abdallah, to the north of Nauri (Fernandez 1983, 1366). Indeed wild *Setaria* are often amongst those grasses used in traditions of wild grass gathering. Such wild grass harvesting is an ancient tradition which goes back to pre-agricultural periods in the eastern Sahara and the Sudan (Wasylikowa *et al.* 1995; Barakat 1999) and has continued to contribute to the subsistence of many modern African societies. The occurrence of seeds of both *Setaria* spp. in at least one sheep/ goat pellet indicates that at least sometimes the foxtail millet crop or its by-products were used as fodder, although this did not appear to be present in most of the recovered pellets.

Important secondary staples in many agricultural diets are the seeds of grain legumes (pulses), which provide important proteins. In the present assemblages only the seed coats of legumes are usually preserved in some cases including the scar where they attached to the pod, which can be diagnostic in identification. The assemblages seem to be dominated by either peas (*Pisum sativum*) (Plate 3), a winter-grown species of South-West Asian origin, or cowpeas (*Vigna unguiculata*) (Plate 4), a summer-grown species (Nobiin: *dignitee*) native to the savannahs of West Africa where it had been brought under cultivation probably by 2000 BC. Legume pod fragments in the samples include a type that may represent fragments of cowpea pods. In addition there are some lentils, which are like peas in seasonality and origin and probably spread up the Nile Valley with wheat and barley.

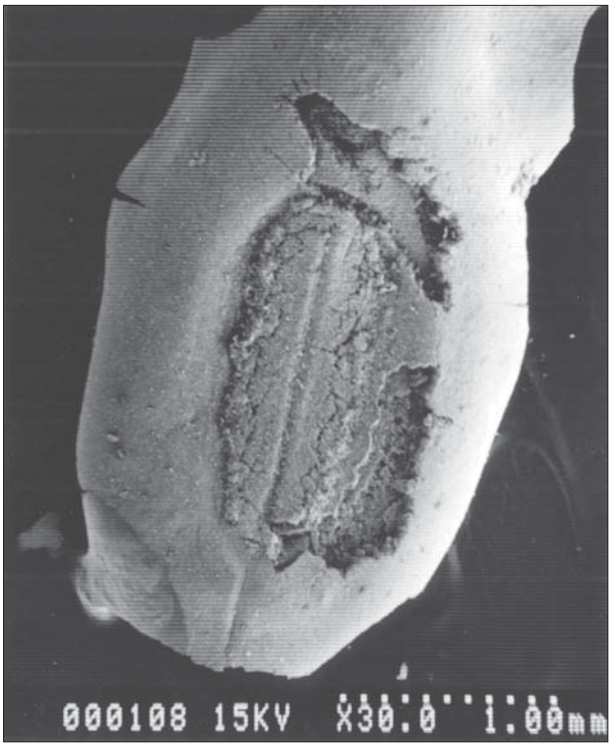

Plate 3. Scanning electron micrograph. Pisum sativum *hilum from Sample 1.*

Plate 4. Scanning electron micrograph. Vigna unguiculata *hilum from Sample 1.*

Other species that are present include fruits, oilseeds, and fibre crops. Dates are a well-known fruit crop of Nubia (Nobiin: *fenti*), and are represented in the present samples by one complete desiccated fruit, as well as pits and the stalks to which the fruits are attached. There is also some evidence for figs, also a common Nile Valley fruit. Seeds of watermelon and numerous seeds of grapes attest to their cultivation and consumption. The abundance of grapes is of interest as vines are very uncommon in northern Sudan today, and in the early 19th century were only seen by Burckhardt at Derr (1819, 144) while Adams (1966) reports some growing in the Dongola Reach in the 1960s. There is good reason to believe that vines were cultivated in Nubia during the Meroitic and medieval periods, probably mainly for the purposes of wine-making (Adams 1966). The presence of grape wood charcoal from Late Meroitic Arminna West provides at least some evidence for the earlier period in Lower Nubia (Fuller 1999), and the evidence here confirms viticulture in this area during the medieval period. All four of the above-mentioned fruits were already known in Nubia from at least by the New Kingdom (*c.* 1500 BC) as they were found in temple foundation deposits at Semna (Van Zeist 1983).

Fragments of the exocarp (husk) of safflower seeds (Nobiin: *kushee*) are also quite frequent, and suggest that this species was grown for its oily seed which can be eaten roasted (like sunflower seeds) or pressed for edible oil, while it is also used as a substitute for saffron. Although this species was probably first domesticated in the Near East, it is thought that it first served as a textile dye, which can be made from its flowers which range from yellow to red (Zohary and Hopf 2000). It was well known from Pharaonic Egypt. It is unclear when it came to be cultivated for its edible oily seeds, although it has been suggested that this had occurred by the Roman period in Egypt (Knowles and Ashri 1995). There is also some evidence for castor (no known Nobiin name; the Arabic *khirwa* is used), which may be used for lamp oil or as a medicinal oil but also grows in the Nile Valley as a weed around settlements (Plate 5). In the early 19th century,

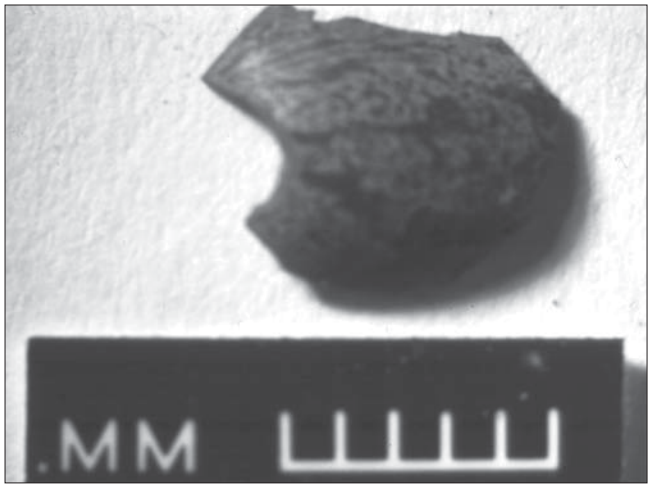

Plate 5. Seed coat of castor oil seed from Sample 2.

Burckhardt recorded its cutlivation and the use of its oil by Nubians 'to anoint their hair' (1819, 78-9). Also cut castor oil beans are reported to have been used for oiling *doka* plates on which *kisra* breads were baked in Lower Nubia and are still sometimes grown in the Mahas area. Examples were found in medieval deposits at Debeira West (Shinnie and Shinnie 1978, 107), and are also common in early medieval deposits at Qasr Ibrim.

Fragments of cotton seeds (Nobiin: *koshmaag*) retaining their characteristic lint were also recovered (Plate 6),

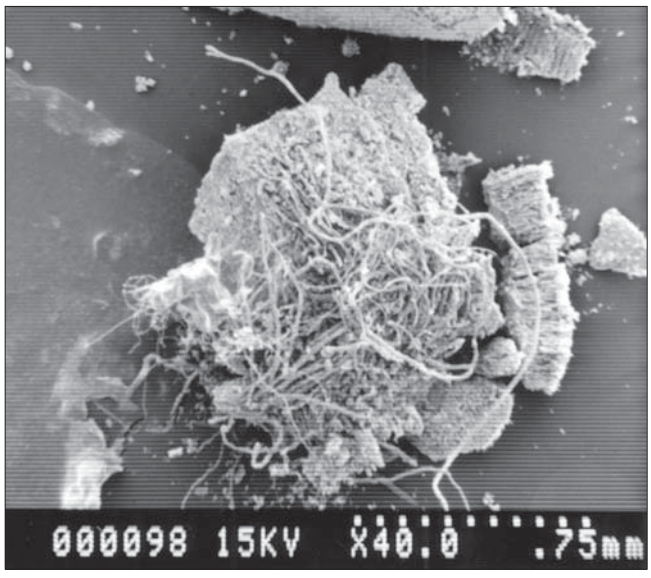

Plate 6. Scanning electron micrograph of cotton seed fragment.

indicating that this important fibre crop was being cultivated in the region and processed for its fibres on this site, which had been the case in Nubia since at least the Late Meroitic period (Rowley-Conwy 1989, 134). In addition to the use of cotton some preserved fragments of string were included in the assemblages which were made from an animal hair, probably sheep's wool (Plates 7 and 8).

Plate 7. Scanning electron micrograph. Close-up of fibres of string showing scale pattern typical of animal hair, in this case comparable to sheep's wool.

Other seeds identified in the present material represent wild seeds, including many that were probably growing as weeds of the crops. In view of the elevated position of the site with no natural vegetation around it, many of these wild seeds may have been brought onto the site largely as incidental inclusions of weeds in the harvested crops and a few may have eroded out of animal dung. Others, such as the *Acacia* seeds, may have had a variety of uses - some are used in tanning processes and some have medicinal uses and are burnt with incense.

Prior to systematic excavations at the site, which may clarify how the upper settlement at Nauri was used, we can only suggest a few pointers in attempting to relate these plant assemblages to human activities on the site. One sample, sample 3, contained large quantities of straw and relatively few identifiable economic plant remains; this clearly represents something different from the other samples. In general, these assemblages represent mixed rubbish including both summer and winter field crops as well as fruits

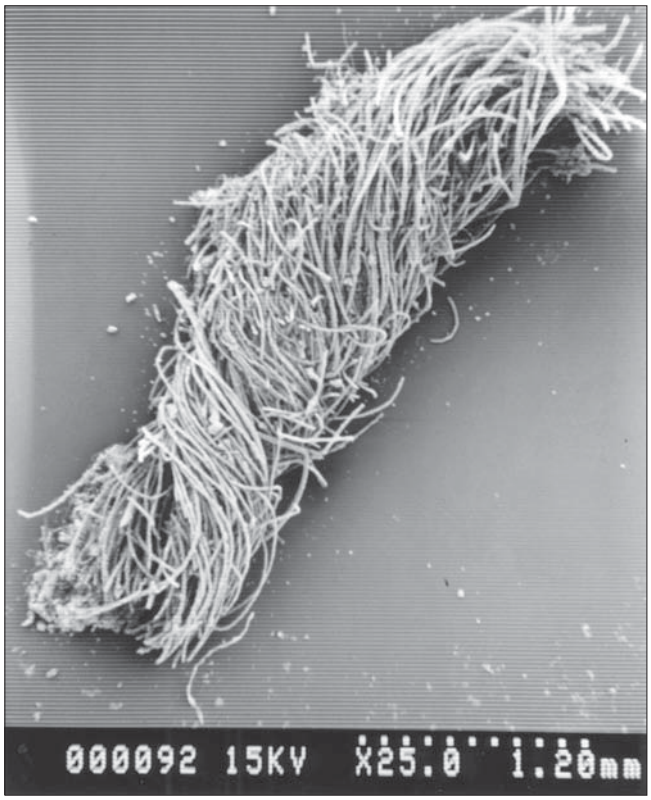

Plate 8. Scanning electron micrograph of string fragment.

represented by and large as discarded by-products, i.e. not normally edible parts such as chaff and pips. In the case of samples 1, 2 and 4 the presence of small weed seeds and chaff, with few culm nodes or large weeds suggests that this material derives from the by-products of winnowing which removes these plant parts after threshing, whereas larger by-products are generally removed subsequently through coarse sieving (Hillman 1984). The presence of possible cowpea pod-fragments could indicate a similar processing stage of waste for this grain legume. This might be indicative of the storage of crops at this semi-processed state, with subsequent stages of processing being carried out elsewhere, perhaps domestically and disposed of differently, such as by burning in domestic contexts. In this regard, it is striking that there is a rarity of charred plant remains, the mainstay of archaeobotany on most domestic habitation sites. Into recent times, crop processing has involved hand cutting of crops, threshing and winnowing in the fields and distribution of grain for storage within domestic areas, with the separate storage of straw for fodder or fuel (Al-Batal 1994b). Further cleaning and sorting are commonly done prior to grinding for food preparation. The general character of the upper settlement, with many small chambers spread across its otherwise very restricted area, suggests it was primarily used for secure storage and perhaps as a refuge rather than as a general domestic area. Thus the material recovered may represent the remnants of, or discard from, storage of straw and winnowing waste that could have been used as animal fodder or fuel, as well as discard from some occasional

human use, such as the fruit seeds.

These first samples from the region have confirmed the considerable potential for future studies. Conditions of preservation at Nauri are excellent and botanical material abundant, and similar conditions have been seen at several other medieval and post-medieval sites in the region. This material promises to elucidate the basis of the agricultural economy in this region in the past. It is also potentially interesting that some crop plants**,** common in this region in modern times, are absent (such as sesame or the *durra* variety of sorghum). Future systematic work will be required to relate the recovered plant remains in more detail to their archaeological context in order to better understand their potential for understanding past human activities, including agriculture, crop processing and the storage of different agricultural products and by-products.

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Plate XLIX. Medieval settlement on the hillside and ledge at Nauri (NAR 001) from which the sample derives. Abandoned modern village in the foreground.

Plate L. Nauri; sorghum chaff from Sample 1.

Plate LI. Nauri; setaria italica spikelets and rachis segment, from Sample 1.