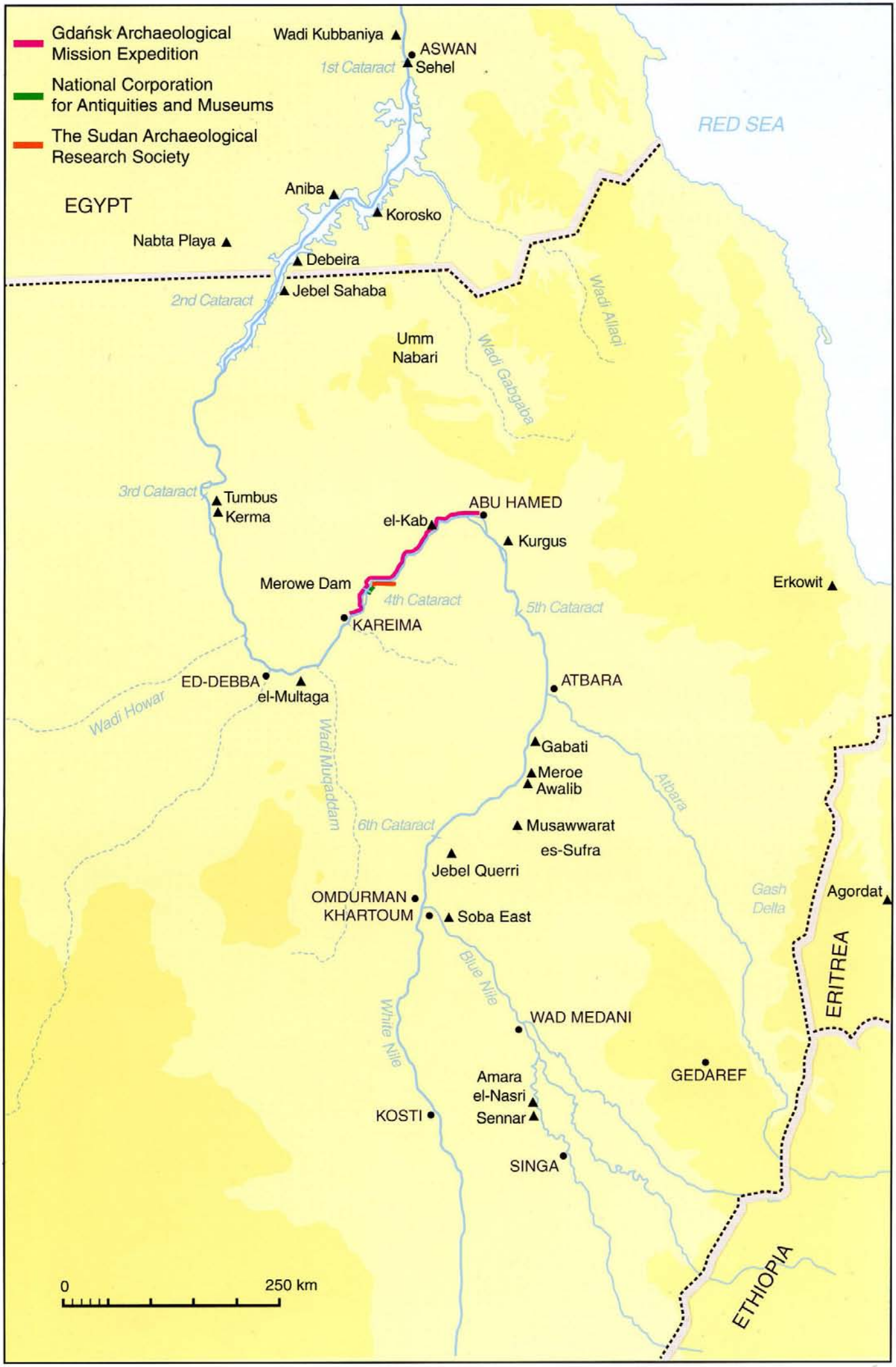
SUDAN & NUBIA

The Sudan Archaeological Research Society

Bulletin No. 7 *2003*


Gdańsk Archaeological Mission Expedition
National Corporation for Antiquities and Museums
The Sudan Archaeological Research Society
EGYPT
Wadi Kubbaniya
ASWAN
Sehel
1st Cataract
RED SEA
Aniba
Korosko
Nabta Playa
Debeira
Jebel Sahaba
2nd Cataract
Wadi Allaqi
Umm Nabari
Wadi Gabgaba
3rd Cataract
Tumbus
Kerma
ABU HAMED
el-Kab
Kurgus
Merowe Dam
4th Cataract
5th Cataract
Erkowit
KAREIMA
ED-DEBBA
el-Multaga
Wadi Howar
Wadi Muqaddam
ATBARA
Gabati
Meroe
Awalib
Atbara
6th Cataract
Musawwarat es-Sufra
Jebel Querri
OMDURMAN
KHARTOUM
Soba East
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Contents

Front Cover: Sehel Island: rock-inscriptions of Viceroys of Kush.

Introduction

Vivian Davies

The Society's two major events of the year, the results of which are published here - the Kirwan Memorial Lecture delivered in October, 2002, and the colloquium on recent fieldwork held in May, 2003 – were extremely well attended. The colloquium incorporated a special session, led by Dr. Salah Mohamed Ahmed, NCAM Director of Excavations, on the Merowe Dam salvage project. The response has been encouraging. Since the colloquium, several organisations have applied for concessions, joining the existing four missions of Gdańsk, NCAM, the French Unit and SARS. Many more are still needed. Interested parties should contact Dr Salah at NCAM tel./fax. 249 11 786784 or the International Society for Nubian Studies c/o dwelsby@thebritishmuseum.ac.uk.

Kirwan Memorial Lecture

Forty Years of Archaeological Research in Sudanese and Egyptian Nubia

Fred Wendorf

It is reasonable to assume that my involvement with the prehistory of the Nile Valley was an accident. It was a fortuitous accident, at least for me, but nevertheless it occurred not because I had a long interest in the prehistory of the Nile, but because I knew almost nothing about the area and its prehistory. I was not aware that the prevailing opinion about the Paleolithic in the Nile Valley among archaeologists at that time was that almost all of the sites of this period were buried below the modern floodplain, and consequently, there was almost nothing to find or to study. This view was reinforced by a survey conducted by two prehistorians who, at the request of UNESCO, made a survey of that part of the Aswan Reservoir between Wadi Halfa and the New High Dam in January 1962 and found no sites. In their report to UNESCO they noted that since no sites had been found they recommended that no funds be allocated for the salvage of prehistoric sites in the reservoir. Fortunately, that advice was largely ignored, but it did impact the amount of money allocated for the salvage of prehistoric sites.

I also was not aware that the few Paleolithic sites that had been studied showed that the latest Paleolithic sites in the area (at Kom Ombo in Upper Egypt and assigned to a complex known as the Sebilian) showed technological features, such as Levallois technology, reminiscent of the Middle Paleolithic. Thus, it was reasoned that even if there were sites, the Paleolithic archaeology in the Nile Valley was predicted to be culturally backward when compared to the Levant (where it was thought the Upper Paleolithic developed, if not in Europe). Furthermore, the then recently obtained radiocarbon dates from the Neolithic in the Levant and the Fayum showed that plants were domesticated several thousand years earlier in the Levant. With little to offer toward the origins of the Upper Paleolithic and the Neolithic, the two most important archaeological research topics of that period, it was no wonder that the Nile Valley was regarded as of little interest.

It was also my good fortune that Dr J. O. Brew, my old professor at Harvard, was Chairman of the UNESCO Commission that was trying to save the archaeology upstream of the new High Dam. The U.S. Congress had appropriated $3,000,000 to assist in the salvage of the archaeological sites in the Aswan Reservoir, and, as Brew confided to me, they had approached several individuals who knew Old World prehistory and asked them to lead the salvage effort for the prehistoric sites in the Reservoir but all had declined. Although at that time I was focused on the archaeology of the American Southwest and planned to continue with those studies for the foreseeable future, Brew asked me if I would be interested in working on the prehistory in the Aswan Reservoir. I think he asked me because I had been managing large-scale archaeological salvage projects in the Southwest, and because he was desperate. I accepted, even after I was told the reasons why others had declined this opportunity, because I thought they were wrong. I was convinced that one of the world's major rivers would have an abundance of archaeological sites and that this archaeology would be of great interest. Brew either shared my view or thought we should find out. Initially, I thought I would work in Nubia for two field seasons and then return to the Southwest, but it did not work out that way. I have been working in Egypt and Sudan ever since.

From the beginning, this work on the prehistory of Egypt and Sudan has been a team effort. We call ourselves "The Combined Prehistoric Expedition." It is an informal entity, sponsored by Southern Methodist University, the Polish Academy of Sciences, and the Geological Survey of Egypt. Since I knew very little about the techniques of Old World archaeology or Paleolithic lithic typology, I actively sought help from those trained in Paleolithic archaeology. As a consequence, the personnel came from several countries, including Belgium, Egypt, England, France, Poland, Sudan and the United States. Besides me, three members of the staff have been with the Expedition almost from the beginning. They are Dr Romuald Schild from the Polish Academy of Science (and the new Director of the Expedition), Dr Bahay Issawi, former Director of the Egyptian Geological Survey, and Dr Achilles Gautier of the University of Ghent, Belgium. In addition, we are still working with the same group of Bedouin laborers that started with us, only now they are the sons and grandsons of our first workers.

Major financial support has come from the United States National Science Foundation and from the three sponsoring organizations. Other important financial support has come from the United States Department of State and the Smithsonian Institution. Finally, of great import have been the substantial contributions received from several individuals and corporations.

1. Paleolithic and Neolithic Sites in Nubia: Research Results

I will not attempt to summarize the major results of our research on the prehistory of Egypt and northern Sudan (Figure 1). Instead, I will touch on four of the major topics that seem to me to be the most interesting. Almost all of the

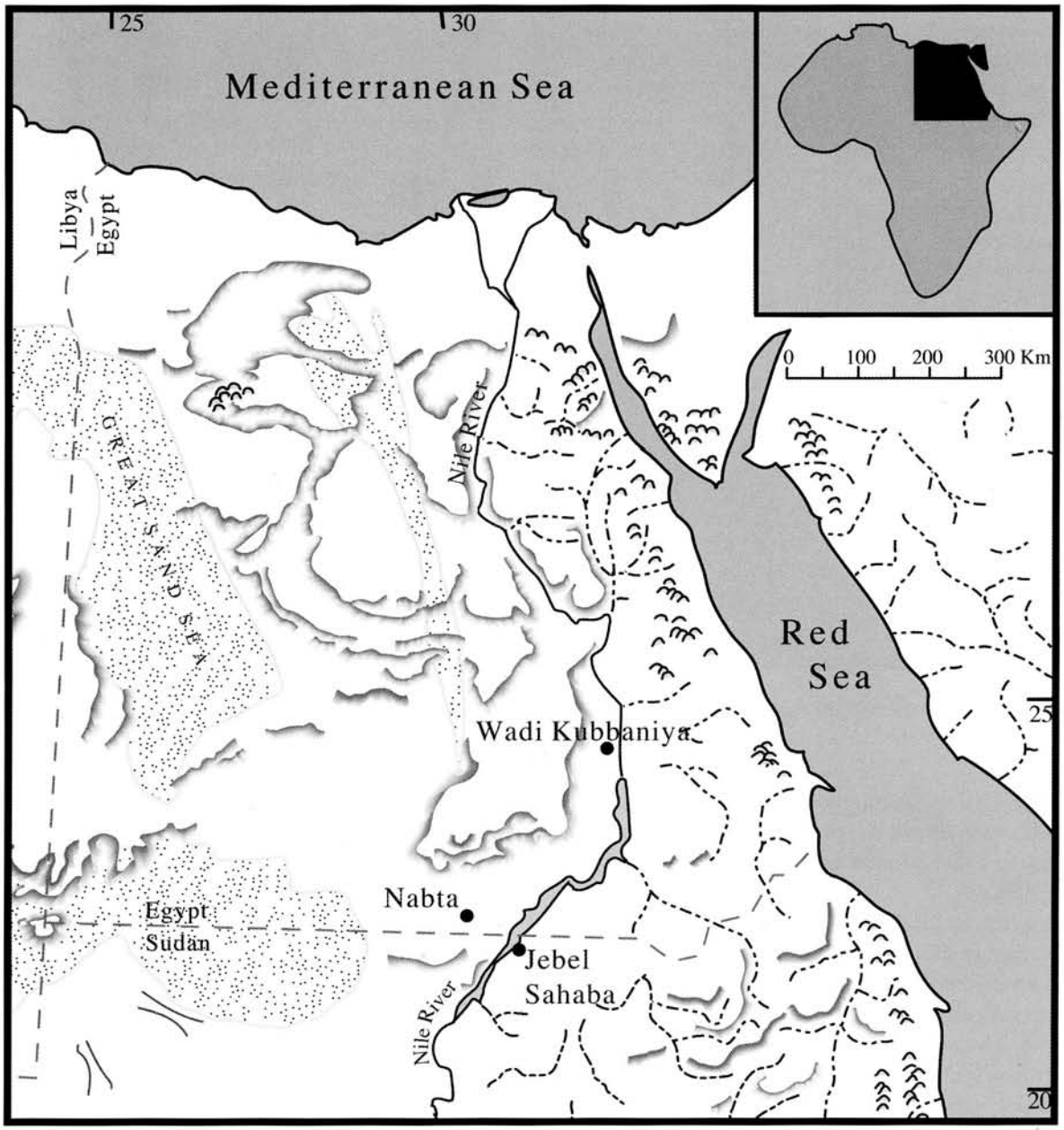

Figure 1. Map of Egypt and northern Sudan showing localities mentioned in text.

data from these studies have been published in some detail in the 20+ books and over 150 journal articles that have been issued in the name of the Expedition. The new information that resulted from this research is impressive in its quantity and some of it is important on a larger scale and has implications beyond Northeast Africa. The interested reader will discover that, as a consequence of all of this work over the past 40 years, we and other investigators have made a good start in developing an outline of the prehistory of Nubia and Egypt.

Perhaps the most important result of our work is that there really are prehistoric sites along the Nile in Nubia, and lots of them (Wendorf 1965, 1968a). In fact, the sites were so numerous that it is difficult for me to understand why no one, with the exception of Vignard (1923), the amateur who was living at Kom Ombo and identified the Sebilian, was able to find prehistoric sites in the Valley. The sites we found occurred in a variety of micro-settings. They were particularly abundant in the embayments, but they also were found on buried levees and where shoreline features occurred, such as where fossil dunes interfingered with or abutted Nile silts (Plate 1). There were also many quarry workshops that were located near or on outcrops of good quality stone for making tools. The chronological range of the occupations represented every major time interval, except the earliest; we found no evidence of the Oldowan. The earliest occupations are classified as Middle Acheulean and are probably between 500,000 and 1,000,000 years old, while Middle Paleolithic and Late Paleolithic sites were frequent and both included several different entities. It is fair to say that,

Plate 1. View of partially deflated Late Paleolithic site near Wadi Halfa, Sudan. Note the numerous artifacts and fossil bones, mostly fish.

because of the work done during the past 40 years by the Expedition and several others, the prehistory of Nubia and the adjacent deserts today is better known than that in most other parts of Africa.

There were a few mistakes. One of these was when we agreed not to excavate sites with Neolithic pottery, because another group was to study those localities. As it turned out, the other group only studied the pottery, and most of that was from burials. This was partially corrected near the end of the work around Wadi Halfa, when we were able to test a few Neolithic living sites, but much more needed to be done because now the sites are gone and our knowledge of this Neolithic is very limited (Schild *et al.* 1968; Shiner 1968).

An important component of our research has always been the study of the past environment. We knew that the paleoenvironment was frequently very different from that of today, and we wanted to understand the changes in the environment through time and how people related to those changes. The participation of geologists, such as Rushdi Said (1969), Bahay Issawi and M. el Hinnawi (1980), and Jean de Heinzelin (1968), the stratigraphic work by Schild, together with the faunal analyses by Gautier and Wim Van Neer, and the paleobotanical analyses by Gordon Hillman, Krystyna Wasylikowa, Hala Barakat (1995) and others, has provided the framework for a model of Nilotic behavior during the Pleistocene, documented the stratigraphic positions of our studied sites, and provided key data on the frequently changing climate and environment during the periods the sites were occupied.

2. Jebel Sahaba: Evidence for the Earliest Warfare?

A few kilometers north of the old Wadi Halfa, in northern Sudan, was a small graveyard containing 58 well-preserved skeletons. The burials included both males and females, and the ages ranged from young children to adults. These burials are very interesting for several reasons. Physically, the adults were fairly large, some males were almost six feet tall, and they were rugged and muscular, but fully modern (Anderson 1968). They were the African equivalent of the Late Pleistocene age Cro Magnon type in Europe. A single radiocarbon date indicates that the skeletons in this graveyard are around 15,000 years old (this and all other radiocarbon age determinations in this paper are calibrated. The uncalibrated age for this date is 13,740 bp ± 600 years [Pta-116]).

A study of teeth indicated that these skeletons, like all other Late and Final Pleistocene-age skeletons found in southern Egypt and northern Sudan, shared many genetic features with modern populations living in Sub-Saharan Africa (Irish 1998). Perhaps most interesting, however, were the numerous small stone artifacts found imbedded in the skeletons (Plate 2). Some of the skeletons had only one weapon point, which were often found between the base of the skull and the first cervical vertebra. Many other skeletons had multiple weapon points that had probably been imbedded in the soft tissue of the arms and abdomen and sometimes in the vertebra or, more frequently, in the pubic bone (Plate 3). One skeleton had 21 pieces associated, and several others

Plate 2. Two of the human burials found at Jebel Sahaba, near Wadi Halfa, Sudan. Pencils show weapon points in close proximity to the skeletons. Late Paleolithic.

had between 10 and 19 associated points; these were like human pincushions (Wendorf 1968b). Nor were the imbedded points the only evidence of conflict. Several of the skeletons had healed and partially healed "parry fractures" of the left ulna and radius, and an examination of the bones by pathologists disclosed other signs of trauma (Anderson 1968; Race *et al.* 1972). It is important to note that because a few of the later burials had cut through earlier ones, the burials were not casualties from a single battle who were interred at the same time. This fact, along with the healed parry fractures, suggests that conflict was frequent – or even continual – in this part of the Nile Valley during the Final Pleistocene.

Plate 3. Pubic bone with imbedded stone point from burial at Jebel Sahaba, near Wadi Halfa, Sudan. Late Paleolithic.

The stone artifacts imbedded within and associated with the skeletons indicate that over 40% of the men, women and children in this graveyard died violently, and, when the pathological evidence is added, the frequency of violent deaths in this group of burials was even higher. It is very unlikely that any society could survive when confronted with such a high percentage of violent deaths, in addition to the normal attrition from everyday living.

The Jebel Sahaba burials are not the only evidence for conflict among the Late Paleolithic groups living in the Nile Valley. A somewhat older skeleton found at Wadi Kubbaniya, about 10km north of Aswan, and estimated to date between 20,000 and 24,000 years ago, also displayed interesting evidence of frequent fighting (Wendorf *et al.* 1986). This was a young adult male, who had been in at least three separate conflict situations. The first resulted in a parry fracture of his right ulna that had completely healed. The second resulted in a partially healed-over weapon point imbedded in his right humerus. The third event was more serious, and resulted in two bladelets in the pelvic cavity. This last wound was fatal.

The Jebel Sahaba evidence suggests true warfare, seemingly with the goal of exterminating a competing group. This may also be true of the Kubbaniya skeleton, but Jebel Sahaba is a more compelling argument for warfare. If Jebel Sahaba does indeed represent warfare, it is among the earliest evidence known, and it tells us that warfare did not begin with settled villages and competition for arable land, as some have suggested, but occurred much earlier. Why did it occur so early in the Nile Valley? To answer that question we need to look at the social and physical characteristics of the Nubian environment at that time.

The paleoclimatic evidence indicates that Northeast Africa was hyperarid from around 65-70,000 to about 13,000 years ago. In Egypt and Nubia there is no evidence of local rains during this period. Rainfall was also greatly reduced in the source areas for the Nile, the uplands of Ethiopia and Central Africa; many of the lake basins in this area were dry, and there were dunes south of modern Khartoum that blocked the White Nile. Because of the reduced rainfall, the Nile was a very different stream from the massive river of today, with perhaps less than 20% of the modern annual flow (Wendorf and Schild 1989). The deserts on both sides of the Nile in northern Sudan and Egypt were hyperarid and apparently devoid of life. In this setting the only place where people could live was in the Nile Valley along the floodplain. Here fish were abundant, particularly during the spawn that occurred with the summer flood, and ducks and geese could be taken during the fall and winter. Wild cattle,

hartebeest and gazelle, plus an occasional hippopotamus, were the major prey animals. Plant foods, particularly tubers of "nut grass" and typha, were eaten in some quantity, even though these tubers had to be processed by roasting to remove the toxins and then ground to break up the fiber (Hillman *et al.* 1989). The tubers were abundant in only a few localities and today these areas can be identified by the numerous grinding stones in the archaeological sites that occur there. Beyond the floodplain, however, the desert was empty and there is no evidence of human presence.

The archaeological evidence indicates that during the Final Pleistocene, between 25,000 and 13,000 radiocarbon years ago, a variety of different archaeological entities, each identified by a distinctive assemblage of lithic artifacts, were present in the area between the Second Cataract in northern Sudan and the Qena Bend in Upper Egypt (Wendorf and Schild 1989). This is very different from the situation in Western Europe at this time, where a long continuity of development is indicated for extensive areas.

In the Nile Valley, in some periods, two or three different entities were living in the Second Cataract-Qena Bend area at the same time, but each was restricted to a particular area. In the area around Wadi Halfa during one period there were at least two different groups living there at the same time (the Sebilian and the Qadan), or they were so close in time that their radiocarbon ages overlapped, and they could not be chronologically distinguished on stratigraphic evidence. Throughout this 11,000-year period, beginning 25,000 years ago, there was rapid replacement of cultural entities, and in most instances the changes were abrupt. It is believed that for the most part these were not developments within the same entity, but replacements by a different group. New people seemed to be moving into the Nile Valley, at times coming from the south, perhaps tropical Africa (the Sebilian probably was one of these, see Wendorf 1968c), and others pushing down from the north. It was these new groups moving in, the resultant competition for limited resources in an area with a sharply limited geographic extent, and the inability of a group to move readily to an adjacent area, that set the stage for hostilities and the onset of the warfare seen at Jebel Sahaba.

3. Wadi Kubbaniya: Barley, and Then There were Tubers

Before the excavations at Wadi Kubbaniya our knowledge of the Late Paleolithic in the Nile Valley was limited to the range and frequencies of the various types of lithic artifacts recovered, the kinds of large animals and fish they hunted, and the chronology of the various entities. We knew nothing of the plant foods they ate or how they scheduled their food economy. Wadi Kubbaniya added a whole new dimension to our knowledge of food procurement and how food was processed (Hillman *et al.* 1989; Wendorf and Schild 1989). These excavations also corrected an embarrassing mistake that could have had important implications for our understanding of the origins of food production. In our initial tests at this locality, several grains of barley and one grain of einkorn wheat seemingly were recovered from a hearth with charcoal that dated 19,000 years old. These finds led us to suggest that barley and einkorn wheat were important foods during the Late Paleolithic along the Nile (Wendorf *et al.* 1982). We soon learned, however, that we were wrong, because more extensive excavations, together with AMS radiocarbon dating of the grains, showed that the cereal seeds were recent contamination, less than 6000 years old, and not associated with the Late Paleolithic occupation (Wendorf *et al.* 1984).

Wadi Kubbaniya is the largest of the drainages in Egypt that enters the Nile Valley on the west side. The wadi is a wide, fault-controlled feature with steep sandstone scarps defining both the north and south sides (Colour plate I). Extending almost due west from the river, the wadi drains an enormous area that goes back to the cliffs of the Eocene Plateau, about 40km to the west. Its mouth is located about 10km north of Aswan and the First Cataract.

As previously noted, during the Late and Final Pleistocene the desert was hyperarid and there was no evidence for local rains in Egypt or traces of flow from the wadi into the Nile. There were, however, seasonal rains in the highland headwaters of the Nile, and at the same time the Valley was choked with Nile silts. The floodplain of the Nile was aggrading, and at that time near Wadi Kubbaniya it was more than 20m higher than the modern floodplain. During the seasonal floods the water would invade the wadi up to 5km from its mouth, leaving a thin veneer of Nile silts on the floor of the wadi. The moisture from the floods permitted plants to grow where the silt was deposited, and at the same time, the loose sand in the desert was being blown by the prevailing northerly winds off the scarp on the north side of the wadi down onto the wadi floor, where the vegetation trapped some of the sand and formed phytogenic dunes. These, in turn, would be covered by silt during the following flood, more plants would grow, then more sand, and the cycle would be repeated the next year by more silt, etc. By this process several meters of alternating sands and silts accumulated on the floor of the wadi (Schild and Wendorf 1989).

During this period of accumulating silts and sands, the wadi was a major focus of settlement by Late Paleolithic groups, whose lifeway was studied in considerable detail during five field seasons between 1978 and 1984 (Colour plate II). Their seasonal round began with the onset of the summer floods, which in modern times occur in early July. During the flood the fish followed the floodwaters up the wadi, where they spawned and deposited their eggs so the fingerlings could eat the vegetation when they hatched. During the period of the spawn, adult fish were taken in great numbers. Tens of thousands of fish bones were recovered and identified from the sites that were located on the adjacent dunes (Gautier and Van Neer 1989). Many of the fish

bones were from the head, suggesting that some of the bodies had taken elsewhere to be eaten or processed. Then, as the flood retreated, probably beginning in mid-September, smaller fish were taken from the cut-off pools on the floodplain and processed at nearby sites. Some of these fish were smoked over roasting pits for later consumption.

From late September through December they may also have begun to gather plant foods (Hillman *et al.* 1989). The human coprolites indicate the first of these may have been seeds of chamomile, followed by club-rush seeds; these mature from December through March. Judging by their frequency in the archaeological sites, however, the main plant foods were wet-land tubers, particularly nut-grass and club-rush tubers. The club-rush, which requires a waterlogged environment, would have grown in lower areas in the wadi, in back-swamps, and seasonal pools. The nut-grass, on the other hand, probably grew as a carpet over much of the wadi floor, wherever the flood reached. Both varieties of wetland tubers reached their maximum food value only at maturity in December or January. When mature, and before they could be eaten, they had to be processed by roasting to remove the toxins, and by crushing or grinding to break up the fibers. Both nut grass and club-rush tubers are rich in carbohydrates and fiber.

Although the Kubbaniya sites contained occasional bones of wild cattle, hartebeest, gazelle, and, rarely, hippo, large mammals clearly were not a major component of the diet. Birds may have been equally or more important than large mammals. In the fall and winter months, from November through February, the people hunted migrating ducks and geese, both of which were taken in great numbers (Gautier and Van Neer 1989).

Other relatively minor foods included dom palm nuts, which matured in February and March, and shellfish, which were probably gathered during the period when the water in the river was at its lowest level, from March until the onset of the flood. During these spring months the major source of food may have been wetland tubers and main channel fishing. It may well have been the most difficult time of the year for the people living along the Nile at this time.

4. Nabta Playa: Domestic Cattle, Early Pottery, and the Rise of Complexity

Although all of the research activities discussed in the preceding sections made important contributions to our understanding of the prehistory of Egypt and Nubia, the still on-going excavations at Nabta and other nearby playas ultimately may have the greatest impact on our understanding of the relationship between the inhabitants of the desert and those living along the Nile, and on the role the desert dwellers may have played in the rise of complexity, and ultimately, in the beginning of Egyptian Civilization in the Nile Valley.

At first glance the Western Desert of Egypt does not appear to be very promising for the study of prehistoric archaeology. On closer examination, however, even the untrained eye can see numerous scatters of lithic artifacts and other evidence of human occupation in an area that today is unoccupied and seemingly devoid of all life. Indeed, the Western Desert has a long history of human use, beginning at least as early as the Middle Pleistocene, and it offers a rare opportunity to study past human adaptation to a hyperarid environment. It should be noted, however, that this part of the Sahara was not always as dry as it is today.

During the early Holocene, between *c.* 12,000 to 5000 years ago, this area experienced seven intervals of increased moisture separated by sharp and abrupt episodes of hyperaridity when the desert was abandoned. Even during the humid events it was not a luxurious environment, because in the wettest of the humid events the maximum rainfall was only 200-250mm per year. This was sufficient, however, to support over 125 varieties of grasses, trees and herbs (Wasylikowa 1997). There were also a few small, desert-adapted animals, mostly gazelles, hares, and small carnivores, none of which required permanent water. Despite this limited carrying capacity, a number of interesting developments occurred in this area. Among these were:

1) the presence of the earliest known domestic cattle, first recorded *c.* 11,000 years ago

2) the contemporary presence of sophisticated and well-made pottery decorated with rocker stamped designs in the Early Khartoum tradition

3) several technological innovations, such as large, deep wells and very large storage pits that first appear around 9000 years ago, which made it possible for groups to live in the desert throughout the year (Wendorf and Schild 2002)

4) the introduction from Southwest Asia of sheep and goats between *c.* 8000 and 7600 years ago

5) the emergence of a regional ceremonial center with megalithic alignments, calendar circles, cattle burials, and other large-scale constructions. The function of this complex is not well understood, but it indicates some form of social control and perhaps a ranked social system by around 7400-6800 years ago, several hundred years before there is evidence of similar complexity in the Nile Valley.

This puzzling proximity of cultural innovation and environmental stress in the Western Desert deserves serious consideration by those interested in the relationship between environment and cultural processes.

Many of these intriguing developments in the Western Desert are best seen in a large, internally drained basin known as Nabta Playa, located near the southeastern edge of the Western Desert, about 100km west of Abu Simbel and some 30km north of the Sudanese border. The catchment area of around 1500m^2 for the Nabta Basin produced, in most of the humid interphases, large seasonal lakes during and after the seasonal summer rains. These playas appear to have made the Nabta Basin an unusually attractive locality for early and middle Holocene groups. Numerous archaeological sites

occur here, often imbedded within sediments of the ephemeral ponds and lakes that occupied the basins, and they made Nabta and the surrounding basins among the most important archaeological areas in the Western Desert.

Although the early domestic cattle and pottery that occur at Nabta are of great interest, and until recently rather controversial, particularly the status of the cattle (see discussions on the Saharan cattle in Bradley *et al.* 1996; Gautier 2002; Hanotte *et al.* 2002; Smith 1992; Wendorf and Schild 1994; 2001, 655-658), I want to focus on several features that suggest the presence of ritual activity and incipient social complexity in the Late and Final Neolithic at Nabta. These features include a "calendar circle," several cattle tumuli, three sets of large stone alignments, and two groups of unusual "Complex Stone Structures." A paleoastronomical study has correlated the alignment of the calendar circle with the position of the summer solstice around 6000 years ago (Malville *et al.* 1998). The megalithic alignments also apparently have an astronomical function. These alignments mark the positions of three stars between 6775 and 6200 years ago: Sirius, Dubhe (or Ursa Majoris) and Orion. All three were important in Egyptian cosmology (Wendorf and Malville 2001).

There are also seven small, stone-covered tumuli, six of which contained the remains of cattle (two had caprovid remains as well); the seventh covered an articulated human skeleton, lacking the skull and buried in a shallow pit. One of the cattle tumuli (Colour plate III) contained a complete young adult cow buried in a clay-lined and roofed chamber below the stone mound (Plate 4; Applegate *et al.* 2001). The other five tumuli yielded partially disarticulated cattle bones scattered among the rocks, usually juveniles or young adults, with parts of more than one animal in each tumulus. All of these small tumuli are located in a cluster along the western edge of the largest wadi entering Nabta Playa from the north. It seems likely that they may have been sacrificial offerings for the onset of the summer rains. Two dates on charcoal of around 7200 and 6200 years ago, plus the stratigraphic evidence, place these cattle tumuli within the Late Neolithic.

Other very interesting elements associated with the Late and Final Neolithic occupations at Nabta are two groups of "Complex Stone Structures" or shrines, found on two adjacent large remnants of lake sediments, about 300m south of the largest site in the Nabta Basin. The underlying lake sediments below both groups were deposited in the final phase of the Early Neolithic, around 8000 years ago (Wendorf and Krolik 2001). There are about 30 of these structures on one playa remnant and six on the other. Two of them were completely excavated, a third was tested, and two others were sampled by drilling.

Plate 4. Nabta Playa. Pit under the small tumulus and the articulated young adult cow. Late Neolithic.

These structures or shrines all share the same basic plan. On the surface each structure consists of a cluster of large, roughly shaped sandstone blocks, set vertically on edge to enclose a rectangular to oval area from 4 to 5m long and from 3 to 4m wide. Lying flat in the center of the oval were one or two, very large, rectangular blocks. Both the central stones and the surrounding ovals were constructed so their long axes were oriented slightly northwest-southeast, about 10° off true north-south. All of the excavated, as well as the tested structures were located over a table rock or bedrock rise buried under 3 to 4m of playa deposit. The construction sequence began when a table rock was located and a pit 5 to 6m in diameter was dug down to expose the table rock, which was then shaped. When the shaping was completed, the pit was refilled and the surface oval erected. The source for these large quartzite blocks was not identified, but it need not have been far. Some could have come from nearby exposures of similar stone, but others seem to have been quarried from outcrops at the edge of the basin, about a kilometer away.

The most elaborate of these Complex Stone Structures is the largest, and has some unusual features. Located near the center of the group of 30, and excavated in its entirety, the top of the table rock was about 3m below the surface. This table rock had a flat, smoothed top and was carefully shaped around the periphery (Plate 5). At one corner there was a rectangular projection that was oriented about 10° west of north. After the shaping of the table rock was completed the pit was partially refilled. A large, shaped block of quartzitic sandstone, weighing about five tons, was placed upright over the center of the table rock, with its long axis also oriented slightly west of north (Colour plate IV). This block was carefully shaped on two sides by pecking with a fan-like projection at the north end. Some have thought that it resembles a cow (Colour plate V). It had been blocked into place with small slabs, and after the shaped stone was positioned, the pit was then completely filled and the surface architecture erected on the surface over the table rock.

The full function of these complex structures is unknown. It was at first thought that they were burial tumuli for elite members of the community, but there were no traces of pottery or human remains. It should be noted, however, that heavy seasonal rains followed by drying would cause the vertisol-like lake clays to expand and contract, and this would have churned and ground into powder any bones and pottery that might have been present. Thus, we cannot say for

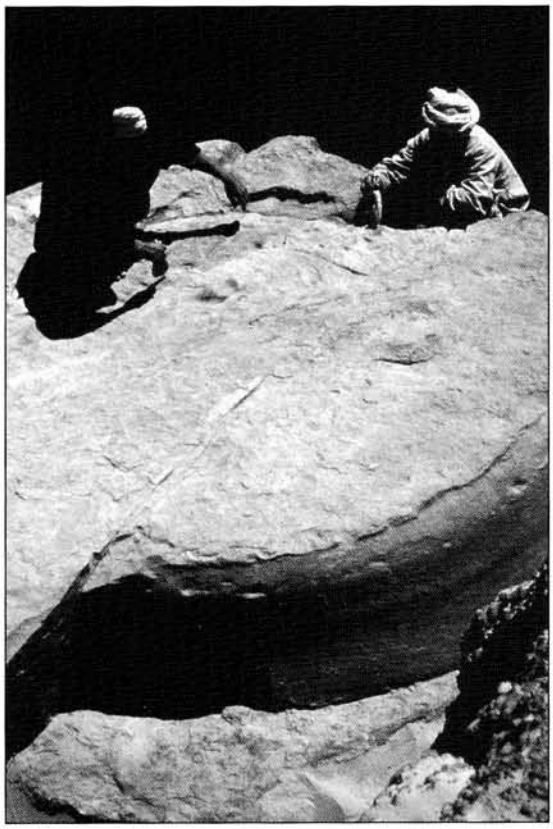

Plate 5. Nabta Playa. Shaped table rock of the largest Complex Stone Structure, found 3m below the surface architecture and 500mm below the large stone sculpture. Late Neolithic.

sure that they were not used for elite burials, but we have no proof either way. Another possible explanation for their function is that they were monuments to leading individuals who died "on the trail" and were buried elsewhere. They also may have been shrines whose role may never be known. Regardless of what functions they may have had, the largest Complex Stone Structure, the one with the shaped, cow-like stone, appears to have served as a central hub or base for the megalithic alignments, all of which radiate out from this structure. Vestiges of this ritual complex survived as late as 5600 years ago at Nabta, then disappeared.

What does all this mean? Although we do not have the complete answer, several observations seem to be appropriate. First, the construction of the megalithic alignments, the cattle tumuli and the large Complex Stone Structures not only required significant effort, but also close management of that effort over whatever period was represented in their construction. This would seem to indicate a religious or political authority with control over human resources for an extended period of time. But how was the society organized? Were these Late and Final Neolithic people at Nabta under the control of a series of strong leaders, and thus a "big man society?" Or was it a ranked society in which some classes had greater access to exotic goods and power than others? We found no clue to answer this question at Nabta. Of the few burials found at Nabta, only one had any grave goods at all, and these were very limited.

A partial answer to the question of whether or not there were social classes, however, may be indicated by a group of burials excavated at Jebel Ramlah Playa, located a few kilometers west of Nabta. Here several graves have been excavated that contain very rich grave offerings, including palettes of exotic stones, fine pottery, several necklaces of Red Sea shell beads, carved stone bowls, ivory and shell bracelets, and pigment cups of bone and horn. These burials evidently represent wealthy individuals who had access to exotic goods, and possibly considerable power. Grouped around the graves with offerings, however, are other burials with no grave goods, possibly indicating a class of people with limited or no access to exotic goods. Both groups appear to be contemporary and date near the end of the Late Neolithic (Schild *et al.* 2002). This dichotomy suggests the presence of at least two social classes, one with considerable power and wealth, and the other with restricted wealth and very limited power.

If, as now seems likely, these Jebel Ramlah burials do indicate social ranking, how did this complexity develop? One possibility is through differences in wealth. Pastoralist societies where the animals are individually owned (and most pastoralists do own their animals) are fertile grounds for the emergence of differences in wealth. This is particularly true in unstable environments, such as the Western Desert with its frequent hyperarid episodes. In a setting where every individual will start out with the same number of animals, differences in skills or just plain luck will soon result in some people having many more animals than others, and some will lose all of their animals. In order to survive, those people who lost their animals will become dependent on those whose herds have prospered. In this setting the animals become a symbol of wealth and power for their owners.

We are suggesting, therefore, that the development of complexity and social classes among the Saharan pastoralists most probably resulted from local causes, and that it was not diffused to them from elsewhere. If so, did the Saharan pastoralists have a significant role in the emergence of complexity in the Nile Valley? It is possible, but it seems likely that local causes were the major factors involved in the rise of complexity in the Nile Valley as well. One such local cause might have been the migration of Saharan pastoralists to the Valley with the onset of the modern period of aridity around 6000-5500 years ago and the competition and conflict that resulted.

Thus, while there may have been indirect or direct input from the Sahara that contributed to the rise of complexity in the Nile Valley, the evidence for this is far from secure. The continuing work at Nabta may resolve this question, but our initial efforts will concentrate on developing a better understanding of the true nature of the Late Neolithic society at Nabta and the vicinity, and in gaining a more secure identification of those local causes that led to the presence of social classes, if they were indeed present.

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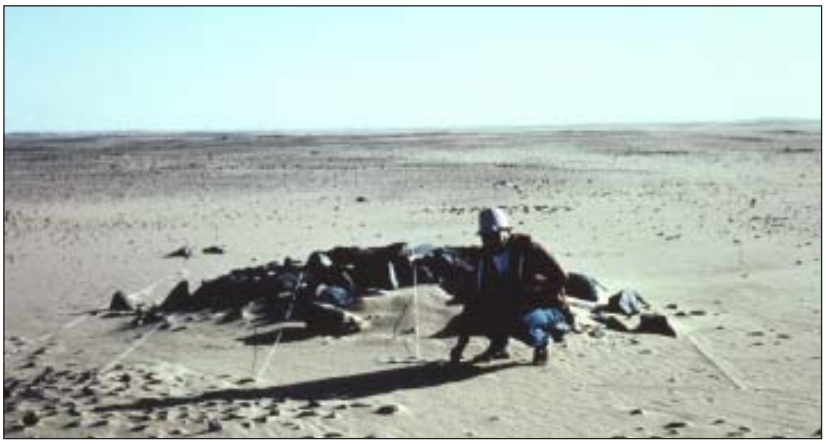
Colour plate I. View across Wadi Kubbaniya, looking south, located about 10km north of Aswan, Egypt.

Colour plate II. Excavations at Late Paleolithic Site E-78-4 in the floor of Wadi Kubbaniya. Note occupation layer with stone-filled hearth within a phytogenic dune consisting of alternating bands of aeolian sand and dark Nile silt. Late Paleolithic.



Colour plate III. Nabta Playa, about 100km west of Abu Simbel. Small, stone tumulus overlying pit containing an articulated young adult cow. Late Neolithic.

Colour plate IV. Nabta Playa. Excavation of largest Complex Structure or Shrine, with the large stone sculpture partially exposed. Late Neolithic.

Colour plate V. Nabta Playa. The large stone sculpture found at the largest Complex Stone Structure or Shrine. Note shaped side and flared, head-like end. Late Neolithic.