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Large cutting tools variations of Early Sudan Paleolithic from the site of Jebel Elgrain east of lower Atbara River

Introduction

Pioneering research in the early stone ages of south east Africa contributed significantly to the development of broader issues in early African prehistory, such as the spread of the transition of lithic tools from south-east to north-east Africa including large cutting tools.

Early beginnings of stone tools studies in Africa started in Olduvai and Kenya by Leakey from 1931 – 1971, to answer some questions about the early human behavior. Besides that, there is little research focused in the sites of Omo, Awash, Olorgesailie and Ismailia. The early study of Olduvai and its Acheulean phase became the standard of classifying large cutting tools in Africa.[1]

The large cutting tools from these sites show primary sloping transition in technology and typology from cobble one side to bifacial tools to MSA small bifacial tools. These complex sites also provided early camps and particular attention has been paid to the hominid fossils, climate changes, economy and social structures.[2]

In the Sudan, there was no specific research into large cutting tools. Large cutting tools were mentioned through the history of Sudan and Old Stone Age in the Nile Valley.[3]

In general, the Sudan Paleolithic culture developed for over half a million years. This date is given based on the relative dating of lithics attested from a wide geographical expanse. Further dating using organic remains from the site of Kaddanarti puts the Sudan Paleolothic culture at one and a half million years ago.[4]

The complete work of Early Sudan Paleolithic tools is its large cutting tools (LCTs), primary disc and a few side chopping and hand axes.[5] A comprehensive overview of late Acheulean and early MSA technology has demonstrated that discoveries in northern Sudan show complex development of taxonomical items. Indeed, the large cutting tools from the site of Khor Abu Anga, studied by A.J. Arkell in 1949, is where hand axes were first identified as Early Prehistoric stone tools in the Sudan.[6] This identification is supported by many finds from central Sudan around Khartoum province.

Many taxonomic items were used by Arkell to describe the Khor Abu Anga collections, most of its related to the Leakey method in Kenya, some of which later disappeared. After Arkell, no assemblages parallel to the Khor Abu Anga have been reported from any other sites in the Sudan. However, many sites in northern Sudan and the desert containing large flakes and disc tools relatively dated to the Middle and Late Paleolithic have been discovered.

For all that has been cited above, the logical conclusion is that the early large cutting tools in Sudan were different and later than the early African discoveries. There is no indication of Olduvai tools, and early Acheulean tools are rare. Even Khor Abu Anga which is an example of the Early Paleolithic, only revealed small and bifacial tools.

In general, the early large cutting tools are still mysterious. There are no clear developments and transitions from one phase to another. However, different methods have been taken to classify the assemblages which increased the depth of understanding of the Paleolithic in Sudan.

The goal of this paper is to understand the roots of problems related to the large cutting tools in the Sudan, which will be summarized as follows:

1 Leakey 1951.
2 Cooke 1963: 32.
3 Arkell 1949, Wendorf 1968, Chmielewski 1987, Wendorf & Schild 1974.
4 Louis et al 2000: 37.
5 see Arkell 1949, and Chmielewski 1968.
6 Arkell 1949: 22-32.

1. Most studies on Early Paleolithic Sudan focused on the time, place and environment.
2. The presence of large geographical gaps in understanding Early Paleolithic Sudan.
3. The complexity of taxonomical items used to classify the Paleolithic stone tools in the Sudan which is based on taxonomical items used in south east Africa and the Sahara.
4. Lack of preserved sites to offer a precise dating.
5. The mystery of the beginning and the end of Acheulean age in the Sudan.

Previous studies

Despite the lack of Early Paleolithic studies in the Sudan, and there being no specific study of large cutting tools, many Paleolithic sites with indications of large cutting tools have been discovered (Acheulean and early MSA technology).

Archaeological studies were started once again stimulated by new discoveries. Recently the method changed and some general questions raised the view that we can divide the history of Early Paleolithic studies into stages:

A. Early studies (from 1928 – 1950): no systematic survey in this period. The preliminary descriptions of the Paleolithic collections from the survey were done by Sandford and W.J. Arkell in the fifth cataract.7 On the other hand the results of A.J. Arkell's survey around the Sudan (1938 – 1949) (fig. 1) were basic information of Paleolithic stone tools in Sudan. A.J. Arkell presented his results in the first Pan-Africa congress, while the description of tools and his comments are published in Old Stone Age in Anglo-Egyptian Sudan.[8]

This is in addition to many sites noted along the Atbara River and eastern Sudan by Wayland 1942 and Crowfoot 1911-1920. In this stage, Arkell set a general description and typology of Acheulean and late taxonomic Paleolithic in his book. He compared the material from Khor Abu Anga with the Kenya collections. When he wrote his work on Shaheinab and other sites in central and northern Sudan, he modified his methodology

The site of Khor Abu Anga set a standard in the Sudan for early stone tools, which contained three Acheulean levels from Arkell's descriptions and the fourth MSA tools (Levallois and Aterian) added from some excavation carried out later in the site.[9]

During this time, scholars elaborated and extended Arkell's conceptions and classifications of early cutting tools and laid Khor Abu Anga as the foundation for understanding assemblages of the Sudan Paleolithic.

B. Stage Two (1959 – 1970): the historical framework to which the large cutting tools and Sudan Paleolithic records can be related is based on diverse sources. Information may be collected from the (CPE) in Third Rescue Nubian Campaign. However the effects of the Second World War on Arkell's activities in central Sudan, and nobody continued Arkell's work. After Arkell's time and during the Nubian Campaign, many publications appeared showing many Paleolithic sites in Faras, Ashkiet, and Debeira (fig. 1). These included sites studied by Wendorf (1968) and Wendorf & Schild (1974), amongst others. The publications focused on Prehistoric sites in order to establish a reasonably secure chronological control over the cultural sequences from the lithic variation as a development to draw statistical transition in Sudan Prehistory.

There were no clear large cutting tools, in spite of some small hand axes and flakes related to the late Acheulean and early MSA technology.[10]

While the further surveys and exploration on the Wadi Halfa and the second cataract (fig. 1) revealed some large cutting tools containing five subclass phases technology from the Acheulean age, based on the classification of 3000 stone tools. The last subclass is distinguished by special Nubian technology, different from the other technologies identified in Africa.[11]

With more extensive surveys and explorations undertaken in and around the second cataract, a handful of sites with large cutting tools were recorded. Most of these sites showed MSA technology. A little known Early Paleolithic site (Arkin 400, 401, 516) (fig. 1), and concentrations of bifacial large cutting tools have been found in Arkin 8.[12] An assemblage of 3.409 stone tools have been collected from the site, of which 2800 were classified and revealed five early technologies of large cutting tools with a new face of Paleolithic in Sudan consisting

7 Sandford & Arkell 1928: 17.
8 Arkell 1949.
9 Carlson & Sigsted 1967: 53.
10 Wendorf 1968: 207.
11 Guichard & Guichard 1965: 83.
12 Chmielewski 1968.

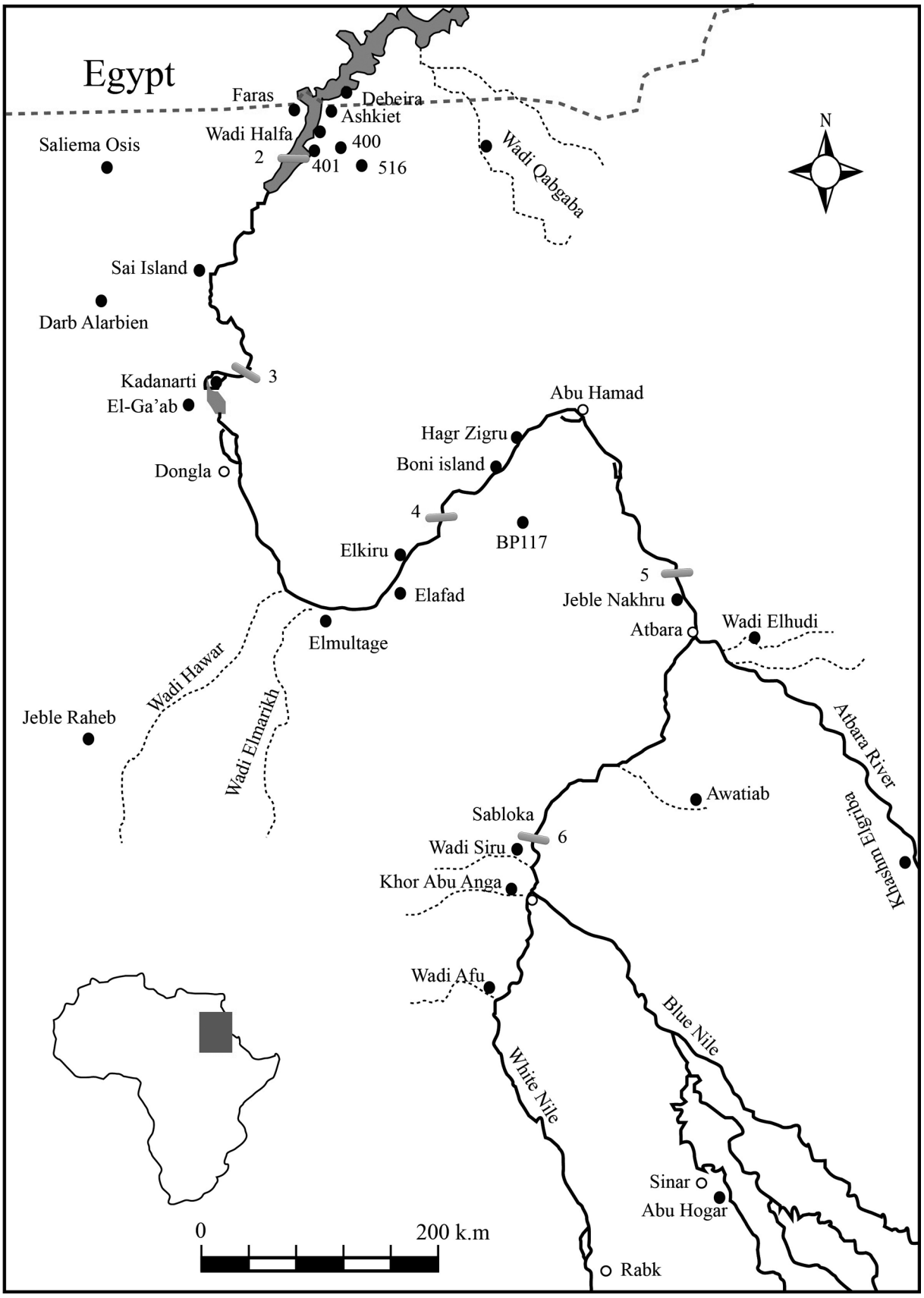

Fig. 1: Large cutting tools sites in the Sudan (illustration A. Nassr)

of chopping tools, cores, flakes, discoidal tools, and hand axes. Chmielewski tried to compare these sites with those in Wadi Halfa to draw a general synthesis of Paleolithic in Nubia.

Although these large cutting tools are made of core and flake, they lack some Early Paleolithic characteristics known in south east Africa. At the same time, they are different from what was noted in the Khor Abu Anga site.

The above mentioned results indicated the presence of differences in large cutting tools in the Sudan. At the same time, this might raise additional questions about the development and cultural transition from south to north.

Following this stage of fieldwork, a number of theoretical studies and discussions listing Middle Paleolithic sites in Sudan were published. El-Amin (1981) summarized the basic information in these publications. Further to that, Badien (1981) wrote a study of the comparison of general Acheulean tools in Africa and Sudan.

Within these studies, some taxonomic items disappeared and other new descriptions emerged, such as Nubian Middle Stone Age, Nubian Middle Paleolithic,[13] Nubian Mousterian[14] and the N Group.15 These are used to describe some tools of late Acheulean and early MSA.

C. Third stage (1990 – present): the general publications of the early two stages laid the basic information of Paleolithic in the Sudan. The new discoveries were announced and the classifications and interpretations show different large cutting tools from MSA and late Acheulean, but the early stone tools were lacking.

The Sai island site (B-B-11) (fig. 1) revealed large stratified assemblages of MSA technology with late Acheulean tools dated to 220 – 180 thousand years ago.[16] On the other hand, rescue excavations around the fourth cataract (fig 1) revealed some sites of MSA technology containing some large cutting tools, and in Elmultage Acheulean tools are recorded.[17] Further to that, the Alafad area site (HP723)[18] and El-Ga'ab basin[19] revealed some MSA tools similar to the late Acheulean.

In the area of Kaddanarti (fig. 1), large chopping flakes were found with organic remains dated to 1.6 – 1.3 million years ago. The stone tools found with the organic remains were similar to early stone tools in Kenya.[20]

In addition, there are some indications of late Acheulean tools in MSA sites in eastern Butana, and Wadi Howar western Sudan[21] (fig. 1) and recently in the Bayuda desert.[22]

Method

Finding a clear method to study large cutting tools is desperately needed for two reasons. Firstly, despite the enormous increase of archaeological research on the early stone ages of the Sudan, the large cutting tools remained untouched, with only a few general descriptions of Paleolithic tools. Secondly is the rarity of the discoveries of Early Paleolithic sites in Sudan. Most of the studies conducted on early tools have used a description and comparison of methods from tools side, face cutting.[23]

A methodology must be established for achieving the general goals of the study set above. Several methodological approaches have been applied in previous Paleolithic tools studies in south-east Africa. One common approach will be used here to document and investigate the large cutting tools in the Sudan, beginning with an overview of the literature and reclassification of Khor Abu Anga collections and survey to discover new sites and a comprehensive classification of tools in one of these sites.

The selected site is in the lower Atbara River and was chosen according to its geography and geology. Paleolithic lithic tools were gathered from random surface collections, systematic surface cleaning and test pits. The classification is supported by measurement and weight. The tools are divided into a main class followed by a subclass. A description of each tool from the striking platform, cutting edge and faces scars is given. Finally, all the tools are compared with the discoveries in the Sudan and southeastern Africa.

Revisiting the Khor Abu Anga Collections

The author spent some time to revisit the Khor Abu Anga collections in the Khalifa House Museum at

13 Guichard & Guichard 1965: 152.
14 Marks 1968: 197.
15 Van Peer 1991: 109.
16 Van Peer et al 2003: 190.
17 Louis et al 2000: 43.
18 Was 2009: 219.
19 Tahir 2012: 101.
20 Louis et al 2000: 35.
21 Idriss 1994: 80-101.
22 Masojć 2010: 67.
23 see Arkell 1949, Chmielewski 1968.

Umm Durman. A quick classification of the tools was done in order to understand the general characteristics of large cutting tools and to ease their recognition during the future survey.

The collections were kept in big boxes, and were affected by the long storage. Labels were eroded, and most boxes were falling apart. Matching the number of each tool with the registration books in the NCAM catalogue was a necessity.

230 large cutting tools have been selected and reclassified according to the technology with the description of faces and striking platform and scars from heated directions and cutting position. The tools were also typologically divided into subclass, measured, and their edges were described. The data of the reclassified tools was compared with Arkell's interpretation. The results may be summarized as follows:

1. The large cutting tools are made from local stone, on large flakes and a few core technologies.
2. Hand axes are the common large cutting tools at the site, and the variation of form, size and edges cutting indicate the site's development.
3. An absence of chopping tools and cleavers and rarity of large flakes, in other words the early characteristics in Africa, was observed, which indicates a later date for the site.
4. Many of the taxonomic items used by Arkell to describe primary tools (Pre-, Early, Middle and Late Chellean) seem to be one face flakes and some of its flakes are incomplete.
5. The emergence of small hand axes and points with tangs shows changes in economic subsistence during later occupation.
6. It is clear that the emergence of numerous tools from the Sangoan, Tumbian and Levallois tools is more or less inseparable from the Middle Paleolithic.

Archaeological survey

The area of lower Atbara River is situated in the eastern desert south of the Nile/Atbara confluence between Atbara town in the north and Siedon province in the south about 60 km along the right bank of Atbara River. The area's eastern boundary is well fixed by two wadis, wadi Elhudi and wadi Abu Adar (fig. 2).

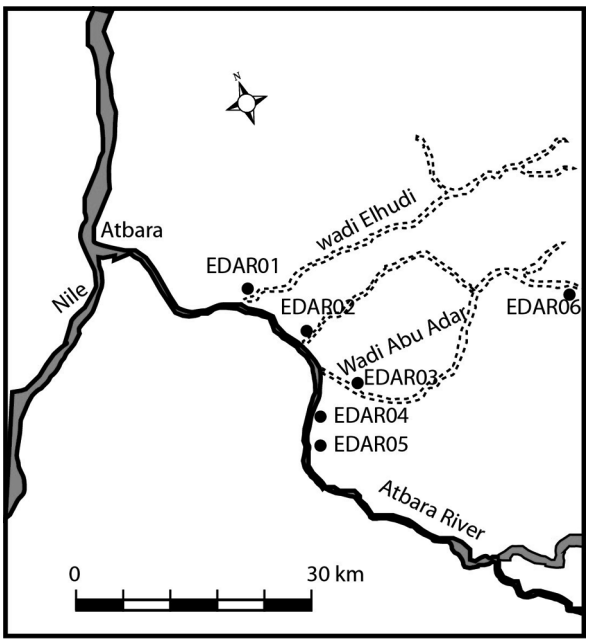

Fig. 2: Large cutting tools sites discovered from the survey in the eastern desert of lower Atbara River (illustration A. Nassr).

The archaeological survey was carried out in late 2013 along the eastern river bank. Many archaeological sites have been discovered in the area, mainly situated close to the River. Six of these sites are related to the Paleolithic and have revealed large cutting tools. These sites were visited twice to collect more observations.

EDAROI: (Elhudi site):
N 17 37 797 E 034 08 318

One of the main sites, Elhudi, was noted earlier by Arkell in 1949 as an Acheulean site. It is the biggest wadi in the area, and the unique rock formation in Elhudi gives the name to the area. The lithic tools were found on the hill top overlooking the wadi (fig 3). The site covered crouched mounds on the eastern side of the wadi. Large cutting flakes were

Fig. 3: General view of EDAROI: (Elhudi site) (photo A. Nasrr).

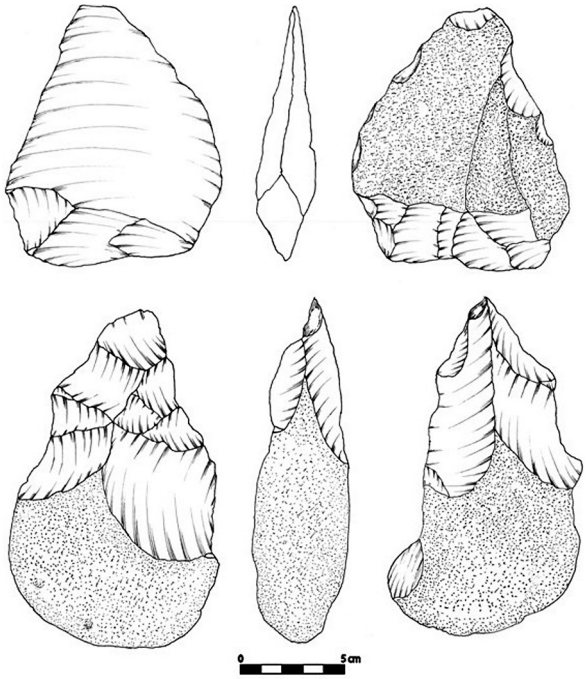

Fig. 4: Sample of large cutting point from site EDAR01 (drawing A. Nassr).

Fig. 5: Classical Levallois scraper in the site EADR02 (drawing A. Nassr)

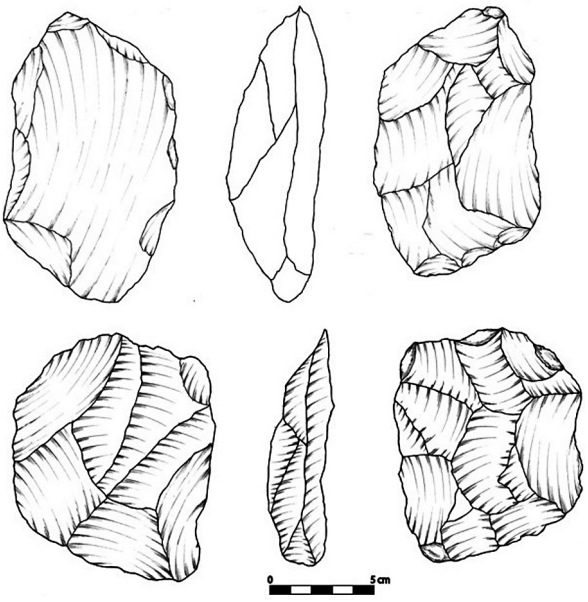

Fig. 6: Samples of site EADR03 assemblages (drawing A. Nassr).

discovered there amongst the stone outcrops. The flakes consist of retouched point made on flakes and cores with some debris resulting from the manufacturing of the tools.

Some bifacial large cutting flakes could be related to the late Acheulean, in spite of the general technology of the tools small cores and flakes with point ends (fig. 4), closely similar to a very wide spread Middle Paleolithic known as a Nubian Levallois points.[24]

EDAR02: (Elagager site):
N 17 37 848 E 034 10 504

Situated within an undulating landscape of deeper small water channel and gneiss outcrops was quite a remarkable site. It turned out to be a Paleolithic factory extending over channel ridges of more than 600 m.

Small flakes and blades technology have been found. These contain rounded scrapers similar to classical Levallois technology and some Levallois cores. Backed blades and scrapers with retouched edges are the most common assemblages on the site (fig. 5), which indicate the presence of MSA technology in the area. This is similar to what is known in the northern Sudan and Bayuda desert.[25]

EDAR 03: (Elkarabab area):
N 17 25 650 E 034 15 318

The site is located next to small a Paleo-channel, with outcrops of silica rocks overlooking the wadi. Due to the presence of most of the lithic tools among the outcrops and in the ridges of the channel, the assemblages were attributed to the blades technology based on the denticulate pieces, scrapers and Levallois cores (fig. 6). Some of these blades types are known in the eastern Butana of the Upper Paleolithic.[26]

Another highly interesting site, EDAR04, next to EDAR03 in Elkarbab area, is a prominently represented workshop of lithic tools. Small scraper sharp edges and flakes scattered amongst the entire outcrops (fig 7). Some flakes are clustered in the area close to the River, where cores illustrate that there is a habitation site of Middle and Upper Paleolithic. The lithic tools are very consistent in raw material and typology. Some parts show significant features of Levallois technology and Nubian point cores.

24 Marks 1968: 248.
25 Masojć 2010: 67.
26 El-Amin 1987: 349.

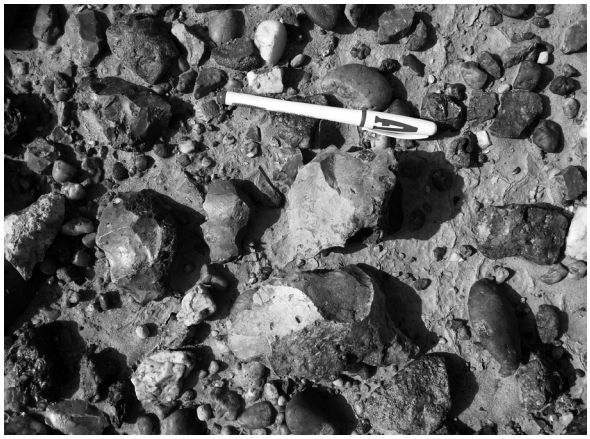

Fig. 7: MSA technology and debris of workshop in site EADR04 (photo A. Nassr).

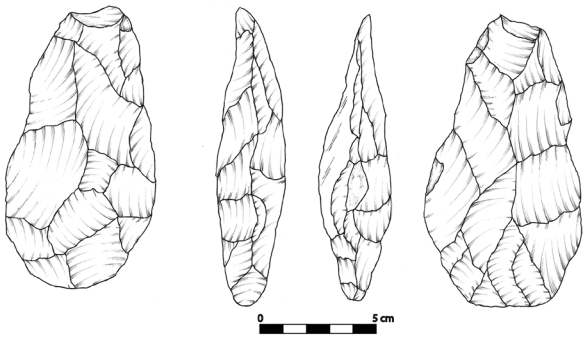

Fig. 8: Bifacial tool from the EADR05 wadi Abu Adar site (drawing A. Nassr).

Between these four sites there is a big wadi at the border of Aldabora village which extends from east to west. An archaeological survey was carried out in the wadi and its environs. Some Neolithic sites were discovered there. In the middle of the deeper wadi channel, one large bifacial cutting tool (fig. 8) was found on the surface (not in situ), which indicated the presence of a site with large cutting tools in the desert and encouraged us to follow the wadi.

Several observations and explorations show many late Prehistoric sites, tumuli and outcrops of workshops related to the Paleolithic. About 85 km from the River in the desert, the wadi seems to be large and shallow, close to the mountain known as Jebel Elgrain.

The site overlooks the flat mound west of the mountain, and is on the northern bank of the wadi close to the Paleo-lake in the southern side.

outcrops of quartz and chest rock. The southern parts of the site, as well as other sites around the mountain, were destroyed by gold mining trenches.

A prominent feature of the site is that large cutting tools covered the surface with outcropping rocks mixed with the debris of workshop tools. A gradual variation of tools between the east and west is observed, where the heavy large cutting tools are concentrated in the middle and eastern parts of the site.

The survey revealed that large cutting tools, several major concentrations of hand axes, cleavers, picks, disc and other large cutting artifacts were deposited over long successive time periods, owing to the environmental conditions were allowed successive habitation. The stone tools variations suggest that the place most favored for settlement was either on a low rocky promontory, or on patches of sand, which generally occurred in the channel of seasonal stream

EDAR 06: (Jeble Elgrien site): N 17 40 342 E 034 44 477

The site extends from east to west along the northern bank of the wadi in 1.5 km and in sloping gradually from north to south (fig. 9).

This site is different to the previous sites. The presence of such a site so far away from the River was in agreement with the main hypotheses of the study, during the general survey in the area.

An extraordinary number of large cutting tools accumulated and extended over the surface, concentrated in multiple spaces overlooking the site, and among

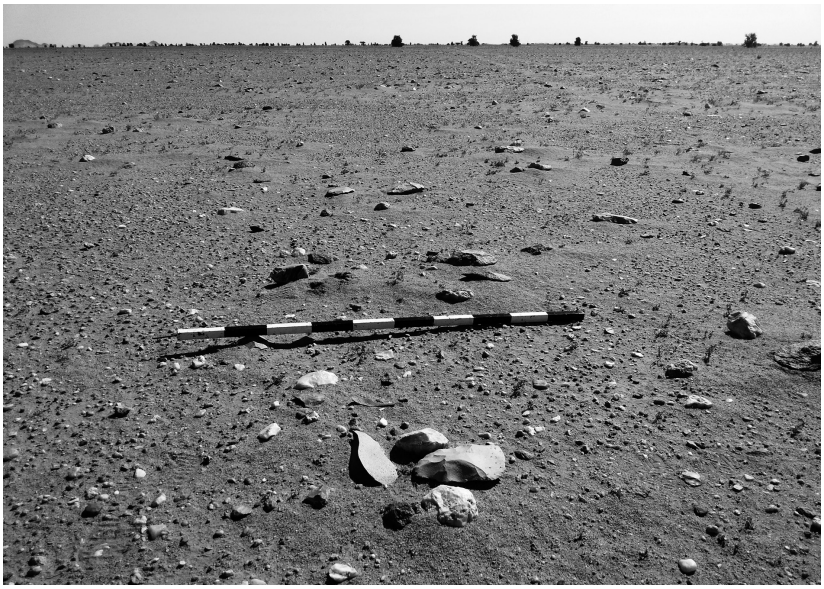

Fig. 9: Wide spread of large cutting tools on the surface of site EADR06 looking from the north (photo A. Nassr).

draining into the lake. This heavy content of large cutting tools of the site is unfamiliar in the Sudan, and seems to be similar to the Olorgesailie site in Kenya Rift Valley.[27]

A systematic survey with two surface cleanings of a square of 20x20 m and a test pit were done on the site. 202 tools and fragments of flakes were collected at first. The surface cleanings were made in different parts of the site, starting at first in the eastern part where a scatter of big tools is to be found. This first area revealed 108 lithic tools and stone fragments. The classification study shows different types of large cutting tools (table 1), mainly early Acheulean tools, similar to the Early Paleolithic industries in Kenya and Ethiopia.[28]

On the other hand, the surface cleaning in the western part of the site revealed 632 lithic materials have been collected, consisting of small tools, debitage, and waste. The classification study provided some new information about the MSA technology on the site, (table 2). The technological features of this material suggested several differences of MSA tools complex previously identified in the northern Sudan.[29]

In the middle of the site, one test pit of 3 x 3 m was dug, in order to examine whether the tools depth extended below the surface. Dark soft soil with small flakes and hand axes were found until the depth 50 cm. Hard and compacted reddish brown silt with rare large cutting artifacts was recorded until the depth of 150 cm, where some flakes and cleavers were found.

This test pit provided a content similar to that found on the surface of the site, which might be evidence of permanent Early and Middle Paleolithic occupation in the site.

Large cutting tools in the site EADR06 (Jebel Elgrain)

In total, 951 lithics were collected from the site. They included debris and tool production wastes. About 500 are complete tools, of which 260 were selected for comprehensive classification and provided large cutting tools variations.

Raw material: from the geological point of view, most of the stone tools were made from local sources, since different sources were observed around the site. Green stone exposed in the wadi and the mountain, which is massive and shows moderate to weak mineral foliation, which is sometimes dark, coarse, grained and highly sheared. The felsites rock is common, very dark, tarnish is high green and concave, fracture fine texture and very hard. Prophertic trachite with low appearance of outcrops and few exposed and the quartz and quartzite is the main rock in the area, in linear shape, fine to medium texture and very high hardness.

The classification of the tools shows varying sorts of rock used, mainly from local sources (table 3).

The studied assemblage consists of a long typological list of large cutting tools which show gradual technological development. These might be from between the Early Paleolithic large flake production to the Middle Paleolithic. This assemblage contains different tool types from between the pre and early Acheulean to the Mousterian, which are small retouched tools made on blades.

Most of assemblage is characterized by a majority of typical large flake cutting tools (chopping, cleavers, hand axes, knifes). There are a few big tools made on large cobble and blank. Some are made on small flakes, which include points and Sangoan hand axes. Others are made on large backed scraper and small blades and denticulate.

The finishing of the tools is bifacial and is affected by the texture of the raw material, whether fine or coarse. Some of the tools have a half cortical striking platform. Some small hand axes, cleavers and points are usually completely devoid of the striking platform and are cortex. Moreover, some of the picks and hand axes are dihedral and have a flat striking platform.

One faced tools are rare. They are identified from large chopping tools and flakes and small chips. Most of the large cutting tools have sharp edges with enveloped leg handle and distal, especially hand axes, points and lance points.

Concave dorsal faces appeared on most of the large cutting tools with small striking platforms which are either cortical or entirely. The scars increase on the tools made of quartz and chest, which indicates that the flakes were the first to be detached from the boulders or cobble that were selected as the cores.

Most of the tools represented multiple cutting ends and edges, which indicate different activities, specially hand axes and cleavers. The small points and picks indicate the use of special techniques for special functions. The cleavers and knifes are distinguished by a butt pushed up-lug handle and hoe ending with sharp edges and dorsal face, which also indicates heavy duty usages.

27 Isaac 1977.
28 Leakey et al. 1969: 53.
29 Van Peer et al 2003: 291.

Square tools	Chopping tools	cleaver	Pre hand axes	Hand axes	flakes	Knifes	points	scraper	Spear	Reniform tools	Discoidal tools	Sangoan	Levallois	Blades	Debitages
A1	-	-	-	2	2	2	1	-	-	-	-	-	-	-	-
A2	1	2	-	-	2	1	-	-	1	-	-	-	-	-	-
A3	-	-	-	-	-	1	1	1	-	-	1	-	-	2	-
A4	-	-	-	1	-	3	2	2	-	-	1	-	-	-	-
B1	-	-	-	2	-	1	-	-	-	-	-	2	2	-	1
B2	-	1	2	1	3	-	1	-	-	-	-	1	-	-	2
B3	-	1	-	1	-	-	-	1	-	1	1	-	-	-	-
B4	-	-	-	1	1	3	4	-	2	-	-	-	-	-	2
C1	-	-	-	1	2	-	1	1	-	-	-	-	-	-	-
C2	-	1	-	3	1	-	-	-	-	-	-	-	-	-	1
C3	-	2	-	1	3	-	2	1	-	-	-	-	-	2	1
C4	-	-	-	2	-	-	1	1	-	-	1	1	-	-	-
D1	-	2	-	1	-	-	-	-	2	-	-	-	-	-	-
D2	-	1	-	2	1	-	-	2	-	-	1	2	-	-	-
D3	-	1	-	2	2	-	1	-	1	-	1	-	-	-	-
D4	-	1	-	-	-	-	1	-	1	-	1	-	-	2	2

Table 1: Large cutting tools in individual probing squares according to basic categories from east surface cleaning.

Square tools	Denticulate	Blades	Flakes	Debitage	Oval scraper	Side scraper	Arrow head	Spear	chips	burins	Hand axes	Waste
A1	4	2	-	12	3	1	-	-	4	2	-	-
A2	-	2	-	13	1	-	3	-	-	2	-	-
A3	-	1	-	15	2	3	2	-	4	-	-	8
A4	3	6	-	24	4	2	3	-	-	-	-	12
B1	-	4	-	7	-	2	11	6	-	5	-	18
B2	-	8	-	24	3	-	6	-	4	-	-	4
B3	-	-	6	14	-	6	4	-	-	2	-	9
B4	-	-	-	19	4	-	13	-	-	1	-	2
C1	-	-	-	19	2	5	12	-	7	-	-	8
C2	-	9	12	22	-	7	12	-	8	4	2	3
C3	-	6	6	30	4	8	7	2	-	-	-	15
C4	-	-	7	12	5	6	11	-	3	-	-	4
D1	4	4	-	12	3	3	6	4	-	-	-	4
D2	9	-	-	29	-	-	11	3	5	-	-	8
D3	-	8	6	13	8	-	7	3	14	-	-	9
D4	-	5	-	16	3	-	5	1	-	-	-	

Table 2: Different tools types in individual probing squares according to basic categories from west surface cleaning.

Stone	Percentage %	Stone	Percentage %
Felsites dite	6.92%	Basalt	1.53%
Chest	27.30%	Quartzite	3.07%
Mud stone	18.46%	Rhyolites	5.38%
Quartz	18.08%	Microsynite	2.29%
Ignimbrite	5%	Trachyte	1.15%
Granite	2.30%	Agate	2.30%
Silesfite sand stone	3.46%	Pebbles	1.15%
Micro granite	1.15%		

Table 3: The raw material of the tools from the classification

For all the technology description set above, the logical conclusion is that the different types of large cutting tools of the site (table. 4) might be related to the Early Paleolithic. This is similar to sites in the Omo Valley and Bed II in Olduvai.[30]

The emergence of bifacial cleavers and hand axes is similar to the material from the Olorgesailie site.[31] Besides that, the tools made on flakes, rounded scrapers and small points are related to the Middle and Late Acheulean and MSA sites in central and northern Sudan.[32]

30 Howell & Clark 1963, Leakey 1969.

31 Isaac 1977.

32 Arkell 1949, Chmielewski 1968, Van Peer et al 2003.

Tool type	Number	Percentage %	Big size : cm	Small size : cm	Weight : kg
Chopping tools	9	4.12%	23 x 11.1 x 5.6	15.1 x 7.8 x 4.3	1.370 – 0.585
Primary hand axes	3	1.37%	16.6 x 12.3 x 8.3	14.2 x 12.6 x 4.5	1.900 – 1.080
cleavers	37	16.67%	23.3 x 12.6 x 6	15.2 x 8.8 x 4.2	2.125 – 0.690
dibble picks	4	1.83%	21.6 x 11.7 x5.5	15.2 x 8.9 x 5.2	1.490 – 0.670
bifacial discoidal	7	3.26%	17.8 x 10 x 4.3	18.2 x 11.1 x 3.6	1.900 – 0.840
hachereau	1	0.45%	19.4 x 9.5 x 5.8	-	1.200
hand axes	29	13.30%	24.2 x 11.6 x 4	13.5 x 7.3 x 3.7	1.380 – 0.660
foliate spear	6	2.75%	15.1 x 8.2 x 4.7	12.8 x 7.2 x 3.5	0.550 – 0.420
denticulate edges lance	4	1.83%	14.5 x 8.1 x 2.7	12.5 x 7.1 x 3.5	0.660 – 0.430
side scraper	6	2.29%	13.6 x 7.9 x 4.3	9.2 x 7.2 x 2	0.570 – 0.260
hand scraper/hand gouge	3	1.37%	11.1 x 9.8 x 5.2	9.1 x 8.3 x 5.1	0.805 – 0.550
knife	9	4.12%	22.3 x 8.4 x 4.2	14.8 x 9.2 x 2.8	0.905 – 0.540
side knife	6	2.75%	17.3 x 8.7 x 4.2	15.4 x 5.3 x 2.3	0.580 – 0.440
Sangoan	17	7.79%	15.9 x 11.3 x 8.2	11.3 x 9.1 x 3.8	1.000 – 0.440
hammer	6	2.75%	10.3 x 9.4 x 5.8	8.6 x 7.8 x 5.1	0.770 – 0.505
lanceolate point	14	6.42%	13.8 x 6.7 x 4	12.2 x 8.5 x 3.5	0.500 – 0.315
MSA point	15	6.88%	13.8 x 7.5 x 4	11.3 x 6.3 x 3	0.480 – 0.260
lance point	6	2.75%	10.6 x 5.8 x 3.6	9.7 x 6.4 x 2.9	0.310 – 0.260
levallois core	2	0.91%	12.1 x 9.6 x4.4	9.1 x 8.7 x 4.6	0.760 – 0.450
classical levallois scraper	8	3.66%	8.3 x 6.7 x3.5	4.5 x 4.1 x 1.2	0.280 – 0.117
chips	15	6.88%	10.5 x 4.9 x 1.2	6.3 x 2 x 0.4	0.100 – 0.020
Mousterian scraper	6	2.75%	10.8 x6 x 2.5	6.5 x 3.8 x 2	0.275 – 0.030
arrow head	22	10.09%	9.2 x 3.2 x 0.6	4.2 x 3.6 x1.4	0.125 – 0.10
blades	12	5.50%	8.4 x 3.5 x 2	5.2 x 3.4 x 1.8	0.060 – 0.040
notch	6	2.75%	4.1 x 1.9 x 0.2	2.7 x 1.8 x 0.2	0.10 – 0.05

Table 4: The variation of number, size and weight of large cutting tools in the site.

In addition, the assemblages consist of many characteristic typologies of large cutting tools, divided into a main class and classified into subclass as follows:

1. Possible chopper and chopping tools: three of the tools have working edges that are situated at the end of the long axis. Two of them are side choppers with convex working edges and weathered surfaces (fig 10). Six chopping tools were characterized by their small bifacial form. The working edges on both faces have sharp end edges (fig. 11). The chopping tools are rare in the Sudan. Some samples were noted in Kaddanarti and Arkin 8, which are famous early sites in Kenya. Similar primary hand axes have been recorded in Khor Abu Anga, however these samples here are heavy and large cutting tools.

Fig. 10: Possible chopper tools (photo A. Nassr)

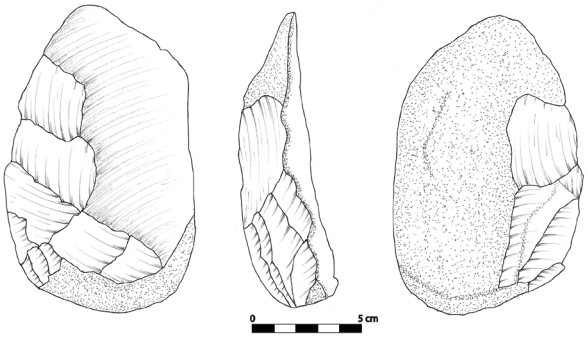

Fig. 11: Sample of chopping tools (drawing A. Nassr)

2. Primary hand axes: three of the primary hand axes were formed of a large flake with cortical striking platform and handle butt (fig. 12).
3. Cleavers: 37 tools from the assemblage were cleavers, which are the main large cutting tool found on the site. They are characterized by their hoe end and pointed tip, bifacial and handful. Some of them are big in size (fig. 13).
   The cleavers appear in a variety of sizes and forms. They include: side cleavers, curve side cleavers, drilled with cleaver end, regular cleaver with straight end, stooping end cleaver, stooping end cleaver of oval edges, cleaver with concave end, cleaver with convex end, cleaver with pointed tip end, cleaver with cubic shape, cleaver with large

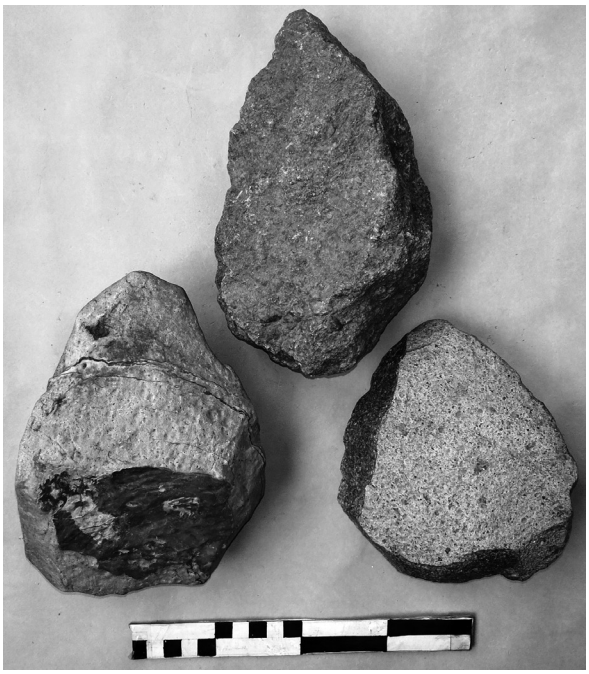

Fig. 12: Primary hand axes (photo A. Nassr)

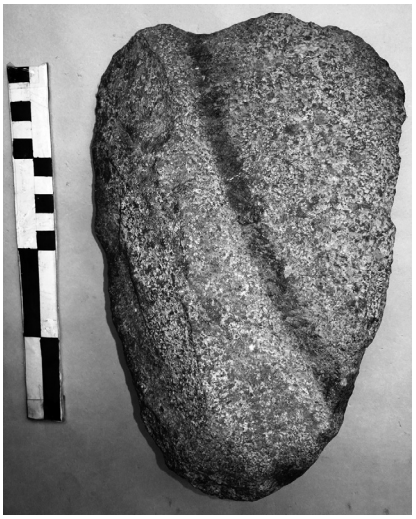

Fig. 13: Sample of big cleaver tools (photo: A. Nassr)

ends, cleaver with pick end and small cleavers. Some of them have a sharp side, while others have two ends (fig. 14).

4. Hand axes: 29 hand axes were classified as large cutting tools. They show the transition of technologies from early Acheulean to late. They are a bifacial and are dihedral in shape (fig. 15).

The result of typological classification shows different sizes and forms of hand axes, which are divided into many sub-classes: hand axes with natural striking platform, hand axes with borer end, hand axes with burin end, elongated hand axes with straight end, concave dorsal hand axes, oval hand axes, dihedral hand axes, foliage hand

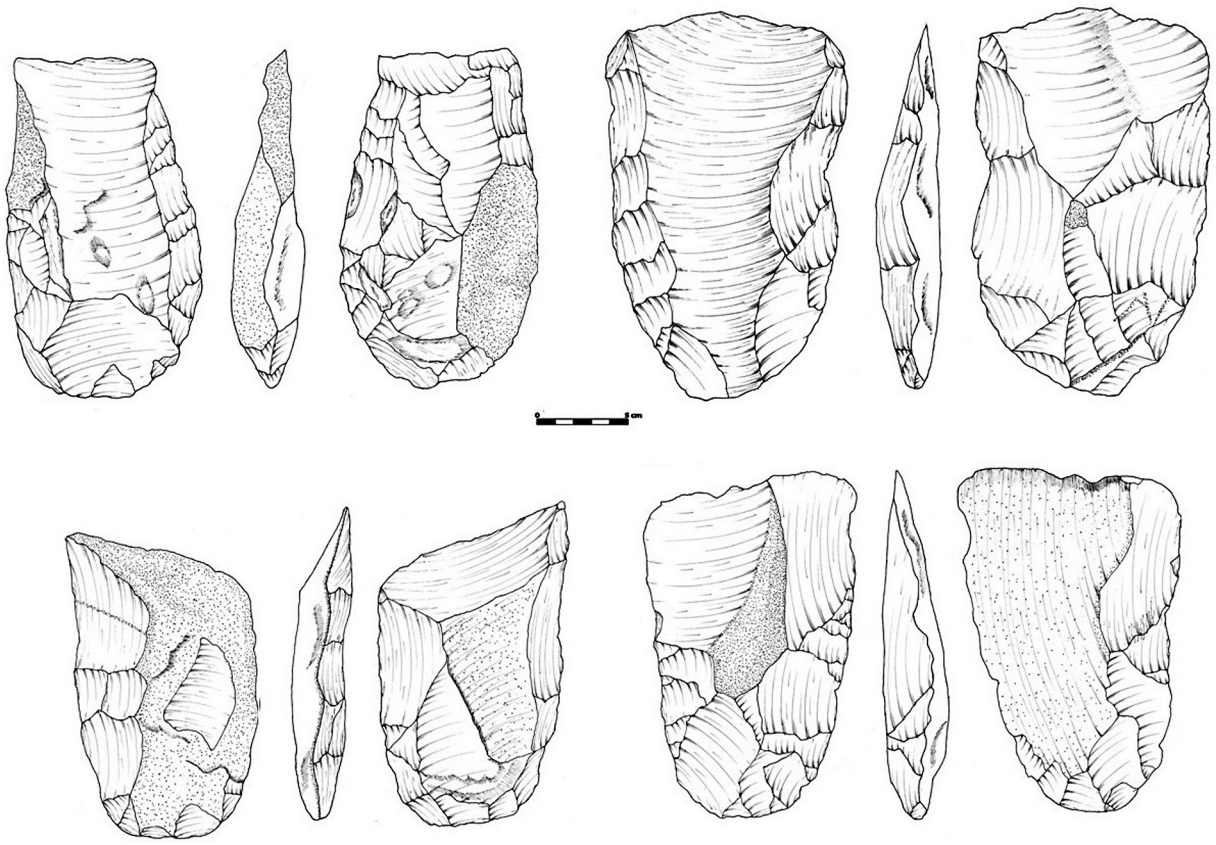

Fig. 14: Different sub class cleavers (drawing A. Nassr).

Fig. 15: Sample of big hand axes (photo A. Nassr).

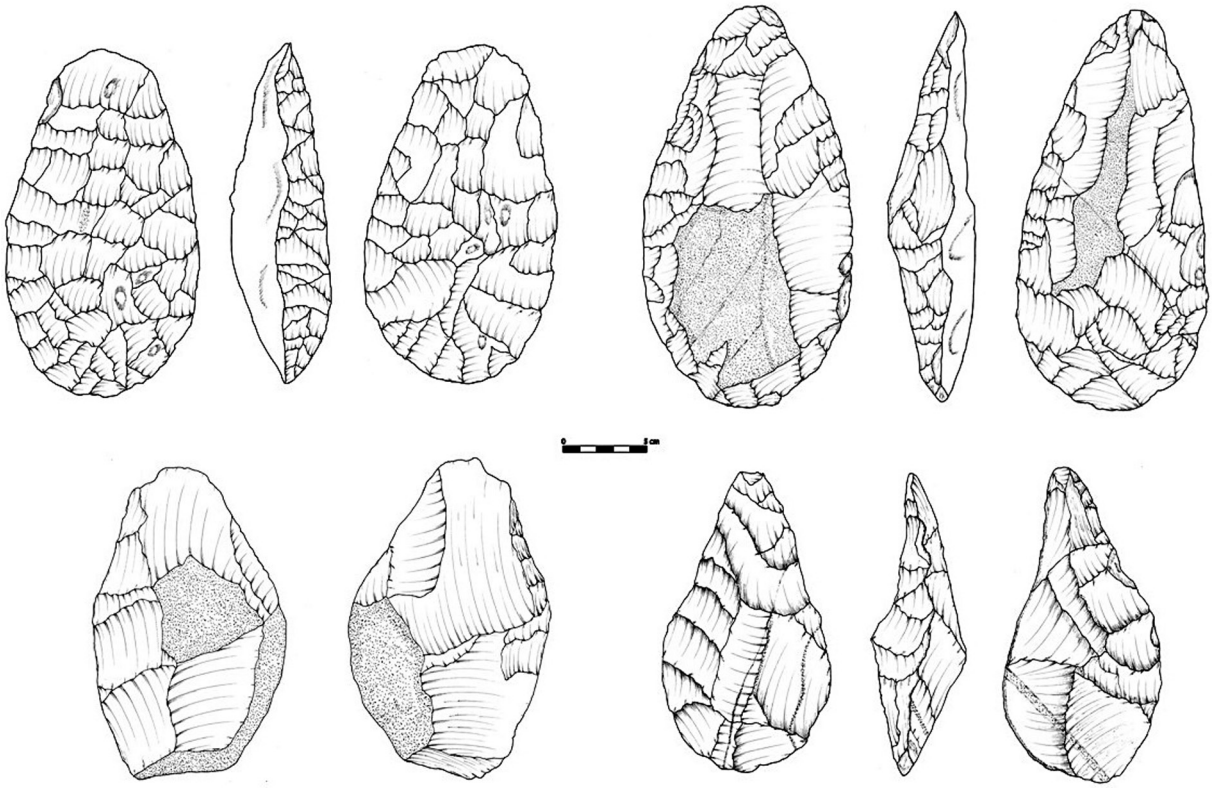

Fig. 16: Different shapes of hand axes (drawing A. Nassr)

axes, regular hand axes, hand axes with curve end, side hand axes with tang, small hand axes, hand axes with cleaver end and hand axes with knife edges (fig. 16). These different shapes of cleavers and hand axes are unfamiliar in Sudan and show similarities with the Olorgesailie collections.[33]

5. Eight discoidal tools: bifacial tools made on large cutting edges, with sharp ends and handles, representing border line between cleaver and hand axes (fig. 17). The tools are reniform or rectangular in shape, or have a complete bifacial function or have a hachereau form (fig. 18).
6. Seven picks made on large flakes with bifacial shape and sharp edges. The cutting flakes and edges of the picks seem similar to the cleavers. The end of these tools indicates a special function (fig. 19). Three tools are foliate spears and were made from quartz with tip ends and tang butt. A further three tools are spear heads. These small tools with large cutting techniques might indicate the technological development of the site.

   Most of large cutting tools described above are unfamiliar in Sudan. The cleavers, discoidal and big hand axes are similar to the Early Paleolithic tools in Awash Valley in Ethiopia and Kenya.[34]

Fig. 17: Types of discoidal tools (photo A. Nassr).

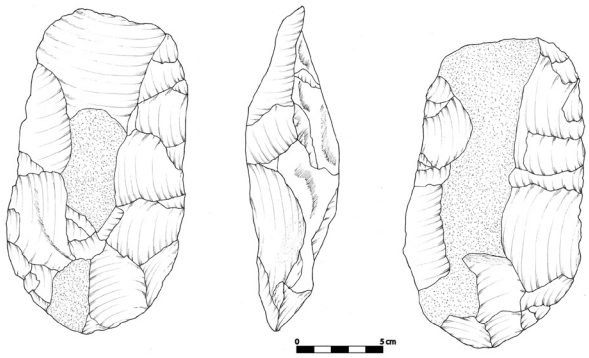

Fig. 18: Bifacial hachereau large cutting tools (drawing A. Nassr).

33 Isaac 1977.

34 Leakey et al. 1969, Howell & Clark 1963.

Fig. 19: Samples of large cutting picks tools (photo A. Nassr).

On the other hand, the small hand axes are similar to the material from Khor Abu Anga and some sites in northern Sudan. The picks and spears are the main Acheulean tools of the Nile basin.

7. Knives: Nine knives represented mixed technology of large cutting tools and knapping and shaping flakes. They have bifacial and sharp edges of different sizes (fig. 20).

There are other types of large cutting tools, small in size and sharp ends. Three of these tools are hand scrapers, distinguished by large ends and handle butts (fig. 21).

8. 14 points are made of flakes have complex scars and are bifacial. Their faces are a result of the different stages of the manufacturing process. They have large, deep scars stemmed on the dorsal side with sharp sloping and stolen edges. The main characteristics are the steep ends and tangs in the butts. Their points include different point shapes: points with double backs, reniform point with tangs, points with sharp edges, foliate points and points with borer ends (fig. 22).
9. 17 Sangoan tools: The classification provided 17 tools related to Sangoan technology with different shapes. They contain hand dibble Sangoan, hand axes Sangoan, side Scraper Sangoan and Sangoan points (fig. 23).

Fig. 20: Sample of bifacial knifes (photo A. Nassr).

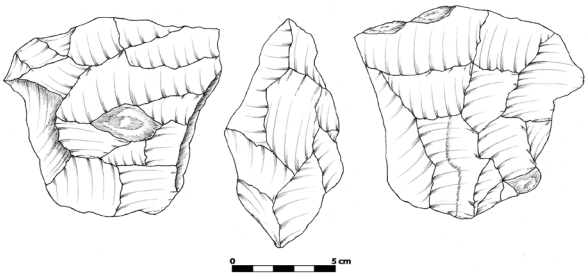

Fig. 21: Sample of hand scraper (drawing A. Nassr).

The Sangoan tools of the site show similar characteristics to the late Acheulean in Kenya and Khor Abu Anga and typical of late Acheulean and early MSA in Sai Island.[35]

Finally, the assemblages from the site of Jebel Elgrain (EDAR06) contain other small tools. These include six hammer stones of different sizes and shapes, 22 bifacial arrow heads, 15 thin and sharp chips, and six small bifacial scrapers. Some tools are related to MSA industries, for example 15 Mousterian points and six Mousterian scrapers and two Levallois cores and eight Levallois scrapers.

The aforementioned data indicates the long occupation of the site of Jebel Elgrain and the development of the widespread large cutting tools on the site, which reveals a new face of Early and Middle Sudan Paleolithic.

Concluding remarks

Despite the lack of early stone tools in the Sudan, the above described assemblages from central and northern Sudan show large variations of large cutting tools in the Early Paleolithic period. This is in addition to the assemblages from the site of Jebel Elgrain

35 Van Peer et al 2003: 189.

Fig. 22: Bifacial tools points (photo A. Nassr).

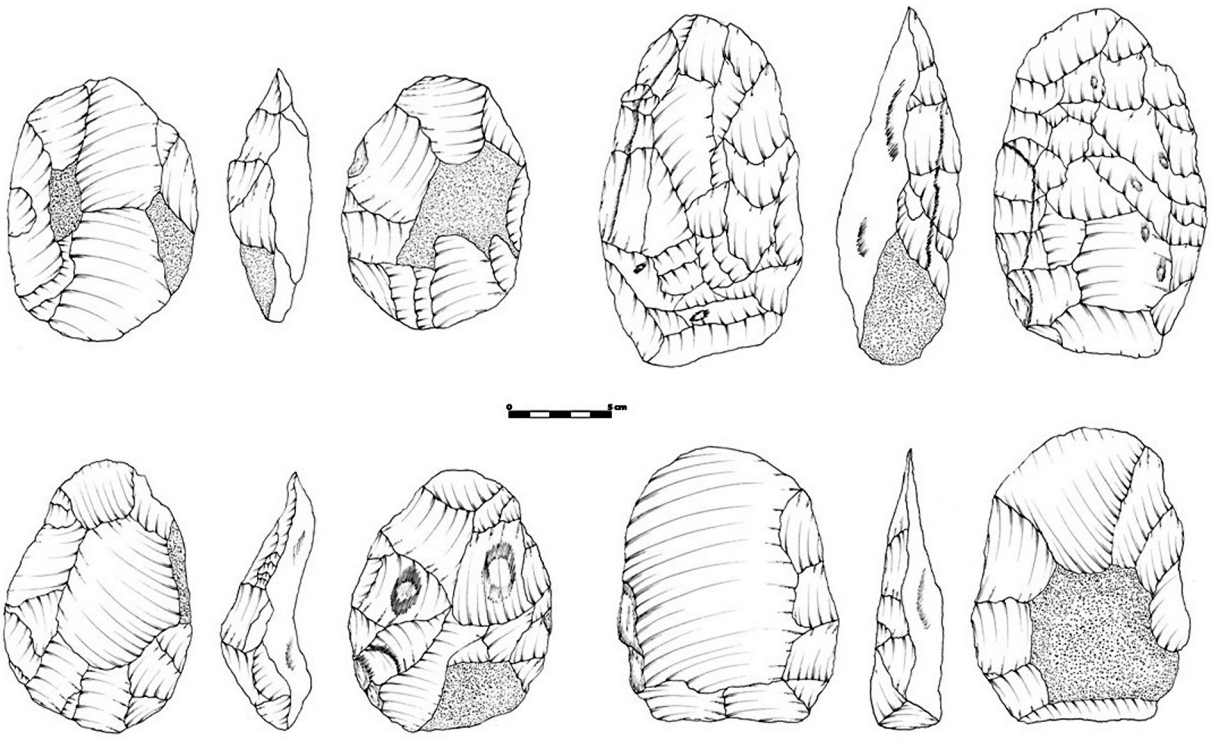

Fig. 23: Samples of Sangoan tools variation (drawing A. Nassr).

(EDAR06) in the eastern desert of lower Atbara River which adds a new face of large cutting tools in the Sudan. The material from Jebel Elgrain is similar to other Sudanese sites in some aspects, but differs in others. These attributes are very informative regarding the regional diversity of Early Paleolithic, and at the same time confirms the importance of the Sudan in early human transition from southeastern to northeastern Africa.

This discussion suggests the following main points:

1. Large cutting tools in the Sudan are different typology. In central Sudan, hand axes are common tools from Khor Abu Anga, in the northern Sudan the chopping tools are the main tool. In both regions, there is a lack of cleavers and both regions present characteristics similar to the south Nile basin (Kenya sites). However, the eastern desert of lower Atbara River revealed different tool attributes from Jebel Elgrain collections: cleavers, hand axes and chopping tools are the most common, which allow us to make a reliable comparison with Early Paleolithic sites in Ethiopia.
2. The diversity of large cutting tools of site of Jebel Elgrain indicate the use of the available local raw materials, and a long term occupation.
3. The assemblages from the site of Jebel Elgrain consist of a long typological list and show developed Olduvai, Acheulean and MSA technology. The Acheulean assemblages are the main types.
4. The variation in technologies used in producing large cutting tools found at the site of Jebel Elgrain might be an indication of a gradual transition of technologies related to environment changes.
5. The content of the site of Jebel Elgrain could allow us to link between the high land in Ethiopia and Sudan, and to discover the early cultural diffusion and human movement across the Atbara River.

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Zusammenfassung

Eines der wichtigsten, jedoch umstrittensten Themen der Studien zur lithischen Technologie in der afrikanischen Archäologie sind Beginn, Übergang, Veränderung und Richtung der Verteilung von frühen Hominiden, die sich über Nordost-Afrika ausgebreitet haben. Der Nil und die Wüste spielen in dieser Debatte eine Rolle, ebenso einflussreich ist die geographische und technologische Variabilität der großen Schneidwerkzeuge des frühen Paläolithikum im Sudan. Während die geographischen und geologischen Daten nahelegen, dass der Sudan der Hauptkorridor der frühen Menschverbreitung von Südost- nach Nordost-Afrika ist, bleibt die archäologische Evidenz bisher nicht aussagekräftig.

Obwohl Entdeckungen im Nordsudan eine komplexe Entwicklung im Mittelpaläolithikum beleuchten, war das Altpaläolithikum bis zu diesen Forschungen wenig bekannt. Viele Fragen entstehen über die Wurzeln dieser Kulturen und die Verbreitung im Nordsudan. Jedoch gibt es begrenzt altpaläolithische Entdeckungen im zentralen Sudan, ebenso Leitmerkmale, die zur Klassifikation führen und die Vergleichsmöglichkeiten größer machen. Es gibt aber neben der regionalen Streuung Lücken in der Entwicklung der frühen Steinwerkzeuge.

Der Artikel behandelt die zurückliegende Diskussion um die großen Steinwerkzeuge im Sudan, beginnend mit dem Überdenken der Khor Abu Anga Sammlung und den Entdeckungen von fünf paläolithischen Sites bei einem archäologischen Survey. Das Resultat der Klassifikation der Funde auf dem Site am Jebel Elgrain wirft Licht auf die hauptsächlichen Charakteristika der großen Steinwerkzeuge im Sudan.

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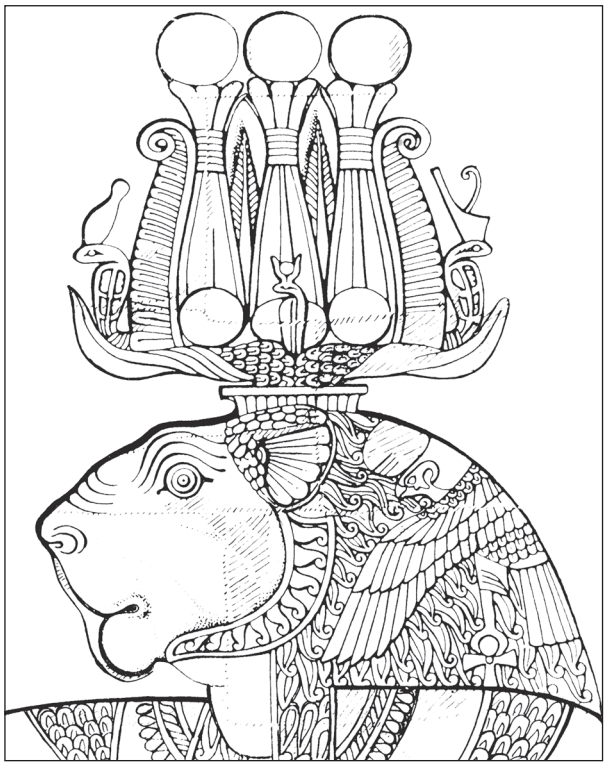

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Angesichts der Tatsache, daß die globalen wirtschaftlichen, ökonomischen und politischen Probleme auch zu einer Gefährdung der kulturellen Hinterlassenschaften in aller Welt führen, ist es dringend geboten, gemeinsame Anstrengungen zu unternehmen, das der gesamten Menschheit gehörende Kulturerbe für künftige Generationen zu bewahren. Eine wesentliche Rolle bei dieser Aufgabe kommt der Archäologie zu. Ihre vornehmste Verpflichtung muß sie in der heutigen Zeit darin sehen, bedrohte Kulturdenkmäler zu pflegen und für ihre Erhaltung zu wirken.

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