

■ EGYPT

The Kharga Oasis Prehistory Project (KOPP), 2008 Field Season: PART I. Geoarchaeology and Pleistocene Prehistory

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Introduction

In 2008, members of the Kharga Oasis Prehistory Project (KOPP) spent 14 days in field research, from January 17th to 31st, exploring the eastern Kharga Escarpment and the adjacent Plateau. Kleindienst spent 12 days in fieldwork; Smith and Adelsberger worked from January 18th to 23rd. We concentrated on Gebel Yebsa Area (GY) (7 days) and Wadi el-Midauwara Area (MD) (4 days), spending one day at Abu Sighawal Area (AS) (cf. McDonald et al. 2006) (Figure 1).

Geological and Geoarchaeological Investigations (Smith and Adelsberger)

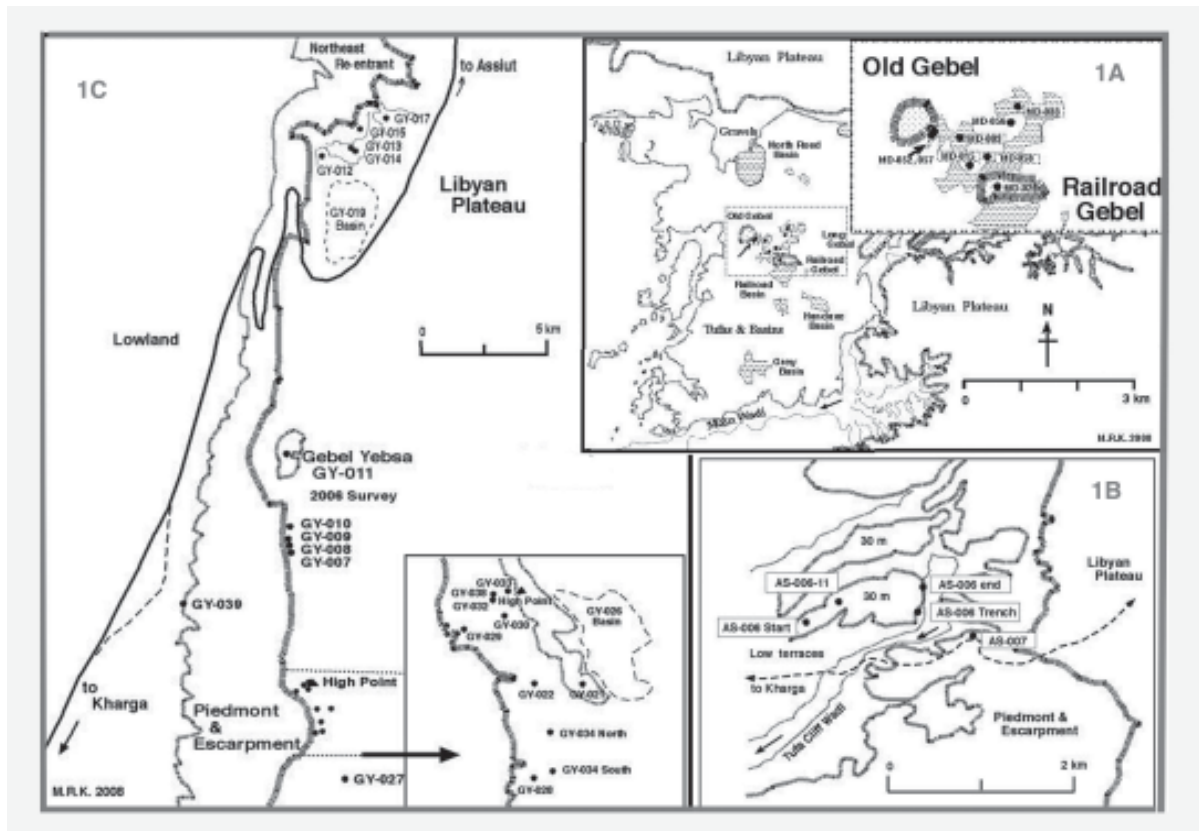
Wadi el-Midauwara Area (MD) (Figure 1A).

In continuing the fieldwork initiated in 2006, we investigated the western tufa deposits at Wadi el-Midauwara, particularly where a topographically and texturally very old tufa [comparable to “Plateau Tufa” of Caton-Thompson (1952)] abuts a sequence of lacustrine silts capped by a relatively young-looking tufa at ‘Lazy Beach’ (cf. Figure 2A). Nearby ESR determinations of ~2myr (Blackwell et al. 2007; Blackwell et al. 2008), and archaeology (below, MD-052, MD-057), suggest that the lacustrine silts could be more closely related to the older tufa in age than to the younger, as previously thought. Close examination of the lacustrine silts identified no erosional surface that might allow for a significant time gap within the section. However, our detailed stratigraphic description will permit comparison of these sediments with others further east which are believed to be younger. We identified additional outcrops of lacustrine sediments in order to determine how often a lake may have existed within the ‘Palaeolake Jaja’ basin. We also documented the dissected and discontinuous tufas of the western margin of the main tufa mass, in order to better understand the complicated stratigraphy.

Abu Sighawal Area (AS) (Figure 1B).

In 2006 we mapped most of the main mass of tufas. This season we continued mapping the north-western margin of tufa deposits at Abu Sighawal. The basic stratigraphy originally described in Caton-Thompson (1952), and observed by us in prior seasons, seemed to apply throughout: the northernmost, high ridge is occupied by texturally old tufa deposits; a breccia containing clasts of an even older tufa occupies the middle elevations; and the lowest are covered by discontinuous sloping sheets of the youngest tufa strata.

Figure 1: Map showing Pleistocene Archaeological Localities designated in 2008: A) Wadi el-Midauwara Area; B) Abu Sighawal Area; C) Gebel Yebsa Area (including 2006 Localities).



Gebel Yebsa Area (GY) (Figure 1C).

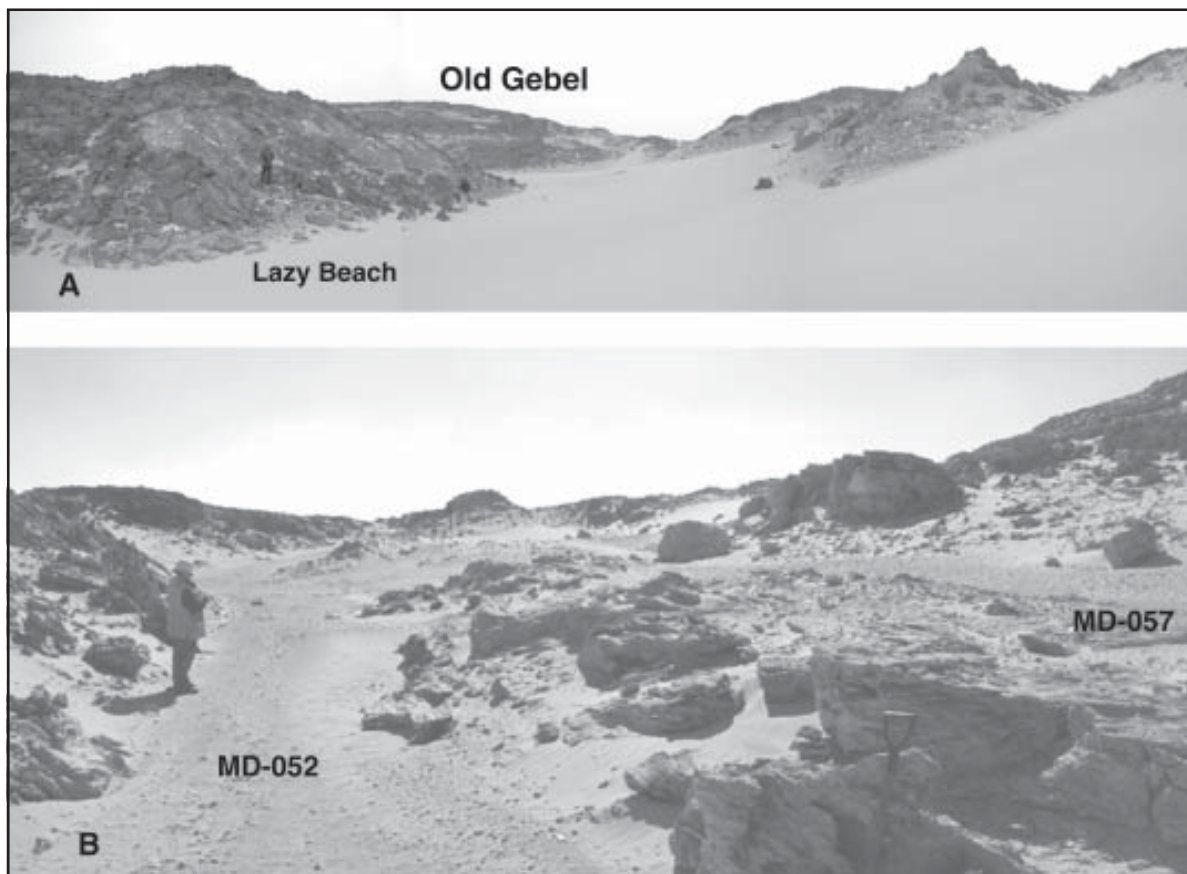
The Yebesa region has proved the most difficult in which to discern discrete tufa strata and to establish their relative ages. There is no consistent relationship between elevations of tufa deposits and the degree of preservation. In general, the highest tufas are more poorly preserved than those at the lowest elevations, but tufas at intermediate elevations may be in any state of preservation. At least three episodes of tufa deposition are represented, and possibly substantially more. We observed that the form of an individual tufa stratum changed as the slope of the escarpment over which it was deposited changed. Along steeper slopes, tufas were deposited in small cascading waterfalls that now are expressed as individual tufa mounds or hillocks on a highly irregular topographic surface; on gentler slopes, the tufas were deposited in fluvial channel or channel margin (paludal) settings which resulted in relatively flat, regular bedding and a smooth topographic surface.

Thus, outcrop form reflects depositional environment rather than age.

With the exception of the southernmost tufas examined (at Gebel Aguz), Yebsa tufas seem overall to preserve less architectural detail (e.g., plant casts, small scale barrage dam morphology) than seen at more southerly locations. This does not seem to be the result of aeolian processes: these tufas are not noticeably more abraded. Differences perhaps relate to the tufas being somewhat older than at other locations, or to alteration processes being somehow enhanced in this region.

During one day we examined the landscapes of the Libyan Plateau surface. We were particularly interested in the playa sediments, presumably Holocene and possibly later Late Pleistocene in age, exposed in the GY-026 basin. At least a meter of relatively homogeneous, laminated fine sands and muds are preserved, suggesting a standing body of water persisted in this area for some time. Limestone

Figure 2: A) Looking west, with ‘Lazy Beach’ on the left, and “Old Jebel’ behind. Talus-mantled silts at Lazy Beach include snails ESR-dated to ~2myrs. Figures for scale (MRK, Jan. 21). B) Looking south-southwest along the Locality MD-052 wind chute. MD-057, Occurrence 1 workshop debris lies above, on the grey/‘blue’ tufa bench on the right, below ‘Old Gebel’. M. F. Wiseman for scale. (MRK, Jan. 26.)



and chert pebbles and cobbles emplaced on top of the muds suggest a time of enhanced sediment transport following the end of the playa lake phase in which the muds were deposited. This may have occurred as the Early Holocene humid phase was waning; vegetation within the region was decreasing, but monsoonal storms were still occurring.

Geoarchaeology, and Early, Middle, and earlier Late Pleistocene prehistory (Kleindienst)

Fieldwork concentrated upon investigations of apparent Early Pleistocene deposits, and, with M. F. Wiseman, upon finding evidence for later Late Pleistocene cultural units (Terminal Middle Stone Age, TMSA). A number of Earlier Stone Age (ESA)

and other Middle Stone Age (MSA) localities were encountered. Both concentrations of artefacts, and isolates—which also inform on landscape usages—were recorded. Thirteen new localities were designated. One is ESA. Two concentrations collected are assigned to the Older MSA; seven are considered to be generalized Younger MSA, or specialized YMSA, Kharga Aterian Unit (Table 1). Aggregates representing ESA or MSA developmental stages are:

- 1) Earliest ESA? (cf. Oldowan Complex or Lower Acheulian Complex); MD-052.
- 2) Terminal ESA? (Dharb el-Gaga Unit, Balat Complex); MD-015; MD-033 (both previously discovered, but yielding newly exposed artefacts); isolated finds, newly exposed, MD-001 and MD-003.

Table 1: Cultural stratigraphic units recognized at Kharga and Dakhleh oases.

Approximate Age Years B.P.	Cultural Stratigraphic Units		Developmental Stages
Dakhleh Oasis	Kharga Oasis		
4000 6000	Sheikh Muftah Unit	Yebsa Unit	Neolithic
	Bashendi Unit	Baris Unit	
8000 10,000	Masara Unit	Midauwara Unit	Epipalaeolithic
15,000	?	New "2008" unit [undefined]	cf. Later Stone Age (LSA)
40,000	Sheikh Mabruk Unit	Khargan Unit(s)	(Terminal, TMSA)
50,000	"318" unit		
100,000	Dakhleh Unit	Kharga Aterian Unit	Middle Stone Age
140,000	[undefined units]	Matana Unit	(Younger, YMSA)
200,000	Teneida Unit	Refuf Unit	(Older, OMSA)
300,000	Gifata Unit		
400,000	Balat Unit	Dharb el-Gaga Unit KO10 unit	(Terminal, TESA)
1,500,000	[undefined units: Upper and Lower African Acheulian <i>sensu stricto</i>]		Earlier Stone Age (ESA)
2,500,000		?? cf. Oldowan Complex	(Developmental, DESA)

- 3) Older generalized MSA (OMSA) (cf. Refuf Unit, Refuf Complex): MD-057; MD-028, Occurrence 2; isolated finds, MD-001; GY-012.
- 4) Younger generalized MSA (YMSA) (cf. Mata'na Unit, Refuf Complex): AS-007 (previously discovered); GY-013; GY-014; GY-019; GY-026; GY-027; GY-034, Northern Occurrence; GY-038; GY-039.
- 5) Specialized Younger MSA (Kharga Aterian Unit, Aterian Complex): MD-058; GY-019; GY-034, Southern Occurrence.
- 6) Generalized MSA (includes both Refuf Unit and Mata'na Unit workshop debris): AS-006, 4 m Terrace; AS-006 30-meter Terrace and Flatiron.

Midauwara Area (MD) (Figure 1A).

Geoarchaeological work at Midauwara was hampered by 'Pleistocene-type' cold and rain on January 21st, which left the sediments wetted, with slippery slopes, and masked colour differences among rocks even a week later. Objectives were: (1) to investigate lacustrine and tufa deposits west of 'Three Balls Basin' (MD-003), now thought to be older than previously believed (MD-052, MD-057); and (2) to investigate Khargan Complex previously discovered on top of 'Railroad Gebel' (MD-028). As usual, other finds were made in the course of those investigations.

As before, MSA and ESA artefacts occurred mainly as isolates, or sparse scatters, lagged down on tufas or eroding from sediments. Compared with ubiquitous Holocene cultural evidence found in nearly every deflated depression, concentrations of ESA or MSA artefacts are rare. Of seven ESA occurrences found, six are incorporated in gravel deposits [MD-003, MD-015, MD-016, MD-027, MD-033 (Kleindienst et al. 2003)]; at two of these, ESA artefacts are also included in overlying sediments (MD-003, MD-033). The north-central gravel spread incorporates abraded ESA and MSA artefacts (MD-032). Locality MD-052 (below), then, is anomalous.

One gravel find only includes MSA (MD-049) (McDonald et al. 2006). Of five discovered surface concentrations of Middle to Late Pleistocene MSA artefacts, only one may represent occupation-type debris (MD-026) (Kleindienst et al. 2003). The others are obvious workshop concentrations [e.g., MD-010

(Smith et al. 2007), MD-028, Occurrence 2], although two of those are not located near outcrops of lithic raw materials [MD-056, MD-057]. The worked rocks would have been imported, although not for long distances.

It appears that ESA or MSA peoples did not inhabit tufa ponds and terraces at Midauwara when they were active, but used the area to gather resources of different kinds, leaving behind few concentrations of their lithics. Also, while an active, tufa-depositing area was probably inhospitable, we now understand that much of the area was under a palaeolake ('Palaeolake Jaja') (cf. Kieniewicz and Smith 2005, 2007). Archaeological finds and detailed palaeoenvironmental work indicate that multiple lake stages are represented (Blackwell et al. 2007; Blackwell et al. 2008). In contrast, one geoarchaeological problem regarding the Holocene is to ascertain what or where water resources were available to sustain continued occupations in the Midauwara area, sometimes in large settlements.

Localities designated in 2008 are:

MD-028, Occurrence 2. Large-sized MSA Levallois workshop debris, lagged in a 4 x 3m low on the western top of 'Railroad Gebel' Esna shales, is near a source of good quality grey chert, with pieces spilling down the steep hill slopes. Resting at a high elevation, artefacts are in relatively fresh, but darkly desert-varnished condition.

MD-052. ESA chert artefacts resting in the aeolian sand bottom of the MD-052 windchute, and on its sanded west bank, are of the type usually assigned to the earliest Plio-Pleistocene Oldowan Complex, or perhaps the succeeding Lower Acheulian Complex. The small aggregate recovered appears to have recently weathered out from the sands in the windchute; they were not exposed in 2002. Presumably, they originally derived from local ancient lake silts in the 'Lazy Beach' area, together with a few other larger clasts. Finds include: four cores/choppers—three chert, one siliceous limestone; a chert polyhedron: five chert flakes; and one possible, heavily weathered biface of a soft 'rotted' rock, wind-fluted on the exposed edge. The last is so heavily encrusted with embedded sand that it is impossible to tell whether it is an artefact or a natural 'pseudo artefact'. Several ESA pieces in mint to fresh condition

have matte ‘silt patina’, and all totally lack desert varnish; some are heavily encrusted with a weathering rind typical of artefacts found in silts. Their condition contrasts with that of the aeolized and varnished OMSA on the tufa bench above, and with that of material derived from there (Figures 2B, 3).

MD-057. First noted in 2002, relatively large-sized MSA workshop material is concentrated on an eroded bench of ‘grey’ tufa, now standing ca.1 m above the windchute bottom and MD-052. This MD-057, Occurrence 1, aggregate includes numerous chert Levallois cores and flakes plus angular waste, most darkly desert-varnished; however, many are only lightly abraded. One extremely weathered and eroded siliceous limestone ESA biface also lay on the bench. Similar pieces lay in the small wadi draining down into the windchute (MD-057, Occurrence 2), suggesting that the bench was a sediment trap for artefacts derived from upstream (Figure 2B).

MD-058. Wiseman found a tanged point, diagnostic for the Kharga Aterian Unit, at the flank of a bulldozer cut (Figure 4A); we collected other, apparently related, artefacts from the scraped surface above. Most were exposed, redistributed, and broken by bulldozing of the floor of the deflated basin near ‘Railway Section’ (Kieniewicz and Smith 2007: Figure 3); however, they appear to have derived from the adjacent younger white lake silts of Palaeolake Jaja. Some artefacts, including the tanged point, bear ‘silt patina’ or ‘silt polish’, and all lack desert varnish—unlike the few darkly varnished MSA artefacts derived from the capping ‘brown’ tufa surfaces above. The tanged point had apparently only recently weathered-out of the underlying silts in the section (Figure 4B, C). We could find no other artefacts in place in nearby exposed white silt sections. However, finding anything eroding from the Palaeolake Jaja sediments is purely a matter of luck, and, when found, they tend to occur ‘one-by-one’ at different levels in the deposits. Wet conditions hindered our search.

The capping tufa on these silt deposits (‘Tufa 2’) has twice been dated by uranium-series [126 ± 4 ka Uys](Smith *et al.* 2004: Table 1); 122.6 ± 1 ka Uys (Smith, personal communication 2008)]. ESR determinations on snail shells from sediments underlying the tufa give 96.24 ± 2.5 ka yrs, which agrees with the uranium series datings (Blackwell *et al.* 2007), given that ESR provides ‘minimum’ ages. These determinations provide a *presumptive minimal* age

for innovation of the hafting method implied by the presence of a tang, and for the Kharga Aterian Unit. It should be noted that the YMSA found *in situ* at MT-002 by E. W. Gardner (Caton-Thompson 1952: 143, Matana Site G) has now been dated between 103 ± 14 and 127.9 ± 1.3 ka Uys (Smith *et al.* 2007). Based upon the small selected collection made by Gardner or her associates, Caton-Thompson speculated that the aggregate might be considered as “proto-Aterian”.

Abu Sighawal Area (AS) (Figure 1B).

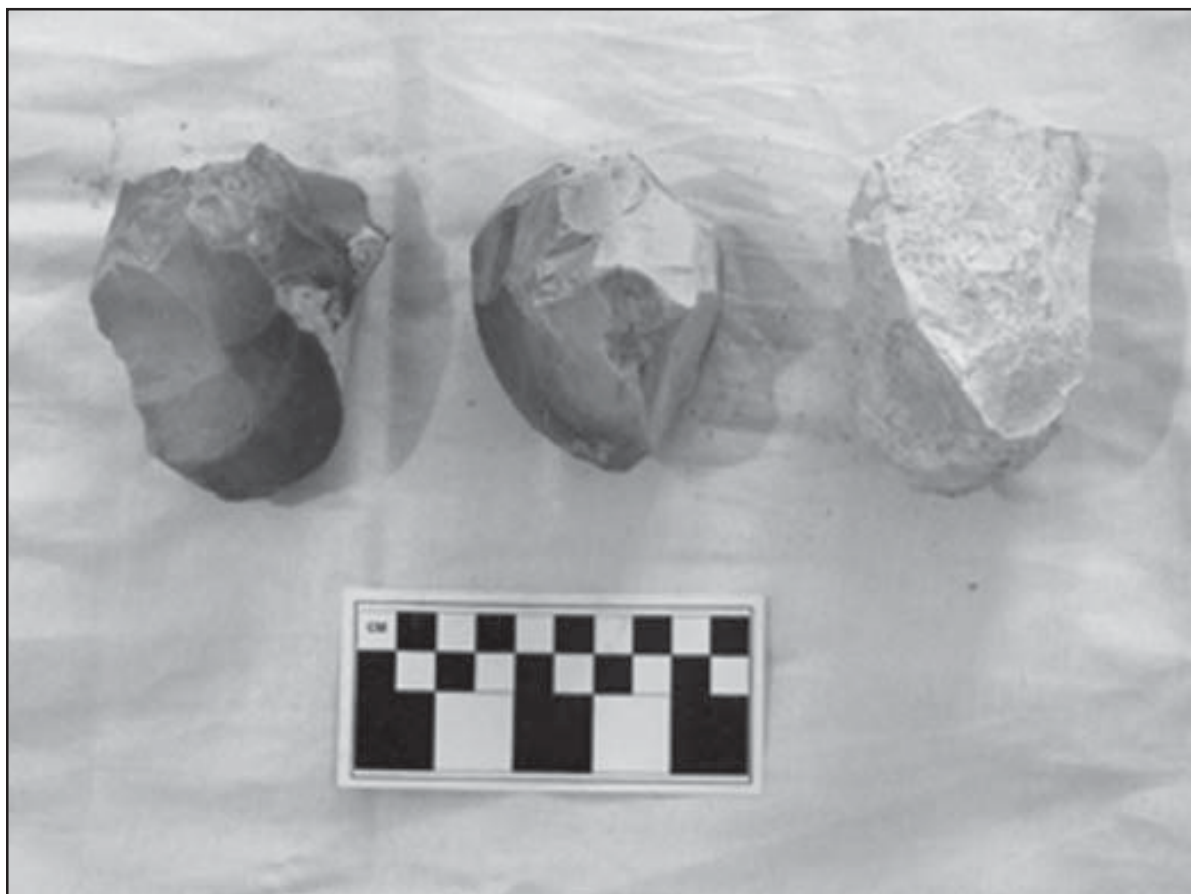
At Abu Sighawal, we investigated the area west and north of Caton-Thompson’s KO18 trench at ‘Tufa Cliff Wadi’ (Caton-Thompson 1952: 108-112). The lower ‘4m Terrace’ flanks the wadi cut, with remnants of the ‘30m Terrace’ standing above to the north and west. These terraced Pleistocene gravel deposits trace upward into a steep, limestone boulder-mantled flatiron overlain by tufa deposits that terminate in an abrupt cliff on the east.

AS-006, Adds 8-13. We conducted a west-to-east transect along the 30 m Terrace remnant, recording and collecting all artefacts encountered. Most finds were of one or two cores or flakes; only one small concentration was noted (AS-006-11: 10 cores, 13 flakes within a 5 x 5 m area). Only two cores and one flake were found on the flatiron head. Based upon typology and condition, both OMSA and YMSA are represented; the raw material is caramel chert nodules and pieces derived from the Escarpment above.

Gebel Yebsa Area (GY) Figure 1C).

In the Gebel Yebsa survey, all Middle to earlier Late Pleistocene-aged occurrences are assigned to the MSA developmental stage. We found no diagnostic ESA. A number of different lithic raw materials occur. Many MSA artefacts are of ‘caramel’ or ‘orange rind’ cherts, which must have been imported for some distance to most find points. Both chert types may have a similar weathering rind colour when desert varnished. However, ‘caramel cherts’ have a distinctive orange colour when freshly broken; ‘orange rind cherts’ are light orange- to yellow-tan when fresh. Caramel chert nodules are known to outcrop below the Plateau rim from the El-Refuf Formation limestones, and also as tabular chert outcrops on the Plateau top near the rim (Caton-Thompson 1952). In

Figure 3: ESA Cores/choppers of chert, in fresh condition, found on/in surficial aeolian sand and fine gravel at Locality MD-052 wind chute. Note thick white ‘silt patina’ on artefact at right, indicating derivation from the Palaeolake Jaja silts in the vicinity (MRK).



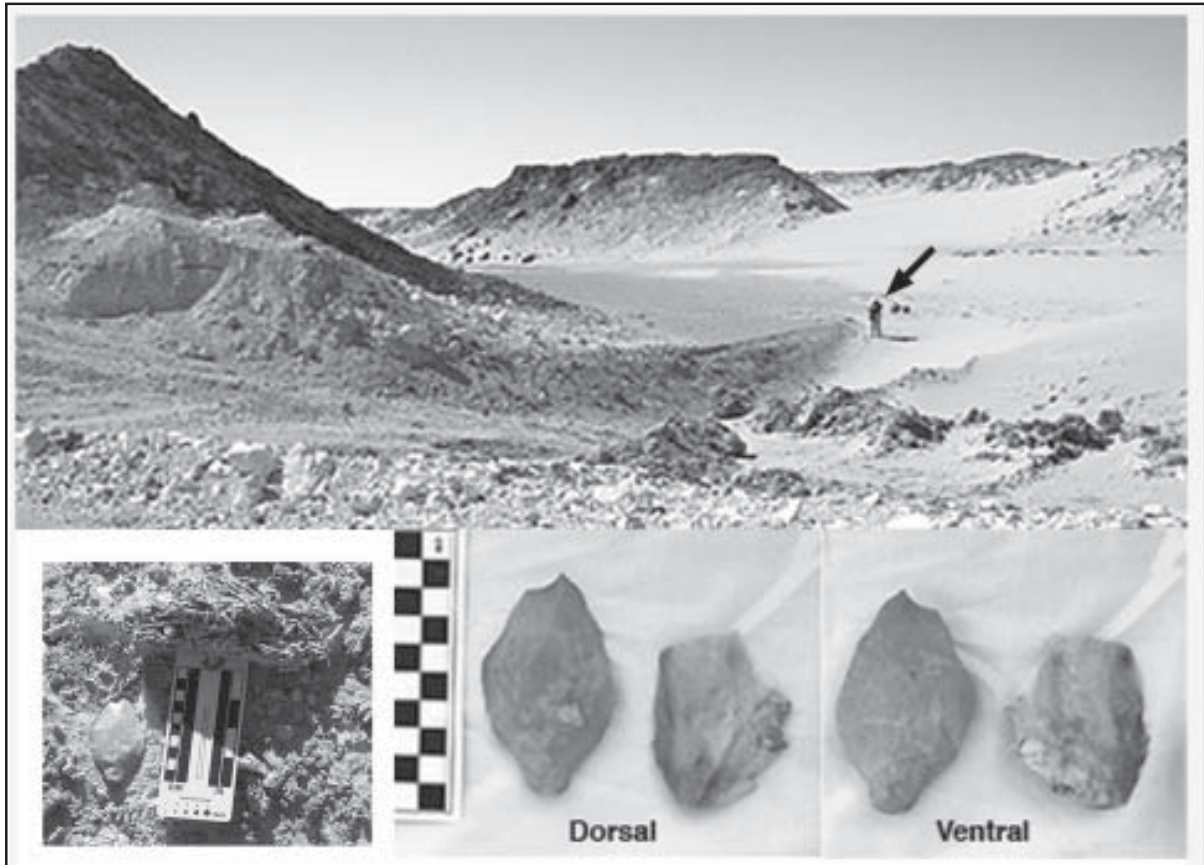
2008, McDonald located three outcrops of tabular orange rind cherts on the southern Gebel Yebsa Plateau, and another of tabular caramel chert in the Abu Sighawal area. No source for the occasional artefact made of semi-translucent orange chert/chalcedony has been found.

Small, friable nodules of brown chert outcrop on the northern Plateau rim (below). Some grey to tan cherts, including ‘wood-grained cherts’, may come from below the main Escarpment in the Tarawan Formation, or may outcrop on the Gebel Yebsa Escarpment. Siliceous limestone nodules (*battikh*) that outcrop in many places on the Plateau surface were also worked. Rocks from the Nubia Group formations in the Lowland were used at the later Late Pleistocene-aged Khargan Complex occurrences and in younger aggregates.

Gebel Yebsa Area, northern survey, 2008 (Figure 1C).

Part of the northern Gebel Yebsa Area surveyed was briefly surveyed in 1982-1983 (Mandel and Simmons 2001: Table 4; Simmons and Mandel 1985, 1986). All MSA localities [“Middle Paleolithic (Mousterian)”] recorded by the Kansas University Western Desert Expedition (KUWDE) along the Plateau rim at “Naqb el-Ramliya” (or “Naqb el-Asyut”) have been destroyed by recent road-working activities (Simmons and Mandel 1985: Transect 7, KUWDE sites 44 to 47, 50). The large basin (now designated GY-019) near the rim, north of the tarmac road to Assiut (containing KUWDE 48 and 49), is now heavily impacted by collection of construction materials, although a few remnants of Holocene occupations remain. We were unable to relocate KUWDE 49

Figure 4: Locality MD-058: A) looking southwest into ‘Railway Section Basin’. M. F. Wiseman standing at location of tanged point found at bulldozer-cut section. The bulldozer-scraped silts were piled on the left and central foreground (MRK, Jan 26). B) Tanged point as found. C) Tanged point and flake, chert, matte ‘silt’ patina: Dorsal (top) and ventral (bottom) views. Point measures $80 \pm 12 \times 50 \times 14$ mm, with possible impact fracture at tip, lightly abraded condition, grey patina.



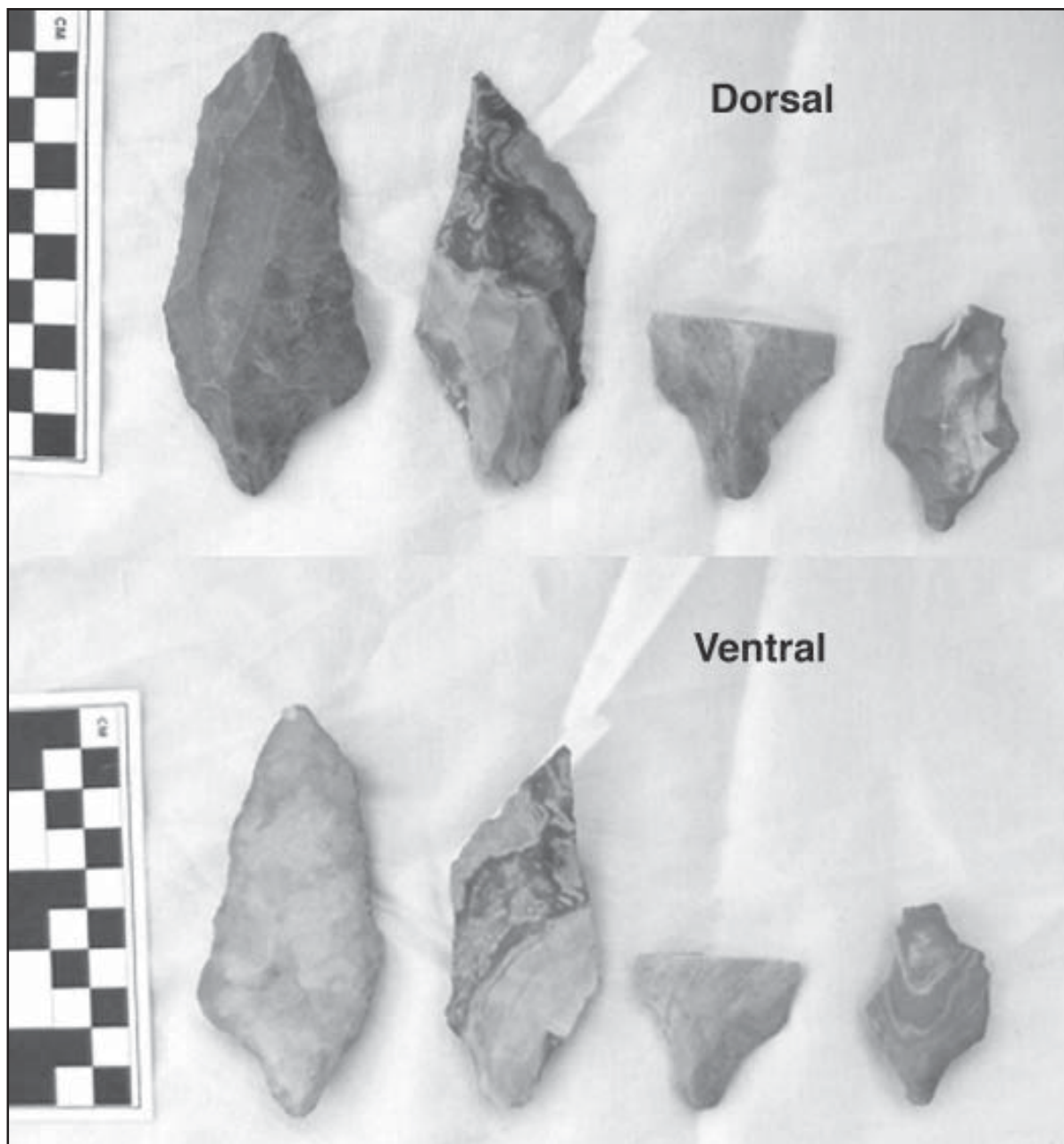
[“Middle Paleolithic (Aterian)” (Simmons and Mandel 1985: 165-166)], unless it designated the ‘*battikh* field’ (sanded outcrop of large nodules) in the northwestern basin, where scattered Holocene and Pleistocene lithics were noted.

A high limestone ridge flanks the western basin margin, ascending steeply northward to a nose that provides a broad view over northern Kharga depression and the northeastern re-entrant. This ‘High Bench’, like other old, high structural remnants, bears darkly greyed limestone rubble. Below such features are one, sometimes two, narrow ‘Middle Bench(es)’ with less greyed rubble. Flanking the Plateau rim are one or two broader structural ‘Low Bench(es)’, with light coloured limestones and slopewash gravels.

In our northern survey along the Plateau rim, only scattered OMSA pieces (cf. Refuf Unit) occur on the highest benches (GY-012). YMSA workshops (cf. Mata’na Unit) occur on the lowest limestone benches, near outcrops of small, dark-coloured, friable chert nodules (GY-013, GY-014). These artefacts are in fresher condition, but are desert varnished. One Khargan Complex locality was also found in this setting (GY-015), and one Holocene locality (GY-023).

Only a few isolated, undiagnostic, artefacts were seen on the Middle benches. Our survey ended northwest of an old, cairned camel trail up the re-entrant, and on a bench north of the highest, cairned point on a High Bench ridge remnant. A Holocene locality was found to the north (GY-016), and a Khargan Complex locality (GY-017) on the southern slope of the

Figure 5: Locality GY-034, Southern Occurrence: four Kharga Aterian Unit tanged artefacts collected originally by Simmons and Mandel. From left to right, a typical point, an acute-edged ?cutting tool, and two basal fragments, caramel chert, fresh but lightly desert varnished (MRK).



high ridge. We noted no Pleistocene artefacts walking southwest from that locality to the GY-019 basin, paralleling the modern road.

Localities designated are:

GY-012. A sparse scatter of OMSA, Refuf Unit, artefacts is found along the High Bench ridge flanking GY-019, with a slightly greater concentration at the highest northern end. These are abraded/weathered and desert varnished.

GY-013, GY-014. Two YMSA, cf. Mata'na Unit, concentrations of Levallois workshop material: areas about 20 x 20 m, on the surface of the Low Bench, back from the Plateau rim. Both utilized the local, small brown chert nodules and some imported cherts. GY-013 is downslope from a chert outcrop, and may result from slopewash; GY-014 lies about 80 m north-northeast.

GY-019. Limestone ridges flank a broad depression, or basin, on the Plateau top, with a lower confining rise to the south at the modern tarmac road. Two limestone inselbergs stand on the southwest. A sanded *battikh* field occupies the central and north-western basin floor. On the west, bulldozed sandy pan sediments (ca. 1 m thick) overlie a ferruginous concretion layer overlying rotten limestone bedrock. Scattered, isolated finds of YMSA include an Aterian-type bifacial foliate, of chert in fresh condition, lying in, and possibly weathering from, the basal talus of the higher inselberg.

Gebel Yebsa Area, southern survey, 2008 (Figure 1C).

Part of the southern Gebel Yebsa Area surveyed in 2008 was previously surveyed both by E. W. Gardner (Caton-Thompson 1952: 162-164) and by Simmons and Mandel (1985: 132, Transect 4, KUWDE sites 29, 42, 51 through 61). I relocated KUWDE 29 and 56, but we cannot verify whether other localities that we found were also noted previously (e.g. KUWDE 55, 57 "Middle Paleolithic (Mousterian)"). Descriptions of site settings suggest similarity, but possibly we did not find all the concentrations. This area seems to have been more heavily used during Late Pleistocene times than was the northern, present-day 'pass' (cf. McDonald et al. 2006). Some areas from the tarmac road to the south of Gebel Yebsa are

now impacted by extraction of construction aggregates.

We concentrated the Pleistocene survey on the area west of the large basin (designated GY-026), from the Plateau rim to the long north-south trending limestone 'Long Ridge' on the east, extending north-south ca. 3 km. Wiseman and/or I conducted three walking traverses. Although an area with low relief, we discovered that the topography is deceptive: limestone rubble-covered low rises that separate solution pans and wadi cuts effectively limiting visibility. A sparse scatter of Khargan Complex pieces is found near the rim, but artefacts are lacking in other similar areas. Concentrations of artefacts are associated with solution pans, some of which are drained by wadis or have been breached by wadi head drainages. Some are closed, serving as sumps for wadis and slopewash, and are floored by considerable thicknesses of fine sediments (>40 cm). Two east-to-west wadi-cut depressions drain to two sharp 'notches' in the Plateau rim, which would have provided old foot access points to the Plateau. No lithic raw materials outcrop in this area except *battikh*, so that all chert or Nubia Group raw materials had to be imported.

New Localities logged are:

GY-026, Adds Ø-6. Limestone ridges flank a large pan/playa basin on its east and west. The floor is cut by a southward flowing wadi exposing >1 m of pan sediments. We explored the eastern and western limestone ridges and wash bench flanks of the playa, and the area on the eastern basin floor where YMSA artefacts were exposed on a level with ferruginous concretions eroding from the pan sediments. Most finds were isolates, or of a few Levallois cores and flakes. Simmons and Mandel (1985: 173-177) noted recycled "Aterian" at KUWDE 61 on the northwest, and "Middle Paleolithic (Aterian)" (Simons and Mandel 1985: 172-173) on the 'Long Ridge' at KUWDE 60 (not relocated). We were unable to determine whether our scattered YMSA finds represent the Aterian Complex.

GY-027. A lagged outcrop of aeolized, tabular orange rind chert (which fragments into blocks and into slivers mimicking blades) is the location where YMSA knapping produced a localized, associated, scatter of Levallois workshop debris. The original bedrock outcrop in El-Refuf limestones has weathered away.

GY-034. Relocated KUWDE 56 [“Middle Paleolithic (Mousterian and Aterian)/Terminal Paleolithic/Neolithic” (Simmons and Mandel 1985: 168-171)]: an elongated drainage southwest of GY-026. The lows are interrupted by the wadi bending around a limestone rise, forming a larger northern depression with gravels along the eastern edge, and a smaller southern sump depression. In the Northern Occurrence, cultural evidence ranged from a red, wheel-made pot to YMSA artefacts, mainly in abraded condition, although some are double patinated and obviously recycled; recycling could be pre-Holocene in age, however. A probable Khargan Complex occurrence on the south end was not investigated. In the Southern Occurrence, McDonald located Simmons and Mandel’s collection, and recovered the four tanged points they recorded (Figure 5). The Kharga Aterian Unit points are in fresh condition, and it is likely that some blades in the area are Aterian rather than Holocene in age.

GY-038. A small, lagged concentration of desert varnished YMSA Levallois flaking debris occurs in a small, inland wadi-head depression area, measuring ca. 6 x 10 m. This is the only isolated YMSA concentration encountered in the rim area.

Gebel Yebsa, Piedmont (Figure 1C).

We surveyed a small area of the Piedmont, that may be in an area previously surveyed (Mandel and Simmons 2001: Table 4, Transect 6). Wiseman and I traversed about 100 m of a limestone gravel-covered higher ‘7-10 m Terrace’ remnant twice, without finding artefacts. We then investigated a ‘4 m Terrace’ remnant, to the south.

GY-039. In two blowouts into the gravel-covered surface at the westernmost end of a 4 m Terrace remnant, YMSA, Mata’na Unit cores and flakes of caramel chert in relatively fresh condition were associated with gravel clasts, and derived fragments of chert. Each blowout measured ca. 10 x 10 m.

General Observations

Archaeological evidence indicates that the Plateau top near the rim south of Gebel Yebsa is a geomorphic surface that has been only somewhat modified since earlier Late Pleistocene times. The few concentrated occurrences representing YMSA (cf.

Mata’na Unit) are Plateau rim area outlooks (e.g., GY-011, GY-038), or are workshops at lagged-down tabular chert exposures (e.g., GY-027). Aeolized YMSA artefacts are sparsely scattered, and given that chert resources are rare, later inhabitants recycled some of these. As noted before (Caton-Thompson 1952; Mandel and Simmons 2001; Simmons and Mandel 1985, 1986), MSA Aterian Complex aggregates here and elsewhere on the Plateau tend to occur in association with large playas/pans (e.g., GY-019, GY-026), with smaller wadi-cut depressions (e.g., GY-034), or with small ‘solution’ depressions (Bulaq Area). The last two types of situation are also locations most favoured during the succeeding Khargan Complex (e.g., GY-007, 008, 009, 010) (McDonald et al. 2006). Five of seven new Khargan Complex localities logged, and two belonging to a new cultural unit, are in solution pans or wadi cut/Aeolian depressions. Therefore, it is not surprising that Caton-Thompson found it difficult to establish the chronological relationships between Kharga Aterian and her Khargan Unit. The 2008 evidence supports our earlier view that the Khargan Complex is younger than the Aterian Complex (Kleindienst 1999; Wiseman 2001) (Table 1).

Acknowledgements

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Bibliography

- Blackwell, B. A. B., J. J. J. Gong, R. A. Long, A. H. Nuzhad, J. Smith, J. L. B. Blickstein, A. R. Skinner, M. Kleindienst, C. S. Churcher and M. M. A. McDonald
- 2007 ESR dating the lake deposits at Medawara, western Egypt. *Society of American Archaeology Annual Meeting, Austin, TX, 2007*, Paper presented.

- Blackwell, B. A. B., R. A. Long, J. J. J. Gong, J. R. Smith, M. R. Kleindienst, A. R. Skinner and J. M. Kieniewicz
- 2008 ESR Dating of spring and paleolake deposits near Kharga, Western Desert, Egypt. *PaleoAnthropology* 2008: A4-A5.
- Caton-Thompson, G.
- 1952 *Kharga Oasis in Prehistory*. London: Athlone Press.
- Kieniewicz, J. M. and J. R. Smith
- 2005 Palaeohydrology of a Pleistocene pluvial lake in the Western Desert of Egypt. *American Geophysical Union, Fall Meetings, 2005*, Abstract #PP31A-1518.
- Kieniewicz, J. M. and J. R. Smith
- 2007 Hydrologic and climatic implications of stable isotope and minor element analyses of authigenic calcite silts and gastropod shells from a mid-Pleistocene pluvial lake, Western Desert, Egypt. *Quaternary Research* 68: 431-444.
- Kleindienst, M. R.
- 1999 Pleistocene archaeology and geoarchaeology: a status report. In C. S. Churcher and A. J. Mills, editors, *Reports from the Survey of Dakhleh Oasis, Western Desert of Egypt, 1977-1987*. Oxford: Oxbow Books, pp 83-108.
- Kleindienst, M. R., M. M. A. McDonald and C. S. Churcher
- 2003 Kharga Oasis Prehistoric Project: 2002 field season. *Nyame Akuma* 59: 17-25.
- Kleindienst, M. R., H. P. Schwarcz, K. Nicoll, C. S. Churcher, J. Frizano, R. W. Giegengack and M. F. Wiseman
- 2008 Water in the desert: First report on Uranium-series dating of Caton-Thompson's and Gardner's 'classic' Pleistocene sequence at Refuf Pass, Kharga Oasis, In M. F. Wiseman, editor, *The Oasis Papers 2. Proceedings of the Second International Conference of the Dakhleh Oasis Project*. Oxford: Oxbow Books.
- Mandel, R. D. and A. H. Simmons
- 2001 Prehistoric occupation of late Quaternary landscapes near Kharga Oasis, Western Desert of Egypt. *Geoarchaeology* 16: 95-117.
- McDonald, M. M. A., A. L. Hawkins and M. R. Kleindienst
- 2006 The Kharga Oasis Prehistory Project (KOPP): research during the 2006 field season. *Nyame Akuma* 66: 2-15.
- Simmons, A. H. and R. D. Mandel. Editors
- 1985 *Human occupation of a marginal Environment: An Archaeological Survey near Kharga Oasis, Egypt*. Vol. 57. *Project Report Series*. Lawrence, Kansas: University of Kansas Museum of Anthropology.
- Simmons, A. H. and R. D. Mandel
- 1986 *Prehistoric Occupation of a Marginal Environment: An Archaeological Survey near Kharga Oasis in the Western Desert of Egypt*. Vol. 303. *International Series*. Oxford: British Archaeological Reports.

- Smith, J., R. Giegengack, H. P. Schwarcz, M. A. A. McDonald, M. R. Kleindienst, A. L. Hawkins and C. S. Churcher
- 2004 Reconstructing Pleistocene pluvial environments and occupation through the stratigraphy and geochronology of fossil-spring tufas, Kharga Oasis, Egypt. *Geoarchaeology* 19: 407-439.
- Smith, J. R., A. L. Hawkins, Y. Asmerom, V. Polyak and R. Giegengack
- 2007 New age constraints on the Middle Stone Age occupations of Kharga Oasis, Western Desert, Egypt. *Journal of Human Evolution* 52: 690-701.
- Wiseman, M. F.
- 2001 Problems in the prehistory of the late Upper Pleistocene of the Dakhleh Oasis. In C. A. Marlow and A. J. Mills, editors, *The Oasis Papers I: Proceedings of the First International Symposium of the Dakhleh Oasis Project*. Oxford: Oxbow Books, pp 15-25.