



## NEW ARCHAEOLOGICAL FINDS IN WĀDĪ ADH DHAMRĀN (FEZZAN, LIBYA)

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### Introduction

Many archaeological sites were found in Libyan Sahara, especially in the Fezzan region (Graziosi, 1969, Ziegert, 1978, Červíček, 1976, Svoboda, 1980 etc.). Beside the knowledge about the human past, the archaeological investigation of the area usually gives an important support also to the search for some ethnographical and cultural-historic problems, as well as for the timing of some Late Quaternary deposits.

The Libyan Sahara is not well accessible with the exception of the vicinity of the main populated places. Thus, some of archaeological objects might be missing in the sporadically visited areas. Several of those were newly found in the Wādī adh Dhamrān.

Performed work is a result of the incidental identification of the finds complemented with some details. Thus, it should be taken as an informative report for the more detailed investigation.

### Location and Physiography of the Area

Wādī adh Dhamrān is located nearly 50 km SE of the Sabhá town running from the NE to the SW in the length of 70 km (Fig. 1). The width of the wādī varies between 0.5 km and 2.5 km. Its drainage area adjoins on the SE to the Sarír al Qattúsah and on the NW is bordered with stony peneplain of the Hamada Murzuq. The bottom altitude varies from 441 to 450 m a. s. l., the altitude

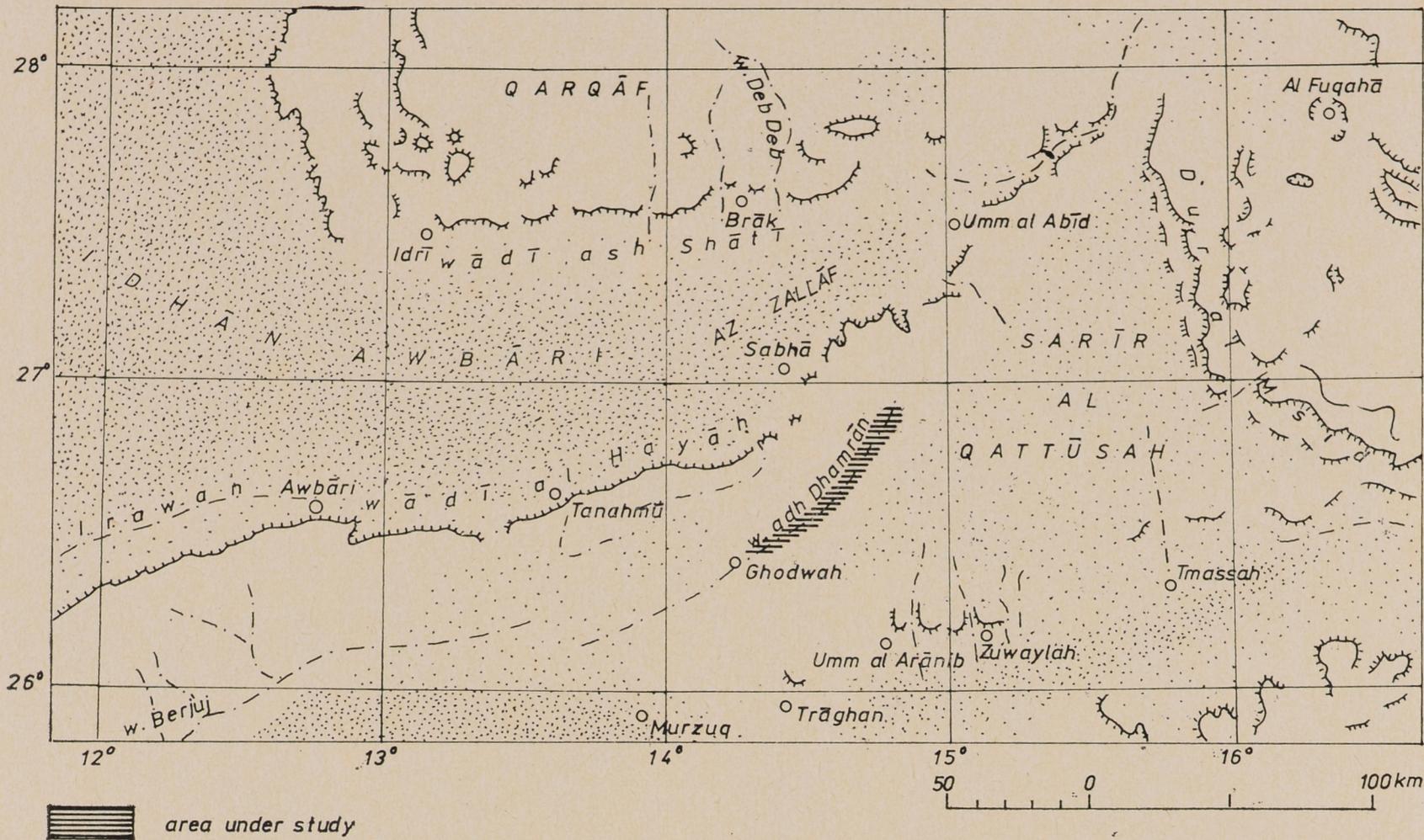


Fig. 1: Location of the study area, Wādī adh Dhamrān, Fezzan, Libya.

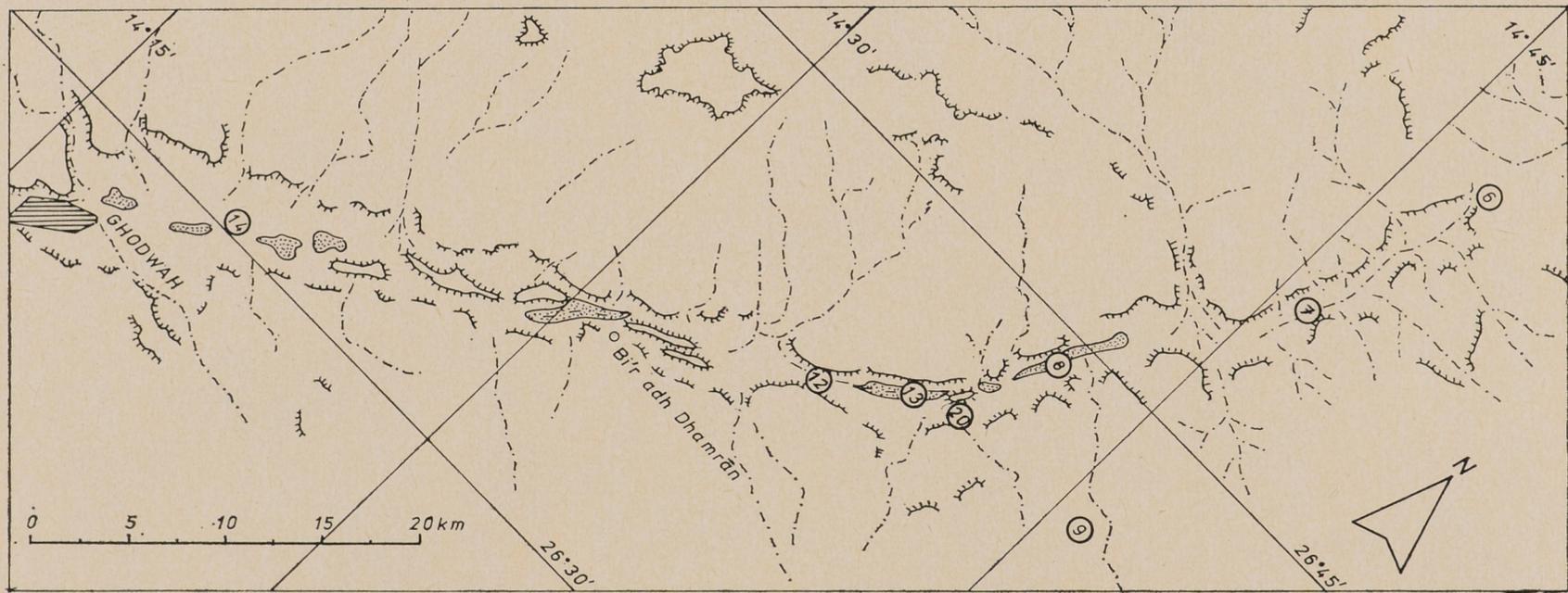


Fig 2: Location of the archaeological sites in the Wādī adh Dhamrān (number in the circle) and the fossil lakes (dotted area).

of the surrounding area from 455 to 475 m a. s. l. In the present time, three elongated shallow drainless depressions are in the wádí bottom, separated each other with elevations of approximately 10 m. Longitudinal crests running in the central part of the wádí are bordered with low escarpments. Many side-wádís join the Wádí adh Dhamrán from NW and SE. The wádí terminates in a large drainless depression near the Ghodwah oasis.

#### Geological Development of the Area

The geology of a broad vicinity of the wádí was newly studied by the author simultaneously with the archaeological observations (Mrázek, 1984).

Continental Jurassic to Lower Cretaceous sediments of the Mesák Formation are the oldest rocks in the area under study. Cross-bedded argillaceous sandstone and conglomerate prevail, interbedded with sandy siltstone.

After the Mesák Formation rocks had been deposited, the terrain relief was eroded and altered during the Upper Cretaceous to Paleogene. The surface of the rock exposures was silicified down to a depth of 3 m. The quartzose cement evenly fills the pores of the rocks and consequently quartzose sandstone and quartzite originate at the upper part of the Mesák Formation rock sequence (silcrete, duricrust). After that, the main morphological structures originated due to the water erosion, including a large depression preceding the Wádí adh Dhamrán.

This old depression was filled with continental deposits of Miocene to Lower Pleistocene age. The sedimentation locally began with ferruginous conglomerate filling old erosional furrows. The most common rock of the lower part of the sequence is greenish to greyish white or pink soft silty and argillaceous sandstone. The sandstone usually contains a considerable amount of calcite and gypsum, and passes upwards into calcareous or sporadically gypsiferous sandstone. The layer of clastic sediments is capped with greyish white massive sandy limestone. Transition from the aforementioned rocks is gradual. Silicite nodules (cherts) with fibrous and microcrystalline quartz commonly occur in the limestone. Silicite is of a fine quartzitic texture, containing relic forms after gypsum and small fibrous pisoids of chalcedony. Silica was completely dehydrated so that no opal mass was observed.

This milky white silicite often serves as a raw material for lithic artifacts making.

The present Wádí adh Dhamrán was hollowed in the more soft Miocene to Lower Pleistocene rocks in the Middle Pleistocene (later water erosion stage). Poor relics of fluvial deposits were preserved as a gravel residue deprived in the fine fraction by deflation. Several levels of old valley bottom are marked by calcrete and gypcrete horizons on the wádí sides.

In the last stage of the wádí development, lacustrine deposits originated at its bottom from Middle Pleistocene to Holocene. The lakes covered an area of approximately 5 sq. km. The lake basins are isolated one from another in the drainless depressions following the direction of the wádí. Sandy, chalky and gypsiferous limestone is interbedded with fine sand, silt and loam. At the lower part of the lacustrine deposits a layer of pure gypsum originated probable due to the epigenetic crustification. The changes in the Quaternary lacustrine deposition were probably result of variable climatic conditions in the Central Sahara (cf. Pachur, 1980, Rognon, 1980 etc.). The periods of the lacustrine deposition may have alternated with either deflation, or water erosion and fluvial deposition. The increasing inflow of clastic particles without any biogenic and chemogenous carbonates or sulphates may demonstrate the increasing precipitation and run-off, while the calcareous and gypsiferous deposits show on the erosional stagnation with quiet deposition. In this stage of their development in the semi-arid conditions, the lakes were supplied predominantly with ground-water from the highest hanging aquifer, however, apart from the poor precipitations.

The Quaternary lacustrine deposits are fossiliferous. Algal structures and imprints of stalks and roots of reeds (*Phragmites* sp.) were frequently near the lake shores (shallow water pool or marshes) together with the following fossil assemblage:

*Ostracoda*: *Cyprinotus salinus* (Brady)  
*Cypridopsis vidua* (Sars)  
*Leptocythere* sp.

*Gastropoda*: *Bulinus* sp.  
*Melania* sp.

The fossils indicate a probable fresh-water environment, but according to the high content of gypsum in the deposits, the lake

development might tend to the origin of inland sabkhas, with high evaporation of water in the latest stage before drying.

All the isolated Quaternary lacustrine deposits in the Wádí adh Dhamrán lie nearly at the comparable elevation, but this fact does not allow to state that their age is comparable.

Acheulean, Aterian and Neolithic stone artifacts repose on the surface of almost all the lacustrine deposits. Both the above mentioned fossils and stone artifacts enable us to assume the possibility of the ephemeral lakes existence over a relatively wide interval of time, from the Middle Pleistocene to the Holocene. Further details about their age cannot be obtained without radioisotopic dating.

Results of the radioisotopic investigation of some Quaternary lacustrine deposits on various localities of the Libyan Sahara confirm the possibility of the lake existence in various time from 163,000 BP (lake coquinas in Wádí ash Sháti', Fezzan) to 1,900 BP (Sarír Tíbistí and Kalanshiyú) according to Petit-Maire (1980) and Pachur (1980) respectively. Small salt lakes (sabkhas) exist until now in a broad vicinity of the Wádí adh Dhamrán (e. g. in the Wádí al Hayáh, Wádí ash Sháti', near Umm al Aránib and elsewhere).

As the existence of the lake depended mainly on rising of the ground-water level, the age of the lacustrine deposits may approximately coincide with the age of the ground-water. Klitzsch et al. (1976) quoted three main groups of ground-water age in the Fezzan according to the isotopic data:

30,000 to 20,000 yrs BP (Wádí ash Sháti', Al 'Aweynát, Trághan),  
11,000 to 7,000 yrs BP (Wádí al Hayáh, Murzúq, Ghodwah etc.),  
3,000 yrs BP (Ghodwah, Umm al Aránib).

The data for ground-water from Ghodwah refer to SW part of the Wádí adh Dhamrán, but also the other data are usable for the regional study. The ground-water older than 40,000 BP cannot be obviously evidenced by the used method.

In the recent period of the geological development in the desert conditions, the earlier deposits are affected by deflation. Fine particles are removed from the surface of dried and poorly cemented Quaternary deposits and some new geomorphological structures originate, e. g. pediments in the middle of the wádí and tors in its northern part.

## Archaeological Sites

Archaeological objects were found practically all throughout the Wádí adh Dhamrán, but mostly in the vicinity of the Quaternary lacustrine deposits. The eight most significant sites have been chosen for the description.

### SITE 336—6

Finding place of a Neolithic industry at the NW closure of the wádí, near the watershed (Fig. 2).

*Coordinates:* 14°48'20"E, 26°56'00"N.

*Finds:*

Sporadic occurrence of non-retouched flakes and blades. One ostrich egg-shell bead, square shaped. Fragments of greyish blue burnt ostrich egg-shells.

*Position:*

On the exposure of brownish red and yellow crustified argillaceous sandstone of the Mesák Formation.

*Raw material of the lithic artifacts:*

Imported white and light red translucent silicite.

*Comments:*

The finding place position at the wádí watershed makes possible to infer the sufficient amount of water in this area although it is out of the reach of the fossil lakes.

### SITE 336—7

Finding place of the Young Acheulean and Aterian industry in the northern part of the wádí (cf. Ziegert, 1978 and Svoboda, 1980).

*Coordinates:* 14°46'20"E, 26°50'15"N.

*Position:*

A low gravel terrace in the middle of the wádí, partly crustified (calcareous gypcrete).

*Finds:*

Handaxes of various degree of trimming and of various shapes were made mostly from cores, less from flakes. Their length varies from 66 to 221 mm (75 pieces).

Cleavers were made only from flakes using the dorsal retouch. Size of them is from 103 to 128 mm in length and from 81 to 90 mm in width (4 pieces).

Six pieces of polyhedral hammer about 80 mm in diameter.

Two lithic balls with peripheral groove, from 75 to 80 mm in the diameter.

Three pieces of a chopping tool.

One discoidal core with eight triangular flakes reposing in its neighbourhood.

*Raw material:*

Mostly dark brown to reddish brown quartzitic sandstone to conglomerate, less creamy yellow quartzite and pebbles of quartz in case of the chopping tools only.

*Comments:*

The occurrence of the lithic balls and the discoidal core together with the handaxes of small size may point to the transition from Acheulean to Aterian industry well-known in the Northern Africa (sbaikien).

SITE 336—8

A long-termed occupation site in the middle part of the Wádí adh Dhamrán (Fig. 3).

*Coordinates:* 14°42'00"E, 26°43'50"N.

*Finding Places*

A) Blade industry accumulation

*Position:*

Slight elevation covered with gravel approximately 1 m above the lacustrine deposits level. In the vicinity of the elevation, the chalky limestone is rich in fossil stalks of reed in the vertical position.

*Lithic artifacts:*

In the centre of the area, one fire place, two stone anvils shallowly pecked, and one stone palette with parallel grooves were found. The size of the anvils is approximately 200 × 100 × 100 mm of each one. The size of the palette is 70 × 50 × 10 mm.

In the vicinity of the above mentioned objects, mostly non-retouched blades and chips repose in an area of approximately 10 sq. m with average density up to 560 pieces pro 1 sq. m. The size of the blades varies from 20 × 5 × 1 mm to 75 × 25 × 10 mm. Beside those, 23 pieces of cylindrical to conical cores, one core scraper, two notches and one borer were found there.

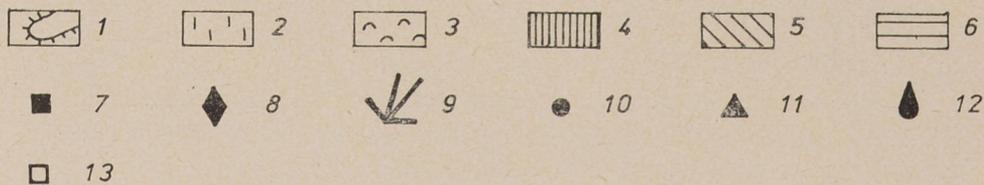
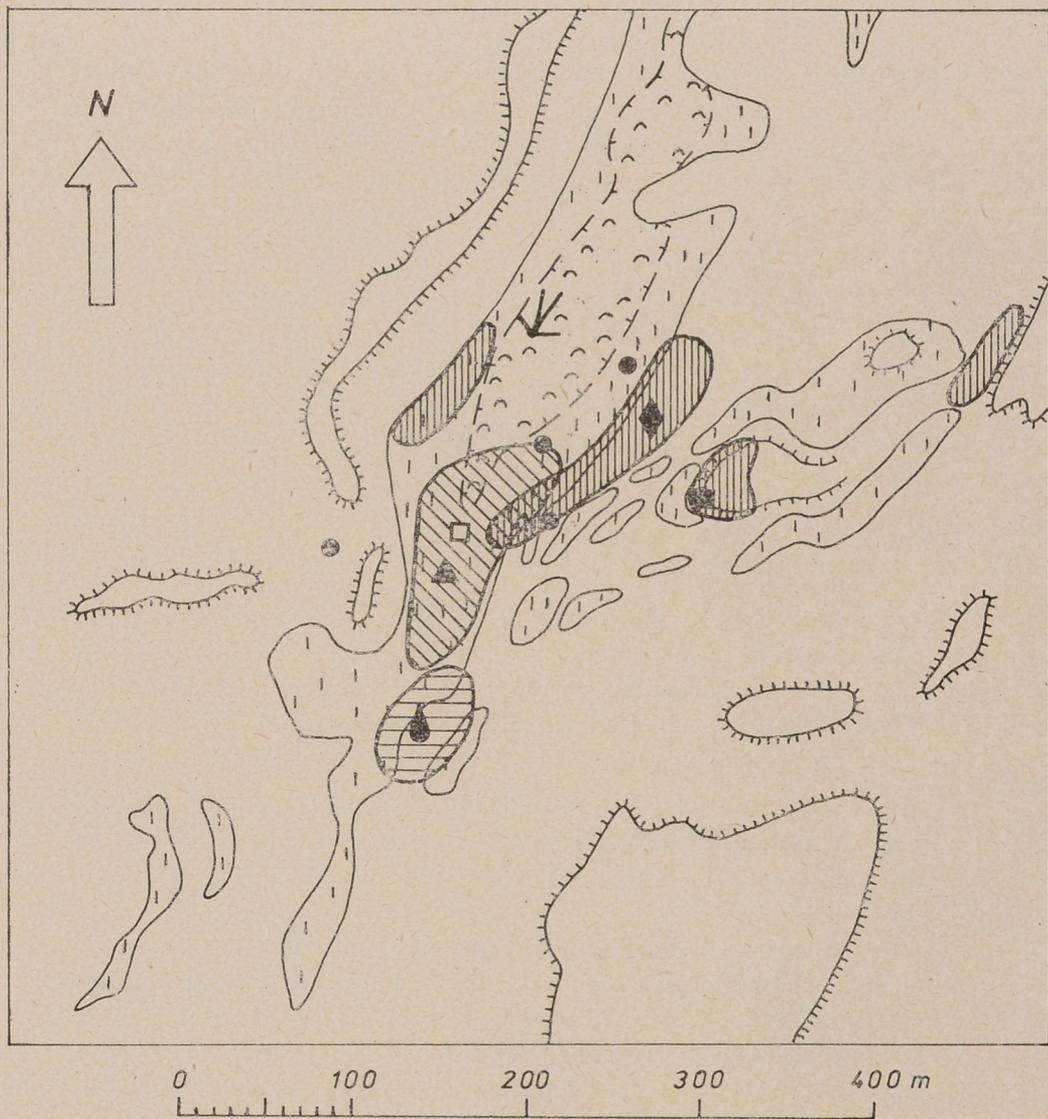


Fig. 3: Sketch map of the archaeological site 336—8. Explanation: 1 — slope; 2 — lacustrine deposits with imprints of the reed stalks; 3 — lacustrine deposits with the algal structure; 4 — area with Neolithic industry; 5 — area with Neolithic and Aterian industry; 6 — area with Acheulean industry; 7 — accumulation of blades; 8 — artifacts assemblage with arrow points; 9 — the structure; 10 — the grinders; 11 — artifacts assemblage with spear points; 12 — accumulation of the handaxes.

*Raw material:*

Imported semi-precious varieties of silicite prevail: white chalcedony with dark dendrites, red, yellow and brown jasper. Less often milky white silicite and greyish white and yellow quartzite of local provenance were used for making of lithic artifacts.

*Comments:*

This finding place may be considered a Neolithic workshop for the lithic industry.

The vertical position of the fossil reed in the surrounding lacustrine deposits (not broken by any activity of men or animals) probably testify to the purposeful detachment on the place from the shore area.

B) Artifacts assemblage with arrow points

*Position:*

The lithic artifacts repose in the strip along the probable lake shoreline on the sandy-gravel plain and to a lesser degree on the calcareous lacustrine deposits with imprints of reed stalks in the horizontal position. The size of the area is 160 × 30 m.

*Lithic artifacts:*

Beside the arrow points, a lot of burnt fragments of argillaceous sandstone and sandy limestone was found as well as the minor amount of blades similar to those in the previous finding place.

154 pieces of arrow points were used for the statistical evaluation of their shape (Fig. 4, Tables 1 and 2). The arrow points are 15 to 55 mm long, 5 to 18 mm wide and 2 to 8 mm thick. Their typological differences are shown on Fig. 4 and on Table 1. Beside the types "a" and "b" which may be used also as spear point, they are shaped by fine pressure retouch. According to a single piece of non-finished tool, the trimming was begun from the distal end on the dorsal face of the blade (Photo 1).

*Raw material:*

The arrow points were made mostly from imported varicoloured silicite as described on the last finding place. Beside this, the local milky white silicite was often used for points type "a" and "b".

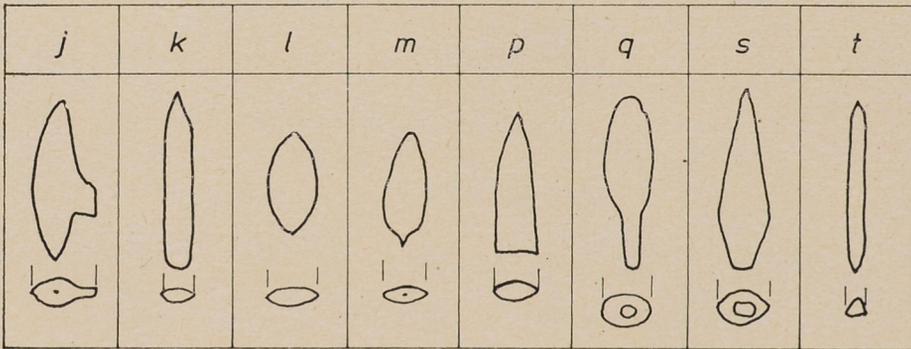
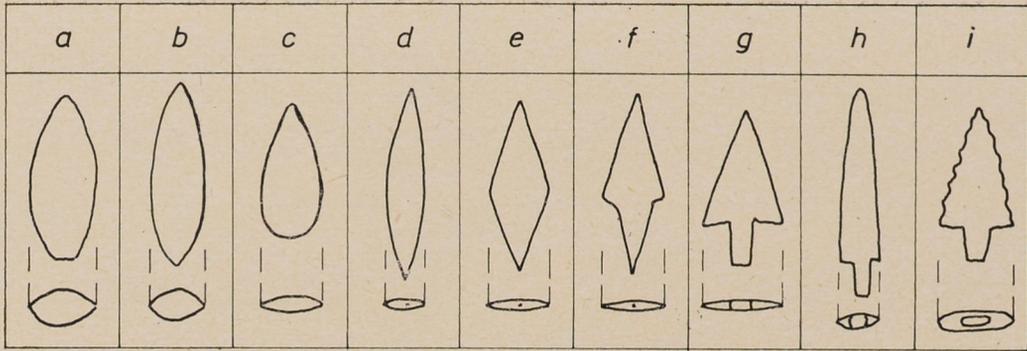


Fig. 4: Shape of the arrow points in the Wádí adh Dhamrán. For description see Table 1.

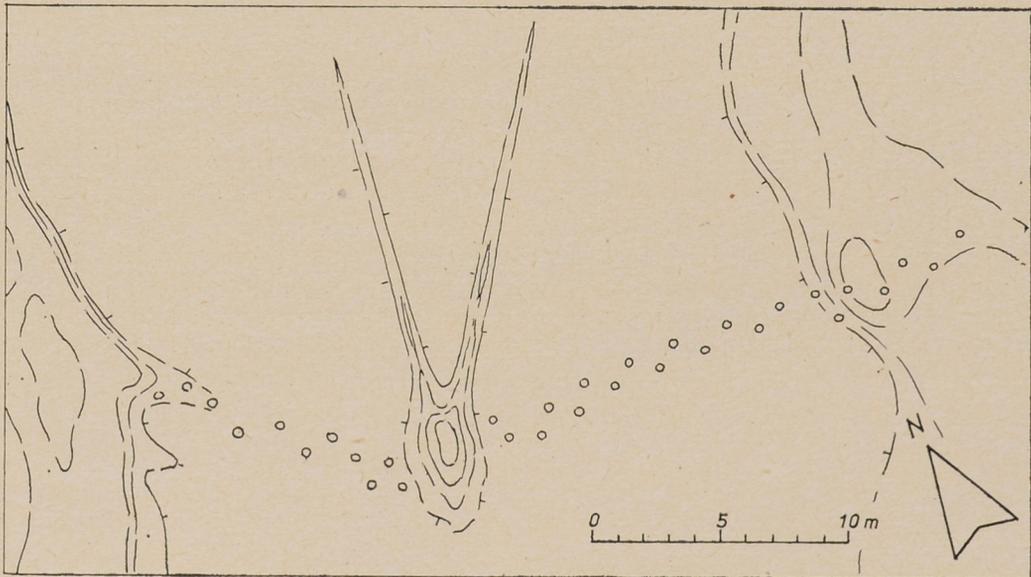


Fig. 5: Sketch map of the lake structure Site 336-8.

*Comments:*

The result of the typological classification of the studied points suggests a Neolithic age. No arrow points of "helwan" or

Type of arrow point	Description
a	bifacial point, with distal end pointed and basal end marked with striking platform mostly without retouch. Percussion retouch prevails over the rough pressure retouch. 30 to 60 mm long.
b	bifacial point with both ends pointed. Percussion retouch is common. The length reaches to 90 mm.
c	bifacial arrow point. The distal end is pointed, the basal one is semi-circularly rounded by trimming. Only the pressure retouch was observed.
d	bifacial arrow point with both ends well pointed. Very fine areal pressure retouch.
e	bifacial arrow point of rhomboidal shape. A pointed tang may be slightly marked. Flatted by areal pressure retouch.
f	bifacial arrow point similar to the type "e" with distinct pointed tang.
g	bifacial tanged arrow point having back hooklets, triangular shape, usually very thin.
h	bifacial tanged arrow point, elongated and narrow.
i	bifacial tanged arrow point with denticulated edges and of triangular shape.
j	bifacial point with both ends pointed and with side-tang. Areal pressure retouch.
k	bifacial arrow point, elongated. The distal end is pointed and the basal one is rounded by pressure retouch.
l	bifacial arrow point of oval shape, trimmed by areal pressure retouch.
m	bifacial arrow point with very thin body, slightly rounded distal end and small pointed tang.
p	bifacial arrow point of triangular to elongated shape with basal end truncated by one stroke.
q	bifacial tanged arrow point with rounded head, circular or oval in cross section
s	elongated bifacial arrow point of rhombus cross section with poorly trimmed basal end. Areal pressure retouch.
t	lanceolate arrow point of triangular or quadrated cross section.

Table 1: Typological classification of the arrow points found in the Wádí adh Dhamrán area

Type of arrow point	Number of pieces	%
a	15	9.7
b	17	11.0
c	7	4.5
d	21	13.6
e	5	3.2
f	5	3.2
g	3	1.9
h	7	4.5
i	1	0.6
k	5	3.2
l	10	6.5
m	15	9.7
p	42	27.3
non-finished	1	0.6
Total	154	99.5

Table 2: The number of various types of the arrow points from Wádí adh Dhamrán, Site 336—8, finding place B. For explanation see Table 1 and Fig. 4.

“ounanian” types and of triangular shape with concave basis well known e. g. from Tenere and Fayúm oases were found. The lack of any pottery makes possible to infer either the early pre-ceramic Neolithic settlement in this area, or the occasional short-term visits of hunters without a possibility of precise timing.

According to the criteria established by Bonnet (1926), and Hadaš and Vyskočil (1955), various purpose for some of the types of arrow points can be inferred: type “d”, “h”, “k”, “m” and “p” for the bird hunting, type “f” and “g” for fishing and type “c”, “e” and also “f” and “g” for hunting of bigger animals (antelope etc.).

About the men’s activity in this area the broken reed stalks in the lacustrine deposits may testify.

### C) Structure

#### *Position:*

A structure was found at the bottom of the wádí on the apparently youngest lacustrine deposits in the area of sandy chalk with algal structures (Fig. 3 and 5).

*Description:*

The structure consists of four banks situated fan-like symmetrically with the lake axis. The outer banks are discontinuous signed with series of piles arranged alternately to the left and right sides in the regular distances. The inner two banks are narrow and continuous including the sharp angle. To the South, the banks terminate at the bigger pile (Fig. 5, Photo 2).

*Building material:*

The banks were showered from the lacustrine sandy deposits. The algae grew on the elevations. During the later lithification, the banks were cemented with carbonates and sulphates. Now, the horizontal concentric lamination is marked by the deflation (Photo 3).

*Lithic artifacts:*

Very rare occurrence of bifacial blade points, fragments of artifacts (both from varicoloured silicite) and red burnt fragments of sandstone, all in probable secondary position near the building.

*Comments:*

The ground plan of the structure and its evident existence under the water level suggest that it was most probably used as a Neolithic fishing trap.

D) Grinders

*Position:*

Two stony grinders were found on the gravel terrace above the lacustrine deposits level and two others in the zone of lacustrine deposits with imprints of reed stalks.

*Description:*

The grinders consist of the basal plate and one or two crushing stones. The size of the basal plate varies from 250 to 500 mm. The shape of them is either nearly circular or oval (Photo 4). Crushing stones are always of regular „mushroom-like“ form up to 120 mm in diameter.

*Raw material:*

Porous slightly cemented sandstone with admixture of Fe oxide, or in one case quartzitic sandstone were used for the making of both parts of the grinder.

*Comments:*

We can point out several facts concerning the using of the grinders:

- the number of grinders is very low against the number of hunting tools and fire places, hence also against the total population of the area,
- no artifacts usable for agricultural purposes were found on this site,
- the size of the grinders is too small for the common grain crushing. The productivity for this type of grinder was experimentally established on 200 to 400 grams of meal per 1 hour (in Malinová and Malina, 1982), and
- the shape of the grinders is similar to those widespread on many Neolithic sites in the Northern Africa and Europe, as well as on recent sites of men on the low stage of society development.

These facts make possible to conclude that the grinders could not be used for processing of grown crop in a common scale. Using for processing of spice performed in India till now (personal communication of prof. Dr. Z. Pouba, DrSc., Charles' University, Prague), or processing of collected seed or leguminous plants performed by aborigines in Australia (Allchin, 1966) is more probable.

#### E) Artifacts assemblage with spear points

##### *Position:*

This assemblage was found in the outer zone of the lacustrine deposits with imprints of reed stalks near the southern closure of inner and lower zone of the deposits with algal structures. The size of the area is 150 × 60 m.

##### *Lithic artifacts:*

Beside debitage (blades and flakes), several fire places (accumulation of burnt rock fragments), scattered burnt rock fragments and various tools were found during the routine identification (Table 3). Among them the points prevail. To investigation of the proportional presence of the lithic artifacts, the complete evaluation of all artifacts presence on the area of 5 × 5 metres was performed. The results are shown in Table 4.

##### *Raw material:*

For the production of artifacts of various shapes and purposes different raw materials were used in different periods. The bifacial spear points were made from quartzitic sandstone and white silicite, both of local provenance and less from imported

Number of pieces	Tool
60	bifacial spear or arrow point, type "a" and "b"
23	bifacial spear point truncated
5	arrow point "c"
2	arrow point "d"
2	arrow point "e"
1	arrow point "j"
7	arrow point "l"
6	arrow point "p"
2	arrow point "q"
1	arrow point "q" with truncated tang
3	unifacial truncated arrow point
4	arrow point "t"
15	bifacial point fragments
27	unifacial spear point truncated
2	unifacial spear point bipolar (both ends pointed)
23	unifacial spear point (one end pointed, the second rounded)
2	blade point unretouched
1	discoidal core
1	convex side scraper
3	blade end scraper
3	round scraper
1	microlithic round scraper
1	borer
1	T-shaped end core scraper
1	burin on a blade
1	big unifacial point assymmetrically tanged
8	backed side scraper — lunate
1	polished axe
1	chopping tool
1	perforated stone

Table 3: Lithic tools found in the area with spear points occurrence during the route identification. Wádí adh Dhamrán, site 336—8, finding place E.

varicoloured silicite. The unifacial spear points, bigger scrapers, bigger debitage and perforated ball-shaped stone are from different varieties of quartzitic sandstone to quartzite. Small debitage, conical cores, arrow points and other small tools are made from varicoloured silicite. Light green basalt was used for the making of one small polished axe (Photo 6). The artifacts made from sandstone varieties having a dark desert varnish are slightly corroded by wind-blown sand.

*Other artifacts:*

One fragment of pottery and one unfinished ostrich egg-shell bead were found. The fragment of pottery is dark grey with thin brownish oxidation zone on its outer surface. Sandy clay

Artifact	Number of pieces	%
bifacial spear point bipolar	16	1.5
bifacial spear point truncated	33	3.0
unifacial spear point bipolar	1	0.1
unifacial spear point truncated	15	1.4
bifacial arrow point truncated	7	0.6
side scraper (lunate)	5	0.5
round scraper	3	0.3
cores, predominantly conical	26	2.4
debitage:		
up to 50 mm of the length not patinated	665	60.9
over 50 mm of the length not patinated	11	1.0
over 50 mm of the length dark patinated	10	0.9
red burnt stone fragments	300	27.4
Total	1092	100.0

Table 4: Proportional presence of the lithic artifacts in the investigation square, 5 × 5 metres. Wádí adh Dhamrán, site 336—8, finding place E.

with grass straw admixture was used as the raw material. The pottery is decorated with impressed zig-zag pattern and also probably with red coloured horizontal bands (Fig. 8). The ostrich egg-shell fragment was perforated, but not rounded.

*Comments:*

Some of the big uni- and bifacial points, scrapers and big patinated flakes made from local raw material are similar to those described from some of the Aterian sites of North Africa. The big, flat, assymmetrically tanged point reminds of the European young Palaeolithic type (e. g. from the Kostenki site, Ukraine).

Other artifacts made from imported varicoloured silicite belong to the Neolithic industry. The very sporadic occurrence of the pottery as well as the only one find of the polished tool may testify to the older stage of this stratigraphic unit.

The very frequent truncation of the points may be explained either as part of the design (making of a basal platform for the better setting to the handle), or as an unintentional fracture during the trimming (these artifacts should be considered a waste). The fragmentation of some small tools due to their using cannot also be excluded.

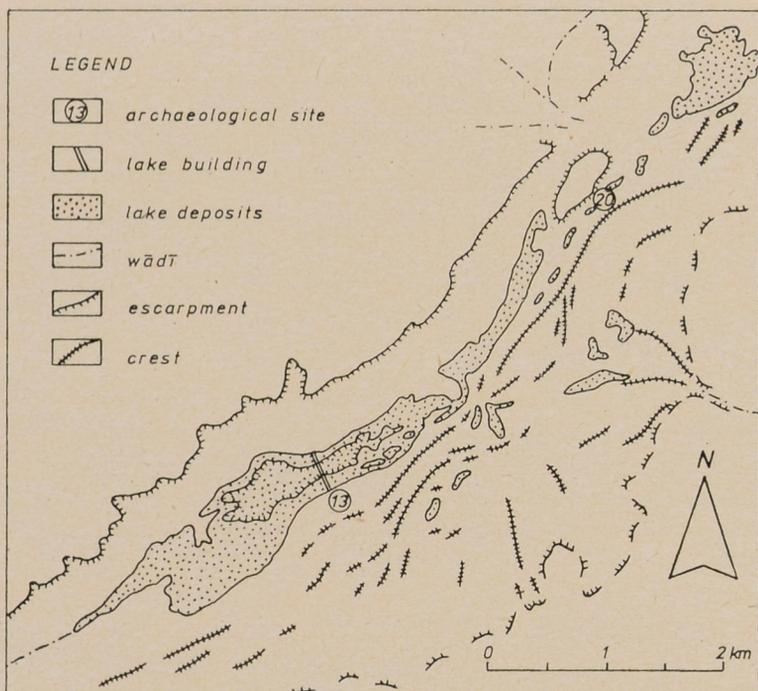


Fig. 6: Sketch map of the archaeological sites 336—13 and 336—20.

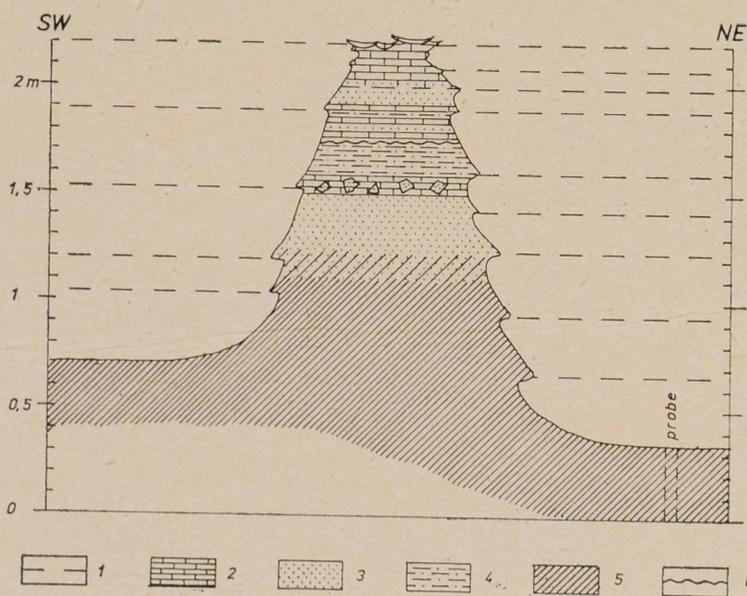


Fig. 7: Cross section of the rampart, Site 336—13. Explanation: 1 — fossil crust level; 2 — gypsiferous chalky limestone; 3 — sand; 4 — loam; 5 — gypsum; 6 — unconformity.

## F) Accumulation of handaxes

### *Position:*

Area of the relics of the calcareous lacustrine deposits and the gravel terraces at the bottom of the wádí, sized approximately 50 × 70 metres.

### *Lithic artifacts:*

16 pieces of handaxes were found. Their size varies from 88 × 63 × 19 mm to 147 × 90 × 30 mm. All the tools are slightly arched in the longitudinal profile. They were prepared from the big flakes by the rough unifacial trimming with percussion re-touch mostly of their distal end only. The basal striking platforms are usually well preserved as well as the ventral faces with a very flat bulb.

### *Raw material:*

Grey, brown and brownish yellow quartzitic sandstone of the Mesák Formation of the local provenance. All the artifacts are patinated and their edges are slightly rounded by deflation.

### *Comments:*

The handaxes belong to the Acheulean industry. Because they repose in the similar geological position and at the same elevation as the artifacts assemblage with the spear and arrow points of prevalently Neolithic elements, this accumulation can serve as an evidence for the long time vertical stabilisation of the wádí bottom.

## SITE 336—9

Finding place of the Neolithic industry in the E tributary of the Wádí adh Dhamrán.

*Coordinates:* 14°45'50"E, 26°41'00"N.

### *Position:*

Shallow depressions filled with sand and gravel in between the elevations of ferruginous conglomerate and quartzitic sandstone.

### *Finds:*

Many fire places occur on the area of several sq. km. Sporadic debitage and burnt ostrich egg shells repose among them. Beside those six arrow points were found (types "b", "c", "d", "e", "j", and "k" for the one) and one bifacial truncated point.

*Raw material:*

The fire places consist of small piles of burnt rocks, especially red coloured sandstone and dark grey limestone secondary enriched in carbonaceous admixture. Imported light red, brown and yellow silicite and local white silicite were used for the lithic artifacts making.

*Comments:*

This finding place can serve as an example of the position of the firing places, which were usually situated rather far from the lake area in tributary valleys and on the plains. In Fezzan, fire places of such type commonly occur probably along the old routes, e. g. across the Sarír al Qattúsah, on the sand sheet of Indhán Awbárí and elsewhere. According to the C<sub>14</sub> dating presented by Gabriel (1978), three periods of the fire places origin may be distinguished in this area:

- the older period from 5500 to 3700 BC,
- the main period from 3700 to 3400 BC and
- the younger period from 3400 to 2000 BC.

On the Sarír al Qattúsah, however, the age of as much as 8000 BC was determined.

SITE 336—12

Finding place of Aterian and Neolithic artifacts 11 km NE of Bi'r adh Dhamrán (an extinct well).

*Coordinates:* 14°37'00"E, 26°39'00"N.

*Position:*

The artifacts are accumulated on a very low elevation of 50 × 30 m size, 30 cm above the large plain in the middle of the Wádí adh Dhamrán. The elevation represents an outcrop of the soft greenish grey argillaceous sandstone of Tertiary age, surrounded by Quaternary lacustrine deposits. Those are free of any artifacts. All the area is strongly affected by the deflation.

*Finds:*

Beside the various debitage, a small amount of tools repose there as shown on the Table 5. Small arrow points with fine areal pressure retouch were not found.

*Raw material:*

Most of the big bifacial points, scrapers and their fragments were made from milky white silicite (including the polished

point). For making of others, light brown to rusty brown quartzitic sandstone was used (these artifacts have a rusty-brown patina). Both raw materials are of local provenance.

Use of the imported varicoloured silicite is scarce, limited on some of smaller bifacial truncated points and arrow points.

Coarse grained argillaceous sandstone was used for the plate grinder.

Tool	Number
bifacial point — over 60 mm of the length	6
bifacial truncated point and its fragment	16
bifacial point partly polished	1
bifacial arrow point of type "s"	1
unifacial arrow point, bipolar	1
side scraper	3
oval plate grinder, size 400 × 300 mm	1
jointed burnt handaxe found in a fire place	1

Table 5: Lithic tools found on the Site 336—12 during the route identification.

*Comments:*

Very little information is available concerning the dating of the human presence in this locality. Some of the well trimmed leave-shaped bifacial spear points are probably Aterian (Photo 8). On the other hand, the grinder, polished point and the evident import of the exotic raw material testify to the human occupation of the area in the Neolithic.

SITE 336—13

Long-termed occupation site 16 km NE of Bi'r adh Dhamrán (Fig. 6).

*Coordinates:* 14°39'45"E, 26°40'30"N.

*Finding Places*

A) Rampart

*Position:*

The rampart crosses the 6 km long and 0.6 km wide dry lake basin filled with Quarternary lacustrine deposits at the bottom. The lacustrine deposits are deeply eroded by deflation in the middle of the fossil lake.

*Description:*

The narrow rampart stretches from the NW to the SE in the direction of  $328^{\circ}$  and in the length of 160 m. Its maximum height reaches up to 1.4 m in the deepest part of the lake basin and the average width is 1 m at the uppermost part (Fig. 7). On the both side slopes of the rampart, several gypcrete horizons mark the steep decreasing of the shoreline during the lake drying in the past (Photo 9 and 10). The basin bottom is deeper in its NE part approximately by 25 cm.

*Material:*

The rampart body was built of the local lacustrine deposits. The interbedding of sandy loam and gypsiferous chalky limestone to calcareous gypsum is visible on the cross section of the rampart (Fig. 7). Thick layer of sandy gypsum underlies this sequence. In the upper limestone and gypsum layer, algal structures and rare imprints of the bulrush were found, while in the sandy loam small fragments of coaled wooden fragments occur. Rare fossil root structures were observed at the bottommost gypsum layer.

*Lithic artifacts:*

Only three small flakes and one arrow point of type "g" were found on the bottom of the lake basin near the SE end of the rampart.

*Comments:*

The origin and the purpose of the rampart are not clear and should be investigated. Two ways of possible explanation may be accepted:

1) The lake bottom deposits might be pushed together till the top of the bank is nearly on the former water level elevation. The algal structures in the upper part of the rock sequence and its calcification testify to the building position under water level at least temporarily. The bank could serve as a paved path across the lake and later as a dam during the seasonal decreases of the water level. The straight-lined course of the structure, well differing from other natural morphological structures in the field and in the areal photographs, may testify to the artificial and purposeful origin of the lake structure.

2) Less acceptable but not excluded idea is derived from the observation of the paths in the contemporary populated swampy

areas. Due to the repeated loading of the muddy deposits they are homogenized and stabilized and their content of interstitial water is squeezed out. During the later deflation of the dried deposits, the loose material is removed and the solid part is weathered out as an elevation. This type of structure, however, is usually less prominent and more tortuous as the structure under study.

The age of the rampart is limited only to the wet stage of the lake basin, i. e. at least Neolithic if not older. The Neolithic human presence, however, seems to be confirmed with the find of an arrow point.

#### B) Artifacts assemblage with eight-form axes

##### *Position:*

SE slopes of the wádí and small relics of the river terraces 2 to 5 metres above the fossil lake level. The surface is covered with crustified coarse grained sand and gravel.

##### *Finds:*

Beside the unidentified flakes, five pieces of the eight-form axes and one undoubtedly Aterian perfectly trimmed bifacial spear point (Photo 8) were found.

##### *Raw material:*

All the tools were made from dark quartzitic sandstone of the local provenance.

##### *Comments:*

The eight-form axes in the assemblage with handaxes and other artifacts including Aterian industry were studied by Ziegert (1978) in the Wádí al Hayáh (Site Budrinna) and in the Wádí 'Atabah. He proposes the Acheulean age. In comparison of the above mentioned areas, no handaxes were found on our site. The presence of the Aterian point together with the eight-form axes may demonstrate the continuity of the Acheulean and Aterian industry in the Fezzan.

#### SITE 336—14

Finding place of the Neolithic fire places and industry in the SW end of the Wádí and Dhamrán, approximately 15 km E of the road from Sabhá to Trághan.

*Coordinates:* 14°21'00"E, 26°30'30"N.

*Position:*

On the silty slope- and fluvio-eolian deposits in the bottom of wádí, near small relics of the Quaternary lacustrine deposits.

*Finds:*

Numerous piles of burnt rock fragments are the main type of the fire places. Beside those, several shallow pits with burnt rim represent another type of the fire places. The diameter of the nearly circular pits reaches up to 30 cm, the depth from 20 to 30 cm. Also several piles of burnt loam were observed, situated on line across the valley in the NW - SE direction.

Rare lithic artifacts repose on the surface, mostly unretouched flakes only. One bifacial arrow point of type "d" was found.

*Material of the fire places:*

Local argillaceous and quartzitic sandstone secondary of the reddish colours is the only material of the fragment piles.

The shallow pits for the second type of the fire places were hollowed in the light brown silty loam. The burnt rim of the pits is to 30 mm thick. The results of the X-ray diffractography do not display any changes in the clay minerals structure of the burnt material. Also the soaking of the burnt material is without changes in comparison with the original one. The light red colour of the burnt material is due to the dehydration of the Fe - oxides. Thus, the ignition temperature from 380° to approximately 600° may be estimated.

*Comments:*

To the question of the fire place age the comments for Site 336—9 can be related.

SITE 336—20

Finding place of the eight-form axes (cf. Ziegert, 1978) in the middle part of the Wádí adh Dhamrán.

*Coordinates:* 14°41'05"E, 26°41'35"N:

*Position:*

A narrow valley between two longitudinal crests approximately 5 metres above the Quaternary lacustrine deposits level mentioned on the Site 336—13. The tools repose on light grey, soft, fine and very loose soil material deprived in easy soluble gypsum and calcareous cement, partly covered with thin evaporite crust and eolian sand.

*Finds:*

16 pieces of the eight-form axes were found sized up to 39 cm in length, 27 cm in width and 17 cm in thickness (Photo 11).

*Raw material:*

Dark brown quartzitic sandstone of the local provenance.

*Comments:*

The occurrence of the eight-form axes is not accompanied with any other artifacts typical for the Acheulean industry as commented Ziegert (1978) in the Wádí al Hayáh. Consequently, the relation of the eight-form axes to this industry cannot be evidenced on our locality.

### C O N C L U S I O N S

1) A new area with archeological finds in the Wádí adh Dhamrán (Fezzan, Libya) is preliminarily described. As an example, two long-termed occupation sites, two Acheulean to Aterian sites, three Neolithic sites and one site of problematic age were chosen for the description of some details.

2) Most of the finds are concentrated in the vicinity of the Quaternary lacustrine deposits in the wádí bottom.

3) Among all finds, the lithic artifacts prevail. Beside those, two Neolithic lake structures and numerous fire places of two types were found.

4) Due to the deflation, the lithic artifacts of various age usually repose on the hard surface never in superposition showing the progress of the deposition and development of the industry. That is why, the archaeological finds can be used for the Quaternary stratigraphy to a limited extent only. In general, however, the older finds lie farther from the central part of the fossil lakes, while the Neolithic finds, excluding the fire places, are usually closer to the youngest lacustrine deposits in the middle of the lake basins.

5) The position of the Acheulean and Aterian industry confirms their close time connection. According to the geomorphological development of the Wádí adh Dhamrán, especially to the lake development, we can infer that those groups of the artifacts may be manufactured in the same palaeoclimatic period. The younger

Acheulean age of the eight-form axes as inferred Ziegert (1978) stay still problematic in the Acheulean / Aterian assemblage, because they were found either isolated from the other Acheulean artifacts, or binded rather with the Aterian industry.

6) According to the pattern of the neolithic industry we can infer mostly the preceramic stage of the population development and the hunters and fishers community in this area.

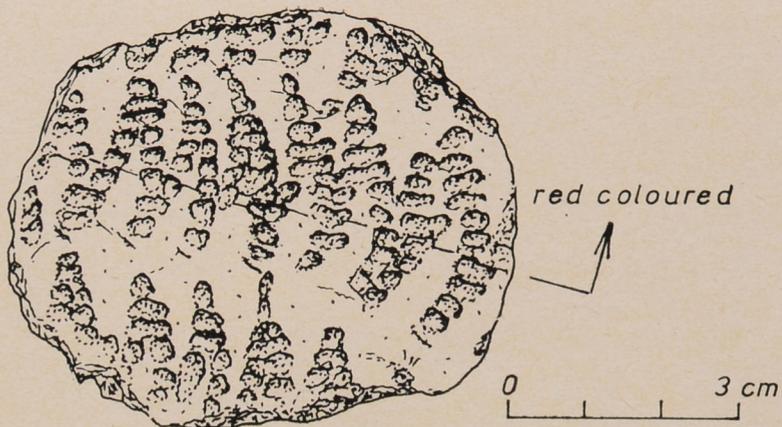
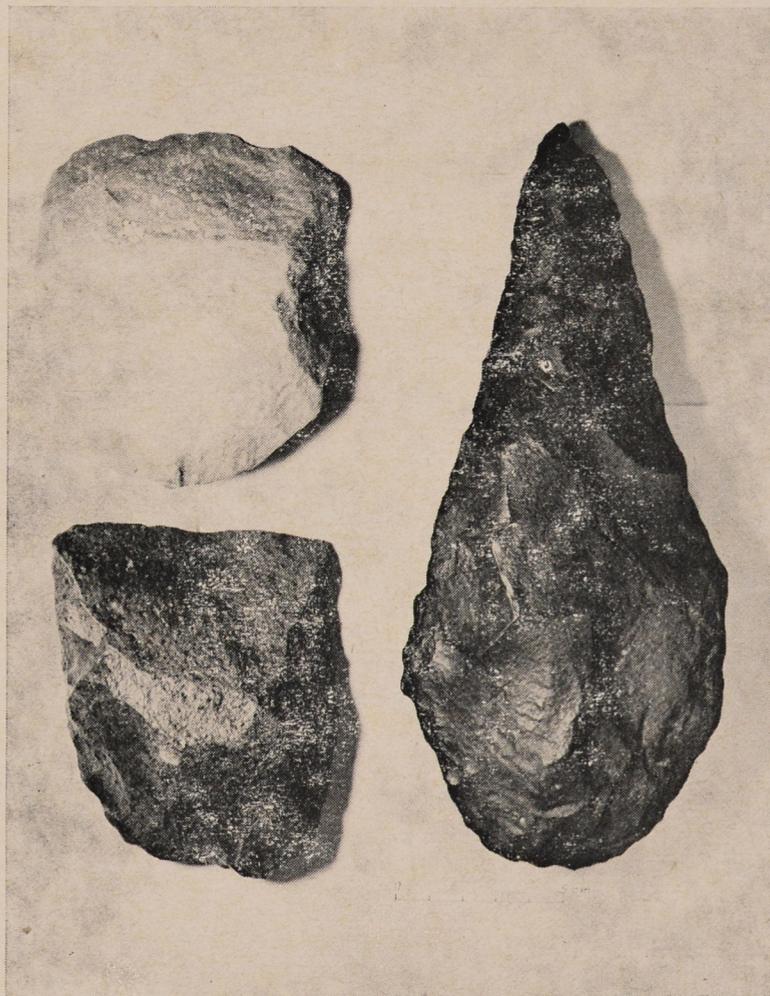


Fig. 8: Pottery fragment. Site 336—8.

Photo 1: Acheulean industry, Site 336—7.



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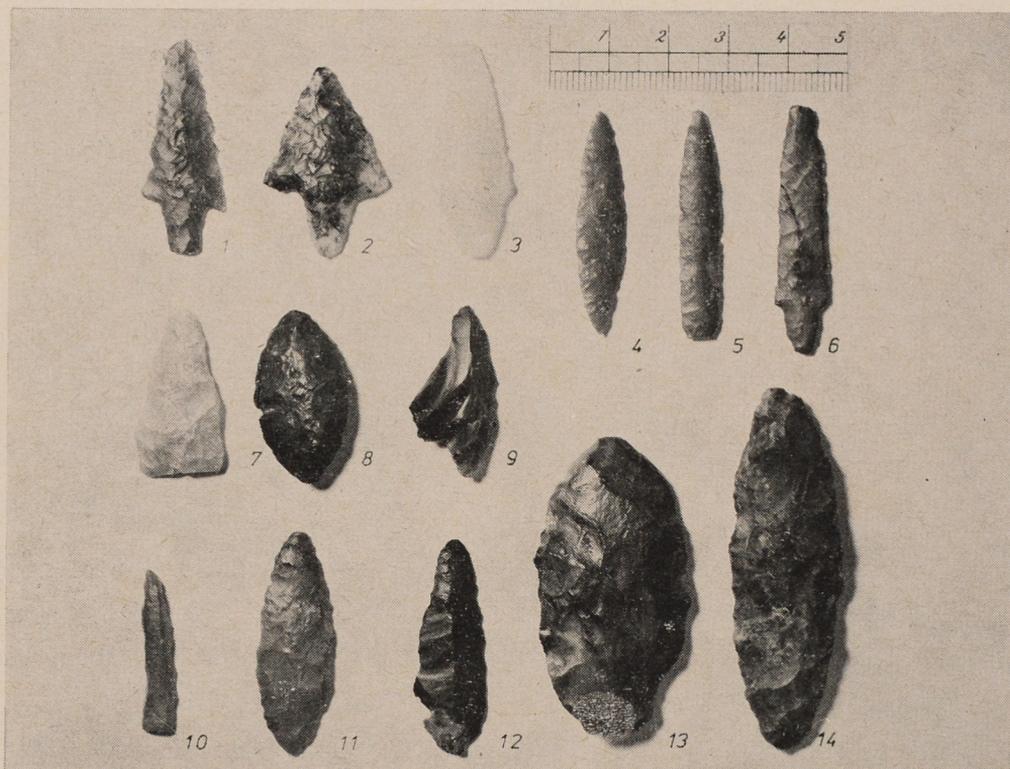


Photo 2: Neolithic arrow points, Site 336—8. Point No. 12 is unfinished. For classification see Fig. 4 and Table 1.

Photo 3: Lake structure, Site 336—8.

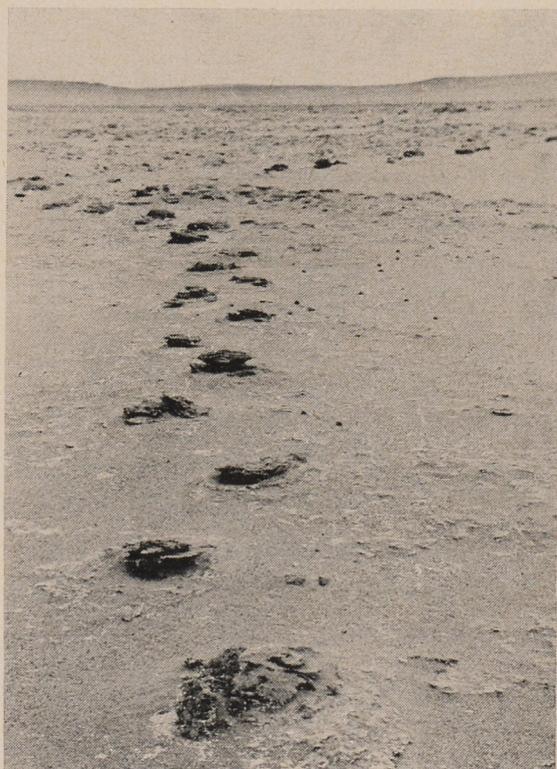




Photo 4: Shape of the pile, lake structure, Site 336—8.

Photo 5: Neolithic grinder, Site 336—8.



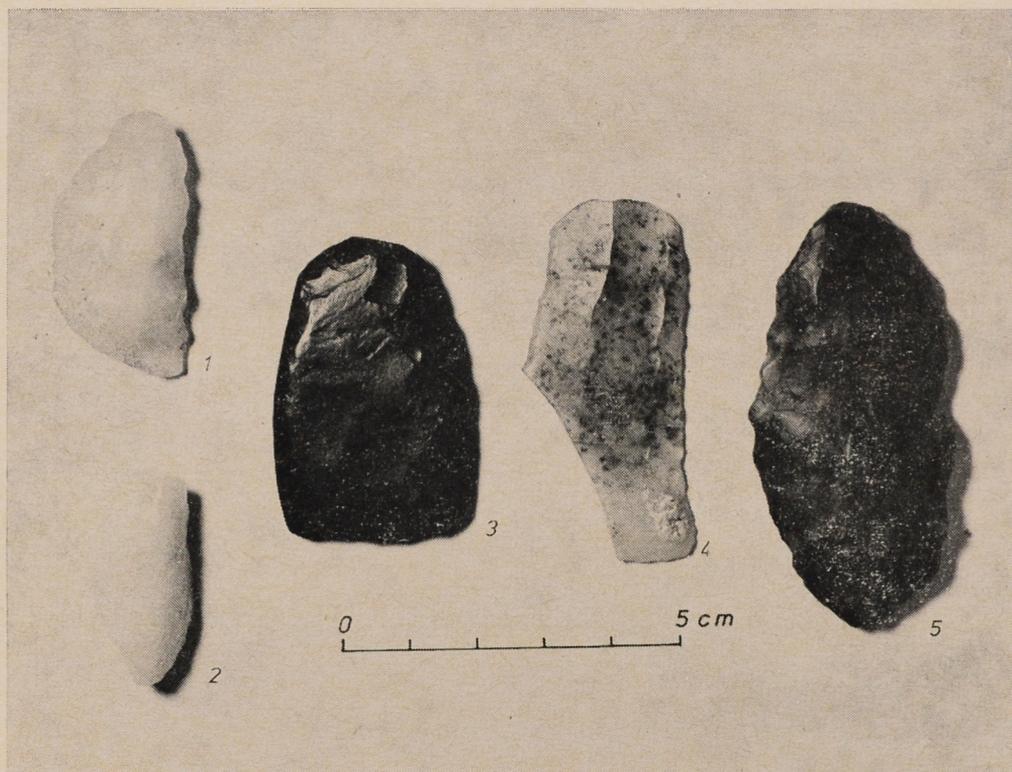


Photo 6: Neolithic industry, Site 336—8. Explanation: 1 — scraper; 2 — cortex core; 3 — polished axe; 4 — blade end scraper; 5 — bifacial point.

Photo 7: Aterian industry, Site 336—8. Explanation: 1 and 2 — scrapers; 3 — triangular bifacial tool; 4 — assymmetrically tanged point.

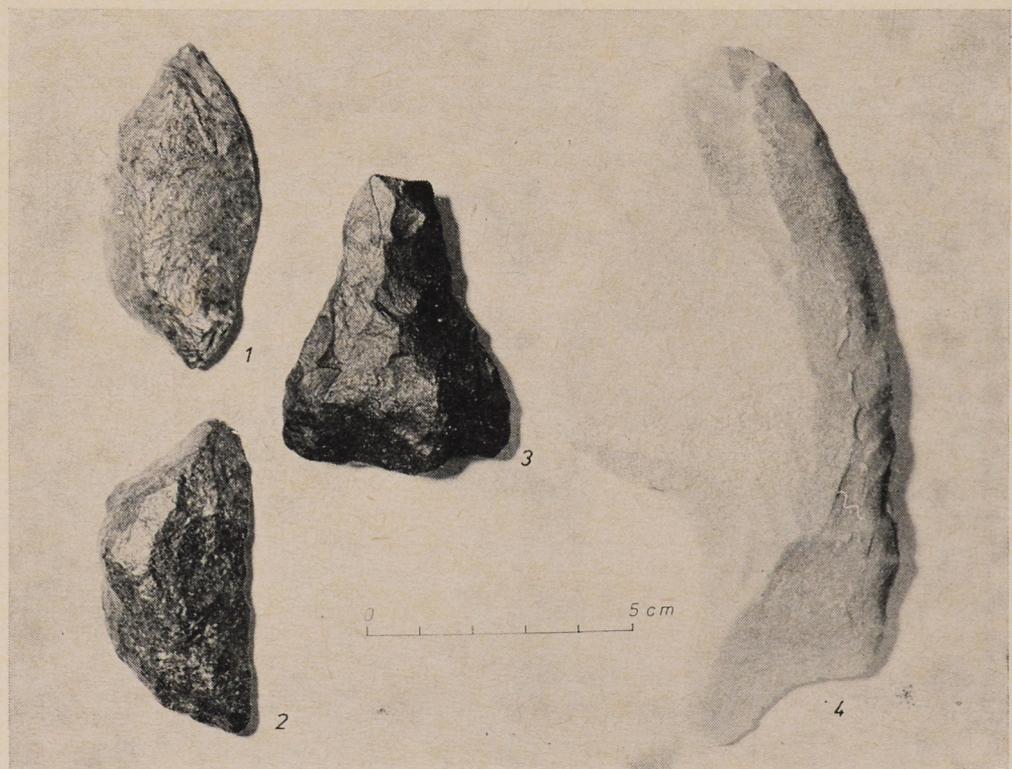




Photo 8: Aterian points. Explanation: 1 — unifacial point, Site 336—8; 2 — bifacial point, Site 336—13; 3 — bifacial point, Site 336—12.

Photo 9: The rampart, Site 336—13.





Photo 10: Fossil crust levels (traces of the former shoreline on the side-slope of the rampart). Site 336—13.

Photo 11: Eight-form axes, Site 336—13 (left), Site 336—20 (right).

