CENTRUM im. Kazimierza Michałowskiego ARCHEOLOGII Śródziemnomorskiej

Title**: Ground and pecked stone industry of Bahra 1, an Ubaid-related settlement in Northern Kuwait**

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Journal: *Polish Archaeology in the Mediterranean* 22 *(Research 2010)*

Year: 2013

Pages: 569–586

ISSN 1234–5415 (Print), ISSN 2083–537X (Online)

Publisher: Polish Centre of Mediterranean Archaeology, University of Warsaw (PCMA UW), Wydawnictwa Uniwersytetu Warszawskiego (WUW)

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GROUND AND PECKED STONE INDUSTRY OF BAHRA 1, AN UBAID-RELATED SETTLEMENT IN NORTH KUWAIT

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Abstract: The archaeological site of Bahra 1 exemplifies permanent settlement in the Kuwaiti Gulf, in this case apparently specialized in the manufacture of shell adornments. The lithics discovered at the site are strongly related to this specialization. The present article concerns the ground and pecked stone industry, which forms only a small part of the lithic assemblage from the site, but which appears to have been an important element. It includes a general characteristic of the industry, brief description of the most common raw materials, based on geological and petrographic identification, as well as a detailed classification of the tool types. A functional diversification of the industry and its spatial distribution follow.

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INTRODUCTION

The ground and pecked stone industry presented in this paper comes from the Ubaid-related settlement of Bahra 1 located in the Al-Sabbiya region of Northern Kuwait, where excavations are being carried out by Prof. Piotr Bieliński under an agreement between the Polish Centre of Mediterranean Archaeology University of Warsaw and the National Council for Culture, Arts and Letters in Kuwait (Bieliński 2011; 2012). The assemblage collected in the course of four seasons of fieldwork (2009–2012) consisted of 120 artifacts, including 78 heavy-duty tools, 17 tested nodules and 25 flakes, making up about 0.3% of the total stone artifact count from the site [*Table 1*].

From a typological point of view, the artifacts represented 13 different groups and varieties of tools, identified based on R.F. Mazurowski's classification list (see Mazurowski 1997). The small number as well as diversification of tool types and varieties are the most characteristic features of this industry, which is generally opportunistic. All the pieces were made of locally available raw material, which was typically selected to be closest in shape to

the intended product, facilitating thus the making of the tool. The number of tools per locus was small, usually no more than two or three per locus. Heavy-duty tools connected with food preparation were represented by single examples. The largest number of tools was connected with processing of mineral and organic raw materials. The evidence is there to consider the Bahra 1 industry described in this paper as a small but important part of the lithics assemblage as a whole, specialized in the manufacture of shell adornments (see Białowarczuk 2012).

Table 1. The Bahra 1 ground and pecked stone industry classified by tool description (omitting classes not represented in the material) (Classification after Mazurowski 1997)

Group		Class / variety	Total quantity	Raw material
I	*Bolas* balls	IA	7	Fine-grained sandstone (soft)
II	Querns	IIB1b	1	Fine-grained sandstone (cemented by silica)
III	Grinders	IIIE1b	6	Different-grained sandstone (cemented by silica)
		IIIE2b	2	
		IIIF1	1	
IV	Mortars	IVA1	1	Sandstone
V	Mortar pounders	VD2	1	Siliceous rock
VI	Hammerstones	VIA	7	Quartz
		VIB	1	Fragile siliceous rock
		VIC	2	Quartz
VII	Celts/axes	VIIA1a	4	Quartz and fine-grained sandstone (cemented by silica)
VIII	Adzes	VIIID	1	Quartz
IX	Polishing tools, plates, trays	IXB1	13	Sandstone
		IXE1	2	
		IXD2	1	Granite
XI	Pointed tools	XID	8	Siliceous rock
XII	Pebbles with traces of blows, smoothing and polishing; stone flakes	XIIA	17	Different kinds of rocks
		XIIC	5	Metamorphic sandstone (cemented by silica)
		XIID	25	Different kinds of rocks
XIII	Composite tools	XIIIA	1	Volcanic rock with large pyroxene content
		XIIIE	4	Different-grained sandstone (cemented by silica)
XX	Choppers	XXA	5	Siliceous rock
		XXB	5	

RAW MATERIALS

Production of tools was determined by the characteristic properties of available raw material, the selection of which was opportunistic and expedient, using whatever fell in hand in the vicinity of the site and reusing old, exhausted tools and debitage. Petrological expertise[1] has confirmed the use of various local sandstones, usually well cemented by silica, as well as Pliocene or Quaternary alluvial or proluvial sediments, accumulated in seasonal rivers, known from all over Kuwait and the neighboring areas. Quartz pebbles and trachytoid volcanic rocks, naturally available in the vicinity of the site [see ***Table 1***], were used chiefly for heavy-duty tools (i.e., polishing plates, anvils etc.), but some small tools, such as chisels occurred in this material as well. Some of these rocks and stones bore visible traces of pounding on their surface, suggesting their use as hammerstones.

TOOL CLASSIFICATION

The assemblage, which counts 120 identified artifacts, included examples of 13 of the 21 groups of tools distinguished in the classification developed for the ground and pecked stone industry of Pre-pottery Neolithic in Northern Iraq (Mazurowski 1997) [***Table 1***]. Missing groups included maceheads (Group X), whetstones (Group XV), whistles (Group XIX), vessels and representations (Groups XIV, XVI, XVII and XVIII). All the pieces in the assemblage were identified to groups.

GR. I. *BOLAS* BALLS [*Fig. 1:4,6*]

Six of the seven artifacts in this group are flattened fragments, one is a complete form. All belong to class IA: spherical or ovoid, crushing present all over the surface. Diameters are similar, ranging from 3.9 cm to 6.6 cm. All the analyzed tools were made of soft fine-grained sandstone, without traces of lamination.

GR. II. QUERNS

The one fragment of a quern that was discovered can be classified as variant IIB1b: an oval trough-shaped form, but with a bowl-shaped depression in the centre [***Fig. 2:6***]. The tool was made of a fine-grained, very well cemented sandstone. The preserved fragment measured 21.5 x 19 x 9.6 cm; the depression was approximately 3 cm deep. The edges and bottom bear traces of smoothing.

GR. III. GRINDERS

Grinders constituted the most numerous group. Six of the nine artifacts belong to variant IIIE1b [***Fig. 3:2,4***]: circular or oval unilateral grinders with working traces on the lateral edge. They were usually made of natural, discoid or plano-convex pebbles of different-grained sandstone, well cemented by silica. They range between 6.6 cm and 9.2 cm in diameter and are

[1] Petrographic examination of samples of the raw material (19) by geologist Dr. Maciej Krajcarz from the Institute of Geological Sciences, Polish Academy of Sciences; on-site examination of stone by geologist Hubert Kiersnowski from the Polish Institute of Geology.

1.5–4.5 cm thick. Another variant, IIIE2b, represented by only one artifact, is nearly the same, but bilateral. The remaining two of the nine tools were classified as variant IIIF1 [*Fig. 3:1*]: plate-shaped, unilateral grinders, made of a flat subrectangular slab of sandstone, about 3 cm thick. In one case, the grinder had visible traces of a single scar on two opposite side edges, probably for hold improvement.

GR. IV. MORTARS

The single identified fragment of mortar can be classified as variant IVA1 [*Fig. 2:5*]: unilateral mortar with one bowl-shaped depression. It was made of sandstone and has traces of polishing on the lateral edges. The dimensions are 8 x 11.5 x 5.2 cm; the depression is 5 cm in diameter and 1.7 cm deep.

GR. V. MORTAR POUNDERS

The complete mortar pounder can be classified as variant VD2 [*Fig. 4:5*]: double-pole pounders made of natural elongated pebbles. It was made of a natural pebble of siliceous rock, its dimensions 12.3 x 5.5 x 3.6 cm. Characteristic are two knapping scars on the opposite side edges, which create small depressions for hold improvement.

GR. VI. HAMMERSTONES

This large group is composed of ten artifacts of three classes: VIA, VIB and VIC. Seven tools were classified as class VIA: single-pole hammerstone [*Fig. 4:1,2*]. They were mostly made of natural quartz pebbles of different size, from 4.2 x 6 x 2.9 cm to 10.5 x 7.2 x 3.7 cm. In one case, the hammerstone was made of sandstone

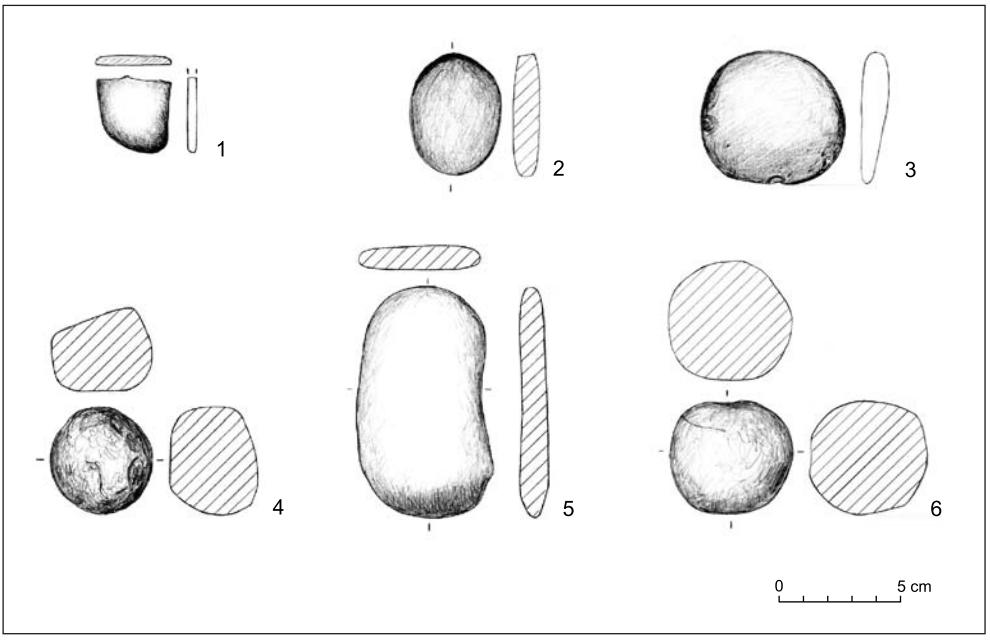

Fig. 1. Bahra 1. Stone tools of groups I and XII: bolas balls of class IA (4,6); oval flat pebbles with traces of polishing of class XIIC (1–3,5) (All drawing E. Hander; digitizing U. Wicenciak)

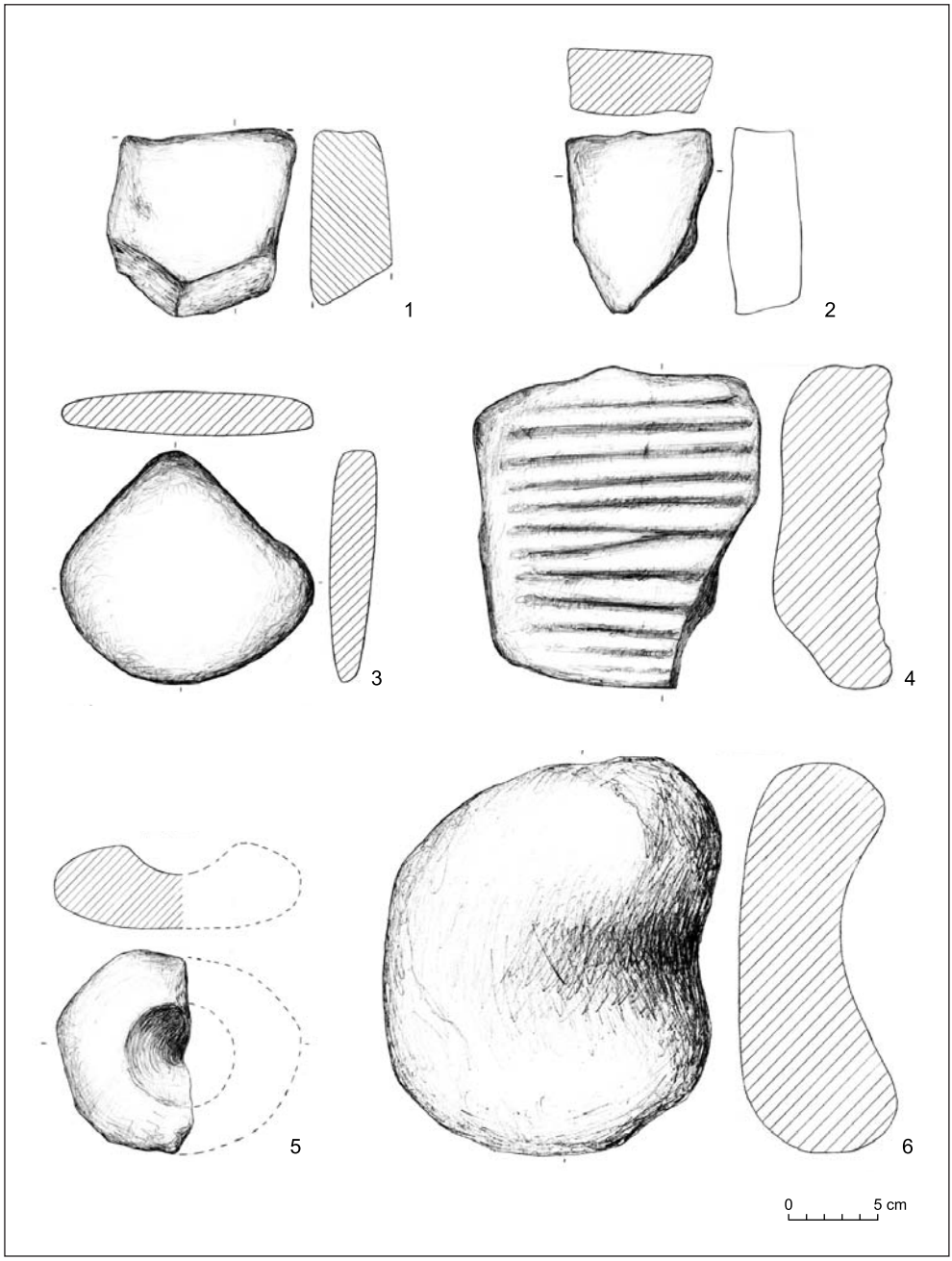

Fig. 2. Bahra 1. Stone tools of groups II, IV and IX: polishing plates of variety IXB1 (1–4); mortar variety IVA1 (5); quern of variant IIB1b (6)

with a large quartz content. Similar to some grinders and the mortar pounder described above, two hammerstones had single scars on two opposite side edges, forming small depressions for hold improvement.

Class VIB is represented by a single complete double-pole hammerstone made of fragile siliceous rock, probably coming from the Dibdibba formation [*Fig. 4:4*]. It measured 10 x 7 x 4.8 cm.

The last two artifacts in this group were classified as class VIC: edge hammerstones [*Fig. 4:3*]. They were circular, approximately 5–6 cm in diameter, plano-convex or elliptic in transverse section. Evidence for numerous blows around the circumference is characteristic of these tools. In one case, traces are visible on lateral surfaces as well. Both were made of quartz pebbles.

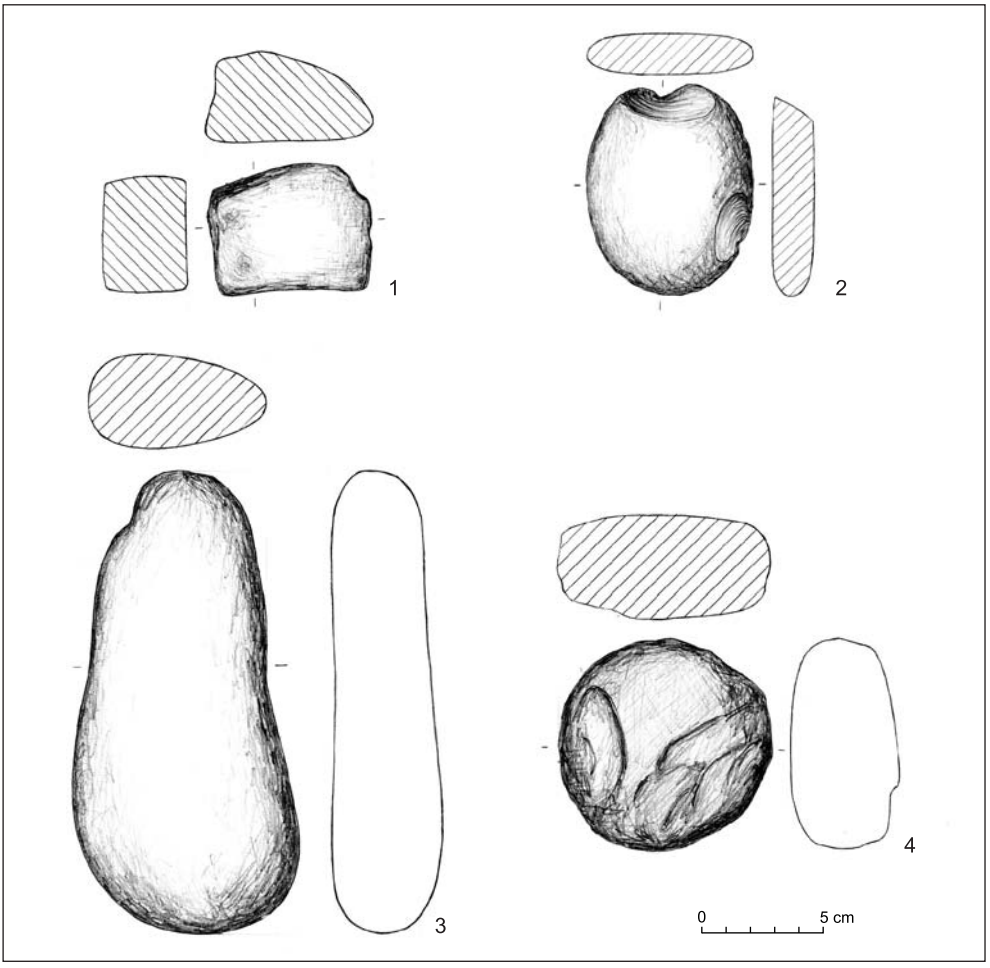

Fig. 3. Bahra 1. Stone tools of groups III and XIII: grinder of variety IIIF1 (1); variant IIIE1b (2,4); combined tool of class XIIIA (3)

GR. VII. CELTS/AXES

The four semi-products of axes in this group represent variant VIIA1a: two-sided trapezoidal axes with oval transverse section [*Fig. 5:1,3,4*]. Two of them were made of quartz pebbles and the others from quality, fine-grained, well cemented sandstone. In each case the symmetric edge was polished. Traces of double-sided forming were visible around the rest of the circumference. Dimensions ranged from 6.9 x 6.4 x 3 cm to 10.5 x 8.5 x 3.1 cm.

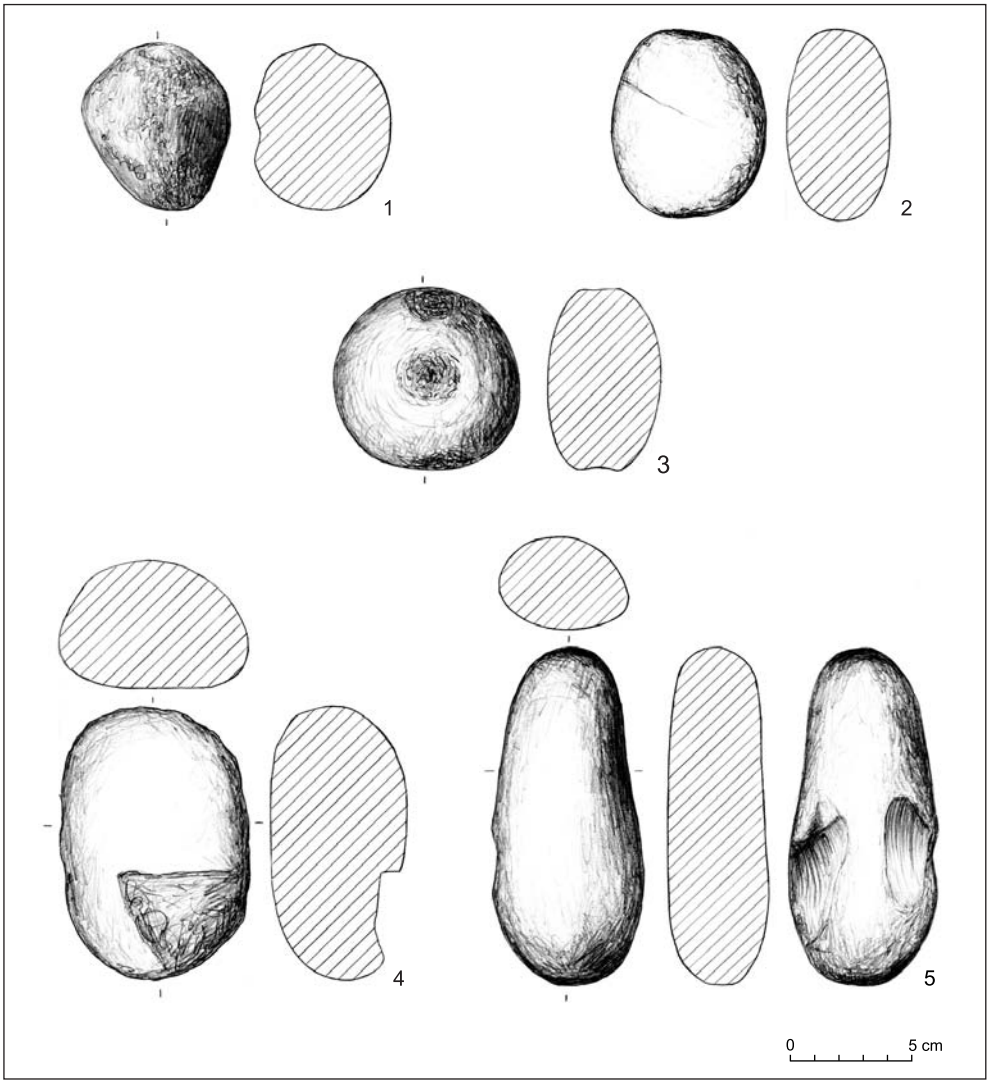

Fig. 4. Bahra 1. Stone tools of groups V and VI: hammerstones of class VIA (1,2); class VIB (4); class VIC (3); mortar pounder of variety VD2 (5)

GR. VIII. ADZES

The one adze of class VIIID is of ovoid form [*Fig. 5:2*], made of a natural flat quartz pebble, dimensions 8.7 x 6.3 x 2.2 cm. The asymmetrical working edge bears traces of polishing.

GR. IX. POLISHING TOOLS, PLATES AND TRAYS

The 15 artifacts from this group can be divided into three variants: IXB1, IXE1, IXD2. Variant IXB1 is represented by polishing plates made of flat pebbles. These were usually fragments of flat slabs of sandstone with an unnaturally smooth surface and dressing on the margins [*Fig. 2:1–3*]. This is the most numerous variant: 13 of the 15 discovered polishing plates. Due to fragmentary preservation, their size and shape is the most diversified and it is not possible to determine the original size. One example is especially interesting. It is a large fragment (15 x 16 x 6 cm), made of a natural slab of sandstone with ten parallel grooves on the upper surface [*Fig. 2:4*]. The function of this

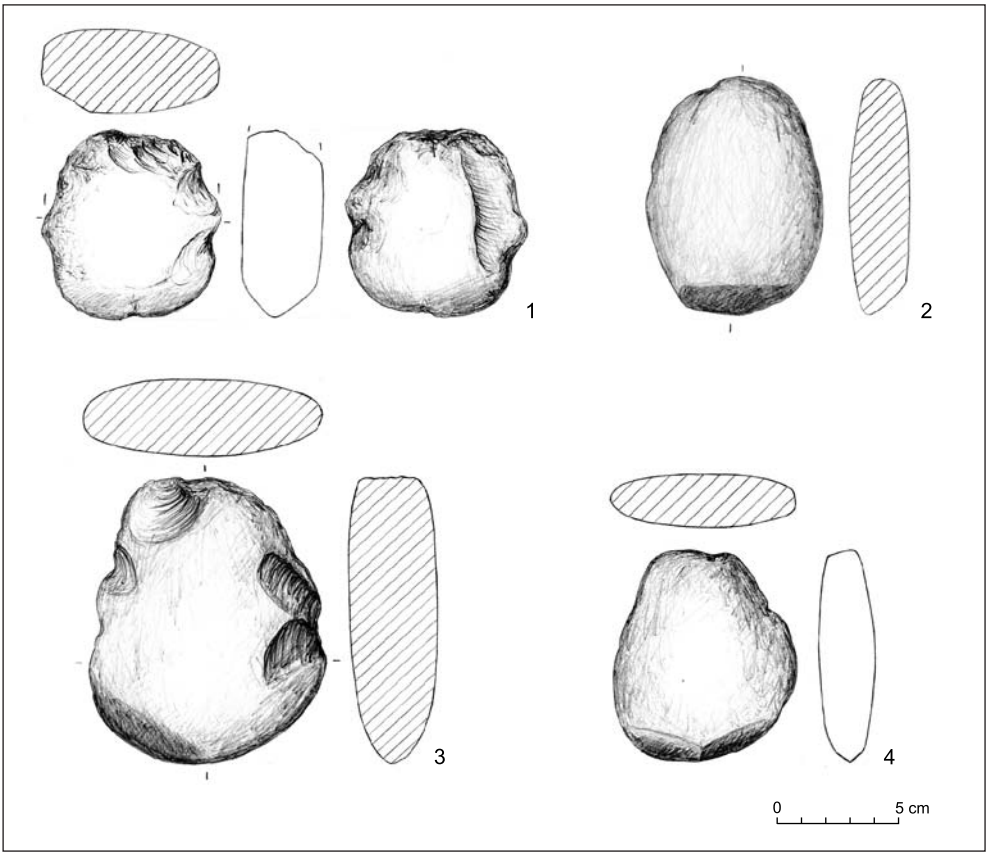

Fig. 5. Bahra 1. Stone tools of groups VII and VIII: axes of variant VIIA1a (1,3,4); adze of class VIIID (2)

plate has not been identified precisely, but the most probable explanation is that it was used for polishing tubular beads.

Two flat sandstone trays with a single oval depression in the centre [*Fig. 8*, left] fall into variant IXE1. Both were of similar size, approximately 10 cm and 3.5 cm thick. The small depression on the surface was probably due to the reuse of broken polishing plates as a kind of anvil for the hard hammering technique, which is dominant in the quartz industry of Bahra 1 (see Białowarczuk 2012).

Variant IXD2 is represented by a single fragment of a flat slab plate without traces of work on the surfaces, but with processed edges [*Fig. 8*, right]. It was found on the surface in sector SBH38. The dimensions are 10 x 6.2 x 8.2 cm. The material is, interestingly, a piece of granite from the Dibdibba formation. The strongly smoothed edges suggest long exposure in a desert environment, before the existence of the Bahra settlement.

GR. XI. POINTED TOOLS

Eight artifacts from this group include a chisel, classified as class XID [*Fig. 6:2–5*]. It was made of a large flake of siliceous rock. The naturally semi-ornate working edge was retouched lightly. The dimensions of the preserved fragment were 5.2 x 5 x 1.5 cm.

GR. XII. PEBBLES WITH KNAPPING, SMOOTHING AND POLISHING; STONE FLAKES

This is the largest group of artifacts, counting 47 pieces, divided into three classes: XIIA – tested nodules (17), XIIC

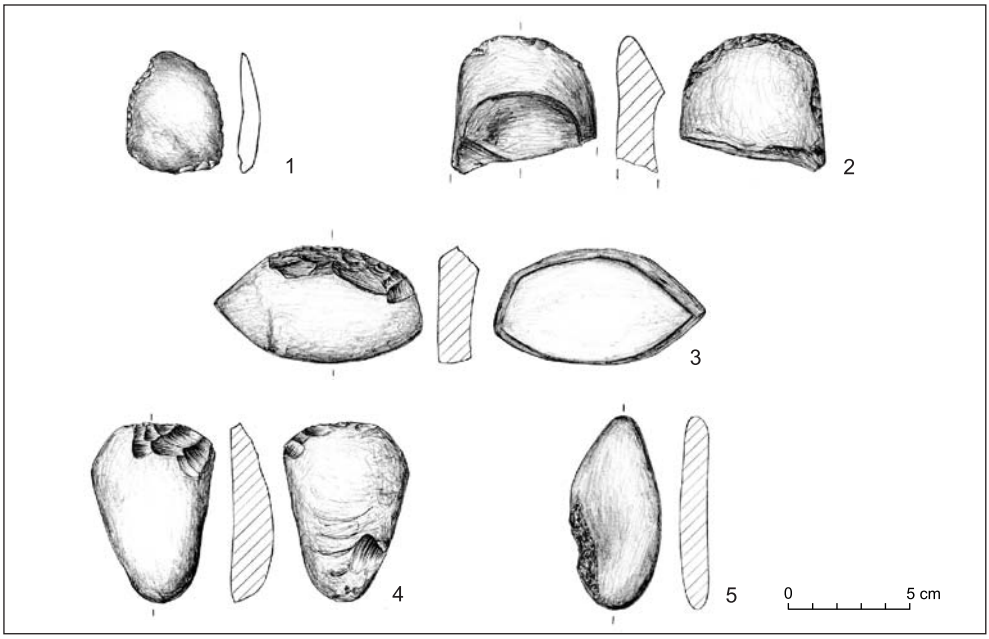

Fig. 6. Bahra 1. Stone tools of groups XI and XII: chisels of class XID (2–5); retouched flake of class XIID (1)

– oval flat pebbles with traces of polishing on part of the edges and surface (5), and XIID – stone flakes (25). The first class is composed of different kinds of stones with scars of test knapping on the surface. The relatively large share of XIIA forms in the analyzed industry from Bahra suggests a general problem with the availability of raw material of good quality.

Five natural pebbles with traces of polishing were classified as class XIIC. It is a metamorphic sandstone, well cemented by silica. Polished and grooved facets are extremely characteristic [***Fig. 1:1–3,5***]. Similar finds were reported at H3 as polishers, presumably used for finishing shell beads (Kallweit, Davies 2010: 120; Fig. 6.7:3–4).

Artifacts from class XIID make up the largest identified class. These simple stone flakes are the product of test knapping. The biggest ones were used probably for making tools of group XI. Some of them have retouched edges and could have been used as side-scrapers [***Fig. 6:1***].

GR. XIII. MULTIPLE-FUNCTION TOOLS

The five artifacts belonging to classes XIIIA and XIIIE could have been used as two different tools. The complete tool from class XIIIA is a merging of mortar pounder and grinder [***Fig. 3:3***]. It was made of an elongated natural pebble of volcanic rock with large pyroxene content, making it a very tough material. The dimensions are 16.5 x 7.7 x 3.9 cm. The wider point has visible traces of pounding. Both surfaces were polished.

The other four tools belonging to class XIIIE merge together hammerstones and grinders. They were made of natural flat pebbles of sandstone, strongly cemented with silica. Their size ranged between 8.5 cm and 13 cm, their thickness being about 3.0–3.5 cm. In all cases, one point

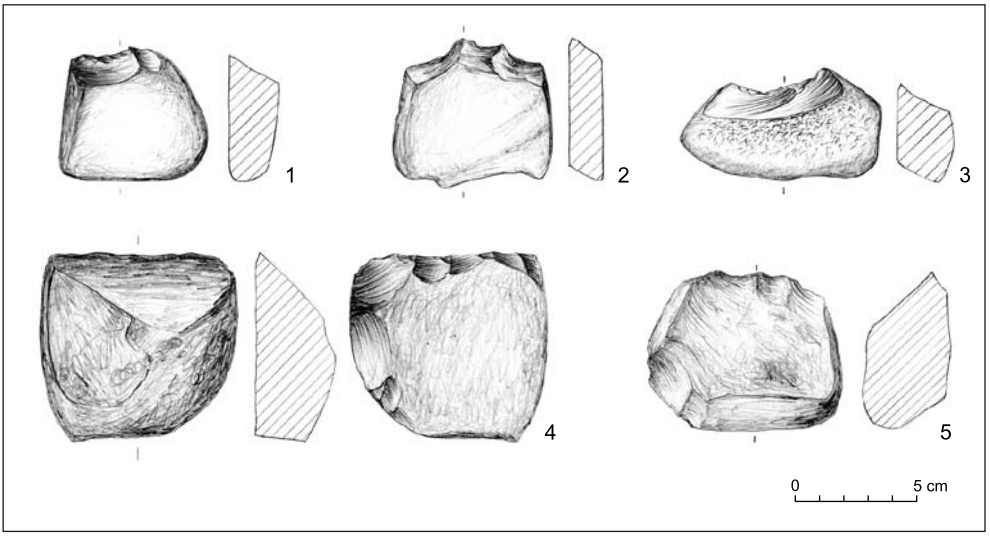

Fig. 7. Bahra 1. Stone tools of group XX: choppers of class XXA (1–3); chopping tools of class XXB (4–5)

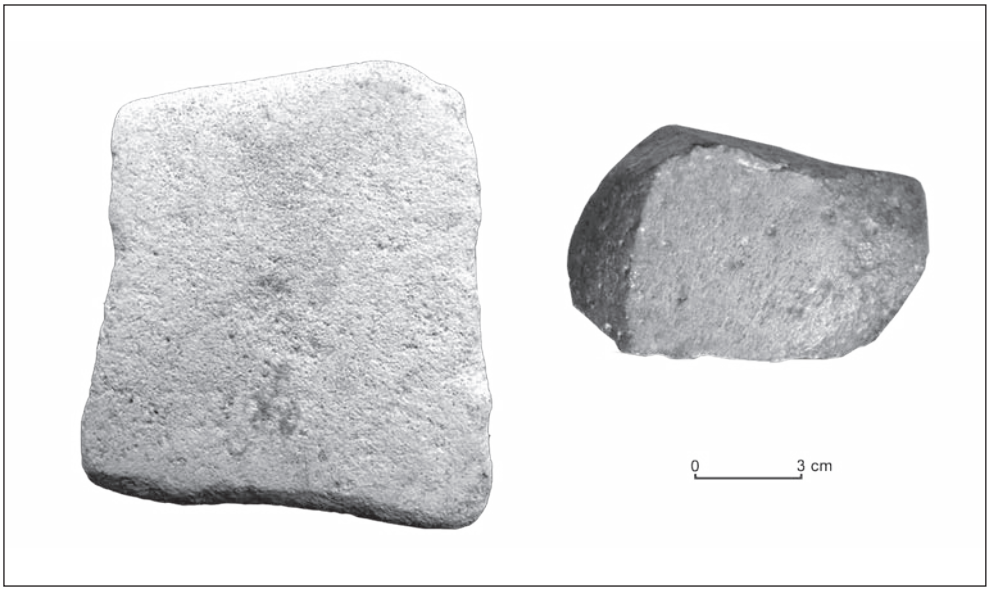

Fig. 8. Bahra 1. Flat slab plate of variant IXD2 made of basaltic rock, right, and sandstone tray of variant IXE1 with small depression on the surface (Photos M. Białowarczuk, A. Reiche)

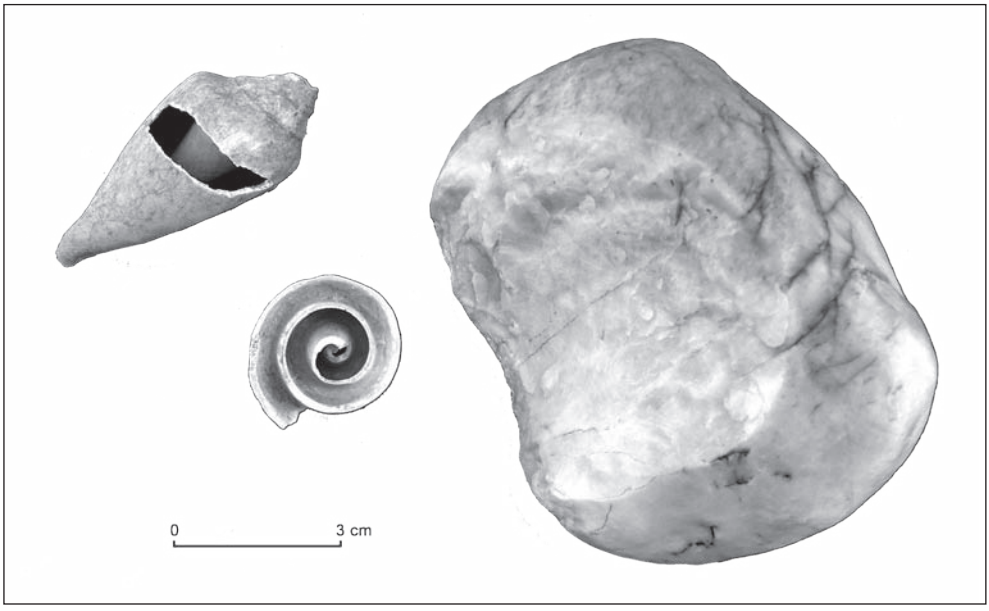

Fig. 9. Quartz chopper and effects of cutting of Strombus persicus shells (Photo M. Białowarczuk)

bore traces of hitting and one or two flat surfaces were used for grinding.

GR. XX. CHOPPERS

Choppers were classified as choppers (class XXA) and chopping tools (class XXB), five artifacts per class. All were made of small natural pebbles of siliceous rocks. An experimental study conducted by the author on site confirmed that these tools were especially effective as shell cutters. *Strombus persicus* shells used in the experiment showed the same technological traces as observed on semi products of beads discovered at the site [***Fig. 9***].

Choppers from class XXA [***Fig. 7:1–3***] were made by one or two single-side percussions of waste flakes on part of the pebble circumference, forming a single-side sharp working edge with an angle of about 45°. The smallest examples of these kind of choppers measured 4.1 x 7.5 x 2.2 cm, the biggest 8.8 x 7.1 x 4.9 cm. Chopping tools from class XXB [***Fig. 7:4,5***] were made in similar fashion. The working edge was formed by a series of 2–4 double-sided percussions on just part of the pebble circumference, made from different directions. These tools were also a little bit bigger, starting from 4.6 x 4 x 2 cm and reaching 12.5 x 8 x 3.5 cm.

FUNCTIONAL CLASSIFICATION AND SPATIAL ANALYSIS OF TOOLS

The functional diversification of tools from the Bahra 1 ground and pecked stone industry followed criteria of actual or presumed original purpose. Three of the five functional groups distinguished by R.F. Mazurowski (1997: 142) were recorded:

FG1 – procurement of food and animals,
FG2 – processing agricultural products,
FG3 – processing of mineral and organic raw material.

Group I tools can be attributed to the first functional group. Different interpretations have been offered: cores, grinding or pounding tools or simple game pieces. Their use as *bolas* balls for hunting was proposed by only a few scholars (see Hole *et alii* 1969: 200). Based on extensive ethnological and archaeological data, R.F. Mazurowski has argued convincingly for the *bolas* ball idea (1997: 24). In the case of the Bahra 1 assemblage, there are only seven artifacts representing this group, which seems to be typical of later agricultural cultures. This corresponds to Mazurowski's chronological analysis associating *bolas* balls with the early stages of animal breeding and agriculture in the 7th millennium BC, when their share in the material increased, following which their number in tool inventories decreased gradually from the emergence of PN cultures in the first half of 6th millennium BC, so that and in the 5th millennium BC they were as rare as in the early stages of their use. According to Mazurowski, this would have been directly connected with a structural transformation of lifestyle from hunting to widespread animal breeding and agriculture (Mazurowski 1997: 23).

Moreover, all the artifacts from Group I at Bahra 1 were made of soft fine-grained sandstone, which is easily processed,

but too weak for use as a hammerstone or grinder, for example. Hence, hunting has been suggested as the most plausible functional identification.

The second functional group encompassed tools from groups II–V, that is to say, querns with grinders and mortars with pounders, as well as multiple-function tools from group XIII. The function of these tools is well documented from both an ethnological (see Bartlett 1933: 4) and an archaeological (see Mazurowski 1997: 24–55, 96–98) perspective, indicating that they were heavy-duty tools for preparing plant food. At Bahra 1 this functional group, altogether 17 artifacts, is also relatively small. Isolated examples of querns and mortars seem to be typical of the same stage of economic development as described above for the *bolas* balls. The obvious craftsmanship orientation of the site suggests that not many such tools were required. Moreover, heavy-duty tools of the kind described above are characterized by a long usage life, being exploited until they were totally worn or destroyed (R.F. Mazurowski, personal communication).

The third functional group distinguished at Bahra 1 included hammerstones (Group VI), axes (Group VII), adzes (Group VIII), polishing plates (Group IX), chisels (Class XID), pebbles with traces of blows and polishing (Group XII) and choppers (Group XX). It is the largest functional group: a total of 96 tools was identified in this category. The function of these artifacts as tools for processing mineral and organic raw material is strongly confirmed by their archaeological context. The tools came from two sectors of the site, SBH 35 and SBH 38, where remains of permanent architecture were discovered (Bieliński 2012; Reiche 2012b). The chronological correlation between these two sectors is still under investigation, but the distribution of stone tools in loci recorded in particular architectural units has given a fair idea of the character of this industry.

Firstly, 70 of the 120 artifacts analyzed in this assemblage came from the said loci and of these 70% represented the third functional group (FG3) [***Table 2***]. Tool distribution per unit is limited to 1–5 artifacts per locus and the tools very often represented a single group (e.g., hammerstones from Group VI in loci 6, 27, 30 and 50) or two related groups (e.g., polishing plates from Group IX and small pebbles with traces of polishing from Class XIIC as seen inside locus 6, or tested nodules from Group XIIA and stone flakes from Group XIID, as in loci 47 and 51). It has been noted by the author in his preliminary study of Bahra 1 lithics (Białowarczuk 2012), as well as by S.K. Kozłowski in his in-depth analysis of the flint industry from the site (S.K. Kozłowski, personal communication) that limited numbers of stone tools in the loci were accompanied by large quantities of products of chipped flint and quartz industries, strongly oriented toward shell jewelry manufacture. The predominance of tools from the FG3 group indicates the same specialization of the ground and pecked stone industry as in the case of the flint and quartz tools (groups VI, IX and classes XIIA and XIID), as well as different stages of shell bead production (groups VII, VIII, IX, XI, XX and class XIIC).

House 1 from sector SBH 38 and Unit 6 from sector SBH 35 have provided sufficient evidence in terms of the lithics material for the existence of specialized

workshops. House 1 was a multi-roomed building (see Bieliński 2011; 2012), yielding a large concentration of lithics and semi-products of shell jewelry in different stages of manufacture (Reiche 2012a; 2012b). The best recognized locus 34 (27) has produced until now more than 1100 stone artifacts, but only five of these represented diverse ground and pecked stone tools [see *Table 2*]. The rest were flint (mostly borers) and quartz artifacts (Białowarczuk 2012: 63; S.K. Kozłowski, personal communication). A similar situation was observed by the author in Unit 6, also a multi-roomed building, from sector SBH 35 (loci 30 and 50–55 in *Table 2*). The assemblage included a larger presence of quartz supplemented by rare, but relatively good quality flint artifacts and single stone tools of the FG3 group, among which there was an evident concentration of Group XX choppers, the largest at the site [see *Table 2*], as well as evidence of stone knapping presumably connected

Table 2. Distribution of stone tools inside architectural units; tools representing the third functional group (FG3) marked in bold

Sector	Locus No.	Tool class/variant (quantity)	Total quantity
SBH 38 House 1	3	**VIA (1)**; **VIIA1a (1)**; XIIIE (1)	3 (**2**+1)
	4	**VIA (1)**	**1**
	6	**IXB1 (1)**; **IXE1 (1)**; **XIIC (2)**	**4**
	8	IA (1); IIIE1b (1); **XIIA (1)**	3 (2+**1**)
	10	IIB1b (1)	1
	14	**IXB1 (1)**; **IXE1 (1)**	**2**
	16	IIIE1b (1); IIIE2b (1); **IXB1 (1)**	3
	17	IA (3); IIIE2b (1)	4
	18	IA (1); **IXB1 (2)**	3 (1+**2**)
	20	**XIIC (1)**	**1**
	22	**VIB (1)**; **IXB1 (1)**	**2**
	23	**XIIC (1)**	**1**
	24	XIIIA (1)	1
	27	**VIC (1)**	**1**
	34	IA (1); VD2 (1); **VIA (1)**; **VIIA1a (1)**; **IXB1 (1)**	5 (2+**3**)
	43	IIIE1b (1); **XID (2)**; **XIIA (1)**	4 (1+**3**)
	44	IIIE1b (1); XIID (1)	2
	47	**XIIA (1)**; **XIID(1)**; XIIIE (2)	4 (**2**+2)
	48	IIIE1b (1); **XIID (1)**; **XXA (1)**	3 (1+**2**)
	49	**XXA (1)**	**1**
	50	**VIA (1)**	**1**
SBH 35 Unit 6	30	**VIC (1)**	**1**
	51	**IXB1 (1)**; **XID (1)**; **XIIA(3)**; **XIID (7)**; **XXA (1)**; **XXB (2)**	**15**
	52	**XIID (2)**	**2**
	55	**XIIA (1)**; **XIID (1)**	**2**
		Total	70 (**49** + 21)

with the production of these choppers (see artifacts of classes XIIA and XIID inside loci 51, 52 and 55 in Table 2). The stone tools were discovered together with large quantities of cut and sectioned shells of the *Strombus persicus* family, representing the earliest stages of bead manufacture (see Reiche 2011: Fig. 16). The author's shell cutting experiments, discussed above, have made the connection between choppers and shells fairly undisputed. It is very likely, therefore, that the structure had been the site of a specialized manufacture of shell jewelry or at least the early stages of processing of shell material.

Final conclusions will have to wait for the completion of the excavations of the two architectural units, but a preliminary spatial analysis has already given rise to certain ideas. The units in sector SBH 38 are dominated by a flint assemblage and later stages of shell bead production (Reiche 2012b), supported by stone tools from Groups VI–IX and XI [see ***Table 2***]. Hammerstones from Group VI were connected with flint knapping and the rest of the groups with bead finishing work. The predominance of chipped quartz and stone choppers from Group XX along with cut shells in Unit 6 point to an earlier stage of manufacture and may suggest its diversification not only among specific rooms of this one building, but also between individual units.

CONTEXTUALIZING THE ASSEMBLAGE

The relation of the ground and pecked stone industry of Bahra 1 relative to other Neolithic stone industries is a major issue. All the presented groups, classes and variants of stone tools from Bahra 1 are well known from the archeological records throughout the Middle East, starting with the Natufian culture (Bar-Yosef, Valla [eds] 1991) and Pre-pottery Neolithic (Mazurowski 1997; Aurenche, Kozłowski 1999; Özdoğan, Başgelen [eds] 1999; Kozłowski, Aurenche 2005). The number of artifacts grew and fell depending on the stage of agricultural development, but the form remained universal down the ages (see Mazurowski 1997). Therefore, cultural and chronological ties with Mesopotamian or Gulf cultural traditions cannot be based on an analysis of the stone tools alone.

The raw materials as well as predominance of tools from the FG3 functional group were correlated closely with an opportunistic flint and quartz industry, suggesting a local provenance for all the ground and pecked stone industry from Bahra 1. Parallels for most of the artifacts have been recorded on other Late Neolithic sites in the Persian Gulf area. The closest site with the largest number of examples is H3, which is located in the same area (Carter, Crawford [eds] 2010). The same pattern has been observed there. Ground and pecked stone tools constituted the smallest part of a similar opportunistic industry, also connected with shell jewelry manufacture. The 218 stone artifacts discovered there counted as 3.1 % of all of the lithics (Kallweit, Davies 2010: Fig. 6.1 and Table 6.1). The prevalent forms included similar kinds of trapezoidal axes, hammerstones, polishing plates and trays, grinders and small pebbles with traces of polishing (Kallweit, Davies 2010: 119–120, Fig. 6.7, Pl. 30). Only maceheads were discovered at Bahra 1 to date.

Other parallels from Late Neolithic sites in the Gulf area are generally poor and reduced to a single group of tools, which may be connected with different settlement specializations and easier access to better quality flint. For example, there are four stone grinders from Dosariyah in Saudi Arabia and one surface find, an axe that is larger and made of a different raw material (unpublished reports for 2010–2012 seasons, courtesy P. Drechsler). Single axes and adzes were reported also from the sites of al-Yahar and Jazirat al-Hamra in the United Arab Emirates and Wadi Dhahr in Yemen (Kallweit 2003: 56, Fig. 3)

A comparison with Mesopotamian Ubaid-related sites is hardly satisfactory, although part of the problem may be the fact that many of them had been excavated in the first half of the 20th century when stone tools, especially non-diagnostic ones, were not even taken into consideration. Revisited studies of Ubaid lithics provide very poor information about the appearance of single ground and pecked stone tools on Mesopotamian sites (see Healey 2010).

CONCLUSION

The present brief analysis of the ground and pecked stone industry from Bahra 1 demonstrates a well considered strategy of local tool production and usage that is typical of the entire assemblage of lithics from the site. Similar to flint and quartz, the stone industry was dominated by working tools intended for processing mineral and organic raw material. The occasional tool for food production can be found in the assemblage as well. There can be no doubt based on the typological and functional classification of these tools that the ground and pecked stone industry from Bahra 1 was an integral part of a specialized tool set applied mainly to the manufacture of shell jewelry discovered at the site.

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REFERENCES

Aurenche, O., Kozłowski, S.K.
1999 *La naissance du néolithique au Proche-Orient ou Le paradis perdu*, Paris: Éditions Errance

Bar-Yosef, O., Valla, F.R. (eds)
1991 *The Natufian Culture in the Levant* [=*Archaeological Series* 1], Ann Arbor: International Monographs in Prehistory

Bartlett, K.
1933 *Pueblo Milling Stones of the Flagstaff Region and Their Relations to Others in the Southwest* [=*Museum of Northern Arizona Bulletin* 3], Flagstaff: Northern Arizona Society of Science and Art

Białowarczuk, M.
2012 Bahra 1: preliminary characteristic of the lithic industries [in:] A. Szymczak (ed.), *As-Sabbiya and Failaka Autumn 2011. Report on the Seventh Season of Joint Kuwaiti–Polish Archaeological Investigations in Kuwait: Bahra 1, Ubaid Culture Related Settlement (3rd Season); Failaka Island – Al-Qusur Site (1st Season)*, Warsaw: PCMA UW, unpublished report, 56–68

Bieliński, P.
2011 Bahra 1, a prehistoric settlement [in:] Ł. Rutkowski (ed.), *As-Sabbiya 2007–2010: Kuwaiti–Polish Archaeological Investigations in Northern Kuwait*, Al Jahra–Warsaw: National Council for Culture, Arts and Letters of the State of Kuwait; PCMA UW, unpublished report, 32–37
2012 Bahra 1, an Ubaid period settlement: Architecture and overview [in:] A. Szymczak (ed.), *As-Sabbiya and Failaka Autumn 2011. Report on the Seventh Season of Joint Kuwaiti–Polish Archaeological Investigations in Kuwait: Bahra 1, Ubaid Culture Related Settlement (3rd Season); Failaka Island – Al-Qusur Site (1st Season)*, Warsaw: PCMA UW, unpublished report, 8–22

Carter, R., Crawford, H. (eds)
2010 *Maritime Interactions in the Arabian Neolithic. The Evidence from H3, As-Sabiyah, an Ubaid-related site in Kuwait*, Boston–Leiden: Brill

Healey, E.
2010 Ubaid lithics revisited: Their significance for the interpretation of Ubaid society [in:] R.A. Carter, P. Graham (eds), *Beyond the Ubaid. Transformation and Integration in the Late Prehistoric Societies of the Middle East. Papers from 'The Ubaid Expansion? Cultural Meaning, Identity and Lead-up to Urbanism'. International Workshop held at Grey College, University of Durham 20–22 April 2006* [=*SAOC* 63], Chicago: The Oriental Institute of the University of Chicago, 181–200

Hole, F., Flannery, K.V., Neely, J.A.
1969 *Prehistory and Human Ecology of the Deh Luran Plain, an Early Village Sequence from Khuzistan, Iran* [=*Memoirs of the Museum of Anthropology, University of Michigan* 1], Ann Arbor: University of Michigan

Kallweit, H.
2003 Remarks on the Late Stone Age in the U.A.E. [in:] D. Potts, H. Al-Naboodah, P Hellyer (eds), *Archaeology of the United Arab Emirates, Proceedings of the First International Conference on the Archaeology of the U.A.E.*, London: Trident Press, 56–64

Kallweit, H., Davies, W.
2010 The lithic industries of H3 [in:] R. Carter, H. Crawford (eds), *Maritime Interactions in the Arabian Neolithic. The Evidence from H3, As-Sabiyah, an Ubaid-related site in Kuwait*, Boston–Leiden: Brill, 103–126

Kozłowski, S.K., Aurenche, O.
2005 *Territories, Boundaries and Cultures in the Neolithic Near East* [=*BAR IS* 1362], Oxford: Archaeopress

Mazurowski, R.F.
1997 *Ground and Pecked Stone Industry in the Pre-pottery Neolithic of Northern Iraq* [=*Nemrik 9,* 3], Warsaw: Wydawnictwa Instytutu Archeologii UW

Özdoğan, M., Başgelen, N. (eds)
1999 *Neolithic in Turkey. The Cradle of Civilization. New Discoveries* [=*Ancient Anatolian Civilizations Series* 3], Istanbul: Arkeoloji ve sanat yayinlari

Reiche, A.
2011 Small finds from Bahra 1, an Ubaid-period settlement [in:] Ł. Rutkowski (ed.), *As-Sabbiya 2007–2010: Kuwaiti–Polish Archaeological Investigations in Northern Kuwait,* Al Jahra–Warsaw: National Council for Culture, Art and Letters of the State of Kuwait; PCMA, unpublished report, 32–37
2012a Bahra 1. Investigations in Houses 1 and 2 [in:] A. Szymczak (ed.), *As-Sabbiya and Failaka Autumn 2011. Report on the Seventh Season of Joint Kuwaiti–Polish Archaeological Investigations in Kuwait: Bahra 1, Ubaid Culture Related Settlement (3rd Season)*; *Failaka Island – Al-Qusur Site (1st Season)*, Warsaw: PCMA UW, unpublished report, 23–36
2012b Bahra 1. Small finds from sectors SBH 38, 2011 season [in:] A. Szymczak (ed.), *As-Sabbiya and Failaka Autumn 2011. Report on the Seventh Season of Joint Kuwaiti–Polish Archaeological Investigations in Kuwait: Bahra 1, Ubaid Culture Related Settlement (3rd Season); Failaka Island – Al-Qusur Site (1st Season)*, Warsaw: PCMA UW, unpublished report, 69–91

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