

ARCHAEOLOGICAL SURVEY AND EXCAVATION AT WĀDĪ AL-YUTUM AND TALL AL-MAGAŞŞ AREA - 'AQABA (ASEYM) A PRELIMINARY REPORT ON THE FIRST SEASON 1998

by

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in collaboration with

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Introduction

A Jordanian-German cooperative project was created in 1998 with the aim of collecting more information about the pre-history of the 'Aqaba region, including Wādī al-Yutum. The project also aims at continuing previous work, which had been carried out by L. Khalil at Tall al-Magaşş and Ḥujayrāt al-Ghuzlān in 1985 and 1990. The first season of the joint research project (ASEYM) was from January 10 to February 13, 1998. It was sponsored and funded by the Deanship of Research at the University of Jordan and the Orient-Abteilung of the Deutsches Archäologisches Institut in Berlin, in cooperation with the Department of Antiquities in Jordan (Eichmann and Khalil 1998).

The staff included Jihad Abu Ali (square supervisor), Ayish Abu Hilal ('Jerichoman'), Khalid Al-Manassir (square supervisor), Heribert Braun (draughtsman), Darar Depolsky (field technician), Salem Dhiab (representative of the Department of Antiquities), Stefan Fengler (photographer), Heiko Kallweit (archaeologist), Riham Miqdadi (square supervisor), and Christiane Meckseper (square supervisor). The work was directed by the authors.

Moreover, a number of specialists participated in the project on a part time basis: Helmut Brückner (geomorphologist), Susanne Kerner (Near Eastern archaeologist), Reinder Neef (palaeobotanist) and Thomas Urban (archaeologist and surveyor). This report is based on contributions by all collaborators mentioned in its title. Their complete reports will appear in a forthcoming

issue of *Orient-Archäologie*, which is a new series published by the Deutsches Archäologisches Institut, Orient-Abteilung, in Berlin (Eichmann and Khalil in press).

The main aims of the Project can be described as follows:

A. Survey

- 1- To survey and document the archaeological sites in the area between Tall al-Magaşş and the mouth of Wādī al-Yutum (Fig. 1).
- 2- To prepare detailed contour maps of the sites of Tall al-Magaşş, Ḥujayrāt al-Ghuzlān, and al-Yutum B.
- 3- To collect and document archaeological surface remains found in Ḥujayrāt al-Ghuzlān and the surrounding area.

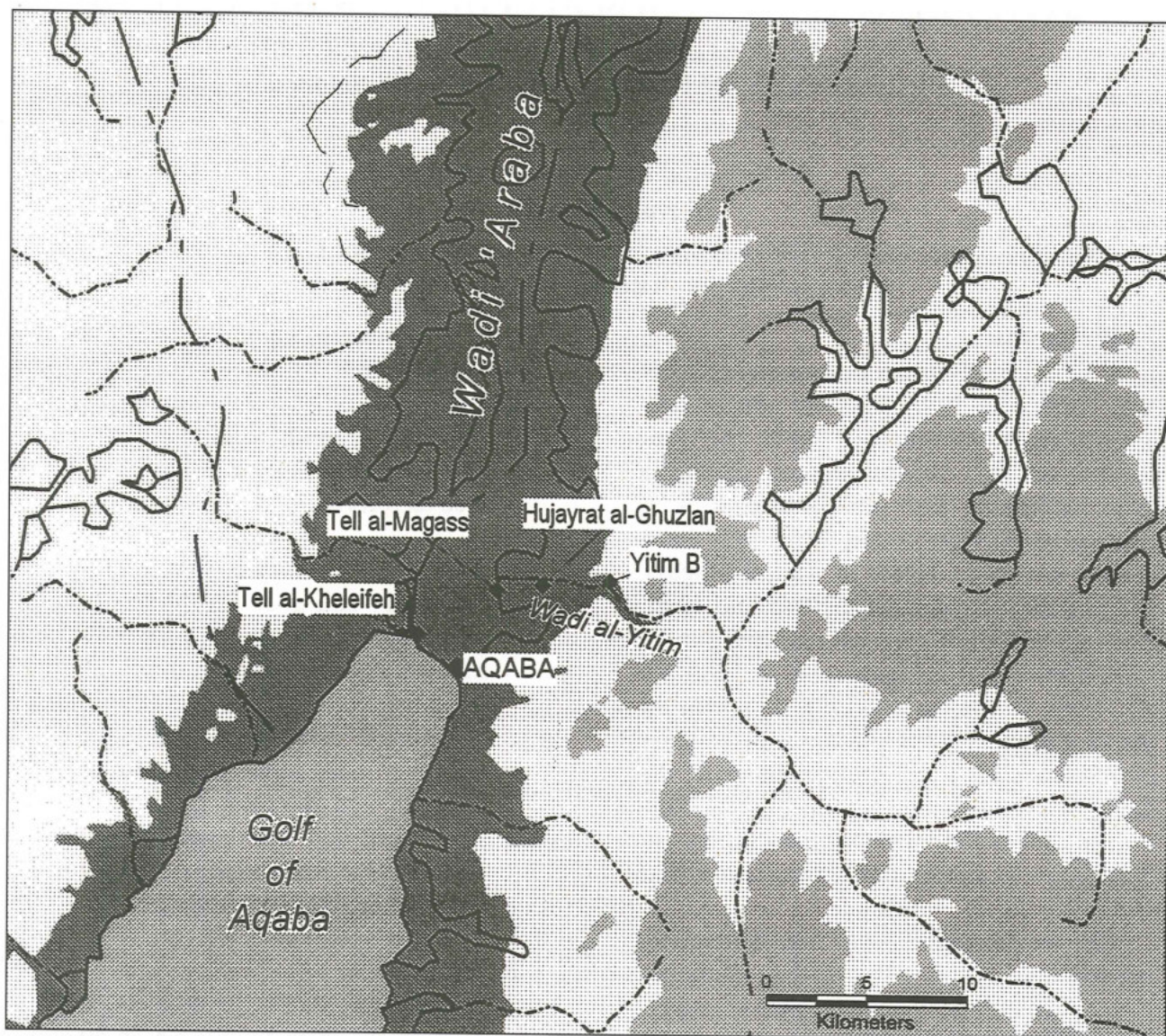
B. Excavation

- 1- To expand the excavation in Tall al-Magaşş in order to expose architectural features, to understand the relationship between walls discovered in previous seasons' work, and to determine whether the large retaining walls from square B2 and C1 are related.
- 2- To examine the stratigraphy and the date of al-Yutum B by means of small soundings.

C. Miscellaneous

- 1- To take C14 and palaeobotanical samples from various sites.
- 2- To study the palaeogeographical setting of the 'Aqaba gulf region and its coastal evolution during different periods.

What follows is an account of excava-



1. Map of the southern Wādī 'Arabah with sites studied in the ASEYM '98 project (Tall al-Magaşş, Hujayrāt al-Ghuzlān and al-Yutum B).

tions at Tall al-Magaşş, an archaeological survey at Hujayrāt al-Ghuzlān, and soundings at al-Yutum B.

Geoarchaeological Aspects

The Late Chalcolithic/Early Bronze Age sites of Tall al-Magaşş and Hujayrāt al-Ghuzlān are situated at a height of ca. 64 m and 110 m asl on the alluvial fan of Wādī al-Yutum, a few kilometres west of its confluence with Wādī 'Arabah (Fig. 1). Composed primarily of sand and gravel, the alluvial fan offered conditions which were hardly conducive to farming. This is also confirmed at

the site of Wādī al-Yutum B on the northern cliffs of the wadi, roughly 1 km east of its entrance and 90 m above the wadi bed. The present savanna-like vegetation is comprised of bushes and desert shrubs, with the dominance of acacia trees, allowing sheep and goat raising. During the time of our work, mainly herds consisting of around 120 goats were observed. According to preliminary results of the palaeobotanical charcoal analysis carried out by Reinder Neef, the ancient climatic conditions did not differ greatly from those of today. The fact that wood was a scarce commodity during the Chalcolithic

period is evidenced by the use of dung as fuel, as can be deduced from the layers of ash at Tall al-Magaşş and Hujayrât al-Ghuzlân.

Although the annual rate of precipitation is less than 50 mm, agriculture must have been possible to a small extent, since there is evidence of irrigation. Samples from trenches at Tall al-Magaşş and Hujayrât al-Ghuzlân contained among others, remains of flax and naked wheat, both of which require irrigation. It seems that the runoff water that flowed down the Wādî al-Yutum during the rainy seasons was collected and used in irrigation. This observation corresponds with the construction of ancient walls (see below), which transverse the wadis in the vicinity of the formerly settled areas. Such structures were already reported by an American survey team (Smith, Stevens and Niemi 1997).

The situation described here can be confirmed by accounts of travellers of the 19th and early 20th century. For example, A. Musil (1907: 256), who reported that in Wādî 'Arabah farming was only attempted after heavy rainfall, he noted that in the lower Wādî al-Yutum remains of extensive terrace walls, gardens along the terraces on the slopes and enclosed springs in the near vicinity could be observed. Moreover, F. Frank (1934: 245) described the remains of structures 80 m in diameter ('wells'), that are probably cisterns, as being at a distance of 1,25 km from 'Aqaba, on the eastern periphery of the alluvial fan of the Wādî al-Yutum. One should bear in mind that this distance is related to the ancient settlement of 'Aqaba (Whitcomb 1997).

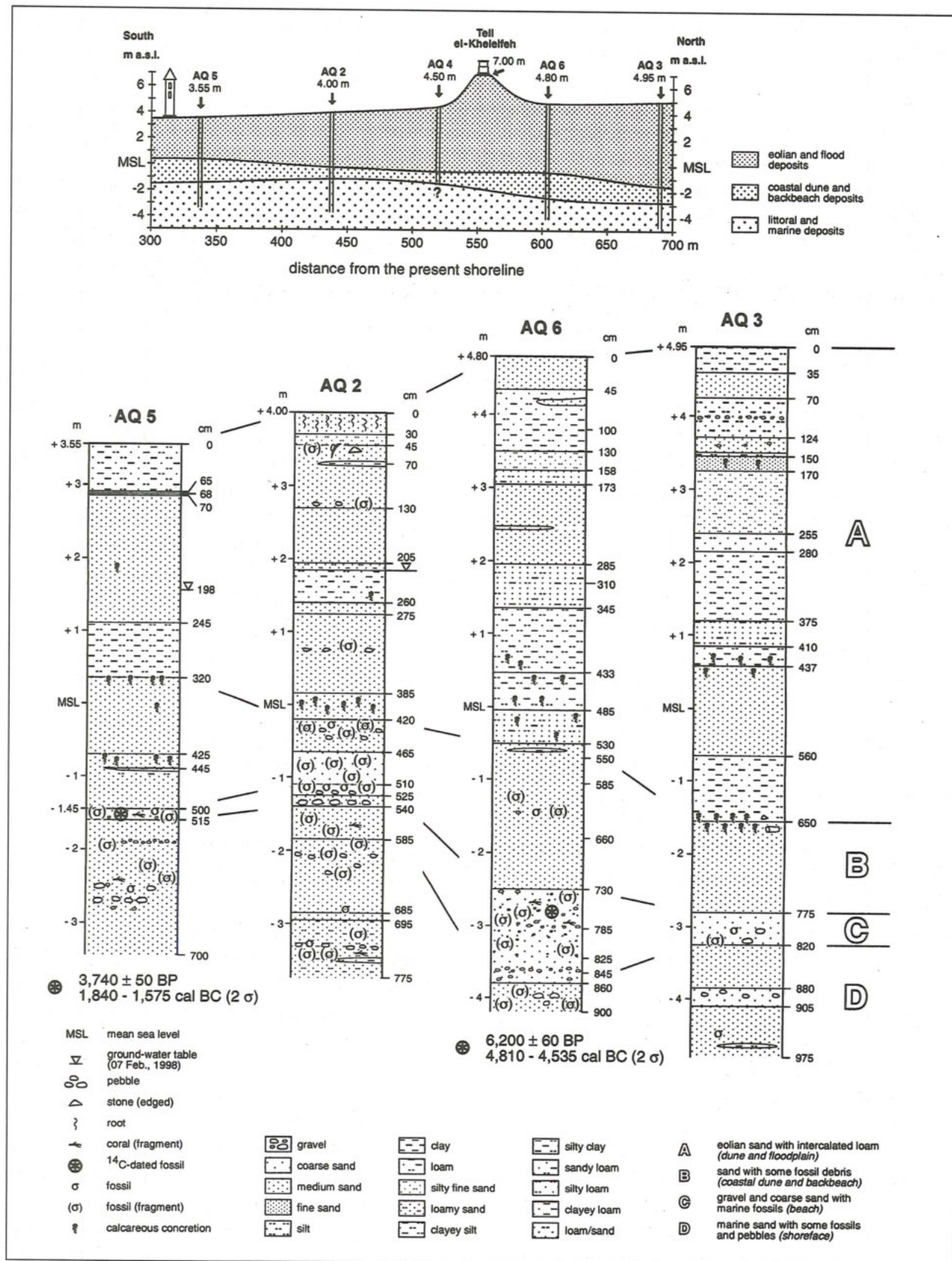
The ancient alluvial surface of the 'Aqaba region has been disturbed by development in its outskirts since the 1960s. Additionally, extensive levelling work was carried out for the construction of truck parking lots and service roads. Hence, archaeological and geological evidence has been destroyed to a considerable extent. Even the sites under

study, which are known as archaeological monuments and protected by a fence, display modern damages and destruction.

The purpose of the geoarchaeological research, carried out by Helmut Brückner in collaboration with Heiko Kallweit during February 1-12, 1998, as part of the ASEYM-project, was to find remains indicating the palaeogeographical setting of Chalcolithic sites in the 'Aqaba region. The focus of attention was directed towards coastal evolution and environmental changes during the Holocene. As D. Whitcomb has already explained, there was a seaward and south-eastern movement of settlements in the 'Aqaba region: The Chalcolithic sites of Tall al-Magaşş and Hujayrât al-Ghuzlân are situated 4 km north of the present shoreline; the settlement of Tall al-Khalayfi dating to the first millennium BC is only 550 m away from the coast, while the Byzantine and early Islamic sites are closer to the water (Whitcomb 1997). The reasons for these movements might have been either a shift in the shoreline or the changing availability of freshwater sources.

To solve questions concerning the former shift in the shoreline a bore sample was taken from the present beach via Tall al-Khalayfi, 700 m to the north (Fig. 2). Marine sediments were detected below the settlement site of Tall al-Khalayfi and further inland.

Until now, the farthest northward extension of the former Gulf of 'Aqaba, i.e. the peak of the Holocene marine transgression, is still unknown. However, we know about the time of the regression. Shell fragments from littoral deposits in two bore samples were radiocarbon dated to the first half of the second millennium cal. BC and the first half of the fifth millennium cal. BC. Thus, the marine strata were deposited during the Holocene sedimentary cycle. The littoral milieu 350 m north of the present shoreline had evolved into a terrestrial one by ca. 1500 BC at the latest (Brückner in press). In view of



2. Drilling profiles north and south of Tall al-Khalayfi (by H. Brückner).

the fact that the Chalcolithic sites of Tall al-Magaşş and Hujayrāt al-Ghuzlān are located at altitudes of 64 m asl and 110 m asl, they cannot be considered as nearby harbour sites.

According to observations made by H. Brückner in a 2 m deep pit near Hujayrāt al-Ghuzlān, Chalcolithic deposits, constituting fine-grained, silty sand layers, contained many specimens of snail *Melanopsis praemorsa buccinoidea* (Olivier 1801; identified by Dr H. Schütt, Düsseldorf). This snail is a freshwater species, living in moving, non-stagnant waters, often in canals or springs. Its occurrence is limited to the Chalcolithic layer, which may be indicative of a more humid environment during that period.

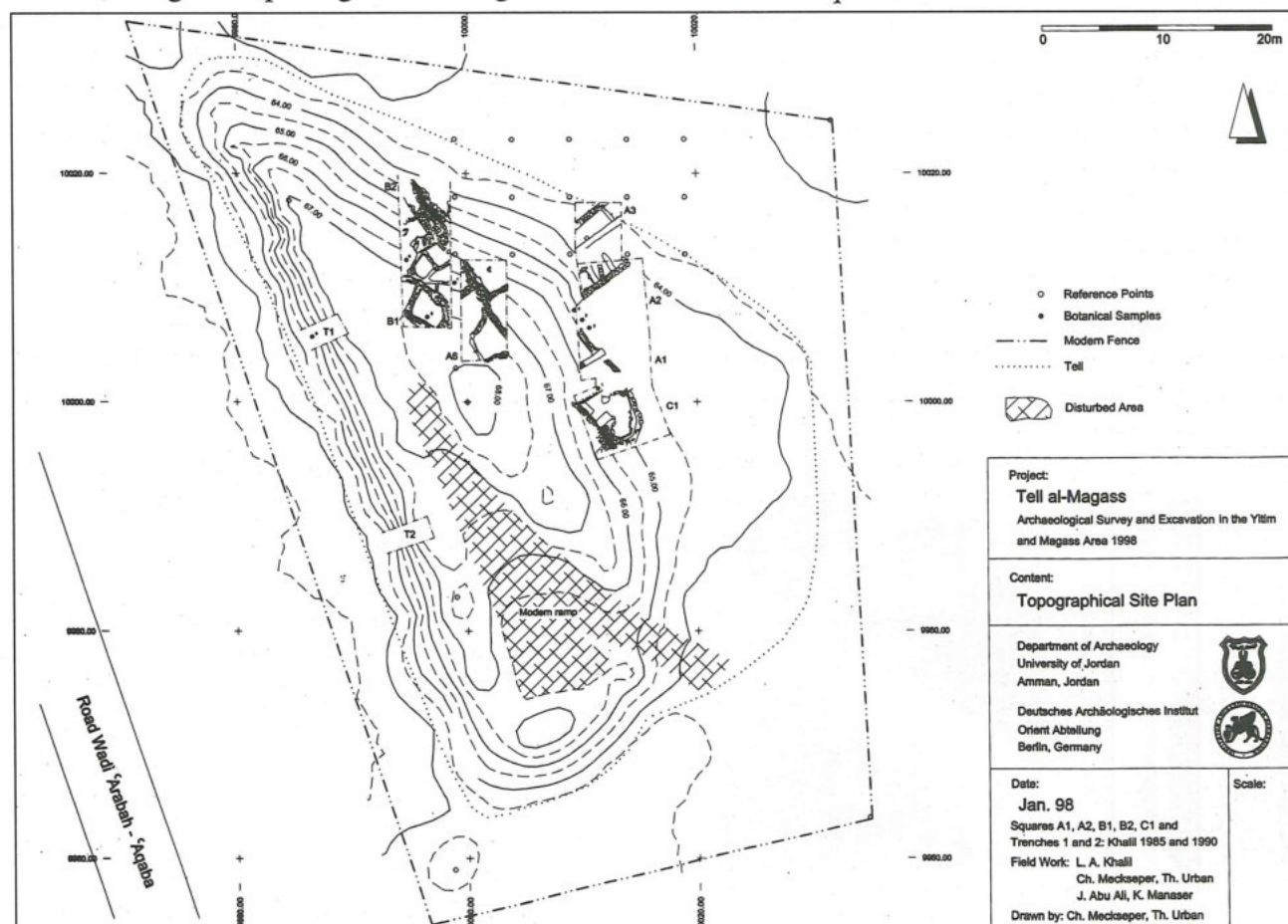
Taking into account that flax and wheat were cultivated, and that terrace walls were built in the wadis leading down to Wādī al-Yutum, the geomorphological investigations

point to a sophisticated water and soil management, carried out as early as ca. 3600 BC (cal.), according to C14-dates, currently being processed at the radiocarbon laboratory at the German Institute of Archaeology (J. Görsdorf in press).

Excavations at Tall al-Magaşş

Despite two seasons of excavation at the site (Khalil 1988; 1995), the relationship between the different architectural features which were discovered in areas A-C, is still not well understood.

Two squares, A3 and A6 were laid out in the north-eastern sector of the site. Square A3, measuring 5x5 m, lies north of A2 at the foot of the tall, while square A6, measuring 5x9 m, lies east of B1 and B2 near the summit of the site (Fig.3). The following is a description of the stratigraphy and architecture of both squares.



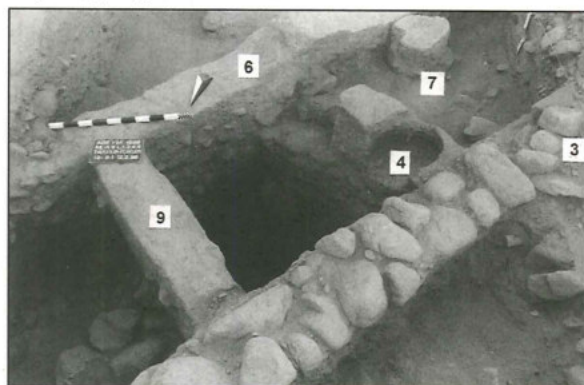
3. Tall al-Magaşş: General plan of the site with the major architectural structures.

Square A3

At an incline towards the east, the top soil consisted of loose sandy layers and measured 17-62 cm. This sand deposit is a result of the alluvial sediments of the nearby Wādī al-Yutum. Digging below the sandy layers revealed two types of walls. The first type, consisting of undressed alluvial stones, is built in irregular rough courses, for example wall 3 is made of two rows with clay used as the binding material. It runs from the middle of the north balk to the middle of the west balk. Wall 21 is also built of the same material as wall 3, but it comprises only one row. The second type of wall is constructed of a mixture of undressed stone and mud, such as walls 6 and 9. Walls 18 and 19 are of the same type, and represent the extension of walls 10 and 8 of square A2 from the 1990 excavation season (Khalil 1995: 68).

Juxtaposed to the southern side of wall 3, and near the west balk is a mud wall with an oval pit (locus: 4). It was filled with sand of the same type as of the top soil. A circular mud column - like locus 7 is located north of wall 6 which runs south-west to north-east (Fig. 4). The walls 3, 6 and 9 formed a room-like structure; loci 4 and 7 might have been part of the ceiling system of the room.

Many layers such as 1, 2, 5A, and 5B were sealed against the walls mentioned above. Both layers 5A and 5B are ashy, easy to dig and were above layer 11. The latter layer (11), brownish in colour and difficult



4. Tall al-Magaşş: Square A3, rectangular room with a round construction of mud and a pit, in which a storage vessel was found.

to excavate, lay above the mud floors 12 and 13. These in turn are related to the walls and continue irregularly, while mud floor 20 slopes towards the east with one step (locus 4).

The deposit layers between the walls represent phase I, where a storage jar was excavated. The mud floors and the walls represent phase II of the latest occupation. The excavated layers below the mud floors, loci 23-25, represent phase III which represents an earlier occupation.

Square A6

Removing the top soil, which was a thin layer of sand, revealed an ashy layer (locus 3), 5-10 cm deep and covering most of the square. This ashy layer was the result of using the area as a rubbish dump. Two rubbish pits (loci 6 and 7) are of the same nature as the locus 3 layer, but are very rich in bones, pottery sherds, flints, shells and a considerable amount of charcoal. They are also similar in nature and content to loci 4, 7, 9, 10, 21 and 22 in square B1 (Khalil 1988: 81). Excavation of pit 5 recovered a large, almost complete pottery storage jar. It was located against the north balk and the west edge of the pit, formed by the mud brick wall (locus 16). Excavating a similar pit (locus 26), which was also rich in finds, resulted in another storage jar.

A small hearth (locus 13) was situated against the north front of wall 21 and directly above the mud floor 14, which covers most of the square.

Several walls were discovered while excavating the ashy layers and pits. They displayed almost the same material and method of construction as other walls, which were discovered in different squares. Walls 16 and 18 were built of a mixture of stones and mudbricks, and the eastern front of wall 18 was plastered (Fig. 5). Walls 19 and 21 may have formed part of a small room in the eastern part of the square. Wall 18 might represent an extension of the structure as well. It



5. Tall al-Magaşş: Square A6, face of a curved wall with white plaster (locus 19).

is possible that the walls are an extension of the architectural features which were discovered during the excavations of previous seasons in squares B1 and B2.

In conclusion, the excavated occupation layers, mud floors, stone and mud walls with associated pottery and other finds, illustrate three phases of occupation in square A3. The Early Bronze Age period can be suggested as a date for phases I - II. The foundation of the structure discovered in square A6 has not yet been reached. Therefore, it is difficult to suggest the function and age of the walls at this stage of excavation.

Survey at Tall Ḥujayrāt al-Ghuzlān

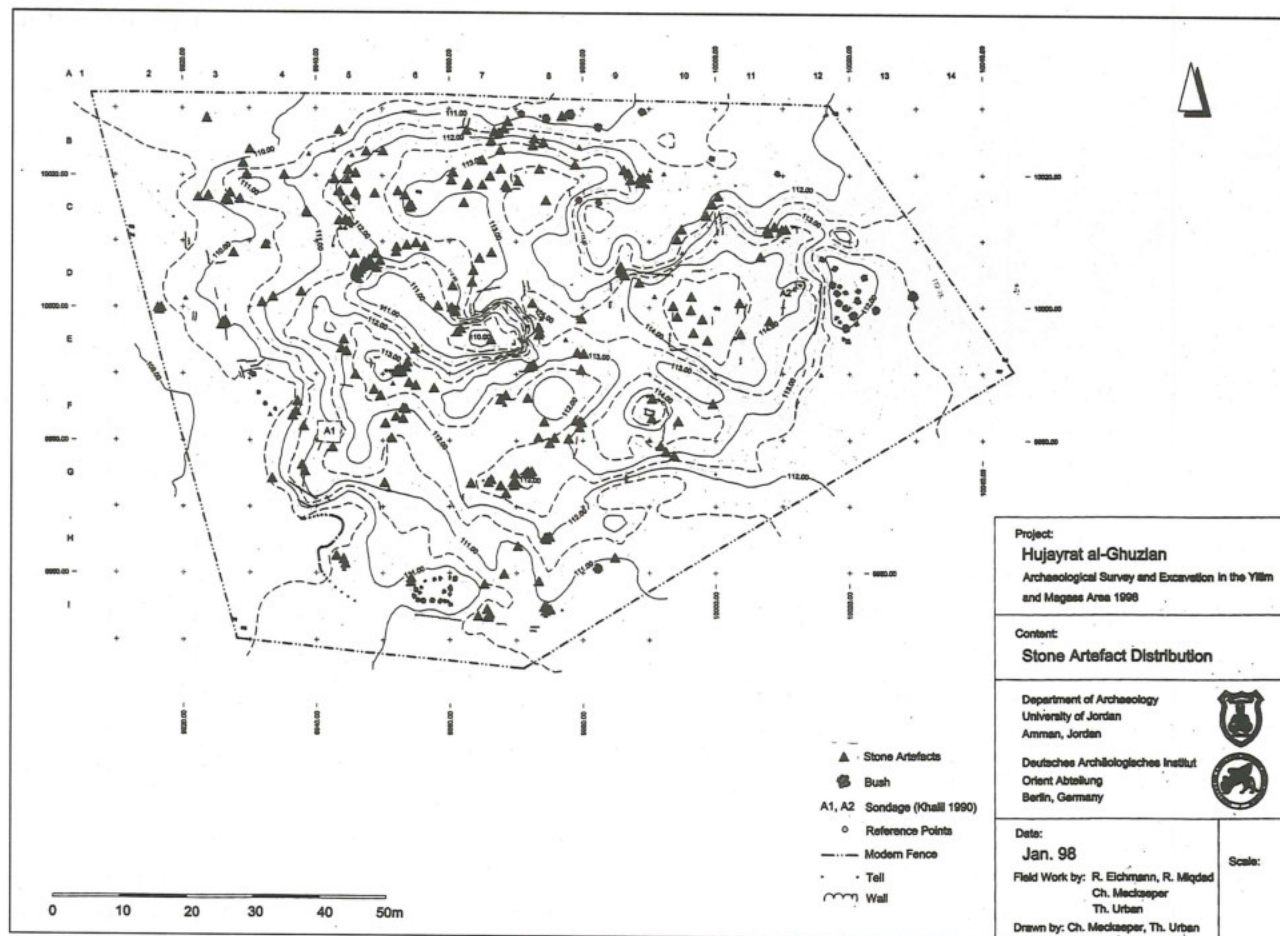
In 1990, Lutfi A. Khalil carried out two soundings at Ḥujayrāt al-Ghuzlān in order "to determine the chronology of the site and to locate any possible relationship between the site and Tall al-Magaşş" (Khalil 1995: 65). The two 3m x 3m soundings, one on the summit, the other at the western edge of the tall, yielded pottery sherds, flint artefacts, stones, bones, shells and copper remains. These artefacts proved to be similar and contemporary with those found at Tall al-Magaşş. Nevertheless, the results were uncertain to a degree, as the stratigraphy was heavily disturbed: "Where modern remains such as glass fragments and pieces of wood are found, they were mixed with the ancient debris" (Khalil 1995: 77), which reflect late

Chalcolithic/early Bronze Age household and workshop activities.

The site was indeed radically destroyed (Fig. 6). Deep squares had been cut into the mound, and the debris were piled up in big heaps, when the site was used for military purposes in the 1940s (Khalil 1995: 77). According to the archaeological research conducted so far, Ḥujayrāt al-Ghuzlān played an important role in the metallurgy of southern Jordan. Measuring about 150 m x 80 m, which is much larger than Tall al-Magaşş, the site seemed to be promising for future excavations. Thus, an intensive survey was carried out to gather more information about possible settlement patterns and undisturbed areas. This work was intended to facilitate planning future excavations and to provide us with more data regarding to the ancient societies in southern Jordan. The archaeological survey, carried out by R. Eichmann and R. Magdadi in squares measuring 10m x 10m covering an 80 m x 150 m area, produced pottery sherds of around 40 different fabrics, in addition to many products related to metallurgy, ranging from copper ores and slags to smelting crucibles and a remarkably high density of incinerated residues. Additionally, numerous groundstone artefacts and other small finds, such as bone and shell artefacts, were recorded (see below), as well as several walls of stone and mudbrick, which will be described elsewhere (Eichmann and Khalil in press).

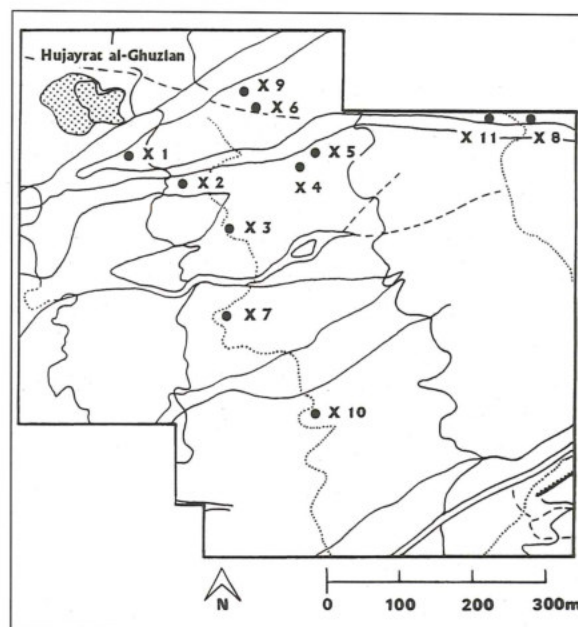
Survey to the East, Southeast and South of Ḥujayrāt al-Ghuzlān

As mentioned above, archaeological sites in the 'Aqaba region are endangered by levelling works and building activities, reaching Wādī 'Arabah. These activities will rapidly change the landscape around Ḥujayrāt al-Ghuzlān, where several ancient structures had been noted. To collect as much information as possible, an area of 500 x 700 square meter was chosen southeast of the Tall, in order to study and document the sur-



6. Hujayrāt al-Ghuzlān: General plan of the site with find spots of groundstone artefacts indicated by black triangles.

face remains of eleven find locations with several built structures (Fig. 7: X1 - X11). Field work, carried out by Heiko Kallweit, took place from 10 to 27 January. According to his observations, the main features are 10 m x 5 m large horseshoe shaped structures (X1; X2; X4), circular structures (X2; X10), and heavily damaged multicellular architectural units (X3), in addition to a 38m long, 4m wide 'boat shaped' structure (X9) oriented east-west along the wadi flow, and walls crossing the drainage lines, coming down Wādī al-Yutum. These structures most probably reflect ancient water management techniques, which might have been applied during the settlement periods, represented by Hujayrāt al-Ghuzlān. The surface finds include pottery sherds similar to wares found at Hujayrāt al-Ghuzlān, slags, copper ores, flint tools, fragments of groundstone tools,



7. Map indicating the survey area and find locations X1 - X11 in the surroundings of Hujayrāt al-Ghuzlān.

as well as worked and unworked shell fragments. However, the diagnostic capacity of this material is limited, and future excavations might provide us with more precise data.

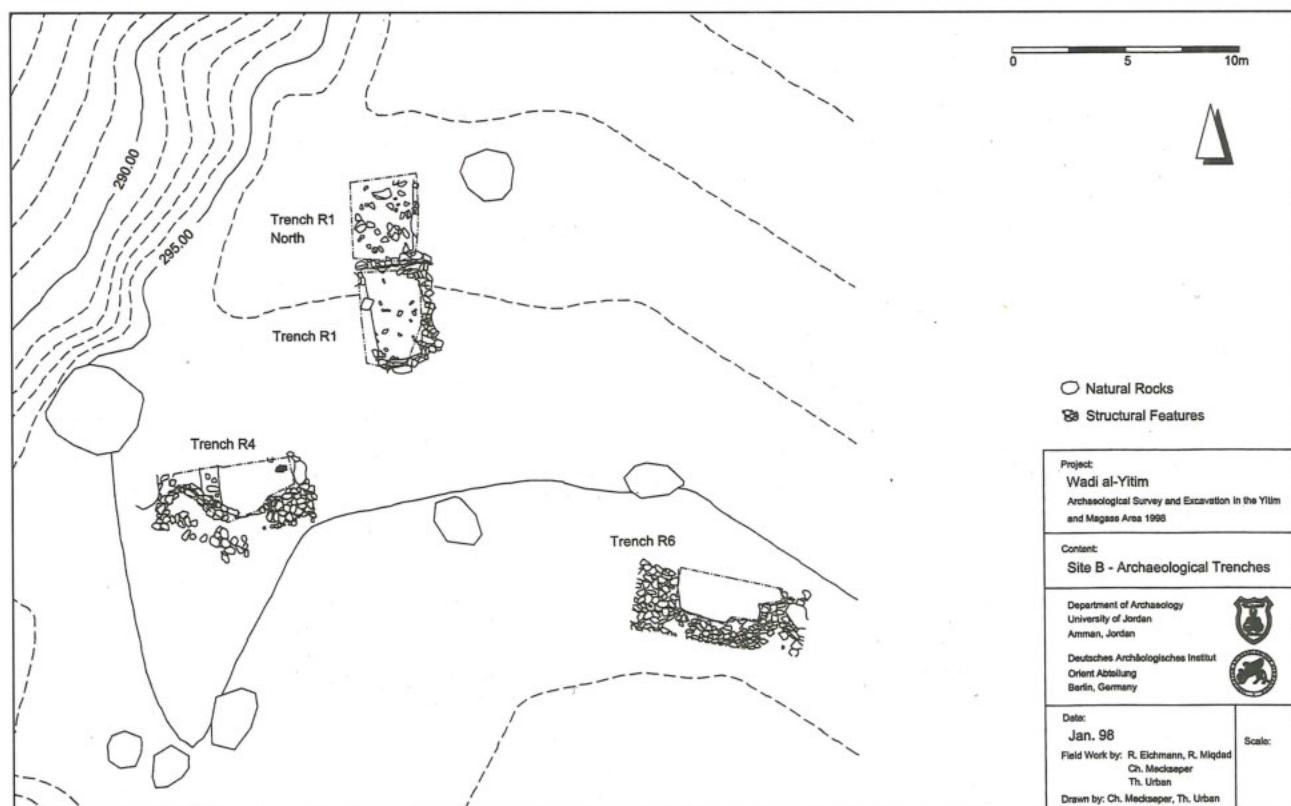
Soundings at al-Yutum B

At Wādī al-Yutum, where the 'King's Highway' once passed, several archaeological sites could be identified with the help of aerial photographs. The sites, bearing the remains of rectangular and circular structures ('houses'), are located on cliffs along the wadi. One site, al-Yutum B (see Fig. 1), situated about 90 m above the wadi bed, is distinguished by the walls of at least 25 different houses. These walls are constructed of worked and unworked stones; their ground plans show straight running, quadrangular or round walled structures. In order to obtain more information about the settlement, surface finds were collected and small soundings were carried out (Fig. 8). The cultural

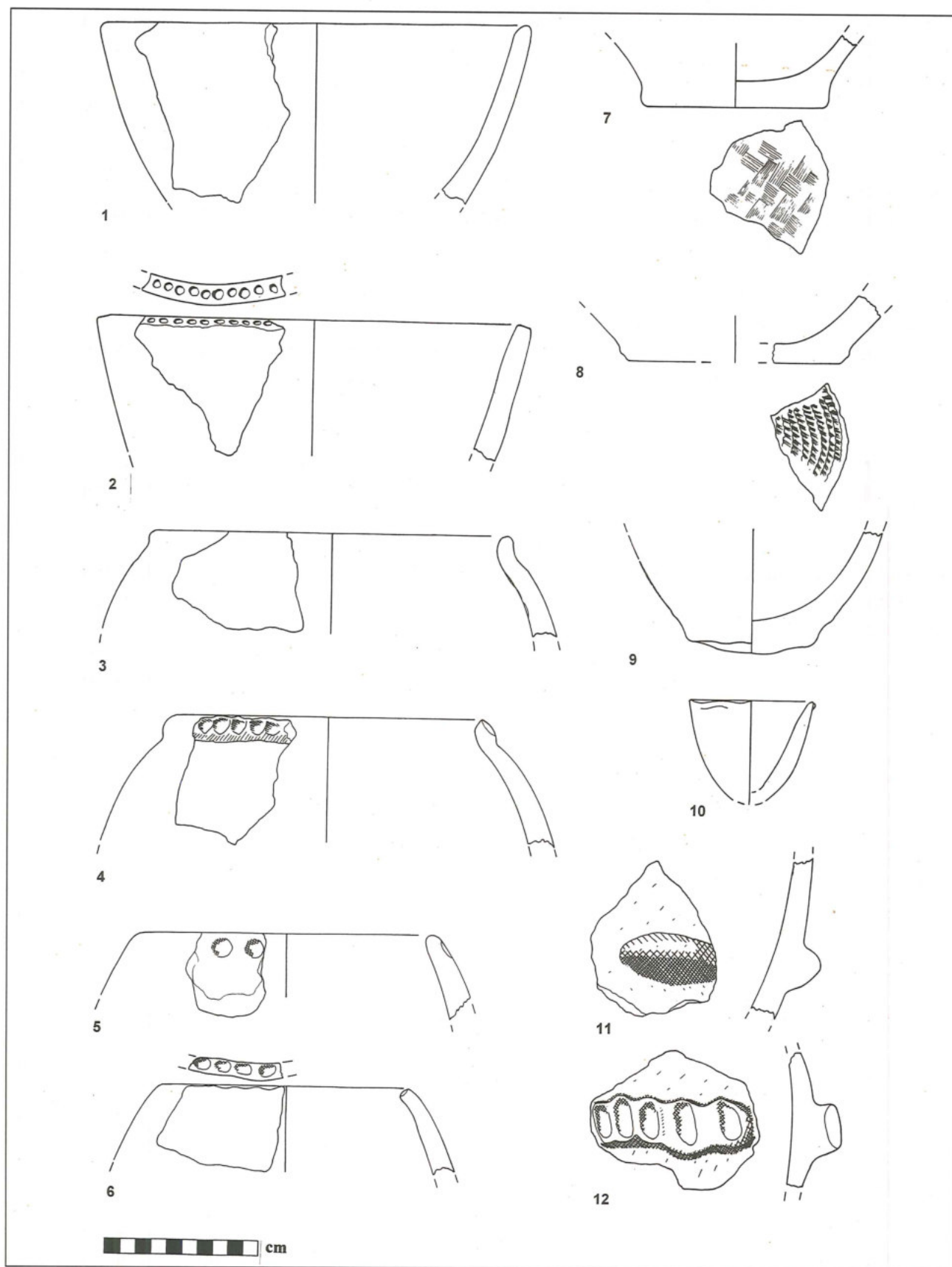
deposits studied in three trenches (Fig 8: R1, R4 and R6), no more than 40 cm thick, contained ash, some pottery fragments, grinding stones, a stone mortar, and two copper awls. Diagnostic pottery fragments, both from the survey and the soundings point to an Early Bronze Age date (see below); C14 dating of samples is currently underway. Up to now, only a few structures could be documented. The whole plan of the settlement will be completed in a future campaign.

Pottery from Ḥujayrāt al-Ghuzlān and al-Yutum B

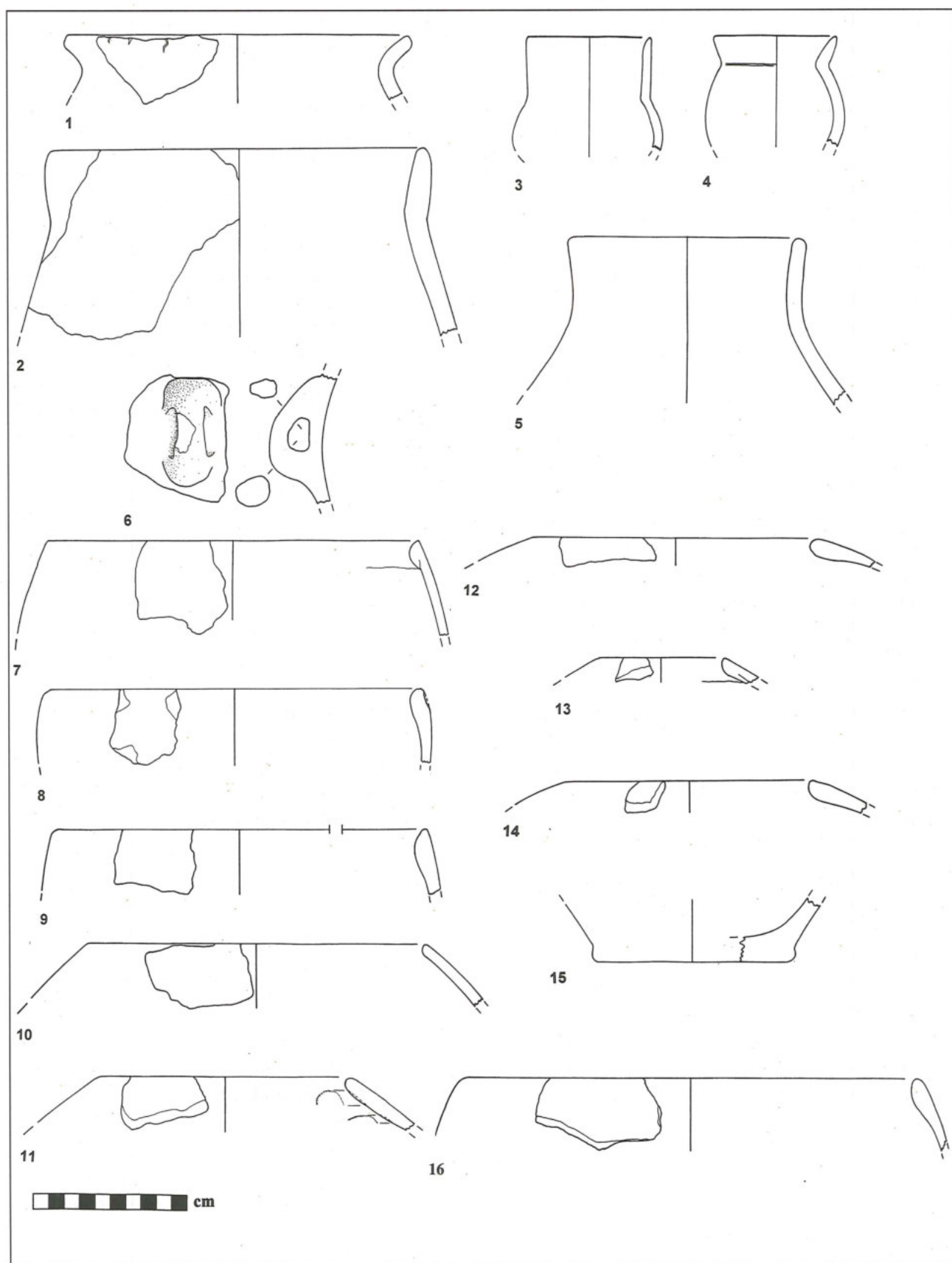
During the survey of Ḥujayrāt al-Ghuzlān only diagnostic sherds were collected (Figs. 9 and 10). They represent 40 different fabrics that could be classified into 8 groups, and generally show a high degree of similarity to the material from Tall al-Magaṣṣ (Khalil 1988; Kerner 1998). All of the pottery is handmade and the coils are still recognizable on the inner and outer surface of several



8. Al-Yutum B: Archaeological trenches within a superficially visible Early Bronze Age (?) settlement, which is not yet completely documented.



9. Pottery from the archaeological survey at Ḥujayrāt al-Ghuzlān.



10. Pottery from the archaeological survey at Ḥujayrāt al-Ghuzlān (1- 6), surveys and soundings at al-Yutum B (7,10,11,13), and from the surroundings of Ḥujayrāt al-Ghuzlān (8,9,12,14-16).

pieces. Buff wares, are common. They are either granite tempered (grain size up to 0.6 cm) or straw tempered.

The formal repertoire is limited to bowls (Fig. 9: 1-2), hole-mouth jars (Fig. 9: 3-6), jars (Fig. 9: 1-5) and pithoi, sometimes with ledge or knob handles, which can be decorated (Fig. 9: 11-12). The bases are flat, relatively thick and show clear signs of the manufacturing process. Often, fingerprints of the potters and mat impressions (Fig. 9: 7-8) are visible. The decoration consists of incisions, finger impressions (Fig. 9: 2 and 4-6), and rows of holes, made with small roundish instruments.

For most of the pottery from Ḥujayrāt al-Ghuzlān, comparisons can be found in either very late Chalcolithic or early Bronze Age IA contexts. So far, Wādī Faydān 4 and 100 provide the best comparisons for the forms as well as the fabrics. Other possible comparisons are those to pottery found in levels V and IV in 'Arad, as well as in Pella (area XIV) in addition to a few similarities with the pottery of Jericho and 'Afula. The pottery at Ḥujayrāt al-Ghuzlān is made in a late chalcolithic tradition, but has forms which are more common in the Early Bronze Age I (Kerner in press; Kerner 1997).

The pottery from al-Yutum and from a small area close to Ḥujayrāt al-Ghuzlān (Fig. 7, find locations X 7 and X 11) is clearly different from that of Ḥujayrāt al-Ghuzlān (Fig. 10: 7 - 16). The wares are partly wheel-made, better fired, denser and harder. The temper, which consists mainly of lime and shells, is much finer, of better quality and lesser quantity. The surface is wet-smoothed and often slipped. The only reconstructable form so far is a medium-sized hole-mouth jar with a slightly thickened rim (Fig. 10: 7, 11, 12 and 14 from al-Yutum B; Fig. 10: 8-10, 13, 15, 16 from Ḥujayrāt al-Ghuzlān X 7 and 11). The pottery is difficult to date. The fabrics are more comparable to the general fabrics of the Early Bronze Age and the only known shape

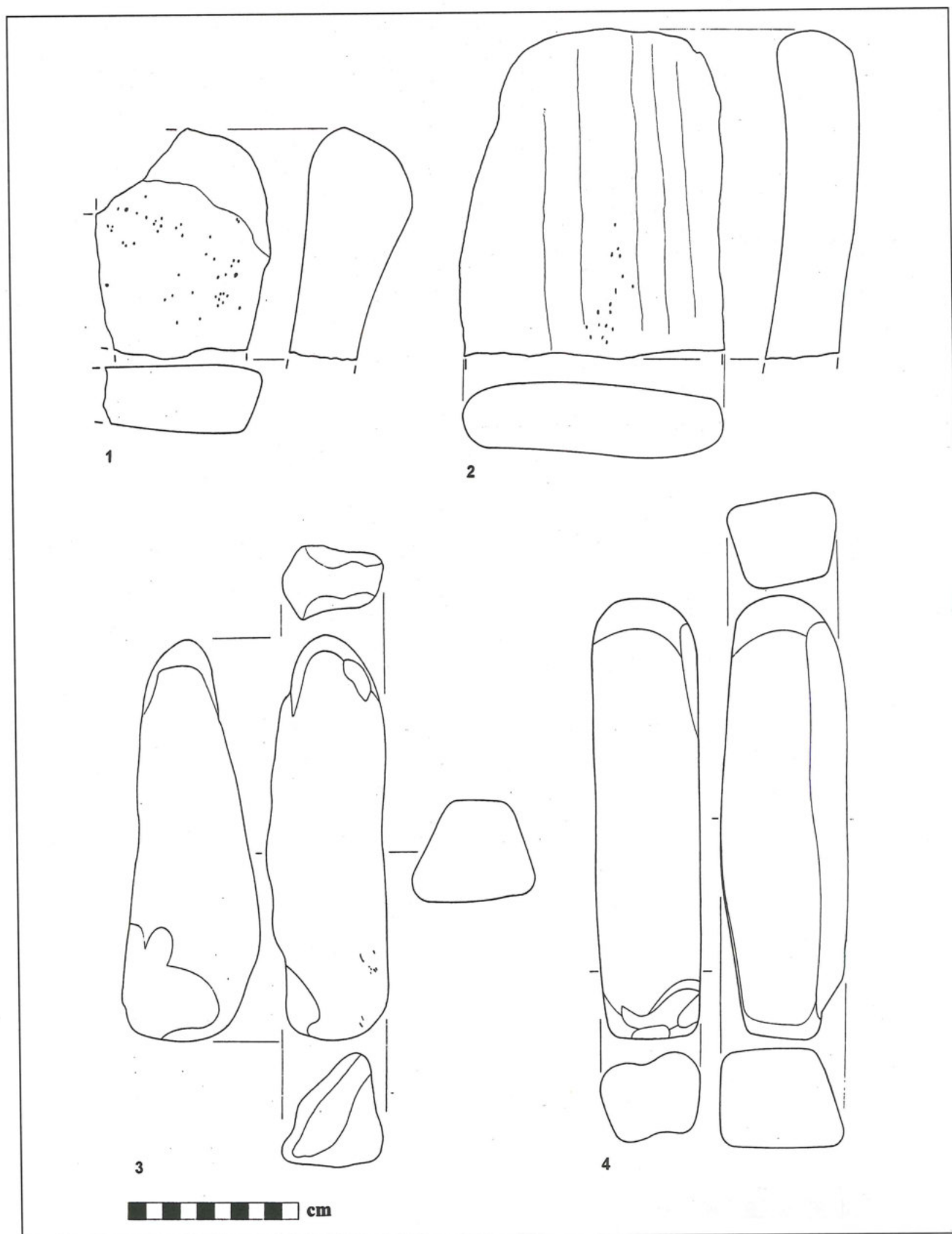
can also be found in Early Bronze Age I and Early Bronze Age II contexts.

Groundstone Artefacts from Ḥujayrāt al-Ghuzlān

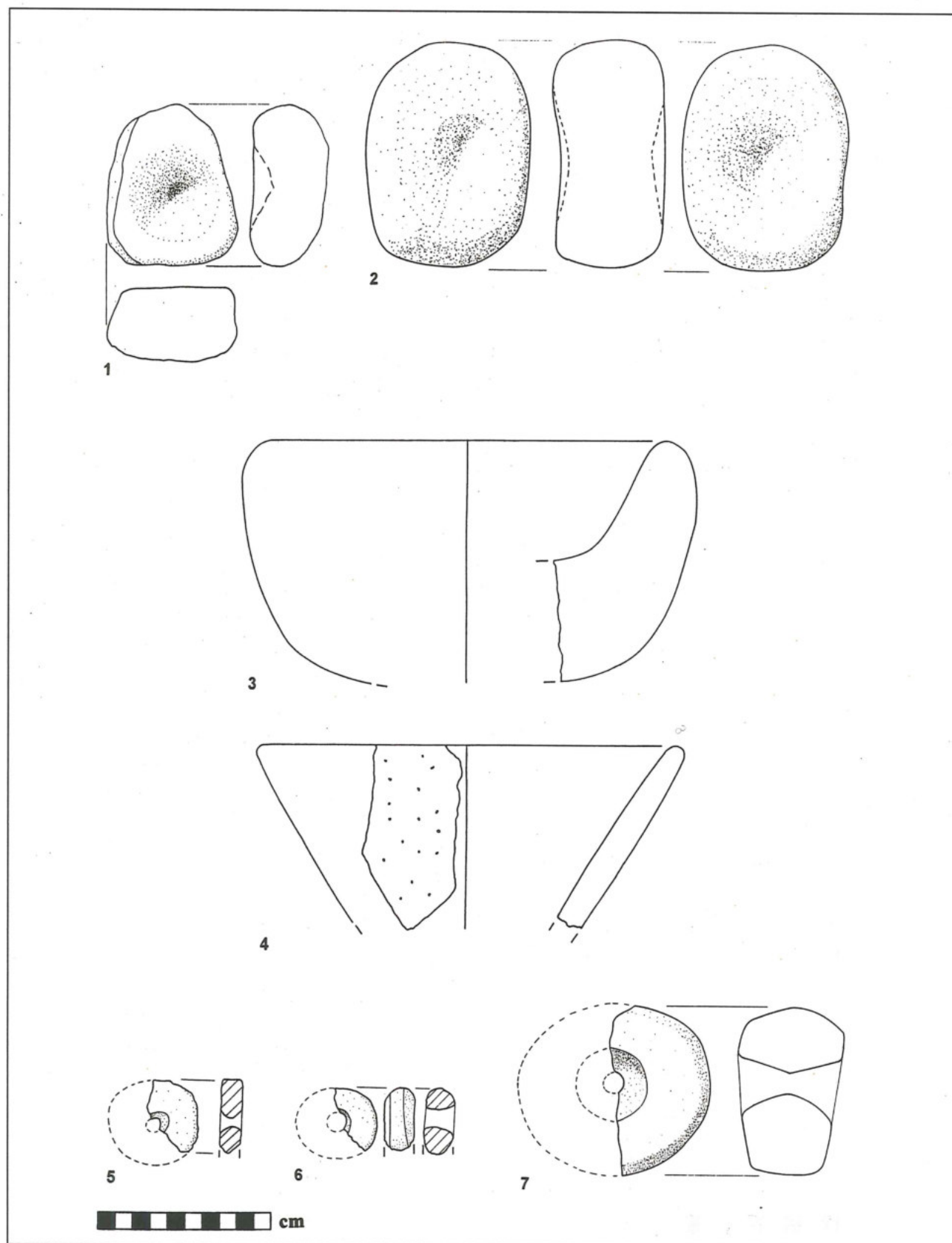
The groundstone artefacts (Figs. 11 and 12) are composed of 316 grinding stones, 2 hand stones, 23 mortars, 5 pounders, 6 pestles, 8 fragments of stone vessels and 4 other items (e.g. loom-weights, Fig. 12: 7). According to the distribution of the tools analysed by Susanne Kerner, only a few find clusters can be observed. These can be interpreted to a limited extent and used as evidence for the reconstruction of different functional areas. For example, there is a dense concentration of grinding slabs, pestles, pounders, mortars around square C5 and its adjacent squares. This combination of finds, which is associated with slags and small pieces of copper ore, can be interpreted as the remains of a working, possibly metal-working, area. The same might be true for squares E6 and F6, although there is a less pronounced density of material. The pores of two grinding stones (Fig. 11: 1 - 2) show clear signs of ore remains and therefore the stones might have been used in connection with the preparation of ore. The majority of grinding slabs was most probably used for grain preparation. The evidence of more vessels and possible loom-weights in the eastern part of the tell, and more grinding stones in its western part might indicate a division of Ḥujayrāt al-Ghuzlān into a more domestic eastern and a more craft oriented western side.

Lithic Artefacts from Tall al-Magaṣṣ and Ḥujayrāt al-Ghuzlān

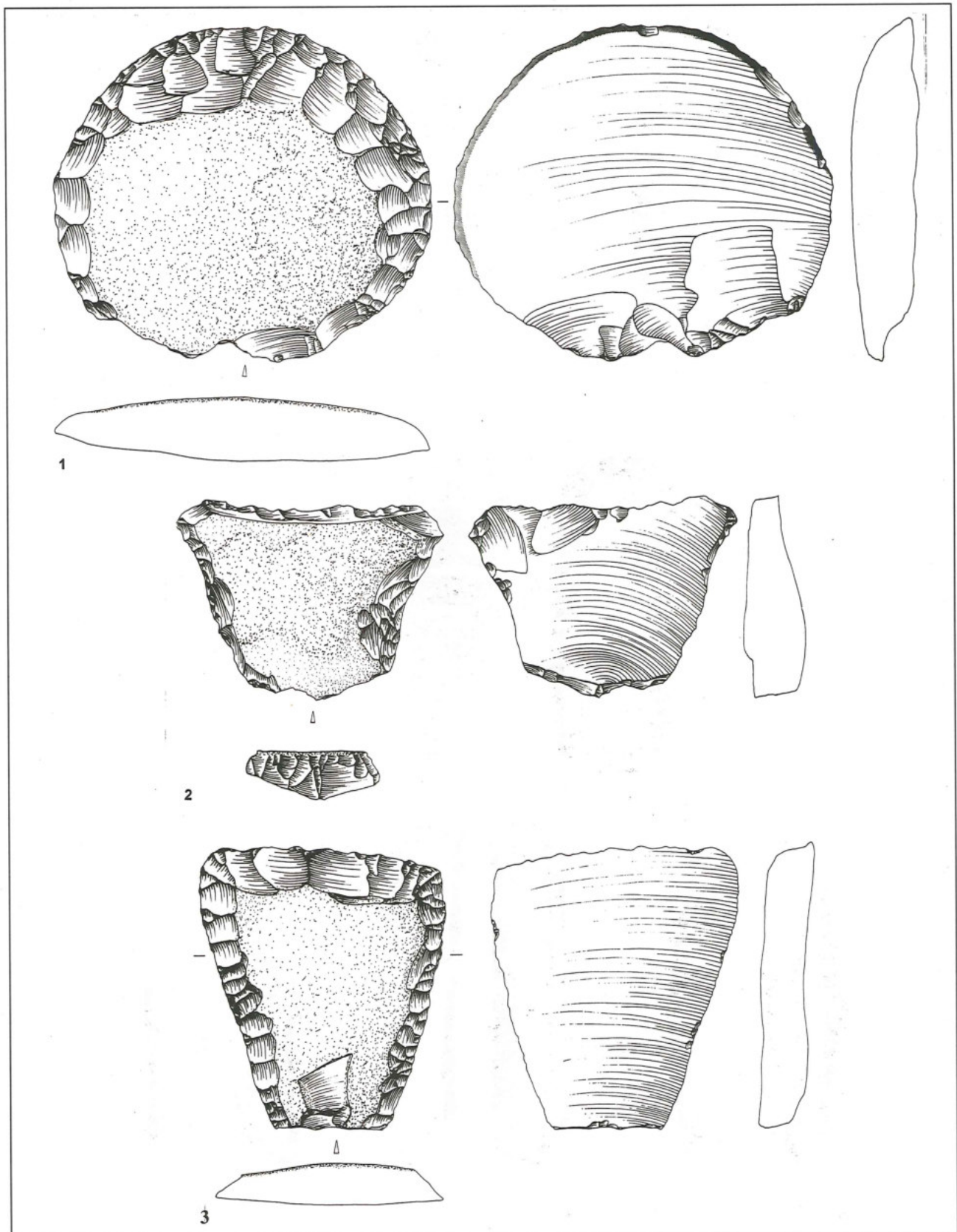
Lithic artefacts (Figs. 13 - 15) were recorded at the two sites, of Tall al-Magaṣṣ (finds from the excavation and the surface) and Ḥujayrāt al-Ghuzlān (finds from archaeological survey). They were thoroughly studied by Lothar Herling (Herling in press), who prepared the documentation of all lithic



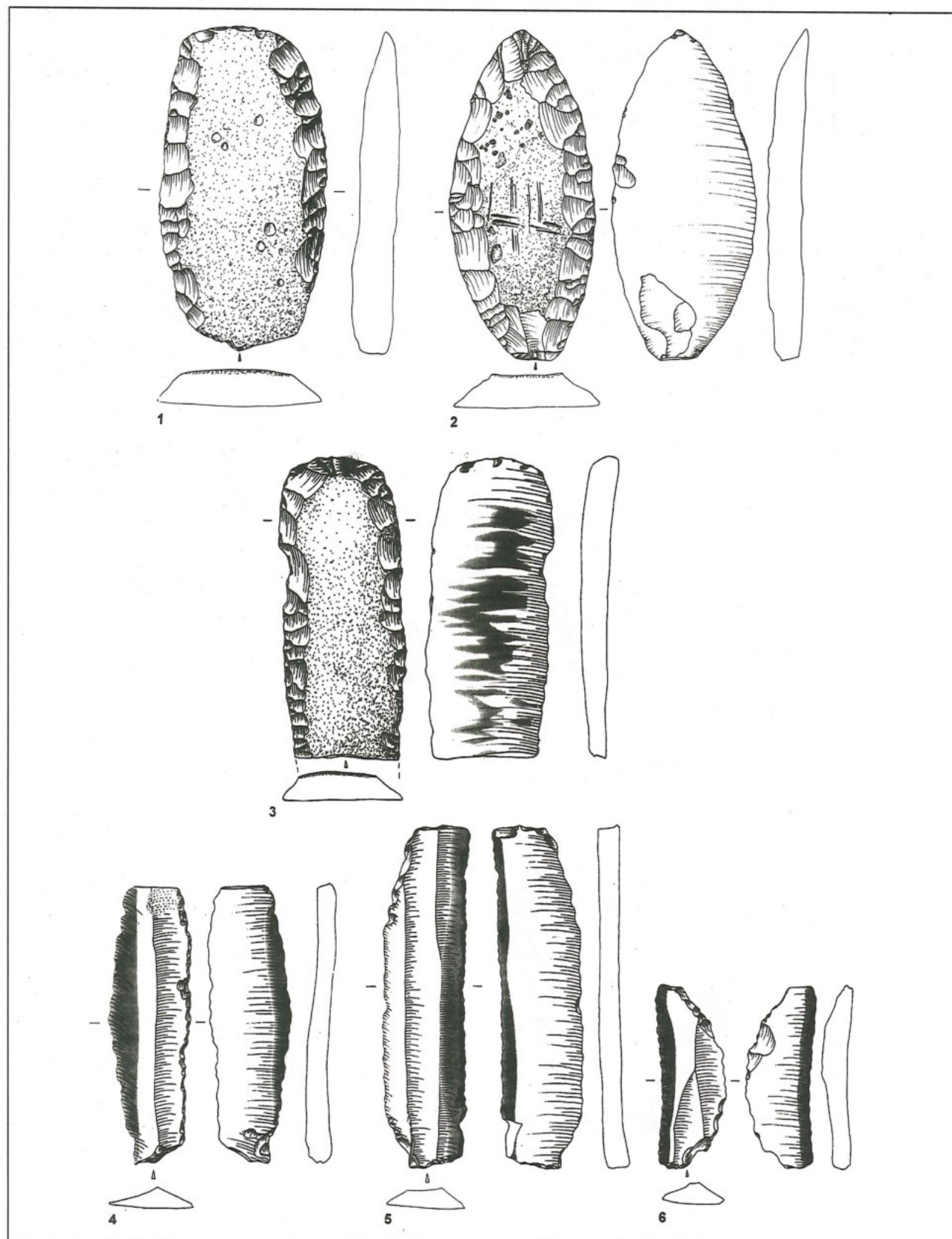
11. Groundstone artefacts from the archaeological survey at Ḥujayrāt al-Ghuzlān. 1-2 = grindstones with remains of copper, sandstone; 3-4 = Pounders with traces of use on both ends, basalt.



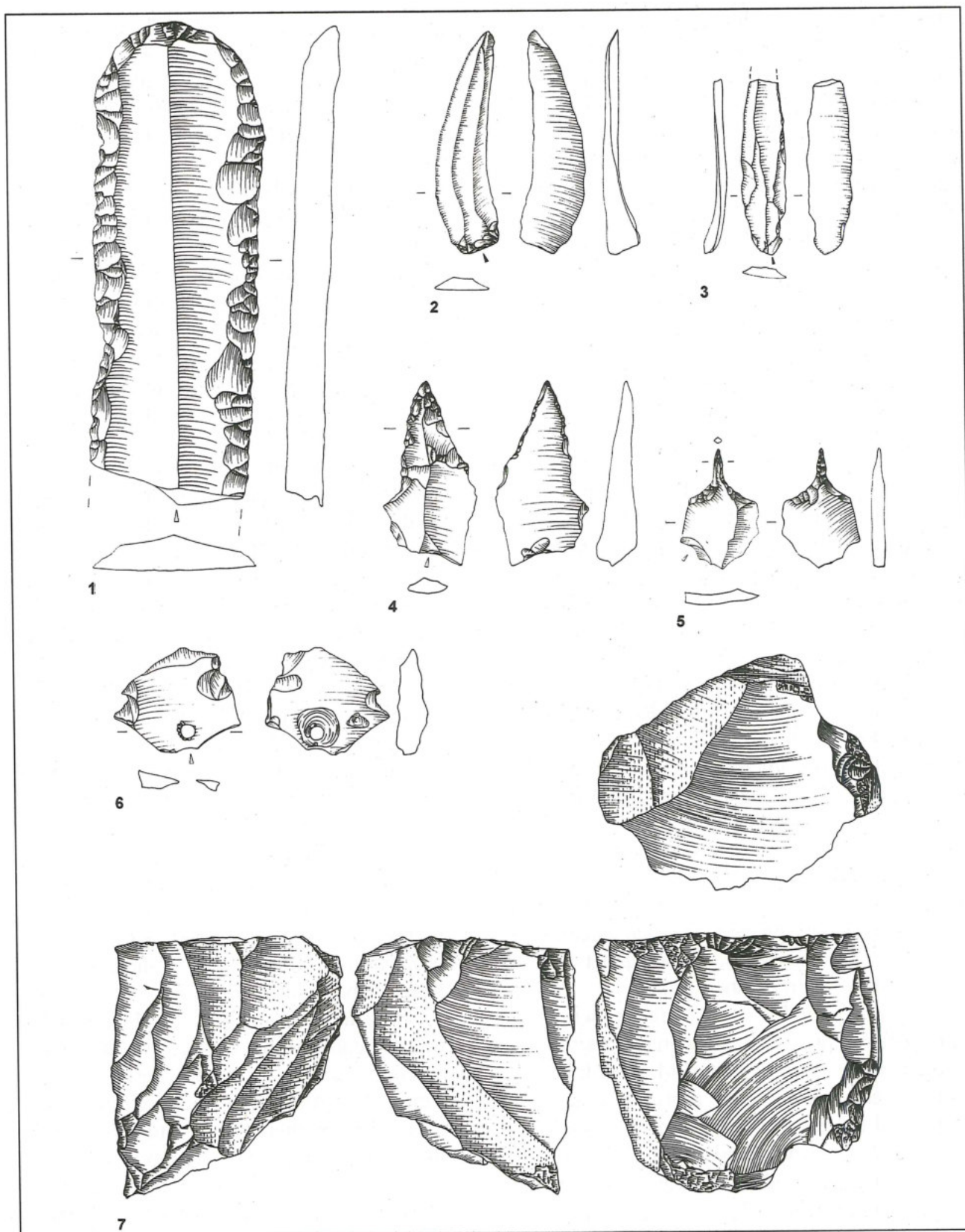
12. Groundstone artefacts from the archaeological survey at Ḥujayrāt al-Ghuzlān. 1-2 = Moulded objects ('pebble mortars'); 3-4 = Stone vessels; 5-7 = Stone rings.



13. Silex artefacts from Tall al-Magaş: Cortex tools ('tabular scrapers'); greatest lengths: 1=8.8 cm; 2 = 6.3 cm; 3 = 6.7 cm.



14. Silex artefacts from Tall al-Magaşş (1- 2 and 4-6) and Hujayrāt al-Ghuzlān (3). 1-3 = Cortex tools; 4-6 = Blades (3-6 with use-gloss); greatest lengths: 1 = 7.9 cm; 2 = 8.1 cm; 3 = 12.2 cm; 4 = 6.8 cm; 5 = 8.5 cm; 6 = 4.5 cm.



15. Siliceous artefacts from Tall al-Magaş (1-6) and Ḥujayrāt al-Ghuzlān (7). 1 = Retouched blade; 2-3 = Twisted blade-lets; 4-5 = Borers; 6 = Perforated implement; 7 = Core; greatest lengths: 1 = 10.5 cm; 2 = 4.9 cm; 3 = 3.8 cm; 4 = 4.0 cm; 5 = 2.6 cm; 6 = 2.7 cm; 7 = 8.7 cm.

finds, not only from the 1998 campaign, but also from earlier seasons (1990; 1985). The following account is based mainly on material excavated at Tall al-Magaşş. Of special interest is a group of ca. 40 tools with a dorsal cortical cover ('cortex tools'), which can be found at many Chalcolithic and Early Bronze Age sites in the Levant. Their contours include round, oval, long and narrow, rectangular, trapezoidal or irregular shapes (Figs. 13 and 14: 1-3). Although the formal repertoire may indicate a special use for the tools, their precise function (e.g. scraper or knife for the processing of meat or hides) is still unclear.

Blades and implements of blades show a large variation in size, shape and function (Figs. 14: 4-6 and 15: 1-5). There are pieces with a bilateral steep retouch, which might have been used as borers, as well as blades retouched on all edges (Fig. 15: 1) or not modified at all. Use-gloss has been found on single blades and on bladelets and segments, which were part of composite tools (Fig. 14: 4-6). Some twisted bladelets (Fig. 15: 2-3) point to an Egyptian influence (Rizkana and Seeher 1988: 19; Rosen 1997: 67).

Borers and one microborer, possibly used for the production of beads, were made from blades as well as flakes (Fig. 15: 4-5). The function of a perforated implement (Fig. 15: 6) remains unknown.

There are a few artefacts, which indicate an on-site primary production, such as cores (Fig. 15: 7), core-heads, a core tablet and several platform preparation flakes.

The large number of isolated observations together provide a more precise picture of the lithic industry at Tall al-Magaşş. It becomes clear that the flint tools must have been used for very varying purposes. Single artefacts can be connected with either herding, farming or bead-production, while the use of other implements remains obscure.

A comparison of the lithic finds from Tall al-Magaşş with those of other sites illustrates, that the site was been mainly inhabited in the

Chalcolithic and into the Early Bronze Age. The finds from Hujayrāt al-Ghuzlān complete the inventory of a Chalcolithic lithic industry only. So far, no Early Bronze Age tools could be identified at that site.

Archaeometallurgy

According to previous studies conducted by Lutfi A. Khalil (1987; 1988; 1998), Faynān and Timna can be considered as possible sources of the copper ores, which were worked at Tall al-Magaşş and Hujayrāt al-Ghuzlān. After a macroscopic study by Andreas Hauptmann, most of the ores originate from the copper deposits at Timna, while no ore from Faynān could be identified with certainty. Obviously the major trade routes of ores from Faynān extended to the west, to the villages in the Beer Sheba basin (Abu Matar, Bir Safadi, Nahal Tillah, Gilat, Shiqmim, and Eien) as far as Wādī Ghazzeḥ (Hauptmann 1998) but not to the south, where nearby Timna must have been the more convenient source.

According to A. Hauptmann, Chalcolithic copper metallurgy at Timna is problematic. Rothenberg (1978) proposed that Chalcolithic copper smelting was conducted at site 39, but a radiocarbon date revealed that such activities were executed in the first millennium AD. The material found at Tall al-Magaşş confirms a trade of copper ores from Timna to the southeast. The copper itself was mainly produced in the interest and under the protection of villages, as was the case in the Beer Sheba basin.

The finds from Tall al-Magaşş additionally confirm that copper was smelted in ceramic crucibles, as is well known in the Levant and Anatolia. The smelting furnace discovered by Rothenberg at Timna Site 39 is, for the time being, unique in the Middle East.

In many respects, the archaeometallurgy of Hujayrāt al-Ghuzlān seems to be comparable with that of Tall al-Magaşş. Most interestingly, a few pieces of slag, one of which contains a typical clayrod as an inclusion,

point to smelting experiments during the Early Bronze Age II. The material is identical with that from numerous Early Bronze Age II/III smelting sites at Faynān (Hauptmann 1998).

Future metallurgical analyses of slags and copper artefacts, which will be carried out by A. Hauptmann and L. Khalil, will aim at checking the preliminary results and characterizing the copper produced at Tall al-Magaṣṣ and Ḥujayrāt al-Ghuzlān. By means of light and scanning electron microscopy, and by chemical and isotopic analysis, the 'fingerprints' of locally produced copper will be investigated and the results compared with those from Faynān and other sites. Because the copper ores of the al-Magaṣṣ and al-Yutum region cannot be found locally, the identification of their provenance will be of special interest.

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