SWEDISH JORDAN EXPEDITION: PRELIMINARY REPORT ON THE ELEVENTH SEASON OF EXCAVATION AT TALL ABŪ AL-KHARAZ, 2008

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With Contributions by M. Rinner, M. Schmidl and C. Wenger

Introduction

The eleventh season of excavation at Tall Abū al-Kharaz was carried out with the kind support of the Department of Antiquities of Jordan between 1 September and 3 October 2008, after a break of seven years. This break saw the publication of comprehensive reports on the Middle and Late Bronze Ages of Tall Abū al-Kharaz (Fischer 2006a), the chronology of the Jordan Valley during the Middle and Late Bronze Ages based on results from Pella, Tall Abū al-Kharaz and Tall Dayr ʻAllā (Fischer ed. 2006b) and the Early Bronze Age of Tall Abū al-Kharaz (Fischer 2008). The excavations were resumed in order to refine our understanding of the stratigraphy and collect new material and additional radiocarbon dates for the next volume, namely, that on the Iron Age (Fischer forthcoming).

One of the main objectives of the 2008 season was to further investigate Area 7, the area which had hitherto yielded the best-preserved Iron Age remains (evidence from the 1993, 1994, 1997 and 1998 seasons partly published in Fischer 1995, 1996 and 1998), in order to further study the occupational sequence of the Iron Age and to provide first-class samples from a sequence of occupational phases for the Iron Age radiocarbon dating project, run in co-operation with the VERA-laboratory at the University of Vienna.

The 2008 team consisted of Peter M. Fischer (director), Rainer Feldbacher (field director), Hikmat Ta'ani (foreman, trench supervisor), Muwafaq al-Bataineh (surveyor, draughtsperson), Michaela Rinner, Martina Schmidl and Christine Wenger (trench supervisors). The Department of Antiquities representative was Ismaeel Melhem, who supported the field work in many ways for which our team is most grateful. Further support was provided by *Salim Suleiman Musa* (transport), *Khalid Mohammad Dheeb* (cook) and two other students who participated part-time in the initial stages of the excavations. Twelve local workers were employed on the excavations.

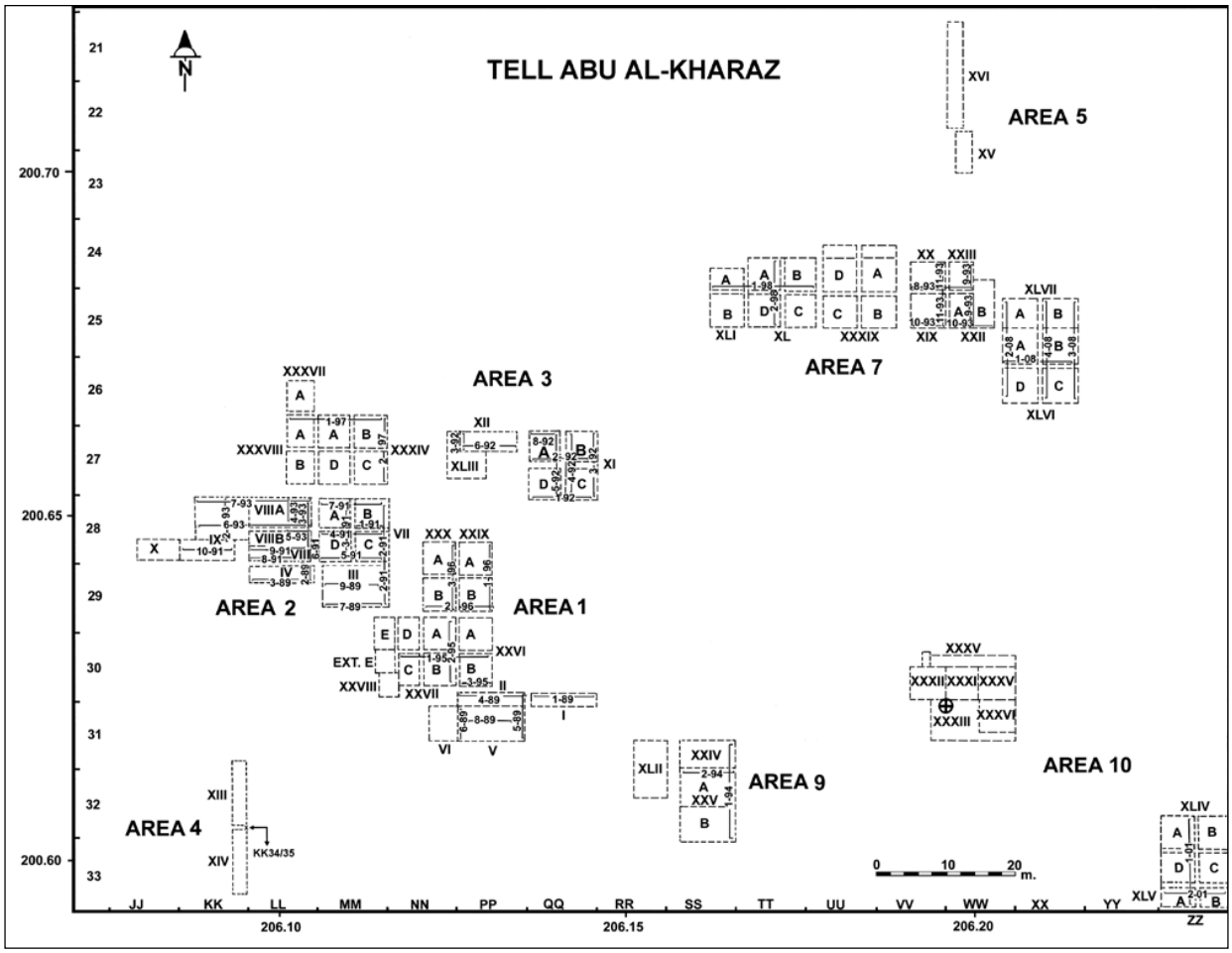
Results

Two trenches, consisting of six sub-trenches, were opened to the east of Trench XXII at the easternmost part of Area 7, which lies in the north-eastern part of the tall just below its summit (**Fig. 1**). These new trenches, located in Grids WW/XX 25/26 (see Fischer 2008: 21, fig. 9), were Trench XLVIA-D (10m x 10m in size) and Trench XLVIIA-B (4m x 10m in size). The area of the excavations in 2008 is almost flat in the east-west direction (10m wide), but slopes down from south to north by 4.9m on its eastern edge and by 2.5m on its western edge (14m long). The occupational phasing is only applicable to the present area of excavation but parallels with earlier excavations in Area 7 and its general phasing will be referred to.

Stratum 1A[1]

The most recent occupational phase can be

1. "Stratum" should only be considered as a term of convenience for use during field work and in preliminary reports (see Fischer 2006: 26). It is used to designate a level of occupation regardless of area, and is allocated a number as it is excavated. From 1989 to 1994 consecutive numbering of the strata was used in the preliminary reports submitted to *ADAJ*. Nevertheless, after the 1995 season it was decided that Stratum 1 A, B etc. should designate the phases from the Islamic period back to the Iron Age. Stratum 2, with sub-divisions, is reserved for the Late and Middle Bronze Ages, and Stratum 3, with sub-divisions, for the Early Bronze Age. All these divisions and sub-divisions relate only to the preliminary reports. The final phasing for the Early, Middle and

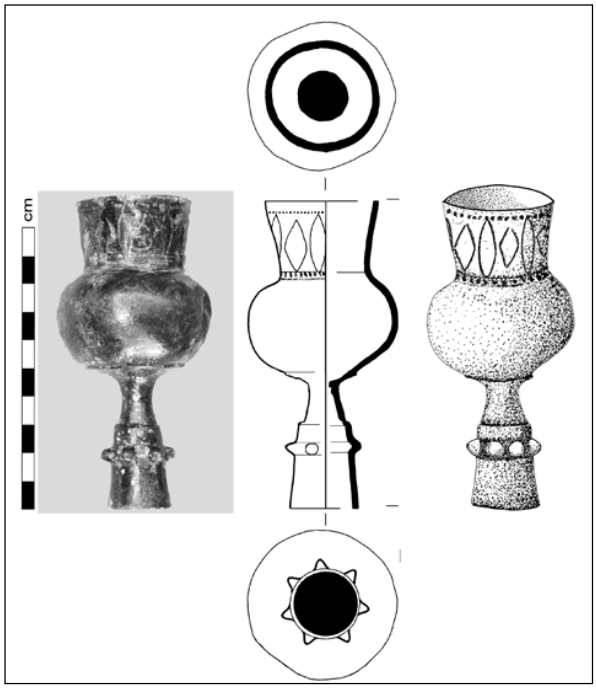


1. Location of Trenches XLVI and XLVII in Area 7.

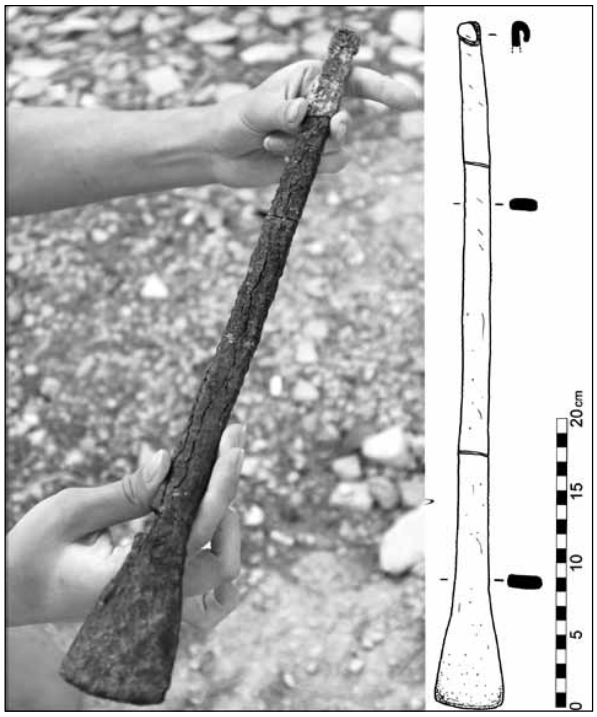
attributed to the Abbasid period. The architectural remains from this period, which were located just below or within the colluvial soil, are much better preserved than those, which were exposed in Area 7 during earlier excavations. The Islamic city wall (W548/569) in the present area of excavation corresponds from east to west with the following walls, which were exposed during earlier excavations: Walls 232, 167, 155, 446 and 486. This gives the exposed Abbasid city wall in Area 7 a total length of approx. 55m It is approx. 0.85m wide and only a stone foundation of one to two courses is preserved. There are two rooms, which were built against the city wall: one to the west and another to the east. They are approximately 3.5m wide (their lengths parallel to the city wall are so far unknown). Between these two rooms is an open area with a refuse pit which disturbed the earlier strata down to Stratum 1C. Another partly preserved wall and additional pits are to the south-west.

In addition to typical Abbasid pottery of the ninth century AD (see the pottery from the 1993 excavations described by Walmsley 1995: 107, 116-7), an unusual find should be mentioned: a bronze object, perhaps partly gilded, with neatly incised geometric patterns which resemble the symbols of playing cards (**Fig. 2**). The function of this object is not clear, but a possible interpretation is a table or hanging lamp (pers. comm. A. Walmsley). There is a well-preserved, 48.5cm

Late Bronze Ages is in Fischer 2006a, 2006b and 2008. There are six sub-phases for the Early Bronze Age (IA and B, IIA and B, IIIA and B), two sub-phases for the Middle Bronze Age (IV/1 and 2) and four sub-phases for the Late Bronze Age (V to VIII). The final phasing of the Iron Age will consequently start with Phase IX.



2. Abbasid lamp of (gilded?) bronze.



3. Iron adze.

long iron object which was found in the south-western part of the excavated area at the lowest Islamic level (**Fig. 3**)[2]: it is axe- or most likely adze-shaped with a long shaft and the tang bent over to hold the tool more securely to a handle, presumably made of wood. It seems to have been used for woodwork.

Stratum 1B

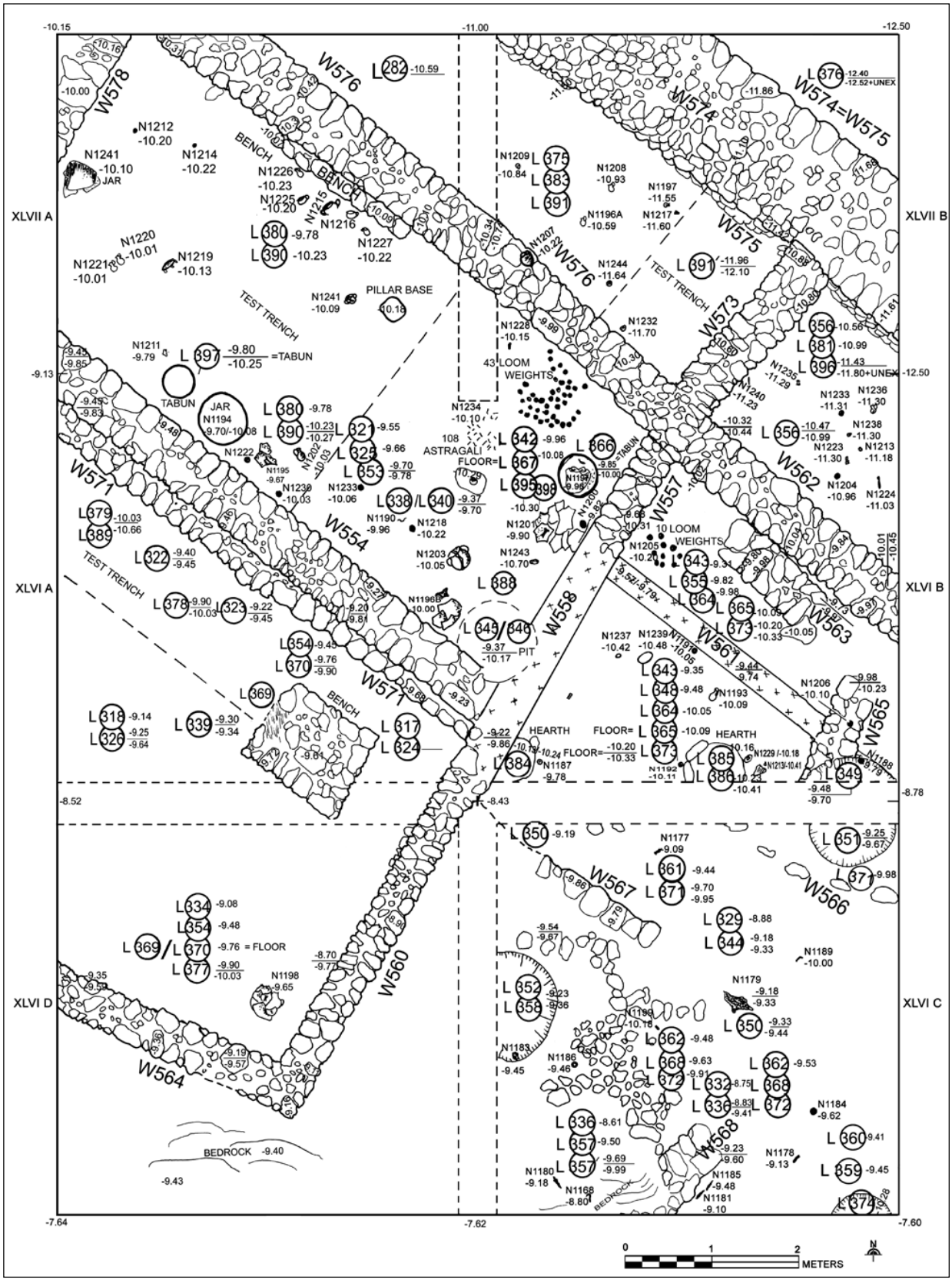
This stratum is only preserved in the north-western part of the excavated area. There is a stone-paved space of the same size as the western room described above (W548, 555 and 550). The architectural remains from preceding Iron Age period seem to have been — at least partly — reused in Stratum 1B. This stratum is also dated to the Abbasid period.

Stratum 1C (**Figs. 4a and b**)

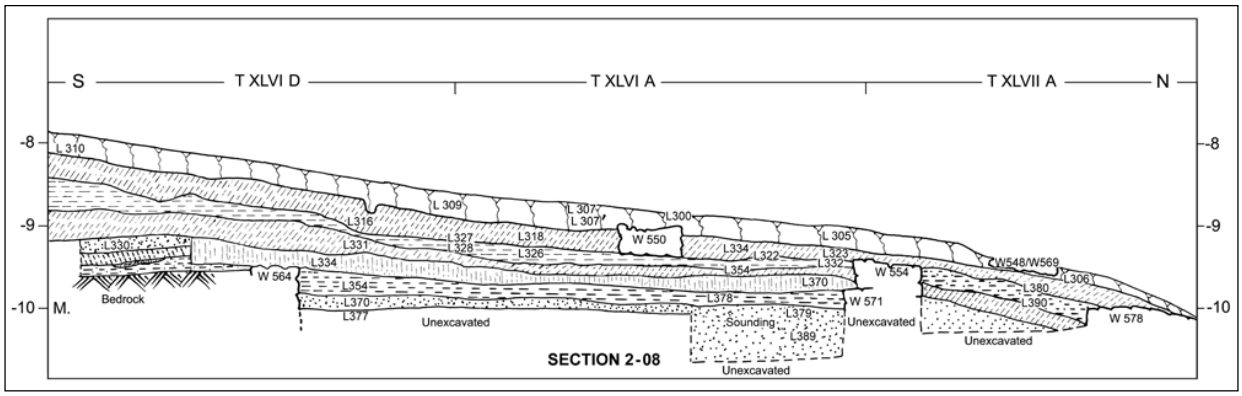
This stratum corresponds to the most recent and best preserved phase of late Iron Age occupation (Iron Age IIC in conventional terms). It is contemporaneous with "Strata 1 and 2" in the previously excavated part of Area 7 (see preliminary report on the 1993 excavations in Fischer 1995: 101). The exposed compound is limited to the north by the stone foundations of a 1.6m wide wall (W574/575). The date of this wall and the perpendicular W573 is problematic: it was certainly used during this period and earlier Iron Age phases, but W574/575 at least might date back to the Late Bronze Age as part of the casemate system previously excavated in various areas (e.g. Fischer 2006: 211, fig. 251). The ceramic evidence strengthens this hypothesis: although late Iron Age sherds dominate, there are also sherds from an earlier phase of the Iron Age and the Late Bronze Age.

W562/576 represents the southern limit of the casemate walls and functions as the northern edge of a building complex. There are two roofed spaces in the western part of the excavated area. One is a room to the north-west which is bordered by W578, 576, 557 and 554. It is 7.5m x 3.5m in size and was full of complete pottery vessels and various tools related to textile production (see Appendix 2 of this report). There is *a ṭābūn* built against W554 to the south-west. The latter wall separates this room from another one to the south-west. The latter room is 7.5m x 5m in size (reconstructed) and surrounded, as excavated, by W554, 560 and 564. It contains a large stone structure, approximately 1m square,

2. This object could equally belong to the fill deposits above the most recent Iron Age occupation.



4a. Stratum IC (Iron Age IIC).



4b. Western section of the excavated area (Section 2 of four).

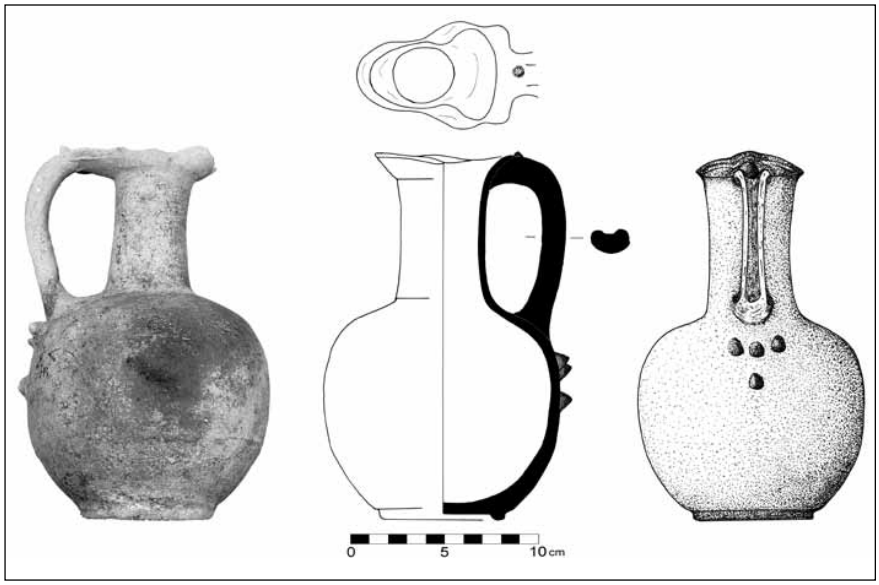
close to its north-eastern corner. This structure might have functioned as a working table or, less likely, a roof support and might represent part of an earlier wall. To the east of these two rooms is a partly excavated area, which was roofed in its northern part. It is limited by W558, 557, 562 and contains a small mudbrick dividing wall (W561). The southern limits of this space are not clear but it seems that it was limited by walls (there are the remains of two walls: W566 and 576).

The south-eastern corner of the exposed area (Trench XLVIC) is interpreted as an open-air workshop for the production of iron and bronze tools on account of thick layers of ash, and pits containing numerous arrowheads of iron and some items of bronze (L329, L332, L336, L344 and L350). The majority of these loci consist of yellowish-red to reddish-brown loose soil intermixed with substantial layers of ash and slag. Pieces of hard-fired mudbrick were also present. Finds from these loci include a number of iron arrowheads (N1177, N1180, N1181 and N1185), a bronze dagger (N1178) and, among other iron objects, an iron sickle (N1168). There is also an accumulation of many arrowheads bundled up together (N1179) in L344 (see Appendix 3).

We are working with the hypothesis that the area once contained a furnace, which was destroyed or dismantled. This theory is supported by finds of parts of a possible tuyère of fired clay / sherds leading to a small pit surrounded by pebbles. In addition, there is another partly excavated small pit with pebbles (L374), which unfortunately continues into the southern section. It contains loose, ashy, material, with a hard bottom of a greyish-white material; this might have been used as a small casting installation. It is somewhat surprising to find evidence of textile production, in the shape of spindle whorls and loom weights, in such close proximity to a metal workshop (see Appendix 2). However, the workshop is separated from the domestic area to the north and west by a small wall (W567), now all but destroyed. The location of the workshop at the north-eastern corner of the settled plateau is well-chosen because at Tall Abū al-Kharaz the wind, today at least, blows mainly from west and south. Therefore, the population would have been less affected by the smoke and smell of the workshop.

How were our metal objects produced? The simplest form of casting is in an open mould of stone, loam or clay. Metal wastage barely occurs if the metal is cast in crucibles and moulds of stone or sand, which are smeared with sheep fat or flour (cf. Reiter 1997: 458 ff.). Unfortunately, evidence for all this is missing except for the remains of fired mudbrick.

Amongst the typical late Iron Age pottery from this phase are imports from Cyprus (Red-on-Black pottery from the Cypro-Geometric III period), Phoenicia and Assyria. The Phoenician juglet, with its inwardly folded rim, double handle and plastic decoration above and below the handle is unique to Tall Abū al-Kharaz (**Fig. 5**). The import from Assyria is a red-painted Neo-Assyrian cylinder seal of steatite / enstatite with the representation of a bearded male, wearing a full-length decorated dress and aiming a bow and arrow at an ungulate heading towards a tree (**Figs. 6 and 7**). There are two symbols above the animal: one is a double-wedge, which resembles



5. Phoenician juglet from Stratum IC.

6. Red-painted Neo-Assyrian cylinder seal from Stratum IC.

7. Seal impression (see **Fig. 6***).*

the Greek letter "pi"[3] and the other a half-moon (see Appendix 1). We also discovered an ostracon of a storage jar (**Fig. 8**). The partly preserved inscription is in a Transjordanian dialect or old Hebrew. There are three letters "r", "q" and most likely "p". The interpretation is speculative but it could be read as "only", placed directly before a name (pers. comm. K. Jaros).

To sum up, the Stratum 1C complex located east of the four-room house exposed in the 1993 and 1994 excavations is tentatively identified as a workshop for the production of metal tools. The compound includes the workshop itself and accommodation for the craftsmen.

Earlier Phases

A number of limited soundings were carried out in Trenches XLVIB and C, and XLVIIB. The pottery confirms the presence of earlier Iron Age, Late and Middle Bronze Age, and Early Bronze Age occupation. It seems, however, that these phases were disturbed to a considerable extent by the extensive and intensive building

3. There is some resemblance between these double wedges and incised and raised potmarks from Early Bronze Age Tall Abū al-Kharaz Phase I (Feldbacher and Fischer 2008: 395, 35), Phase II (idem: 396, 26) and "unstratified" (idem 397, 17). These finds are dated to around 3000 BC (see chronological discussion in Fischer 2008: 371-382).

8. Ostracon from Stratum IC.

activities of Stratum 1C, *viz.* the Iron Age IIC. At some spots in the southern part of the exposed area, bedrock was reached upon which mainly Early Bronze Age pottery was found.

Future Objectives

The 2008 season is the first of at least three seasons intended to continue investigation of the Iron Age sequence at Tall Abū al-Kharaz.

Appendix 1: A Neo-Assyrian cylinder seal from Tall Abū al-Kharaz (M. Schmidl)

The Cylinder Seal and the Context

A cylinder seal (N1161, **Figs. 6 and 7**) was discovered in the most recent Iron Age phase in Trench XLVIB, Area 7. The seal is of a yellowish-white material with a 'greasy' surface and dark brown core, probably enstatite. Its 2.9cm long, slightly convex body has a diameter that varies from 1.0 to 1.1cm. It has a centred drilling throughout its length, measuring 0.3mm in diameter; its weight is 5.2g. The seal is engraved with fairly deep, hand-cut lines. Brownish-red stains on its surface are most likely the remains of paint.

The Engraved Scene

Between two collars there is one scene covering the entire surface. It shows an anthropomorphic figure and an ungulate. Other motifs are a crescent moon, a pair of wedge-shaped elements and a tree-like element, narrowing towards its top, which is split in several directions above half of the total height of the seal.

The human figure, which fills the entire space between the two collars, is depicted in profile, facing left. Only one foot is slightly indicated. This hunter can be identified as male on the basis of his clothing, a belted, full-length skirt, seemingly worn in a wraparound fashion (according to the various sloping, horizontal and vertical lines across its surface) leaving the upper part of the body naked, and his high, pronged headdress and apparent beard. His right arm is stretched away from the body; the left one is raised up to his face with the elbow at the level of the shoulder in order to aim and draw a bow which is nearly two-thirds as long as its owner. Although the string has not been cut, the arrow is clearly visible with its elaborate arrowhead pointing at an ungulate whose head is turned away from the aggressor. Its four legs consist only of angular lines, but nevertheless show details such as joints and hooves. Its horn is emphasized, with an ear protruding from the head right next to it. In addition, a mane and tail are depicted, with the tail — which ends in tassel — dropping down to the floor and crossing one of the hind legs. Lines across its body seem to indicate a harness. The animal is facing the tree-like element. The two remaining filling motifs, the crescent moon and two adjoining wedges, cover the space between the bow and the animal's head and neck.

Interpretation and Parallels

This seal is certainly an import. It depicts the well-known motif of archer and prey, with the prey being attacked from behind. The relatively common feature of a stylized tree or plant might denote a sacred tree which needs to be defended by the archer (Porada 1948: 73). The style of cutting, namely linear with the depicted elements consisting for the most part of contours with few details, is convenient considering the soft material and the fact that only hand-held tools were used for the cutting. This 'linear style' is typical of Neo-Assyrian seals, usually dated to the ninth and eighth centuries BC (Collon 2001: 2-3). There can be variants in the posture of the archer (e.g. standing or kneeling), the kind of animal (which might turn its head to look at its attacker or be replaced by winged human-headed animals or monsters) and the repertoire of filling motifs. Normally, this style is not as deeply cut as in our example (Teissier 1984: 34; Brentjes 1983: 153). This style continues into the seventh to sixth centuries BC (Teissier 1984:

34). Matthews (1990: 90-91) has proposed an even earlier date for the appearance of this type of seal, a hypothesis based on Middle-Assyrian cylinder seals. Nevertheless, this plausible theory is not particularly consistent with Porada's view (1948: 73), *viz*. the distinction between early and late seals according to their size, with the earlier ones being taller than those of later centuries. In addition, Porada (1948: 72) favours a connection between the Kassites and the evolution of the linear style in Neo-Assyrian times, due to the non-realistic but ornamental or decorative way of depicting scenes. Teissier (1984: 34) refrains from a definite pronouncement on the origin of the style but also mentions Kassite or Elamite glyptics (13th century BC), referring to Middle Assyrian seals cut in linear style only in a footnote.

Herbordt (1992: passim) and Collon (2001: passim) prefer to categorize on the basis of motif, rather than style and technique as suggested by Porada (1948: passim). Designs like the one shown here might, according to Collon (2001: 3, 35-41), be influenced from the west. It remains to be added — especially considering the standing archer — that this motif is found mainly on faience seals (Collon 2001: 3). This can be seen as a consequence of the general correlation between hand-cutting techniques and soft materials. These facts seem to support the supposition that this cylinder seal is of enstatite, although empirical proof has yet to be found.

The most striking parallel was published by Collon (2001: 29; see also Collon 1987: no. 337, originally published in Wiseman 1959: pl. 51). The individual elements are almost exactly the same: we see an archer pointing his bow towards a winged bull facing him. Additional motifs are (again) a tree, though less stylized, a crescent moon and two wedges, in this case separated from each other. The last three motifs are placed above the bull. An interesting correlation concerning the posture and garment of the standing archer is depicted by Parker (1962: pl. XI, 3), notwithstanding the fact that it is damaged. Other seals show at least some parallel elements, demonstrating that a certain repertoire of forms and figures were in use and were combined with this type of motif and style of cutting during the period in question. The stylized tree, for example, is depicted in a very similar manner on a stamp seal impression on a tablet from Nimrud (Herbordt 1992: pl. 16, 5; cf. Parker 1955: 121, fig. 21, pl. 28, 1).

Crescent and wedges as filling motifs are very common within this group of seals, e.g. crescent and wedge (Collon 2001: no. 19), two vertical wedges (Collon 2001: no. 27), one wedge (Collon 2001: no. 28) and standing archer, crescent and two wedges (Collon 2001: no. 31). Collon 2001: no. 24 and 25 are interesting because they show animals that might be intended to represent bulls, but actually resemble horses; the latter could be case in our scene. The interchangability of horse and bull is even more clearly demonstrated in Kist (2003: no. 338), where a bull has been re-modelled as a horse. Another example is Doumet (1992: nos. 137, 138), which shows an archer aiming at a horned quadruped and wearing a robe of very similar design to ours. In Doumet no. 137, the ungulate's body is depicted with linear details which hint at the presence of a harness. There are many more parallels, including Keel-Leu and Teissier (2004: nos. 168 and 170) and Porada (1948: no. 617) which use three joined wedges as filling motif, while another one (Porada 1948: no. 621) shows them placed separately. Similar pieces can be found in Teissier (1984: no. 163, 167, 168).

There seem to be no exact parallels to our cylinder seal in Jordan. The closest one in period and motif was found in Khirbat an-Nuḥās (Eggler and Keel 2006: 127, 1), which has a standing archer and procumbent ungulate. However, it is very simple in style and, moreover, a stamp seal in the form of a scarab. Nevertheless, its date seems close to the abovementioned group of seals and motifs, *viz*. 1075-900 BC (Eggler and Keel 2006: 126). It may be added that depictions of standing archers seem to be few in number in Jordan as a whole. Eggler and Keel (2006: 267, 14) present only one further example, from Saḥāb, on a cone made of limestone. While different in style, the motif is similar to ours, although the extremely schematic prey is cut above its assailant and rotated 90°. Another archer is engraved on the side of the cone. This piece is dated to 1250 / 1200-1000 BC. An example in Kühne and Salje (1996: 103f Nr. 52) shows one of the rare depictions of an archer, this time from Kāmid el-Loz, but according to the authors it was roughly carved with a cutting-

wheel and left unfinished. Still, it is dated to the early Iron Age on the basis of its stratum, without ruling out a possibly earlier date. The example in Keel *et al*. (1990: 389, 98) is another possible parallel, but the composition cannot be unambiguously determined with regard to motif. Scarabs in Keel (1997: 560f, 85-89) originate from Akko and show standing archers, but not a comparable scene. An equivalent in date and scene, but not style can be found in Keel (1997: 575, 123) and is dated 1150-900 BC. An ungulate turning its head towards its assailant is illustrated in Keel (1997: 591, 172A) but differs conspicuously in style. A standing archer, hunting a probable dog, can be seen in Keel (1997: 599, 191) and has been dated between the 12th and 10th centuries BC. An Iron Age IIA-B stamp seal from Ashdod might show a warrior with lance and bow. Archers aiming at lions are a recurring motif, see for example Keel (1997: 613, 233 or 699, 25). A depiction of a horse, which resembles our ungulate — especially its legs and tail — in posture, from Aseka is in Keel (1997: 737, 5) and is dated to the middle or end of the 8th century BC.

There may even be a similar scene from Tall Abū al-Kharaz itself: an impression on a handle from Area 2, Trench XXXIVC, in a pottery context dated to Iron Age IIC. There seems to be a figure behind a quadruped, but owing to its state of preservation no detail can be deciphered (Fischer 1998: 214, fig. 2; cf. comments by Eggler and Keel 2006: 279, 3).

Summary

The seal in question, which depicts an archer and prey, is certainly imported from Assyria on the basis of related seals and its exclusively Mesopotamian design elements. The comparable, but unfortunately extensively damaged, example in Parker (1962: pl. XI, 3) could hint at an origin from Nimrud, but this remains highly speculative. The motif and style of our seal point to a ninth or eighth century BC date. While such seals are not uncommon in areas closer to the main Assyrian sphere of influence, its occurrence in Jordan seems to be unique, with no convincing parallel published so far. With regard to the identification of the prey, I prefer to consider it a horse or ungulate other than a bull, owing to its mane, harness and the parallels discussed above. Concerning the seal itself, its supposed painting seems odd, as its form does not hint at its use as an amulet. If a painted stone seal were to be used on clay, its colour would have to be constantly renewed.

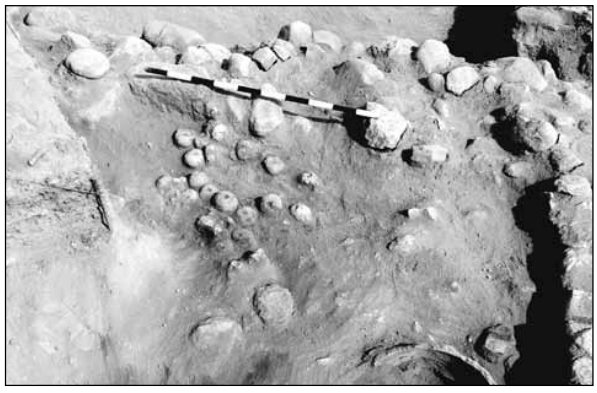
Appendix 2: The Loom Weights from the 2008 Season at Tall Abū al-Kharaz (M. Rinner)

Introduction

The objective of this study is to investigate loom weights from Iron Age II C contexts at Tall Abū al-Kharaz which were discovered in 2008 (**Fig. 9**).

Loom weights are unpretentious artefacts which help to reveal the characteristics of textiles that were produced in ancient times (Friend 1998: 11). Two types of looms, warp-weighted and horizontal looms, were used for the production of fabric (Boertien 2004: 308). Loom weights are only necessary for the warp-weighted loom. This type of loom consists of two vertical side beams supporting the cloth beam, to which warps and loom weights were attached. The function of the loom weights is to stretch the warp threads. The weights ensure the necessary tension of the warps and keep the threads parallel (Crowfoot 1951: 18, fig.3). In order to facilitate the weaving process, the tension must be sufficient to hold one set of threads, the warp, parallel so that another set of threads, the weft, can be interlaced with the warp. The actual weight of the loom weights varies depending on the width and the type of fabric.

Some of the oldest findings of warp-weighted looms and complete sets of weights derive from Early Bronze Age II contexts, dated to around 3000 BC, at Tall Abū al-Kharaz (Fischer



9. Collection of sun-dried loom weights from Stratum IC.

2008: 50-54, 352-354; Fischer 2006: 350-357). The warp-weighted loom underwent continuous development in the Levant (Barber 1991: 81, 83-84) and spread westwards, reaching Greece, northern Italy and even Scandinavia, where it was used from the Early Pottery Neolithic onwards (Hoffmann 1974: 17). The use of warp-weighted looms in northern Europe has even been documented as late as the middle of the 2th century (Hoffmann 1974: 17; Barber 1991: 81, 301). In addition to making it possible to weave fabric of considerable lengths, other advantages of the warp-weighted loom are that it can easily be dismantled and stored away when not actually in use, or moved to another place.

Boertien (2004: 314) divided the perforated loom weights from Iron Age contexts at Tall Dayr ʻAllā into two groups: the horizontally — and vertically-pierced loom weights. The conical, spherical or doughnut-shaped loom weights from Tall Abū al-Kharaz all belong to the vertically-pierced group. Boertien also claims that conical loom weights often appear in small numbers within larger groups of other loom weights and that the doughnut form was the most popular shape in Iron Age Palestine. It is difficult to form a spherical shape from dry clay, but wet clay gives a smooth round ball with an intended shape that is difficult to maintain during the drying process (Boertien 2004: 316).

The vast majority of loom weights from the 2008 season derive from the most recent Iron Age IIC phase. They are all of unfired, sun-dried clay and have counterparts in the hundreds of unfired loom weights from earlier excavated Iron Age contexts at Tall Abū al-Kharaz. The 2008 season yielded 64 loom weights. Of these, 35 (55 %) were complete and pierced. Five (8 %) weights were not pierced, which shows that they were made on the spot. Twelve (19 %) were incomplete but pierced; in seven cases (11 %) no hole could be observed but markings suggest that they once were pierced. Five loom weights (8 %) were not sufficiently well-preserved to give unambiguous measurements of weight and diameter.

As shown in **Table 1**, variation in weight is considerable, as also noted by Boertien (2004: 312) at Tall Dayr ʻAllā. It is likely that the number of threads tied to each weight was not always the same and it was thus not necessary to make each example identical in terms of weight (Shamir 1996: 143; Broudy 1979: 26; Hoffmann 1974: 314). Boertien (2004: 313) claims that at least ten loom weights would be required to weave a cloth wide enough to be of any practical use.

From experiments with loom weights recovered from various sites, it is known that about 20 warp threads were tied to a cord in the loom

Table 1: The Iron Age loom weights from 2008 by type and weight.

	n	***weight (g)***	***hole (cm)***	***diameter (cm)***	***height (cm)***
Complete, pierced	8	189 - 272	0.6 - 1.2	6.0 - 7.9	4.6 - 5.2
	8	305 - 388	1.2 - 1.4	7.9 - 8.4	5.3 - 6.0
	19	413 - 640	1.4 - 1.8	8.4 - 9.6	6.1 - 8.1
Complete, not pierced	5	381 - 465	n/a	8.1 - 9.1	2.0 - 7.0
Incomplete, pierced	6	138 - 297	1.0 - 1.6	5.7 - 8.0	4.4 - 5.4
	6	310 - 544	1.7 - 2.1	8.4 - 9.7	5.7 - 7.2
Incomplete, hole missing	7	180 - 429	n/a	6.4 - 8.5	4.8 - 6.3
Indefinable	5	291 - 512.7	n/a	8 - 9	5.5 - 6.7
Total	64				

weight (Shamir 1996: 144; Kelm and Mazar 1995: 163; Shamir 1994: 282; Broudy 1979: 26; Hoffmann 1974: 314). In this way, weaving would have been possible without disordering the warp to the extent that holes would have appeared in the cloth. Ten loom weights would have resulted in a piece of cloth about 20cm wide (Sheffer and Tidhar 1991: 5-19). In general, lighter loom weights were used for finer textiles and heavier weights for coarser textiles.

In order to understand this ancient craft, analyses of loom weights will be very important in future research. The evaluation of these weights gives us an insight into daily life, the tools used and the products manufactured (Friend 1998: 11).

Concluding Remarks

Two major areas of Iron Age II textile production have been listed by Sheffer (1981: 81-83) and Browning (1988): one around Beisan and the central Jordan Valley, and the other in the Shephelah region. Tall Abū al-Kharaz must now be added to the list of textile-producing sites in the former region because of the large number of Bronze and Iron Age loom weights found at the site.

The more elaborate loom weights from the Early Bronze Age at Tall Abū al-Kharaz were usually made of doughnut-shaped basalt or, more rarely, limestone discs (Fischer 2008: 50-54, 352-354). Their weight did not exceed 100 grams. Middle and Late Bronze Age contexts at Tall Abū al-Kharaz also produced light loom weights of stone or fired clay which were most often conical or dome-shaped (Fischer 2006: 350-357). During the Iron Age, certain tools related to textile production changed and loom weights became much heavier, made mainly of unfired clay in sphere, doughnut or other shapes. A possible explanation (Friend 1998: 9) for this change in production methods is that the conical and dome-shaped forms tended to break more frequently at the narrow end, near the perforation, and a cheaper material — unfired clay — was used instead. At Tall Dayr ʻAllā, the ball-shaped type often occurs in large groups (Boertien 2004: 316) which correlates well with our findings at Tall Abū al-Kharaz.

The Iron Age loom weights from Jerusalem are notably lighter than our loom weights (Ariel 1996: 139). These weights, which are all of unfired clay, range from 160.7 to 187.1 grams. In our material, there seem to be three size groups: light from 189 to 272 grams, medium from 305 to 388 grams and, most frequently, heavy from 413 to 640 grams. It is clear that heavier loom weights can only be used for the production of heavy textiles like rugs, wall hangings, blankets or storage bags (Friend 1998: 10). Crowfoot (1951: 29) suggested that there may be a correlation between loom weight form and function but this cannot be demonstrated on the basis of the Iron Age assemblage from Tall Dayr ʻAllā. Here, the type of loom weight does not enable us to establish what sort of textile was being produced (see also Boertien 2004: 323). It seems likely that only eight of our complete pierced weights could have been used in the production of light- or medium-weight textiles, e.g. for garments or household textiles.

The relatively high number of loom weights discovered in Iron Age contexts at Tall Abū al-Kharaz is suggestive of substantial textile production at the site at this time. This assumption is further supported by the recovery of nine spindle whorls from the limited exposures excavated in 2008.

Appendix 3: A Note on the Arrowheads (C. Wenger)

During the 2008 excavations at Tall Abū al-Kharaz, at least 22 iron arrowheads dating to the most recent Iron Age occupation (Iron Age IIC) were discovered in Trench XLVI C (**Fig. 10**). The arrowheads were in various stages of corrosion: some consisted mainly of calciferous layers and others were fairly intact. There was also a conglomerate (38.7 x 16.5 x 22cm) of no

10. Collection of iron arrowheads from Stratum 1C.

Table 2: The best preserved arrowheads from the 2008 season of excavation.

Description	*Length (cm)*	*Width (cm)*	*Thickness (cm)*
Corroded but almost complete	5.3	0.6 (tongue)	1.2
Corroded but complete	7.8	2.0 (max)	1.4
Corroded but complete	7.0	1.9 (max)	1.0
Complete but broken	9.3	1.7	0.7

less than 12 arrowheads on which x-ray investigation was carried out. The majority of the arrowheads are pointed and their shape resembles a stretched rhombus. There are, however, two arrowheads with rounded tips which are most likely the result of corrosion. The best preserved arrowheads have a flat or oval cross-section. On three of them, a midrib could be discerned. Their lengths vary between 5.3 and 9.3 cm.; the average width is just under 2cm and the average thickness around 1 cm. (see **Table 2**). A deformed bronze dagger was found close to the arrowheads. Its shape is irregular and its size 12.7 x. 4.5 x 0.7 - 1.4cm (thickness) as preserved.

There are no iron ore deposits in the vicinity of Tall Abū al-Kharaz. The closest iron ores are in the eastern foothills of the Jordan Valley, leading up to the Jordanian plateau. Therefore, iron and / or iron ore must have been brought to Tall Abū al-Kharaz where it was used in local workshops for the production of weaponry, armour and other iron objects for daily use (see also main report).

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