

Introduction

Excavations at KEN (Sept.-Dec.) 2002 focused on the Gate Structure that led into the fortified perimeter at the Northern part of the site. Aims were to expose the outer walls of the structure, to define their inner and outer faces, determine the inner structural division and to receive a stratigraphic idea about the history of the structure, from which a more general picture of the history of the fort and the site itself could be derived. During the excavations all outer walls of the gate structure were revealed, an area abutting the outer entrance was exposed and the two northern chambers were fully excavated.

In addition probes reaching natural soil were excavated along the southern wall and in front of the inner entrance by the eastern wall. All excavated parts inside and outside the structure reached natural soil or bedrock. The two northern chambers, which could be defined even before excavation and the entrance corridor were left unexcavated and maybe subject for future investigation.

Prior to excavation the gate structure was covered entirely with large stones and other debris that collapsed from the fallen walls. Some parts of those walls could be defined, whilst others were completely obscured. Below the first layer of rocks a considerably deeper debris fill containing rocks and sediment appeared in all excavated parts. Below the debris, a layer of copper industry waste was found, under which flat earth surfaces, often covered with ash layers, were exposed. The surfaces superseded additional, although much thinner and compact layers of industry waste under which natural sediment and/or bedrock were exposed.

- Four strata, some of them sub-divided were determined: -
- Ia) Upper, sediment free stone debris (collapse).
 - Ib) Lower and deeper stone and sediment debris (collapse).
 - (IIa) Residual, probably metallurgical installations over the main layer of industry waste.
 - IIb) Main layer of copper metallurgical waste
 - III) Original gate structure phase
 - IVa) Metallurgical waste below gate structure foundations
 - IVb) Natural Soil

Excavations at Area A were planned in accordance with the gate structure as a unit, therefore no square based grid system was followed.

Stratum Ia:

A layer of large stones covered the gate structure prior to excavation (Figure 1). The stones originated at the collapsed walls of the gate structure. This phenomena repeated throughout the site, as well as at the contemporary site of Khirbet-al-Jarryeh. The possible reasons for this thorough destruction will be discussed below. The upper stratum of debris represented by Stratum Ia was clear of any sediment. However, the accumulation of sediment free rocks were only one layer deep below this layer, further debris within thick sediment was excavated (Stratum Ib). Parts of the perimeter walls of the gate structure were unstable, however an assessment of the structure's inner division was still permitted. The debris covered the whole extent of the inner structure and spilled over all four walls to a distance of approximately 1.5m from each wall. The stones represented were all local, shale, granite and limestone. Some of the stones may have gone through partial cutting, although the shale, which was by far the most represented, tended to break in natural even lines. No clear indication for stone cutting was noticed.

At the northwestern part of the gate structure many stones were removed from the ruins in order to be reutilized at the construction of rough corrals. The corrals could not be dated precisely since (with the exception of one part of a wall) none were excavated. Yet, the corrals were all constructed over sloping ground along the western wall, outside the fort. The slope was created by the collapse of the fort's walls, as proven in consequent excavations. Since there was no evidence for recent utilization it was likely that the corrals date to a stage that was represented at topsoil collections (possibly Roman Byzantine). Only a few isolated shards and pieces of slag were found within the upper debris.

Stratum Ib:

Below the upper layer of sediment free debris, an additional and considerably deeper layer of collapse debris was met at all parts of the excavation. The main

difference between the two debris strata was that at stratum Ib falling stones were found within a deep and homogenous accumulation of sediment. The origin of the sediment was probably fill intentionally introduced by the builders between stones and construction courses. Such fill can still be seen within the surviving courses of all gate structure's walls. This fill was used as a stabilizing and complementing agent, necessary due to the fragility of the shale, of which most of the structure's walls consisted. All three types of stone mentioned above (stratum Ia) were represented within the debris. Stone size varied wildly. No clearly cut stones were found although naturally straight broken shale appeared in abundance.

Stratum Ib debris found abutting the outer face of the western wall of the gate structure differed in its relatively higher elevation excavation below the debris exposed a residual layer of copper production above another layer of debris (Stratum IIa). It seems therefore that the collapse represented in the stratum resulted of a prolonged period of structural decay rather than in a singular event. The deepest layer of this stratum was found within the northeastern and northwestern chambers of the gate structure (Figure 2). This supports the impression that much of the collapse accumulated within the structure rather than spreading around it. It should be noted that even though secondary use of stones is clearly evident at the western side no similar appearance was detected at the other parts.

Although stratum Ib is the deepest of the strata defined in the area, it was notably poor in finds of any type. Few shards and pieces of slag as well as copper waste were found scattered in the fill. One significant exception was a copper or bronze figurine of a kneeling bearded man wearing an elongated hat and flanked on both sides by concentric shapes (Basket 1696, Figure 3). The figurine was found at the upper layer of stratum Ib at the northwestern chamber of the gate structure (L44). It is unclear whether the figurine depicts a ruler or deity. Although common interpretation of such objects tends to prefer deities, the kneeling position of this particular figurine may suggest a human. The concentric shapes may be related to similar shapes known from statues of bearded men wearing elongated hats that were discovered elsewhere in Transjordan, and are similarly dated to the Iron Age. Such statues can be seen both at the archaeological museum in

Amman and at the Israel museum in Jerusalem¹. In their cases the identification of the figure is similarly unknown. It has been suggested that the unusual spot and elevation where the figurine was found can be explained by it being originally located on a shelf or niche high on one of the chamber's walls. The figurine was the only find of its type to have been discovered at area A this season, although a fragment of a mold for figurines was found at area S. The presence of the mold may indicate that the figurine at area A was not actually used at the site but instead is an example of a type of product manufactured there.

Stratum IIa:

Copper production at this part of the site was evident into sub-phases (strata IIa, IIb). Stratum IIa includes evidence for residual copper production activity which probably follows a much more intensive industrial phase. Stratum IIa is characterized by several small installations while evidence for actual smelting is lacking. Four of those installations were found next to the southern wall of the gate structure, an additional by its southeastern corner, one by the southern part of the eastern wall and less defined remains of probable two or three installations were detected between debris layers by the western wall. Within the northeastern chamber a possible surface (L70) detected below the debris may date to the same phase (Figure 4). The identification of the layer as a surface, however, is questionable. It includes a layer of possibly intentionally placed stones and vaguely discernable lines of would be installations (Figure 5).

The installations by the southern wall (L30, 31, 39, 62) are round, of various sizes and built of small and medium-sized field stones (Figure 6). Size ranges between 40-80cm in diameter. An additional and considerably larger round installation (L10, 2.4m in diam.) was found by the southeastern corner (Figure 7). The installation by the eastern wall (L102) measured ca. 50cm in diameter. No dimensions could be taken for the western installation due to their fragmentary preservation. The exact purpose of the installations is unclear. Part of the large amount of slag found in and around is probably related to activity within them. That activity does not seem to have involved actual smelting because no significant amounts of furnace fragments were found in the related

¹ See Mazar 1990:543.

context (GIS Plan). An alternative use may have been the crushing of slag for the extraction of copper. It should be noted that a large amount of mortars and grinding stones have been found in the area in various contexts (GIS Plan). Some of those stones may have been utilized for copper rather than food production. The best example of a mortar was found just outside the western entrance to the gate within a surface possibly related to stratum IIa (L78, Figure 8). This mortar (Basket 2159) was made of basalt, survived intact, and was found in situ within a supportive stone installation. It should be noted that the elevation of the surface is ca. 1m lower than that of the stratum IIa activity detected immediately to the south but the reason for that may be that a far lesser volume of ruins accumulated next to the entrance, where no structure stood.

Surfaces related to stratum IIa were usually covered with light ashy sediment, probably representing blown in dust from the adjacent industrial activities. This type of surface was clearly detected within the northeastern gate chamber (L70) and outside the western entrance (L78). Similar ashy levels were also noticed at the southern probe (L13,14, L102, Figure 9) and by the southeastern corner (L28) around installation). Some pottery and scattered slag were found within the ashy layers, in contrast to the almost sterile fill and debris, which superimposed them (Stratum Ib). Ceramic finds within the installations matches their relative volume at the adjacent layers. In addition to many hand made vessels that cannot be precisely dated, collection includes types, which can be roughly dated to the 7th century BCE, such as vessels decorated with black geometric shapes over white-yellow slip ("Edomite" pottery), and Busseyran types.

In all cases stratum IIa installations were found laid over thick layers of slag and copper industrial waste related to earlier more intensive industrial activity. The installations were place directly over the upper most layer of slag. It would be impossible to relate the installations to those thick slag layers, which reached over 40cm deeper and were found in all parts of the area. The contrast between the modest scene of the installations and the massive appearance of slag deposit prevents possible relation between them and it is clear therefore that the installations belong to later phase which post-dates the peak of industrial exploitation of the former military structure.

The suggestion of copper industrial activity is based on the positive evidence of the vast amount of slag upon which stratum IIa installations rest and on the negative

evidence of the lack of evidence for other discernible uses, yet option of a non-industrial use for the installations remains feasible. Notably, human remains were discovered within one of them (L61, Figure 10, Basket 1451). The remains were very fragmentary and include mainly parts of jawbones and teeth of a probably young individual. These were the only human remains so far identified in the bone record of the area. These very fragmentary human remains are not sufficient for a positive identification of that installation as a grave but that possibility remains. Bones of animals were also found in the same installation and were represented in most of the others, as well as in the related ashy surfaces. It is also possible that even if at some point the installation had been used as a grave this might have been a secondary utilization. As a third option, this installation may have been a burial while all the others served other purposes (this is the only installation found by the southwestern corner of the gate structure and was separated from the others by a thin yet well built wall (W16, 2.2x0.5x0.8, 4 courses). As with all undefined installations found at archaeological sites, myriad other uses are possible, such as storage, and various small-scale industries. Present day Bedouins of the same regions make various uses of such structures, both in nomadic camps and in permanent settlements.

Stratum IIb

Massive layers of industrial waste related to copper production, including both large quantities of various types of slag as well as concentrations of furnace fragments and copper waste were found in all parts of the area that have been excavated this season (GIS plan). The layers were uniform in character, volume and finds, as well as in their stratigraphic location, and even though their relative elevation varies between layers within and outside the chambers, they can be securely related to a single phase in the history of area A. This same appearance was noticed at other areas at the site and probably represents one of the main phases of copper industrial activity at KEN, possibly the longest and most intensive of them. Evidence points to considerable smelting activity that took place, utilizing spaces both within and outside the chambers, and taking advantage of the disused gate structure. The complete absence of debris below the slag layers, compared with the considerable debris accumulation superceding it, indicates that

the structure was still standing, at least to a large part, when it had been re-adapted for copper smelting activity.

Stratigraphically, stratum IIb copper industrial waste occupies a layer ca. 40 cm deep in all excavated areas but the western probe, limiting it to spaces within the fortified perimeter (the coating of slag spread over the topsoil outside the western gate may have been only waste deposits, although excavation is needed to confirm that). The layer appears at thinly varying depths (L37, 76, south probe, 36, 40, 53, 54, East probe, Sections 2,3,4) under collapsed debris, and the thin surfaces of stratum IIa. As mentioned above, the industrial waste served as a foundation bed for IIa installations and ashy surfaces. Within the two excavated chambers the pictures changes, with considerably deeper layers of debris superceding both stratum II phases (Sections 5,6). This deviance has little to do with stratum IIb, and results of the general concentration inwards of the final collapse event.

Stratum IIb consists of practically sediment free fill dominated almost entirely by pieces of slag and other waste directly related to copper production (Figure 11). Sediment between the slag is composed mainly of ash, which resulted from the same industrial activity. Slag pieces vary and include the variety of types known from elsewhere at the site, ranging from particularly large fragments of tap slag to small and rarer pieces of glassy slag. Many of the slag fragments contained remains of copper among the slag were also found many pieces of deformed copper waste. Evidence for actual smelting was found in two parts of the area in form of significant remains of actual furnaces, one by the southern wall (Basket 1600, L72) and a better preserved one at the northwestern corner of the northwestern chamber (Basket 2154, L99).

The furnace beside the northwestern chamber was represented by unusually large fragments (Figure 12), some of which still preserving the original curves of the structure, and by a considerable number of tuyere pipes, several of them well preserved (Figure 13). Slag layers above (L98), around (L92), and below (L103) the furnace fragments included very large pieces of tap slag, characteristic of Iron Age copper industry. A similarly dominant layer of slag and copper industry waste was found at the northeastern chamber (L74, GIS plan) also including a significant number of furnace fragments (Baskets 1832, 1794, 1860 and more) and tuyere pipes (Basket 1867), even though the precise spot

where the furnace was located could not be detected. There can be little doubt, therefore, that smelting activities took place at both chambers. No evidence for furnaces came from the eastern probe or from the excavation to the west of the gate.

While not impossible it is highly unlikely that this intensive copper industry is contemporary with the defensive utilization of the fortified perimeter and its four-chamber gate (see more below, at conclusions). Rather it is more feasible to relate the industrial phase with a stage in which the fortified perimeter no longer served its original purpose. While the circumstances involved with this development remain obscure, it seems that the defensive structures were adapted for industrial use. Re-adaptation, especially of the chambers, probably involved the removal of the roofs, which would allow the venting of smelting smoke (since probably made of wood and reeds, the roofs also provided valuable fuel for the operation of the furnaces). The original surfaces of the chambers seemed to have been utilized also at the industrial phase. Its location within protected architectural allowed better preservation of the inner-chamber copper industrial activity in comparison with that which probably took place south of the gate structure, from which only concentrations of furnace fragments (Figure 14, L72), slag, and ash remains. Despite of the fragmentary preservation, the appearance of smelting evidence by the southern wall should not be underestimated, as attested to by several considerable layers of slag, copper waste and ash.

Non-industrial finds associated with stratum IIb include scattered ceramics found in moderate quantities within the waste layers. Ceramic types include many handmade vessels, which cannot be dated precisely, but also, few indicative shards of black burnished juglets (L74), dated through comparisons to the 9th-8th centuries BCE, as well as similarly dated craters (L92). It should be noted that animal bones (mainly sheep and goat) were also found in varying quantities, although the presence of furnaces discredits the option of stratum IIb representing just waste concentrations. Yet the presence of these bones indicate daily activities aside the industrial ones. A reconstruction of a typical day represented by that phase would show copper smelting workers working and resting within the same limited quarters and depositing of both industrial and other waste into the same locations.

Stratum III

This stratum represents the original stage of the fortified perimeter, including the gate structure at area A. Due to the intensive industrial utilization that post-dated the defensive stage, very little remained from that stage apart from the actual architectural frame. While only the northern inner part of the gate structure has been excavated, the outline of the whole structure can be discerned through visible pre-excavation remains, as well as through comparison. Possibly due to a natural topographic decline towards the north, the preservation of the southern part of the gate is considerably superior to that of the northern part. Despite the dense stone debris still present at the southern part a dividing wall between two chambers can be clearly defined along an identical access as the fully exposed dividing wall between the two excavated northern chambers. Unless the builders, in an unusual manner, failed to level the ground before the gate structure's foundation was laid, the preservation of the two southern chambers is even better than the considerable preservation of the northern rooms.

In light of the results of this year's excavations the gate structure of the fortified perimeter at KEN measures 16.5x10m (Figure 15) and follows the model of the four-chamber gate that is well known from numerous contemporary Iron Age sites (Mazar 1990:468), including desert forts in the approximate region, such as Hatzeva and Tell el-Kheleifeh (Cohen 1994:210, Cohen and Yisrael 1995:228-9, see Table 1 for comparisons to Negev desert forts). The gate is somewhat smaller than four-chamber gates found in Israel (Table 2), which can be expected since KEN is an industrial site, while the Israeli sites are actual towns. The gate at KEN is irregular in that its northern part is shorter by ca. 1m in comparison with the southern part. Another notable difference is in the separation of the chambers from the entrance corridor by walls in which entrances have been fitted. These architectural features were discovered at both excavated northern chambers (Figures 16,17) and presumably are paralleled in the two yet un-excavated southern chambers. The nearest example is at a contemporary four-chambered gate at Ha-ofel, Jerusalem (Mazar 1990:423). The dimensions of the two northern chambers are identical: 2.6x3.2m. The entrances measure 1.9m long (remained unexcavated). The entrance of the northeastern chamber is at its southeastern corner, while that of the northwestern chamber is at the southwestern corner. In that KEN arrangement differs

from the gate at Ha-ofel, where entrance locations are uniform. Although the entrance corridor has not been excavated, its dimensions can be measured due to partial visibility of its architectural lines among the covering debris. The corridor is 10.5m long and 3.5-4.0m wide. Remains stone paving at the western end of the corridor (L80) indicate that at least part of the corridor surface was paved, but due to limited exposure no more is presently known. While some of the inner walls of the southern chambers can be discerned through the debris, not enough is visible in order to determine their dimensions.

As mentioned above while describing the debris (Stratum Ia) the walls were built of local stones consisting of mainly shale as well as some granite and limestone. No clear evidence for cutting although some improvisations were probably made in order to better fit some stones within their courses. Local clay and small stones were used as solidifying agents. There are no remains to indicate the use of plaster. Typically the outer perimeter walls were slightly wider than the inner walls of the chambers. Outer walls are 1.8m wide in average, compared with 1.4m in average for inner walls. The walls consist of two constructed faces with a space between them haphazardly filled in with stones and sediment. The carelessness in which the fill was introduced is apparent in the many air pockets that remained within it. Despite of this, wall preservation reach an impressive height; W47 and 46 were preserved respectively to a height of 2.9m and 2.75m, with 17 and 18 courses still in place. W32 was preserved to 3.25m with 18 courses. W7 remains standing to 3.2m with 16 courses. The reasons for the preservation of walls casually built of stones of types that often disintegrate on contact are their concealment below masses of debris, as well as the semi-subterranean plan of the chambers. Since the southern wall of the gate structure abuts the inner face of the western perimeter wall of the fortified zone, the gate structure is technically later. Yet the walls seem clearly planned and constructed in identical manner, showing similar, style, materials and relative dimensions. It can be therefore determined that the gate structure belongs with the same plan as the fort's perimeter walls.

The surfaces of this stratum were identified both within and outside the structure. Floors were made of packed earth mixed with ash that originated in predating copper industrial activity. The best example of a stratum III surface was exposed outside the western entranceway to the gate structure (L82). The surface there was unusually

hard-packed clay mixed with dense crushed slag, giving it a very dark gray-black color (Figure 18). This surface slopes moderately but noticeably to the north, following the natural topography, which may indicate it having been a foundation bed for a superceding floor. Due to the reutilization of the floors for intensive copper production during the consequent phase (IIb) within the chambers, few remains and finds could be related to this stratum. The only exceptions were in the northeastern chamber of the gate structure, where a restorable storage jar (Basket 1959) was found over the original surface (L94) and below the massive layer of slag deposits (Figure 19). At the northeastern corner of this chamber a stone installation (L97) was found over the surface and below masses of slag (Figure 20). The very basic quality of the installation does not seem fitting with the original stage of the structure and probably belonged to an intermediary stage between the original phase and the subsequent industrial one. Ceramic evidence from surfaces related to the original stage is particularly scarce outside the structure, although some pottery was extracted from layers underneath the deeper slag deposits outside the southern gate. Shards include at least one clearly indicative ring-burnished bowl (L41) widely known from Israeli sites and commonly dated to the 9th-8th centuries BCE. A rim shard from a large storage jar that seems like a variation of the collar rim jar was also found at the same locus. The only ceramic evidence from a layer clearly predating the industrial phase came from the northeastern chamber, within fill between the surface and bedrock (L95). It remains unclear, however, whether the pottery should be related to stratum III or to the preceding stratum IVa, which represents material below the foundations of the walls, and not necessarily contemporary with the original stage of the gate structure itself.

Architectural changes within the gate structure

At an yet unclear stage several architectural changes took place within the gate structure. These changes included:

1. The blocking of the inner (eastern) end of the gate structure's entrance corridor (L42, Figure 21).
2. The construction of two pilasters (?) by the outer (western) end of the gate structure's entrance corridor (Figure 22).

3. The blocking of the passage between the northeastern chamber of the gate structure and the entrance corridor (It is possible that similar blockage took place in the case of the other chambers but no visible evidence for it has yet been exposed).

Since the entrance corridor and the two southern chambers have not yet been excavated the relation of these changes with specific strata are circumstantial and tentative and cannot yet be connected by clear stratigraphic evidence, either depositional or architectural. At this stage it cannot even be determined whether they are contemporary with each other or belong to different phases. There would be no sense in these changes while the gate served its original purpose within the fortified perimeter. The blocking of the chambers would be inconsistent with their intensive utilization for copper production at the following phase, and the wide sheets of slag on topsoil within the walled perimeter indicate that the area was generally open at that time. Yet, if stratum IIa is represented at the northeastern chamber, this same logic would apply to that stratum. The changes may have taken place in a yet undetermined sub-phase. The questions of the date and the purpose of these changes, in any event, remain unsolved and require additional excavation in the future.

Stratum IVa

The earliest evidence for human activity at the area included relatively thin layers of fill deposited between stratum III structures and surfaces and the bedrock or natural soil. Pre-gate structure fills were reached both inside and outside the gate structure's chambers, in fact, in all parts where excavation took place during this season. Such fills were particularly discernible at the eastern probe (L59) and in both chambers (L95 and L100) where they were characterized by the appearance of relatively dense layers of crushed slag. In all these cases crushed slag layers were found below the foundation course of the respective gate structure's walls above layers of fine silt superceding, in some cases, bedrock. At the southern probe ash layers were discovered over natural soil but did not contain a distinguishable layer of crushed slag. Crushed slag did appear at the area west to the western entrance, but there it was distinct in a remarkable and compact

appearance, in contrast to the thicker, lighter and loose texture within the two chambers and at the eastern probe.

There are two possibilities concerning the origins of this layer: Either it was intentionally introduced as a foundation bed, thus transported from other parts of the site, or was already present at this spot when the gate structure was erected, and was merely leveled as part of the preparation work. In any case, the layer is evidence for copper industry taking place at the site prior to the construction of the fortified perimeter, although this activity, at least at area A, was not intensive, or lasted only a short period.

Few ceramic and other finds were found at this stratum. Several shards were found below the early surface below the slag layer at the northeastern chamber, in fill that superceded the actual bedrock (L95). No finds at all were collected at the eastern and southern probes between the level of the surface and the natural deposits, nor west to the entrance. None of the shards from L95 is clearly indicative.

Stratum IVb

This is a technical stratum, which represents the natural soil and bedrock below the earliest human related strata. Bedrock was reached at the eastern probe (Figure 23) and at the northeastern chamber of the gate structure, but not at the southern probe or the northwestern chamber, nor at the excavation west of the gate entrance. The absence of bedrock of several locations despite the proximity to places where it was found may indicate an intervention in which rock was carved away in order to facilitate construction or even the ground prior to the spread of the foundation bed fills. It is also possible that no intervention took place and that bedrock appearance follows the natural geomorphology at the site. The latter option is supported by the fact that no trace of the bedrock was found despite considerable depth reached into clearly natural and sterile deposits at the excavation west of the entrance (Figure 24). Similar appearances of deep natural silt below the earlier surfaces was detected at the southern probe at layers below the foundations of the southern wall of the gate structure.

Conclusions

The following sequence can be suggested from this season's excavations at area A:

Copper activity evidence at the area dates at least to the 9th- 8th century BCE, while it remains unclear due to the relatively narrow exposure whether copper working actually took place at area or waste produced elsewhere at the site had been transported at utilized as a foundation bed for the construction of the gate structure. Probably following a sharp rise in profitable copper extraction and working at the region during the 9th-8th centuries a decision was made by some central authority to strengthen the control over the industry. The fort dates to that stage. While incapable of halting an onslaught by a large army it sufficed to ascertain the authority of the powers behind its construction in the eyes of the largely or wholly nomadic populations present at the Faynan region at that time. The fort may have been utilized as an administrative center as well as base of operations for a military squadron sent in order to ensure the orderly extraction and production activities as well as the administrative and fiscal control of the central authority at this remote region.

Due to circumstances yet undetermined, military and administrative activities at the fort ceased and the building seems to have been abandoned by its guards and officials, to be incorporated into the intensive copper working activities, which at this stage seem to be taking place throughout the site or over large segments of it. Since it is unlikely that any central power would voluntarily abandon an industry that seem to be only gaining profitability, the reasons for this development may be found at political development at the center, such as a weakening of the central government, or in an opposite scenario, its strengthening to the point where close inspection of the desert region and its copper production was no longer necessary and local chieftains could be trusted as agents.

Whatever the circumstances, the following stage (mid to late 8th century?) saw an increase of copper production operations at the site, with area A and the still standing gate structure incorporated into the mass production. Smelting took place inside the former guard chambers as well as along the outer walls of the gate structure. Large volumes of slag were disposed of, probably after various secondary activities intended for maximal metal extraction, in and around the work areas. Perhaps due to decrease in

regional stability following the various clashes between Assyrian and Babylonian forces and local kingdoms, several of which left their echoes in the Bible as well as in Assyrian, Babylonian and Egyptian sources, copper extraction at the Faynan diminished. Other reasons may have been a steady increase in trade with the rising Aegean peoples and an influx of cheaper and transportation safer copper from Cyprus. In any event, by the 7th century copper production at the site, and at area A within it continued only as small scale, local activity, probably by local nomadic peoples for whom it provided a useful additional cash resource. This phase may have disappeared on its own accord, or, alternatively, ceased abruptly due to a devastating destruction event, the causes of which at the present impossible to determine. There is no indication at all to violent action at any stage of the area's existence (the two arrowheads discovered at area S probably evidence for production rather than destruction). Natural phenomena, such as earthquake, are well known in the region and at least one such contemporary event is attested to in the biblical record². In addition, the complete destruction of every building at the site should be taken into consideration as well as the almost total lack of finds on exposed floors at both excavated structures at area A and S. Both these scenes are inconsistent with the standard archaeological scene at sites ruined by single war events. Yet earthquake need not be the only possible explanation and long-term post-abandonment decay (along with occasional seismic events, well attested to at numerous sites in Jordan at various historical periods, which certainly affected this area too) may well be the background for the collapse of the gate structure over the copper production installations and remains.

No evidence was found for significant post-Iron Age utilization of the site. Once copper was no longer worked at KEN the site was only residually inhabited, probably by nomads, as attested to by the corals and various small installations constructed over the slag horizons, often utilizing stones from the ruins. Several such round stone corals were built along the western wall of gate structure and further along the walls of the enclosed perimeter. The corals are difficult to date but a possible indication for their period might be found in the small quantity of Roman-Byzantine shards from surface collections. No shards dating to these phases were discovered below the topsoil or the uppermost-excavated layers. There is no indication whatsoever for copper working at the site in this

² Amos 1:1.

phase and later, till present time. Nelson Glueck, in his interviews with local Bedouin elders in 1936, reports that while they were well aware of the Arabic name of the site, literally “Ruins of Copper”, they had no idea as for the origin of the name, stating simply that “it had been called so by their fathers”(Glueck 1940:57). Indeed, no signs for copper related activities have been noted in the many Bedouin campsites recorded in the pre-excavation surveys of either Wadi Jarriyeh or Wadi Ghwueib.

Suggestions for future excavation:

1. Completion of the exposure of the gate structure.

The passageway of the gate structure should be fully excavated, in order to achieve a better functional and stratigraphic understanding of the gate structure. If similar to the situation at the northern part of the gate structure, the exposure of the southern part will involve mainly a massive removal of stones and debris, with a possibility of extensive evidence for copper production at the lowest levels. The investment should be weighed against the expected results, which may add little to existing information. The full exposure of the gate should be attached to site presentation as much as to archaeological aims. Conservation should closely follow excavation.

2. Excavations within the fort's inner space.

Excavations within the fort's perimeter are essential for the understanding of the fort's function as well as date and phases. *The* investigation of Structure A1, which is visible on topsoil and which showed good results in a brief preliminary excavation this season should proceed. Another option could be a probe at the center of the fort, where no architecture is visible on topsoil but where massive slag sheets are present.

3. Further investigation of the fortification.

In order to better understand the architecture and sequence of the fortifications a part of the square wall line of the fort should be exposed. The northwestern corner shows good preservation and would not require mass investment of labor and time since most of its debris has been removed for the construction of later adjacent corrals.

Bibliography

- Cohen, R. 1994. The Fortresses at En Haseva. *Biblical Archaeologist* 57:203-14.
- Cohen, R. and Yisrael, Y. 1995. The Iron Age Fortresses at En Haseva. *Biblical Archaeologist* 58.
- Glueck, N. 1940. *The Other Side of the Jordan*. New Haven:American Schools of Oriental Research.
- Herzog, Z. 1992. Settlement and Fortification Planning in the Iron Age. In *The Architecture of Ancient Israel From Prehistoric to the Persian Periods*. Jerusalem:Israel Exploration Society, pp.231-274.
- Mazar, A. 1990. *Archaeology of the Land of the Bible, 10,000-586 B.C.E.* New York:Doubleday.
- Meshel, Z. 1992. The Architecture of the Israelite Fortresses in the Negev. In *The Architecture of Ancient Israel From Prehistoric to the Persian Periods*. Jerusalem:Israel Exploration Society, pp.294-301.

Khirbet En-Nahas 2002, Area A, Section List

Section 1:

Location: west of the gate entrance.

Direction: east.

Description: Original stage and later layers of occupation, including surfaces, by the western entrance. Section includes segments of the walls on both sides of the entrance.

Section 2:

Location: southern probe.

Direction: south.

Description: Layers of occupation and copper production remains located at the corner between W7, the southern wall of the gate complex and the inner western wall of the fort, to the west of a small wall (W16) that probably post dates the main phase of the structure.

Section 3:

Location: southern probe.

Direction: south.

Description: As section 2, to the east of W16.

Section 4:

Location: Eastern probe.

Direction: south.

Description: Layers of occupation and copper production remains located east to the eastern wall of the gate structure (W8).

Section 5:

Location: northeastern chamber of the gate structure.

Direction: south.

Description: Depicts accumulation of debris from the final destruction event above the original surface of the gate chamber and the considerable copper production waste that attests to the industrial secondary utilization of the chamber. The section is located at the entrance that connects the chamber with the gate structure main passageway.

Section 6:

Location: northwestern chamber of the gate structure.

Direction: south.

Description: As in the northeastern chamber.

Figure 1: Area A, prior to excavation, overall scene.



Figure 2: Debris accumulation in the northeastern chamber.



Figure 3: Anthropomorphic figurine, northwestern chamber.



Figure 4: Stratum IIa surface (L. 70), northeast chamber.



Figure 5: Possible installations (L. 24), west to gate structure.



Figure 6: Late installations (L. 30, 31, 39) by the southern wall of the gate structure.



Figure 7: Late installation (L. 10) by the southeastern corner of the gate structure (Str IIa).



Figure 8: Mortar over stratum IIa surface (L. 78) by the western entrance of the gate structure (no Str IIb was found in front of the gate).



Figure 9: Ashy surface (L. 13,14) , stratum IIa, south probe.



Figure 10: Late installation (L. 61) containing human remains, stratum IIa, south probe.



Figure 11: Layer (L. 74) containing dense accumulation of copper industrial waste, stratum IIb, (inside NE chamber of gate).



Figure 12: Furnace remains (L. 99) at the northwestern corner of the northwestern chamber, stratum IIb.



Figure 13: Tuyere pipe in situ, northwestern chamber (L. 103; Stratum IIb)..



Figure 14: Furnace remains (L. 72), south probe.



Figure 15: Gate structure, original phase.



Figure 16: Entrance (blocked) between gate corridor and the northeastern chamber.



Figure 17: Entrance (blocked) between gate corridor and the northwestern chamber.



Figure 18: Stratum III surface (L. 82 – lower black ashy level in photo), compact clay/crushed slag, west of gateway entrance.



Figure 19: Storage vessel over stratum III surface (L. 94), northeastern chamber.



Figure 20: Installation (L.97) over stratum III surface of the northeastern chamber.



Figure 21: Blocked inner entrance of the gate structure.



Figure 22: “Pilasters” at the outer entrance of the gate structure. These two pilasters limited traffic through the north and central part of the passage.



Figure 23: Bedrock (L. 67) and superimposing strata, eastern probe.



Figure 24: Stratum IVb, natural deposits (L. 91), west of gate entrance.



