The Jabal Hamrat Fidan Project: Excavations at the Wadi Fidan 40 Cemetery, Jordan (1997)

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This report describes the excavation and preliminary analysis of the Wadi Fidan 40 cemetery by the Wadi Fidan Regional Archaeological Project during 1997. The cemetery is a large, enigmatic funerary complex. Previous work suggested a link to the nearby Early Bronze Age site of Wadi Fidan 4. During the 1997 season 62 grave features were excavated and human remains of 87 individuals recovered. The aceramic nature of the cemetery and other finds suggests the possibility of a semi-nomadic population. A short life radiocarbon determination for the cemetery indicates an Iron Age date in the tenth/ninth centuries BC. The implications of this date and the potential significance of this population are discussed in terms of recent findings in southern Jordan.

Introduction

The Jabal (Arabic = mountain) Hamrat Fidan in southern Jordan marks the ‘gateway’ to the Faynan district— the largest source of copper ore in the southern Levantine mainland (Fig. 1). Although copper ore bodies are known from the Sinai and the western Arabah at Timna, the Faynan district was the most significant source of copper ore for ancient communities living in what is today Jordan-Israel-Palestine up to the end of the Early Bronze Age (c. 2000 BC). At this time the ore sources of Cyprus began to take precedence, and maritime trade in copper established Cyprus as the most important source of copper in the eastern Mediterranean.

Exploitation of Faynan copper ore spans the entire range of human occupation in the southern Levant, with an apparent short hiatus during the Middle and Late Bronze Ages (1900–1200 BC), and the beginning of the Iron Age (1200–1000 BC). Evidence for the use of copper ore in the region is known particularly from the Neolithic (eighth/seventh millennia), Chalcolithic (c. 4500 – 3600 BC), Bronze Age (c. 3600 – 1900 BC), Iron Age II (c. 1000 – 586 BC), Roman (37 BC – 324 CE) and early Islamic (c. 638 – 1099 CE) periods (Hauptmann 1989). By focusing on the role of copper ore and early metallurgy in social change from the Neolithic period through the Iron Age, the Jabal Hamrat Fidan Archaeological Project¹ will contribute to the long term studies of interaction of craft specialisation and social evolution in this part of the Levant. This work will provide the social context of technological change from the advent of food producing societies (Neolithic) to the rise of chiefdoms (Chalcolithic), the emergence of the earliest urban centres (Bronze Age) to the advent of the first historical kingdoms in the region (Iron Age). By using copper metallurgy as a lens for examining social change through time in the southern Levant, this research will systematically monitor social evolution through the key periods of cultural evolution and contribute to the broader fields of archaeology, anthropology and the ancient history of the Near East.

This new project is possible due to the pioneering efforts of researchers from the German Mining Museum at Bochum, under the direction of Andreas Hauptmann (see Hauptmann 1996; Hauptmann, Weisgerber and Bachmann 1989; Hauptmann et al. 1992), who carried out the first in-depth technological studies of early copper metallurgy and mining in Faynan in the 1980s and early 1990s. This work also builds upon the early research of the Wadi Fidan
Figure 1. Map of sites in the Jabal Hamrat Fidan and Faynan regions.


During the summer of 1997 a new programme of research was begun in the western Faynan district in the region of the Jabal Hamrat Fidan. In particular extensive excavations were carried out on the sites of Wadi Fidan 4 (Adams and Genz 1995; Levy and Adams forth. a) and Wadi Fidan 40 (Adams 1991), both of which had been investigated previously on a small scale. The work in the Early Bronze I village of Wadi Fidan 4 expanded the earlier work on this site through broad horizontal excavations, which shed new light on the organisation of Early Bronze I metal production and the rise of local control of ore procurement and metal production in the Faynan district. In addition, large scale excavations were carried out at an extensive cemetery complex located opposite the site of Wadi Fidan 4 that was previously assumed to be Chalcolithic/Early Bronze I in date (Adams 1991). This most recent fieldwork indicates that the cemetery is primarily Iron Age in date, represents some of the earliest Iron Age evidence to come to light in southern Jordan, and provides important and exciting information concerning the social organisation of Iron Age groups living in Edom. Future research should link the Wadi Fidan
Figure 2. Plan of Wadi Fidan 40 Cemetery.
Cemetery (henceforth called Wadi Fidan 40) population to the more general issues described above. The following report focuses on a discussion of the 1997 cemetery excavations. A forthcoming report will detail the recent Wadi Fidan 4 village excavations (Levy and Adams forth. a).

**Wadi Fidan 40 Cemetery Excavations**

In the light of the first systematic archaeological survey carried out in the Jabal Hamrat Fidan in the spring of 1998 (Levy and Adams forth. b), the cemetery first sampled by Adams (1991) is now referred to as Wadi Fidan 40. The primary aims of the 1997 cemetery excavations were to recover the largest possible number of tombs and associated burial remains within the six week excavation season so as to explore the social dimensions of what had originally been assumed to be an Early Bronze Age cemetery. While there was only minor evidence of looting prior to the 1989 excavations, by the summer of 1997 there was evidence that robbing had increased, as seen by more recently robbed graves. In most instances the robbers took the cultural objects from the graves, but left the skeletal remains relatively undisturbed. In order to familiarise the team with the nature of the cemetery, several of the looted graves were excavated to salvage these graves and to recover the well preserved skeletal remains. The cemetery was not particularly rich in terms of cultural material, with a broad variety of beads, wooden bowls, some metal jewellery and other artefacts comprising the most common objects recovered from the graves. Surprisingly, no pottery vessels were found in any of the mortuary structures. This may be an indication of the socio-economic structure of the society represented in the cemetery, and will be discussed in more detail below. The six weeks of excavation were quite successful with a total of 62 tombs excavated and the remains of 87 human skeletons recovered. In terms of recording, the difference between the grave and skeletal numbers was due to the presence of both double burials and the large number of secondary burials.

To facilitate excavation, the cemetery was divided into three areas (A, B and C) from the west to east. Each area varied in terms of grave density and space between the graves, but the largest concentration of graves was located in the central area (Fig. 2). In Area A, tombs were distributed so closely that in some cases they touched the edges of neighbouring grave circles (in the east-central area, see Fig. 2). Area B was characterised by large single graves separated from one another by some distance (c. 1 – 1.5 m., Fig. 2). In Areas B (Figs 3 and 4) and C, each contained one large complex of graves (grave circles) that enclosed two to four cist graves buried within them. Area C had one large circular boundary that enclosed several graves (not all excavated).

As will be shown below, we now date the Wadi Fidan 40 cemetery to the Iron Age. However, at present, it is difficult to link the cemetery population with confidence to Iron Age populations living on the Edomite plateau to the east. For that matter, the cemetery cannot be tied with any certainty to the newly discovered group of Iron Age metallurgical sites along the Wadi Fidan. Hopefully, as the project progresses, it will be possible to tackle this problem.

**Grave Structure**

All graves had the same basic construction with a minimum of size variation between each grave (Figs 2 and 5). The sequence of tomb construction began with a pit which varied in size according to the age of the deceased. The depth of the pit varied for each
grave, with adult graves on average being the deepest at well over one metre, and infant graves the shallowest at about 25 cm. At the bottom of each pit a cist was constructed for use for the primary burial. The rectilinear cist usually consisted of undressed stone slabs made of limestone or sandstone with one slab at the north or south side forming each end of the cist grave. The body of the deceased was placed on bedrock at the bottom of the cist, which was then covered with large limestone or sandstone capstones, without in-filling of the cist with soil. The openings between the capstones were closed on bedrock at the bottom of the cist, which was then covered with large limestone or sandstone capstones, without in-filling of the cist with soil. The openings between the capstones were closed with small rocks and also sealed with pisé ‘plaster’. The pisé consisted of a mixture of wadi gravel, fine sand and mud and was smeared especially between the gaps in the capstones and in most cases covered all the capstones and reached the edges of the cist. The pisé was probably applied by hand as indicated by rough edges of the ‘plaster’ found on the capstones. Later the pit was filled with sediment covering the capstones up to ground level. The last step in the construction of the tomb was the placement of a stone circle marking the location of the grave, using well rounded local black dolorite wadi cobbles. These circles of dolorite cobbles, placed on their ends, are in most cases visible on the site surface. Often flatlying cobbles of the same dolorite are used as paving within the circle. In a very few tombs, standing stones, some protruding c. 80 cm. above the site surface, were placed in the middle of the grave circles.

In general, there are four variations within the grave circles which may relate to differences in the internal chronology of the cemetery or perhaps to the status of the buried individuals.

1) The first variant type is built with a single circle of dolorite boulders that vary in size from one grave to another. In general there is no rule to the circle size, both large and small circles were used. Although each grave circle appeared to relate to a single cist, the close proximity of circles and cists often made direct correlation difficult. In some cases individual circles had another half circle on one of the sides, which may indicate later cutting of the circle for subsequent burials.

2) The second grave type was a dolorite circle with a lining of flat cobbles that enclose the entire inner portion of the circle. In some cases the flat cobbles were taken for reuse in other graves, as indi-
icated by half complete cobbled surfaces in some of the dolorite circles.

(3) The third variant was a dolorite circle in which the interior of the circle was filled with a pile of cobbles, which may be indicative of later reuse of the graves in which the flat cobbles were removed for reburial, and where the cobbles were replaced as a pile.

(4) The last variant consisted of three to four concentric circles, with a central large rock marking the centre of the grave. This kind of grave consistently had more than one cist grave at the bottom, with a minimum number of two graves and sometimes up to five cist graves. Usually the larger the concentric circles, the greater the number of cist graves at the bottom.

**Mortuary Practices**

The cemetery was probably in use over a considerable period of time, based upon both the sheer number of estimated graves and the variation in mortuary monument styles. For example, an average of 5 grave circles was found in each 5 x 5 m. square in the cemetery excavation. As the cemetery consists of an area of approximately 17,600 sq. m., we estimate the presence of a minimum of 3,500 graves in the Wadi Fidan 40 cemetery. Another indication of the long-term use of the cemetery may be the four different types of grave circles, and the reuse of some graves. Indications of reuse include the reuse of cobbles as indicated by partial circles, missing capstones in apparently undisturbed graves, and the presence of double burials.

The inner cist grave was occasionally re-used for later burials. In these instances, the disinterred remains of the original grave occupant were often re-buried in the sediments above the cist containing the most recent burial, and are here referred to as ‘secondary burials’. These ‘secondary burials’ were largely identified by piled human remains placed within the sediment fills located above the inner cist grave. We assume that these skeletal remains represent the earlier occupants of the graves that were later removed and put aside in the fill when the grave was reused for a later burial. Secondary burials placed within the sediment fill were often found in a limited area defined by two medium-sized rocks. The bones were arranged in an organised ‘bundle’ or ‘pile’. The skull was usually placed at the bottom and the long bones (legs and arms) piled at the sides of the skull, with the remaining bones (vertebrae and the ribs) put on top. In some cases two individuals were placed in the same bone pile and occasionally infant bones were found associated with adult bones. In most cases, when the skeletal remains were removed from cist graves to be interred as ‘secondary burials’, not all the bones were collected from the primary grave. In adult burials, mostly skulls, long bones and some of the large vertebra were collected and placed in the secondary burial. Infant remains, whose bones are small and fragile, were often only represented by a limited number of larger bones.

Several cist graves that were suitable for primary articulated burials contained the remains of what appears to be ‘secondary burials’. In these cases the skeletal remains were scattered within the cist in no organised pattern as seen in Graves 60, 38c, and 101. Although these graves contain ‘secondary burials’, it is clear that they were given the same care as was given to primary inhumations. This care was demonstrated by the completion of the normal burial sequence of the grave, with the remains placed in the cist, followed by closure of the cist with capstones, the sealing of the cap-stones with plaster, the placement of the sediment fill inside the burial pit, and finally the construction of the stone circle at surface level.

In one cist grave evidence for two interments was found, with the original burial left undisturbed by subsequent burial. These two primary burials in Grave 17, consisted of an initial adult burial, covered by a thin layer of the soil followed by a later juvenile burial that was placed in primary articulation over the skeletal remains of the first adult individual without causing disturbance to the earlier burial. The interment of the juvenile was followed by covering the cist with sandstone slabs and sealing it with the ‘plaster’.

**Burial Position**

Body position in burials in Cemetery 40 varied between flexed (70%), semi-flexed (15%) and extended (supine). In 90% of the burials, the orientation of the head was placed either north or south, with only 10% oriented west or east. Flexed burials were placed on either the left or the right side of the body with arms either on the chest or in front of the face. The legs were flexed at both hips and knees, placing the feet exactly in the buttocks region. In two cases, Graves 67a and 75, the legs were tightly flexed and the knees were pushed up to the chest area with the feet in the buttocks region. Semi-flexed burials were placed with the deceased supine with the legs in a semi-flexed position with the hips and knees keeping the feet away from the body.

There were four cases of extended supine burials, one of which was an adolescent and the rest were adults. In these extended burials, the cist grave was
enlarged and the end slab usually employed to define the end of the cist was missing, to allow the legs and feet of the deceased to extend beyond the cist.

Several of the grave cists that contained 'secondary remains' did not show any burial position since the skeletal remains were disarticulated. One unusual burial occurred in Grave 87 where the remains of an adult female were buried in a prone position with the skull on the left side facing west, with the legs in a flexed position.

Grave Goods

There were relatively few burial goods found within the graves. The most common objects were beads made from a variety of materials, including minerals, animal bone, glass and ceramics. In total 1,317 beads were recovered from the cemetery, which are of a variety of shapes, sizes and colour, indicating significant variety in personal ornamentation. These beads occurred in the burials as pendants, or as necklaces, bracelets and anklets found around the neck, arms and legs. The most common colours of the beads are red, white, green and black. A preliminary assessment of the materials from which the beads were made, found that despite the cemetery's presence in a zone rich in copper minerals, very few beads were made from these, and that the most common minerals in use included varieties of quartz ($\text{SiO}_2$) such as carnelian (red to brown-red) and onyx (black) as well as other agates (also $\text{SiO}_2$) and amazonite (a green form of microcline feldspar). A detailed report of the bead corpus will be published in the final report on the cemetery excavations.

One of the most unusual cultural items found in the cemetery was a scarab (Fig. 6) that formed part of a necklace found around the neck of an adult female in Grave 92 (Figs 7 and 8). The scarab is...
Figure 9. Wooden bowl (complete); Area A, Grave 97 B. 3619.

Figure 10. Wooden bowls (fragments); (1) Area A, Grave 22, B. 2048; (2) Area A, Grave 92, B. 2134.

Figure 11. Wooden bowl (fragment); Area B, Grave 12, B. 2318 + 2326.
most similar to Middle Bronze IIIB 'Hyksos' examples which show a uraeus wearing the crown of lower Egypt, with two conventional signs indicating beauty and two 'wah' signs representing endurance (see Rowe 1936, no. 331). Recent radiocarbon determination from this grave indicates that it is much later than the Middle Bronze II period, and the scarab therefore seems to be a reuse or curation as a valued or decorative piece for inclusion as part of the necklace.

The second most common cultural material found in the cemetery excavations were fragments of shrouds used in the burial rite in eleven graves (12, 13, 22, 23, 25, 28, 29, 38a, 54, 92, and 97). The shroud was made of two materials — textile and leather. The type of textile and animal hide used in the shroud is currently under study. At some time after death, textile was first wrapped around the entire body, and then a second wrapping of animal leather was applied. The preserved pieces of leather indicate that it was worked and decorated by sewing with the use of threads. In addition, the edges of the leather were fixed and sewn into two layers. The shroud covered the body from head to toe and was secured around the entire body. In Grave 13 a wooden pin was found at the skull region that seems to have been used to hold the leather in place. The remaining textile pieces did not show signs of any decoration or work; however, this may be due to the small amount of preserved textiles.

Most surprising was the fact that no pottery vessels were found in any of the 62 tombs excavated. However, one complete and three partially complete wooden bowls were found within the Cist graves 22, 92, 97 and 12 (Figs 9–11); one wooden cup in Grave 33 and Graves 102, 110 and 13 had the remains of wooden objects that seem to be fragments of wooden bowls. The wooden bowl in Grave 22 had carbonised seeds placed inside. The wooden bowls were placed beside the skull either in front of the face or behind the head. In the case of the wooden cup in Grave 33, the cup was placed upside down beside the chest area of an adult female. The best preserved, complete wooden bowl was recovered from Grave 97 with the remains of a child of approximately 18 months. Associated with the burial was an animal bone with a cut mark on the shaft that was placed within the bowl. There were no signs of any other preserved material within the bowl.

Figure 12. Rings. (1) Area C, Grave 54, B. 2543 (toe ring, copper alloy); (2) Area C. Grave 54, B. 2542 (finger ring, iron); (3) Area C. Grave 54, B. 2544 (toe ring, copper alloy).

Figure 13. Bracelets and anklets. (1) Area A, Grave 92, B. 2134 (left leg anklet, copper alloy); (2) Area A, Grave 92, B. 2134. (right leg anklet, copper alloy); (3) Area A Grave 92 B. 2134; (left arm bracelet, iron); (4) Area A Grave 97, B. 3620 (child's arm bracelet, copper alloy).
Grave 92 contained five complete pomegranate fruits. The presence of pomegranate fruits most likely indicates that the two adult females interred in Graves 23 and 92 died and were buried during the summer season, as pomegranates ripen during the late summer.

Four graves contained metal objects: Grave 54 had two copper rings on toes of both the left and right feet, and one iron ring on the left hand (Fig. 12); Grave 92 had two copper leg anklets (one on each leg) (Fig. 13:1,2), one iron bracelet on the left arm (Fig. 13:3), and a metal earring fragment; Grave 97 had one copper bracelet on the right arm (Figure 13:4); and Grave 12 had an iron ring. Other cultural objects included sea shells and fragments of mother-of-pearl and a spindle whorl.

Preservation

The preservation of the skeletal material and cultural remains was very good, and a wide range of organic materials were recovered. The best-preserved skeletal remains came from the graves that were completely sealed with 'plaster' and the remains were in a primary burial position. In these graves, sediment did not percolate through the capstone openings and the remains stayed as they were in a still, anaerobic atmosphere that allowed slow decomposition of the soft human remains. This kind of still environment helped in the drying process of the shrouds and several other organic materials including the pomegranates, seeds and body organs. The best-preserved shroud pieces were recovered below the body, even though in some graves the sediment had percolated into the cist resulting in damage to the upper layer of the shroud. In graves where sediment completely covered the skeletal remains, no evidence of shrouds was found. The pomegranate fruits (Fig. 8) were superbly preserved with the only significant change being colour. The drying process caused the pomegranates to become dark black and desiccated. Inside, the fruit seeds were desiccated but maintained their original shape making it easy for botanical analysis.

The anaerobic conditions inside the sealed cists contributed to the drying of several body organs that were recovered and which will be used in later analyses. One of the identifiable body organs found in Grave 92 were lung fragments located in the chest area and in a good state of preservation. In Grave 23, the grave of an adult female, the remains of her hair were found under the skull. The most interesting feature about the hair was evidence that suggests that it may have been treated with henna which had caused the hair to have three bands of colour: orange, reddish and probably the original colour, black. Faecal remains were identified in the pelvic region of some burials, as were insect pupae shells. The presence of pupae cases in Grave 25 may indicate that the body of this adult male was not buried immediately in the cist grave (Hunter 1991), but remained exposed to the outside environment for enough time for insects to lay their eggs on the body. Grave 92 had excellent preservation including a string that was used to hold the bead anklet around the left leg. All of the organic remains are currently being studied and will be described in detail in the final report.

The preservation of the secondary burials found in fills was usually very poor, as they were situated close to the site surface where extreme hot air and direct sun contributed to the deterioration of the remains. Several soil samples were collected from the soil matrix surrounding these burials, and which contained a combination of decomposing human flesh, animal leather and textile, all mixed together with the sediment. These sediments are also undergoing analysis.

Skeletal Remains

During the field season only a limited amount of analysis of the skeletal remains could be completed, and precise details of age estimation, sex determination, health and pathological condition were not obtained but will be dealt with in the final report on the excavations. From the preliminary analysis undertaken it is possible to provide some general information about the population buried at the cemetery. The 87 skeletal remains recovered indicate an almost equal distribution of ages and sexes. Infants, juveniles and adolescent skeletal remains were found in several graves and were buried not only as a secondary, but also as primary burials. A preliminary field assessment of the best-preserved and complete adult skeletal remains allowed determination of sex according to the pelvic and skull features that show sexual dimorphism, and revealed 6 males, 11 females and 39 as yet indeterminate due to the incomplete bone preservation.

Age estimation of the infants and juveniles was done by dental eruption, while sexing of the infants and aforementioned age groups was not attempted since the features used for sexual dimorphism are not manifested until puberty (Bass 1987).

A general overview of the health of this population revealed few pathological conditions. Only two obvious pathological conditions were observed from
the skeletal evidence, which were cribra orbitalia and degenerative joint disease. Cribra orbitalia is a condition in which the orbital surface of the eye socket showed degrees of porosity which is indicative of anaemia. Degenerative joint disease is a common pathological condition that is associated with ageing, and several of the adult remains had this condition. Osteoarthritis was found in the vertebral column, the carpal bones (hand bones) and the knee joints (Roberts and Manchester 1995).

A preliminary examination of the general dental health of the Wadi Fidan 40 population showed a number of dental pathologies. Dental caries were a common pathological condition found in all age groups, and several of the adult dentition samples showed the lack of the upper (maxillary) and lower (mandibular) molars as a result of periodontal diseases. In several of the adults, an additional dental pathology was evidenced by the presence of abscesses in the alveolar process of the maxillae.

**Dating**

The dating of the cemetery has important ramifications for the Iron Age history of the southern Levant. The large number of graves opened (N = 62) and the significant amount of skeletal remains recovered (N = 87) comprise an important record that can be used for study of the health and burial practices of the Iron Age population in the Jabal Hamrat Fidan/Faynan region of southern Jordan. DNA samples were taken from 46 individuals of the population group and will provide the first opportunity for a detailed genetic analysis of an Iron Age population group in Jordan.

The dating of the cemetery has been problematic since its first systematic investigation by Adams (1991). Before entering the field in 1997, the writers were under the impression that Cemetery 40 dated to the Early Bronze Age based on structural similarities between its tombs and those found at late prehistoric sites in the Negev region (Levy 1998) and elsewhere. However, during the course of the 1997 excavation, the discovery of metal toe rings on the feet of some of the deceased led to a reassessment of this situation, and to questioning the original dating hypotheses. As fieldwork progressed, the Middle Bronze Age scarab mentioned earlier came to light providing a possible terminus post quem date, placing Grave 92 and similar examples in the sixteenth century BC at the earliest. When an iron bracelet and ring came to light in Grave 92 and 54 respectively, even this date seemed spurious. Following the excavation, and in the absence of other clear criteria for provision of relative dating in the cemetery (i.e. pottery), the writers decided to rely on radiocarbon dating methods to arrive at the most likely date for the cemetery. It was judged that the best possibility of dating lay in attaining a short life dating sample from a sealed grave, which although it could not be assumed to date conclusively the entire cemetery, would give an approximate date as a basis for further studies. The sample used for dating was taken from one of the pomegranate fruits found in sealed Grave 92 and represents a short-lived dating sample – one of the best for radiometric dating.

The results of this analysis undertaken by Beta Analytic Inc., comes from Wadi Fidan 40 Cemetery, Area A, Grave 92, Locus 531, Basket: 2133 + 2157. The material consisted of pomegranate seeds that were pre-treated using acid/alkali/acid.

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Measured C14 Age</th>
<th>C13/C12 Ratio</th>
<th>Conventional C14</th>
<th>Calibrated results</th>
<th>Calibrated radiocarbon age with Calibration Curve</th>
<th>1 sigma 68% Probability</th>
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<tr>
<td>Beta-111366</td>
<td>2800 ± 70 BP</td>
<td>-25.0 0/00</td>
<td>2800 ± 70 BP</td>
<td>cal BC 1130-815</td>
<td>cal BC 925</td>
<td>cal BC 1015-845</td>
</tr>
</tbody>
</table>

The results of radiometric dating of a fruit sample from Grave 92.
The Iron Age of southern Jordan

Until very recently evidence for a pre-seventh-century Iron Age occupation on the Jordanian plateau south of the Wadi Hasa has been both very sparse and highly debated in the literature (Finkelstein 1992a, 1992b, 1995; Bienkowski 1992a, 1992b). Notwithstanding Finkelstein’s assertions that early Iron Age ceramics are present in most ‘Edomite’ sites excavated to date (Finkelstein 1992a, 1992b), there is a clear lack of stratified evidence to support this hypothesis. Moreover, the absence of these early Iron Age sequences should be seen as part of a larger problem concerning the almost complete lack of archaeological evidence for Middle Bronze Age, Late Bronze Age and Iron Age I occupation in southern Jordan in general (see Bienkowski and Adams 1999). Although this ‘gap’ in occupation in southern Jordan is now a well-known phenomenon, it has yet to be satisfactorily explained. Recent attempts to account for this situation have taken two approaches, the first of which has been to suggest that the lack of sites reflects the ‘nomadic’ nature of populations in the region at this time, which have been suggested to exist largely as groups reliant upon a pastoralist economy. The second approach has been to attempt to rectify the lack of sites through more intensive survey of the region over the last two decades, to address this perceived ‘gap’ in occupation of southern Jordan. These surveys, both north (Karak Plateau Survey: Miller 1991) and south of the Wadi Hasa (Wadi al-Hasa Archaeological Survey: MacDonald et al. 1988; Southern Ghors and Northeast Arabah Survey: MacDonald et al. 1990; Edom Survey Project: Hart 1989, 1992; Aqaba-Ma’an Survey: Jobling 1981, 1983), have all met with relatively limited success.

Perhaps the most successful of these recent surveys, the Wadi al-Hasa Archaeological Survey and the Karak Plateau Survey, recorded a number of potential sites of the Late Bronze Age–Iron Age periods, and perhaps as many as six which potentially could provide a sequence covering the transition between the Late Bronze Age and the Iron Age II (Bienkowski 1995). However, the most promising of these sites identified through surface survey have revealed little or no positive results for establishing a stratified sequence for these periods. Moreover, as far as the Late Bronze Age and the earliest phases of the Iron Age are concerned, no definite evidence of occupation has yet been found on any of these sites on the plateau (Bienkowski 1995, Bienkowski et al. 1997, Bienkowski and Adams 1999).

In the Wadi Arabah however, more promising results have recently been found, which may well support the existence of occupation during these periods. Already well known is the evidence for Egyptian and ‘Midianite’ mining activities at Timna (Rothenberg 1988, 1990). To date, these remain the best-documented evidence of a Late Bronze Age–Iron Age I occupation in the southern Arabah. However the evidence there is one of limited occupation and exploitation of natural resources by foreigners and not of localised and extensive permanent settlements. Although there is evidence for a lengthy exploitation of the copper resources at Timna during the reign of several pharaohs during the Nineteenth and Twentieth Dynasties, as evidenced by several cartouches of pharaohs from Seti I through Rameses IV, c. 1300–1150 BC (Rothenberg 1972), no extensive occupational evidence has yet been found to support other than short-lived mining encampments in the region. The exact composition of the population at Timna is also open to debate since three distinctive forms of pottery have been found in sites of the region, including Late Bronze Age–Iron Age wheel-made pottery, hand-made ‘Negev’ ware, and also distinctive hand-made, painted ‘Midianite’ pottery. It seems likely, as Bartlett has suggested earlier (1989, 74–75), that the population at Timna was most likely composed of Egyptians, local inhabitants and others — including prisoners and slaves — forced to work the mines for the benefit of the Egyptian occupiers.

In the greater Faynan region, the other main source of copper in the southern Levant, evidence for an Iron Age phase of occupation which has long been assumed, is only now being confirmed by recent fieldwork. One of the key sites of the region, as yet unexplored in detail, is the site of Khirbat al-Nahas. This site, one of the most extensive copper production sites in the Near East, used extensively during the Roman–Byzantine period, is thought to have begun to be developed during the Iron Age. Investigations undertaken here by the Deutsches Bergbau Museum team led by Andreas Hauptmann involved extensive examination of the archaeometallurgical debris and slag piles, which have produced a series of radiocarbon dates spanning the Iron Age I–II (Table 2). To date only one small excavation trench has been opened in an area of habitation, which has produced evidence of a structure from the Iron Age II (Fritz 1996), with associated ceramics.

A second smaller smelting site at Khirbat al-Jariya in the adjacent Wadi Jariya, attests to the widespread nature of such smelting sites during the Iron Age. Here, analysis of the smelting slag piles has produced similar radiocarbon dates (Table 2), although no work has yet been undertaken to investigate the site in any further detail.
Table 2. Published radiocarbon dates from archaeological sites in the Faynan area.

<table>
<thead>
<tr>
<th>Site</th>
<th>Source of Sample</th>
<th>Sample Ref. No.</th>
<th>Radiocarbon date Age BP</th>
<th>Radiocarbon date Calibrated BC</th>
<th>Reference</th>
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<td>2905 ± 40</td>
<td>1199–1030 BC</td>
<td>Engel 1993, 209</td>
</tr>
<tr>
<td>Khirbat al-Nahas</td>
<td>Slag pile</td>
<td>HD 14308</td>
<td>2876 ± 38</td>
<td>1110–945 BC</td>
<td>Steinhof 1994</td>
</tr>
<tr>
<td>Khirbat al-Nahas</td>
<td>Slag pile</td>
<td>HD 14113</td>
<td>2864 ± 46</td>
<td>1110–930 BC</td>
<td>Steinhof 1994</td>
</tr>
<tr>
<td>Barqa al-Hatiya</td>
<td>House 2</td>
<td>HD 13977</td>
<td>2743 23</td>
<td>905–835</td>
<td>Fritz 1994, nd</td>
</tr>
<tr>
<td>Khirbat al-Nahas</td>
<td>House 1</td>
<td>HD 13978</td>
<td>2704 52</td>
<td>900–805</td>
<td>Fritz 1996, 5</td>
</tr>
</tbody>
</table>

Recent research in the vicinity of Khirbat Faynan and the outlying field systems as part of the British Institute at Amman Faynan Project (Barker et al. 1997, 1998, 1999) has also begun to reveal areas of Iron Age occupation in close proximity to the Khirbat. The evidence to date has comprised both background evidence of ‘generic’ Iron Age ceramics from random and exploitative sampling, as well as discrete concentrations of Iron Age ceramics which may suggest remnant field terraces of an Iron Age date (Adams in Barker et al. 1998). More recently possible occupation in close proximity to the Khirbat which may be part of industrial installations related to copper smelting have been found (Barker et al. 1999). The ceramics from this area, WF424, seem to suggest a pre-seventh century date for this occupation (Barker et al. 1999, fig. 27).

In the western Faynan region, investigation of a structure at Barqa al-Hatiya in 1990 (Fritz 1994, nd.), revealed a well preserved four-room building with a central courtyard, that was radiocarbon dated to the ninth century BC (Table 2). The site provided extensive amounts of ceramics that varied, as at Timna, between wheel-made and hand-made vessels, some of which were identified as ‘Midianite’. This seemingly isolated structure, situated on a small knoll to the south of the Jabal Hamrat Fidan, suggests the possibility of a not-so-sparingly settled landscape in which mining activities, isolated settlements and pastoralist camps were found across an extensive landscape.

Last of all, renewed survey in 1998, as part of the Jabal Hamrat Fidan Archaeological Project, revealed extensive evidence of Iron Age occupation and smelting sites throughout the Wadi Fidan (Levy and Adams forth. c). Although not yet analysed in detail, the survey pottery and other finds suggest a much more intensive use of the region during the Iron Age than previously believed. These new sites will be further investigated in future seasons.

It is perhaps too early to comment on the overall extent of Iron Age occupation in the Faynan region at this time, however the evidence that currently exists suggests that there was a fairly widespread occupation in this region prior to the formation of the ‘Kingdom of Edom’ in the seventh century BC. While archaeological evidence supports the crystallisation of the ‘Kingdom of Edom’ in the seventh century BC (see Bienkowski forth.; Herr 1997; LaBianca and Younkers 1998), this process was probably well underway several hundred years earlier. However, the exact nature of Iron Age state formation, and the extent to which it may have relied upon the exploitation of the copper resources at Faynan requires further investigation.

The nature of occupation in southern Jordan during the early Iron Age

To date, the presence of small isolated sites and the absence of large settlements in both the Faynan region and on the Jordanian plateau during the earliest phase of the Iron Age could, as suggested above, be argued to suggest settlement patterns of the type which may be evidence of a non-sedentary, pastoralist population. The textual evidence from Egypt at the end of the Late Bronze Age also seems to support this possibility (see Kitchen 1992), with the geographic area later known as Edom, and

...
referred to as Seir by the Egyptians being inhabited by 'clans' (wh3ywt) ruled by 'chiefs' (wrw). Indeed the well known and often quoted sections from the Papyrus Anastasi VI, from the eighth year of Merneptah seems to suggest just such a picture of pastoralists and their flocks.

“We have finished with allowing the Shasu clansfolk of Edom to pass the fort of Merneptah that is in Succoth, to the pools of Pi-Atum of Merneptah that are in Succoth, to keep them alive and to keep alive their livestock...” (Gardiner 1937, 76–77; translations, e.g. Pritchard 1969, 259; with notes, Caminos 1954, 293).

Other references, including a piece of text from the Papyrus Harris I from the reign of Rameses III (c. 1184–1153 BC) supports this scenario of a population whose economy was rooted in pastoralism.

“I destroyed the Seirites, the clans of the Shasu, I pillaged their tents, with their people, their property, and their livestock without limit...” (Erichsen 1933, 93; translations, e.g. Pritchard 1969, 262:1).

It is clear from these examples that the Egyptians identified the inhabitants of Edom as Shasu – a problematic term but probably related to an Egyptian word meaning ‘wanderers’ (Ward 1972, 56–59). The implication of this and other historical data is that prior to the rise of what LaBianca and Younker (1998) refer to as ‘Transjordan’s tribal kingdoms’ in the post-ninth century BC, Edom was most likely inhabited by pastoral non-sedentary groups who lived in tents.

On the basis of this evidence it may be possible to make some inferences about the nature of the society buried in the Wadi Fidan 40 cemetery. The circular character of the Wadi Fidan 40 tombs, the absence of pottery and other indications of a settled population, may be indications that the individuals interred in the cemetery were part of a mobile, pastoralist society. Although it may be premature to tie the Wadi Fidan cemetery population with certainty to any specific population group, it is possible this population may be some of the first archaeological evidence of the Shasu known from the Egyptian historical records (cf. Ward 1972, 1992). How the Wadi Fidan 40 mortuary population relates to other Iron Age sites in the Faynan district, and the wider southern Levant, will be one of the subjects of the Jabal Hamrat Fidan project in the near future.

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