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**To cite this article:** Piotr Bienkowski & Juan Manuel Tebes (20 Feb 2024): Faynan, Nomads and the Western Negev in the Early Iron Age: A Critical Reappraisal, Palestine Exploration Quarterly, DOI: [10.1080/00310328.2023.2277628](https://doi.org/10.1080/00310328.2023.2277628)

**To link to this article:** <https://doi.org/10.1080/00310328.2023.2277628>



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Published online: 20 Feb 2024.



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# Faynan, Nomads and the Western Negev in the Early Iron Age: A Critical Reappraisal

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## ABSTRACT

The final report on the Edom Lowlands Regional Archaeology Project concludes that local nomadic tribes created a complex polity at early Iron Age Faynan, in southern Jordan, that was responsible for a radical shift in copper production to an industrial scale. Erez Ben-Yosef has subsequently used these conclusions as the key example in a theoretical argument about the social complexity – and, usually, archaeological invisibility – of nomadic societies. A review of the archaeological evidence from Faynan indicates that the sudden change at the beginning of the 10<sup>th</sup> century BCE should not be attributed to local nomads. Evidence from the Wadi Fidan 40 cemetery – both material culture and chemical analysis of teeth – shows that its nomadic inhabitants did not actively participate in the copper industry. There is no evidence of a process of transition from nomadism to sedentarism at Faynan, and its architecture does not reflect any influence or antecedents in the archaeology of nomads. The evidence shows close material culture connections with the western Negev and the major site of Tel Masos. The scenario that best fits the evidence is that Masos took direct control of copper production at Faynan and developed it as an industrial site to exponentially increase the copper trade – Masos had the resources, technical skills, an architectural tradition, and connections to trade networks that the local nomads lacked, and which transformed Faynan. Hundreds of sites in the Negev Highlands were settled by pastoralists who found employment both in production and transport in the burgeoning copper industry. The industrial transformation of Faynan, along with the settlement of Tel Masos and the Negev Highlands sites, was short-lived, and lasted little more than a hundred years.

## KEYWORDS

Iron Age; Levant; Faynan; nomads; states; metallurgy

## 1. Introduction

What sort of society was early Iron Age Faynan? The large-scale excavations and regional surveys in the copper-production region of Faynan, south of the Dead Sea in southern Jordan (the Edom Lowlands Regional Archaeological Project, henceforth ELRAP,

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directed by Thomas Levy) commenced in 2004,<sup>1</sup> with a final publication in 2014. Since its early years, the archaeologists leading that project have been arguing that the local nomadic/semi-nomadic tribes in Faynan in the Iron IIA period (10<sup>th</sup>-9<sup>th</sup> centuries BCE) created a complex nomadic polity that engaged in industrial-level copper production (e.g. Levy, Ben-Yosef and Najar 2012, 211).

After a period of small-scale copper production at Faynan between the 13<sup>th</sup> and 11<sup>th</sup> centuries BCE, attributed to the Shasu nomads referred to in Egyptian texts (for the Egyptian references, see Kitchen 1992, 26-7; Cooper 2020, 75-6; Tebes *forthcoming*), there was a radical shift from the previous nomadic/semi-nomadic occupation pattern. This radical shift was characterised by a sudden boom in copper production, the construction of monumental buildings, elite residences, and industrial-scale copper manufacturing processes. The nomadic polity hypothesis has been an attempt to explain this radical change, and different iterations of the hypothesis have been proposed.

The final report on ELRAP proposed that the local nomads in Faynan developed sophisticated copper production and social complexity and constructed monumental, elite buildings, essentially creating the kingdom of Edom already in the 10<sup>th</sup> century BCE, which in the late Iron Age flourished in the highlands of southern Jordan (Levy, Najar and Ben-Yosef 2014, 978-94). More recently, Erez Ben-Yosef, one of the co-authors of that final report, has developed the hypothesis further, as part of his broader argument that research tends to underestimate the level of social complexity that nomadic societies can achieve and their possible historical impact. He proposes that the local tribes in Faynan engaged in copper production and developed a complex nomadic polity with a more extensive reach that controlled the Arabah, the Negev Highlands, and the Edomite Plateau, and eventually developed into the kingdom of Edom in late Iron II (Ben-Yosef 2019, 2021; Ben-Yosef and Thomas 2023, 20-3).

The authors of the present paper have previously challenged some of the conclusions of ELRAP. Tebes (2022) has reassessed the stratigraphy and radiocarbon dates of the central site of Khirbat an-Nahas, which are notoriously tricky at such an industrial site lacking floors and secure contexts and with mixed layers of metallurgical waste. Bienkowski (2022) has demonstrated that there is no evidence for continuity between early Iron Age Faynan, in the lowlands of southern Jordan, and the late Iron Age kingdom of Edom in the highlands, with a gap of around 100 years between them and the evidence pointing instead to the existence of different social groups in the two periods based on completely different economies and settlement patterns.

The purpose of this paper is to critically review the evidence for local nomadic tribes creating a complex polity at early Iron Age Faynan that was responsible for the radical shift in copper production to an industrial scale.<sup>2</sup> We argue that the nomadic polity hypothesis is not a credible or evidence-based explanation for that sudden major shift, and suggest that the evidence overwhelmingly points instead to Faynan being a short-lived industrial site producing copper for trade, probably developed and controlled by the exactly contemporary 'Tel Masos-Negev Highlands' entity to the west.

The paper is divided into four parts:

- A review of the evidence for occupation and copper production at Faynan during the 13<sup>th</sup> to 11<sup>th</sup> centuries BCE, prior to the 10<sup>th</sup>-century BCE industrial boom.

- A review of the evidence for what changed in the 10<sup>th</sup> and 9<sup>th</sup> centuries BCE, and the scale of that change.
- A detailed examination of the archaeological evidence in order to assess who might have been responsible for that sudden and massive transformation: was it local nomads or an external entity?
- A conclusion tying together the main points, showing that the nomadic polity hypothesis is not tenable, rather that the evidence links Faynan's industrial transformation to contemporary developments in the western Negev.

## 2. Evidence for occupation/copper production at Faynan in the 13<sup>th</sup> – 11<sup>th</sup> centuries BCE

This section reviews the evidence for occupation and copper production at Faynan prior to the 10<sup>th</sup>-9<sup>th</sup>-century BCE industrial boom, so that we can properly assess the nature and scale of that later transformation. According to the evidence published by ELRAP, and more recent excavations at the copper-smelting site of Khirbat al-Jariya in the northern part of Faynan (for location see [Fig. 1](#)), there was some occupation and use between the 13<sup>th</sup> and 11<sup>th</sup> centuries BCE, divided into two distinct periods: 13<sup>th</sup> to 12<sup>th</sup> centuries BCE, and late 12<sup>th</sup> to 11<sup>th</sup> centuries BCE. [Table 1](#) shows the stratigraphic position of the contexts under review and their relationship to later contexts.

### 13<sup>th</sup> to 12<sup>th</sup> centuries BCE

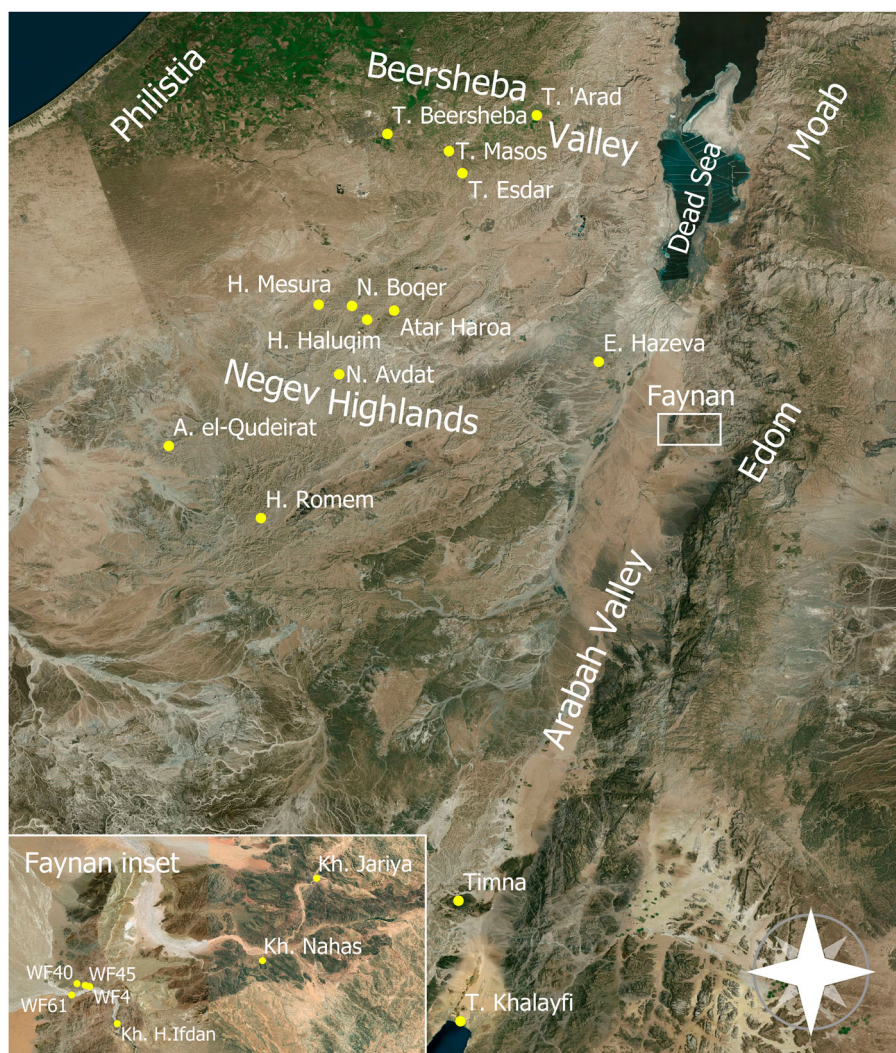
As can be seen in [Table 1](#), the only contexts at Faynan dated to this period are in Area M at Khirbat an-Nahas, a deep sounding through a slag mound (Levy et al. 2014, 146 and table 2.8; for location at the site see [Fig. 2](#)). The earliest context, on virgin soil, was an 'altar'-shaped limestone installation (L676, Layer M5b) laid as a pavement and covered with a layer of plaster. Fine crushed slag fragments were found mixed with the wadi soils. No pottery was published from this context. Above this, and separated by a thin accumulation of soil, was a limestone hearth or oven (L673, Layer M5a), with some bone and ash, but no slag. Just a single sherd was published from this context, from a white-slipped bowl with a flaring neck (Smith and Levy 2014, fig. 4.7:1).

This evidence testifies to some limited activity in the 13<sup>th</sup> to 12<sup>th</sup> centuries BCE, with cooking and probably very small-scale and technologically simple copper production, judging from the small amount of crushed slag.<sup>3</sup>

### Late 12<sup>th</sup> to 11<sup>th</sup> centuries BCE

There is a little bit more evidence from this period, including the earliest occupation at Khirbat al-Jariya (see [Table 1](#)).

At Khirbat an-Nahas Area M, Layer M4 consisted of three sediment layers: the lowest (L671) with crushed slag, then L670 with mud, clay and furnace fragments and some slag, capped by a layer of ashy silt (L667), which marks a clear break in activity before the intense copper production of the succeeding Layer M3 (Levy et al. 2014, 235 n. 45). This is clearly evidence for some copper production, described by the excavators as



**Figure 1.** Location of Iron Age sites in southern Jordan and the Negev.

‘less intense’ than the following Layer M3 (Levy et al. 2014, 146). One sherd from a bowl was published from Layer M4 (Smith and Levy 2014, fig. 4.7:2).

At Khirbat an-Nahas Area S, just north of Area M, Layer S4 was the earliest use of this area. It seems to reflect domestic/cooking activities, with fish teeth, animal bones, some pottery, and some partially processed copper, suggesting small-scale metallurgy (Levy et al. 2014, 151-66). Six sherds from Iron Age coarse bowls and jars were published from S4, one of them containing glassy slag, another indication of metallurgy (Smith and Levy 2014, figure 4.19:1-6). However, a few Early Bronze Age sherds – unfortunately not included in the ceramic report – were mixed with pottery from the layer, so this context may be disturbed.

In Area W, west of Area M, below the later residential/storage buildings, Layer W3 was sediment with layers of crushed slag mixed with sand (Levy et al. 2014, 189). But



**Table 1.** History of occupation at Khirbat an-Nahas and Khirbat al-Jariya (adapted from Levy et al. 2014, table 2.1 and Liss et al. 2020, table 2).

Absolute date BCE	KEN Area A gatehouse	KEN Area M slag mound	KEN Area R monumental building	KEN Area S copper production area	KEN Area T monumental building	KEN Area W residential/storage	Khirbat al- Jariya
9 <sup>th</sup> C.	Post-abandonment Ephemeral metal production outside gate	Post- abandonment Smelting	Post- abandonment Copper production in extramural courtyard; rest abandoned	Post- abandonment Abandoned	Abandoned (unoccupied)	Collapse  Post- abandonment (unoccupied)	Post- abandonment Post-abandonment–small- scale copper production
9 <sup>th</sup> C.	Intensive metal production	Intensive smelting		Minor extension of building		Domestic complex; storage areas; cultic?	
Late 10 <sup>th</sup> -early 9 <sup>th</sup> C.	Decommissioning. Residential?	Building; intensive smelting		Building: casting/slag processing	2 <sup>nd</sup> occupation phase floor		
10 <sup>th</sup> C.	Building of gatehouse	M3: Industrial copper production	Some additions to structure Main building phase, residential	Crushed slag below later building	Main building phase, residential		Building and copper production
Early 10 <sup>th</sup> C.	Crushed slag below gate		Crushed slag below building		Crushed slag below building	W3: Sediment with crushed slag	Copper production and occupation
Late 12 <sup>th</sup> -11 <sup>th</sup> C.	Unoccupied	M4: L667 Ashy silt  L670 Sediment with furnace fragments, crushed slag  L671 Sediment with crushed slag	Unexcavated	S4: Domestic/cooking activities: mixed EB/IA sherds, bones, some copper	Unexcavated		Accumulation of domestic and copper debris (A5), occupation with domestic refuse (C2c)  Occupation: crushed slag, some copper ore fragments, ash, pits in bedrock (A6), crushed slag (C2d)
13 <sup>th</sup> -12 <sup>th</sup> C		M5a: L673 Limestone hearth/oven, bone and ash  M5b: L676 Altar-shaped limestone installation, crushed slag fragments		Unoccupied		Unexcavated	Unoccupied



**Figure 2.** Bing Map satellite view of Khirbat an-Nahas, with excavation areas. © 2023 Microsoft.

the dating of this layer is uncertain, and it may be attributed to the 10<sup>th</sup> century BCE. No pottery was published from this context.

The earliest occupation on bedrock at Khirbat al-Jariya is dated to this period and reflects domestic use and some copper exploitation. The two earliest contexts are A6, crushed slag with some copper ore fragments, ash and pits, and C2d, a layer of crushed slag (Ben-Yosef, Najjar and Levy 2014, 801-3; Liss et al. 2020, 424).<sup>4</sup> Above these were A5, an accumulation of sherds, bone, ash and small fragments of industrial remains such as furnace linings and tuyères, and C2a, domestic refuse of bones and date seeds, but no slag.

Assessing the overall evidence for the late 12<sup>th</sup> to 11<sup>th</sup> centuries BCE at Faynan, there is some occupation, although relatively little pottery was recovered (and the few sherds were local and unpainted), and limited copper production. It is clear that neither occupation nor copper production were very extensive. While it is true that some of the pre-10<sup>th</sup>-century BCE levels at Khirbat an-Nahas are unexcavated (e.g. Areas R and T, see [Table 1](#)), we know that Areas A and F further north at the site were unoccupied at this time. So, any use of the site was quite restricted to the area around Areas M, W and S (see [Fig. 2](#) for location).

Similarly, at Khirbat al-Jariya, the earliest occupation and copper exploitation was restricted to Areas A and C, with the large Area B to the north of the site not used until the construction of Building 2 probably in the 10<sup>th</sup> century BCE.<sup>5</sup>

The ELRAP excavators have described these phases at Faynan as nomadic or semi-nomadic, with a mixture of herding and limited copper craft production (Levy, Najjar and Ben-Yosef 2014, 988). The nature of the evidence, with very little pottery, no structures or installations (although surviving fragments of furnace linings and the pottery with glassy slag imply there were some furnaces), and limited use of the sites, may well reflect opportunistic use by groups such as the Shasu (Ben-Yosef 2010, 371).

### 3. The industrial boom of the 10<sup>th</sup> – 9<sup>th</sup> centuries BCE

At the beginning of the 10<sup>th</sup> century BCE, there was a sudden change, with an exponential increase in the scale and technological sophistication of copper production. The intensity and industrial scale of this production is marked by the three metres of metallurgical debris in Layer M3 of the Khirbat an-Nahas slag mound (see [Table 1](#); Levy, Najjar and Ben-Yosef 2014, 982). That industrial change of M3 is clearly dated to the early 10<sup>th</sup> century BCE, in both calibrated and re-calibrated radiocarbon dates (Tebes 2022, 123, table 4). Across Faynan, large-scale installations were embedded into a complex organisation of copper production involving mining at several locations, ore and charcoal production, transportation to production centres, ore and flux processing, furnace construction and operation using tuyères and bellow pipes which were further developed during the 10<sup>th</sup> century BCE, secondary processing such as refining impure copper, and slag processing and recycling (Levy, Najjar and Ben-Yosef 2014, 983-4).

This was accompanied by a sudden and marked improvement in the control of the copper-production technology. A key measure of this is the copper content in slag – the more copper, the less efficient the technology. The highest copper content in slag was found in Khirbat an-Nahas Layers M4 and M5, dating between the 13<sup>th</sup> and 11<sup>th</sup> centuries BCE when production was simple and small-scale. There is a marked drop in copper content from Layer M3, dating to the early 10<sup>th</sup> century BCE, reflecting much improved technology, and the control of the technology and copper content continued to be improved in the second half of the 10<sup>th</sup> century (Ben-Yosef et al. 2019, 4 and fig. 2).

Several monumental<sup>6</sup> buildings were constructed at Khirbat an-Nahas in the 10<sup>th</sup> century BCE: a fortress with a four-chamber gatehouse (Area A) ([Fig. 3](#)), Building R (with five rooms, stairwell and second floor), and Building T (a five-room structure with a tower and central courtyard).<sup>7</sup> These have been interpreted as elite residences for those controlling copper production, with the fortress “an expression of power and concern for defence of the copper industry” (Levy, Najjar and Ben-Yosef 2014, 982). Also built were the Area W residential/storage building, and structures





**Figure 3.** View of the fortress at Khirbat an-Nahas, from the south-east, in 2019 (photo by J.M. Tebes).

concerned mostly with metal production rather than administration: Area F, a building inside the Khirbat an-Nahas fortress devoted to the re-melting and casting of copper, and Area S, a specialised ground-stone processing complex and copper-production area. Apart from Area S, all the new buildings were constructed in areas not utilised previously. The construction was carefully planned: in Areas A, R, S and T, layers of crushed slag were levelled to provide foundations for the buildings (e.g. Levy et al. 2014, 97, for Area A). This crushed slag was not the remains of localised copper-production activities, but material brought in specifically for use as a foundation (Levy et al. 2014, 113). At the same time, at Khirbat al-Jariya, the largest stone building at the site, Building 2, was constructed, with between four and seven rooms, interpreted as either for slag-processing or supervision of operations, perhaps similar to Area S at Nahas (Liss et al. 2020, 417-86, 423).

Pottery suddenly appears in vast quantities at the beginning of the 10<sup>th</sup> century BCE, reflecting a very different and more extensive type of occupation, and different cultural approaches to storage, cooking and dining: virtually all of the c. 2500 diagnostic sherds from Khirbat an-Nahas (Smith and Levy 2014, 305) come from the 10<sup>th</sup> and 9<sup>th</sup> century BCE levels, including all 216 examples of painted pottery (Smith and Levy 2014, fig. 4.39).<sup>8</sup> Imported pottery appears only in 10<sup>th</sup> and 9<sup>th</sup> century BCE contexts – imports from the western Negev, Cypriot juglets, and Qurayyah ware – demonstrating a wider international outlook, beyond the local of the previous period (Smith and Levy 2014, 417).

#### **4. Exploring the responsibility for the transformation: local nomads or external entity?**

Who was responsible for the sudden and massive transformation in Faynan in the 10<sup>th</sup> and 9<sup>th</sup> centuries BCE? Most recently, Ben-Yosef (2021, 161-6) has further developed

his view that a local nomadic polity in Faynan evolved to create a hierarchical and centralised society that supported a large-scale copper-production industry and copper trade networks, and exerted control over the entire Arabah Valley, the Negev Highlands and the Edomite Plateau. This section examines the evidence for that assertion, as well as alternative explanations.

### *The evidence for nomads in Faynan*

Although nomads were present in Faynan in the 10<sup>th</sup> and 9<sup>th</sup> centuries BCE, there is little to connect them to the copper industry. In terms of evidence for nomads in Faynan, there is the large 10<sup>th</sup> to 9<sup>th</sup> century BCE cemetery of Wadi Fidan 40 (Fig. 4), interpreted as the burials of a nomadic or semi-nomadic population (Beherec, Najjar and Levy 2014). However, it is difficult to connect this nomadic population to the copper production at Faynan. The ELRAP final report concluded that this mortuary assemblage was very different from the contemporary occupants of the copper production centres, and referred to a ‘dichotomy’ between the two, explicitly acknowledging that it could find no evidence to connect the nomadic population of the cemetery with Khirbat an-Nahas or any of the copper production (Levy, Najjar and Ben-Yosef 2014, 987). Not only were there no material culture parallels, but the cemetery is quite isolated, in a different wadi system, and 4 km distant from Nahas, the centre of copper production. Furthermore, there are no radiocarbon dates at the cemetery later than the mid-9<sup>th</sup> century BCE, while copper production continued to the late 9<sup>th</sup> century (Beherec, Najjar and Levy 2014, 678 table 9.3). Crucially, Wadi Fidan 40 does not show the



**Figure 4.** View of the Wadi Fidan 40 cemetery, in 2019 (photo by J.M. Tebes).

evidence of a hierarchical society with an elite layer that is present at Nahas in the 10<sup>th</sup> and 9<sup>th</sup> centuries BCE.

The WF 40 cemetery is related to the long tradition of desert funerary architecture of south-western Jordan and the Negev that harks back to the Neolithic period (Tebes 2020). It contains a total of 245 excavated cist graves, although most of the site is still unexcavated, the most common type consisting of stone cist graves, covered by stone slabs and mud plaster. The graves were frequently surrounded by two or three concentric circles of cobbles set upright on the soil, some of them identified as aniconic or anthropomorphic standing stones because of their shape or special placement within the grave circles. A large number of grave goods were interred with the dead, most commonly adornments made of stone, shell beads and pendants. Only two pottery vessels were found at WF 40, but the most common items were wooden bowls, said to be typical of pastoral groups (Beherec, Najjar and Levy 2014, 677-709; Tebes 2020, 513). This led the excavators to suggest that “by avoiding ceramics, the individuals interred at Wadi Fidan 40 appear to have signalled a distinction between themselves and groups with ceramics” (i.e. Nahas) (Beherec, Najjar and Levy 2014, 703). All burials were roughly the same size, shared the same material culture, and likely reflect a tribal, egalitarian society.<sup>9</sup>

WF 40 was not the only Iron Age burial field found in the Faynan region, although it was certainly the largest and most complex. Other tumulus burials from the same period were excavated at Wadi Fidan 4, 45 and 61, with a similar material culture as WF 40. Wadi Fidan 45 consisted of only one stone-ringed tumulus with cists covered by slabs; grave goods included 32 beads (including two made of copper), but no pottery. Excavations at Wadi Fidan 4 unearthed three tumulus tombs, again made up of a ring of stones and covered by capstones; grave goods comprised beads (some made of copper and iron), an Egyptian seal, a scarab, and a figurine, but no pottery. At WF 61, one tumulus grave was excavated with similar burial offerings (Beherec, Najjar and Levy 2014, 673-7).<sup>10</sup>

The features present at WF 40 (and the other three excavated cemeteries) are completely absent at the main period of occupation of Khirbat an-Nahas. At Nahas, no burial was found associated with the main early Iron II phase. It may be argued, of course, that WF 40 was the main cemetery for the people working at Nahas, but the striking fact is that the grave goods deposited at the former find no parallel in the latter. It is interesting to note that Iron Age tombs or tumuli *were* indeed found at Khirbat an-Nahas, but they were constructed after the main occupation period. Circular structures identified as possible tombs were excavated at Area R, but in the post-abandonment R1 layer, thus dating sometime in the 9<sup>th</sup> century BCE (L1811, L1813, feature R09L018) (Levy et al. 2014, 204-5, 239-40 n. 84, figs. 2.197S, 2.198S). They can be interpreted as a brief utilisation of the area by pastoral peoples for interring their dead; interestingly, no artifacts were recovered, coinciding with the simple burials at WF 40.<sup>11</sup> The excavators also found a standing stone, although not in a funerary but in a possible cultic context. It was unearthed in Area F, outside the main structure's northern wall in layer F2a (L884), and interpreted as a possible altar or a working surface (Levy et al. 2014, 127). A cultic interpretation of these finds would be supported by the finding, nearby in the same layer, of a pottery fragment of a button-decorated fenestrated stand (L861) (Levy et al. 2014, fig. 2.56; Smith and Levy 2014, fig. 4.26.12). As the excavators acknowledge, the decoration of this stand has its best parallels in the open-air ‘Edomite’ shrine of ‘En

Hazeva, dating to the 7<sup>th</sup> century BCE, which would date this whole assemblage (including standing stone, stand, and a fire installation) outside the early Iron II occupation phase (see also Tebes 2022, 127 n. 15).

Analysis of chemical elements found in teeth from Wadi Fidan 40 burials shows that the majority of people buried there were not exposed to metal pollution during their lives, and were therefore unlikely to have been connected to the copper industry (Beherec et al. 2016). Only a few individuals were found to have a significant excess of lead and copper: from a total of 38 individuals sampled, only five were exposed to heavy-metal pollution at some point in their lives. One explanation is that these individuals were exposed through working in mining or processing copper, raising the possibility that a small number of the nomads were part of the copper-production workforce. An alternative explanation is that those with elevated heavy-metal concentrations ingested these materials in food – plants absorbed these metals, and people and animals ate them. Extensive heavy-metal pollution from ancient copper metallurgy in Faynan is still present in the environment today, in sediments, plants and livestock, and is even found in modern Bedouin with no involvement in copper production (Grattan, Gilbertson and Kent 2013; Grattan, Huxley and Pyatt 2003).<sup>12</sup>

Ben-Yosef, in his papers on the nomadic polity at Faynan and nomadic complexity (2019, 2021), does not refer at all to the Wadi Fidan 40 cemetery and its lack of connection to copper production. The only evidence he cites to support the hypothesis of a nomadic polity administering copper production at Faynan is that there were tents in the vicinity of the mines and smelting camps, where he claims the nomadic groups lived (Ben-Yosef 2019, 366; 2021, 163). What he fails to mention is that evidence of these campsites was limited to Wadi Jariya – none were found in the other mining areas of Wadis Fidan or Ghuwayb – and there were only eight of them with Iron Age pottery.<sup>13</sup> The ELRAP final report describes these campsites, consisting of tent clearings and hearths, as ephemeral and transient, located close to the mining sites, and concludes that they were temporary campsites used by Iron Age miners who extracted and transported the copper ore to Khirbat al-Jariya (Knabb et al. 2014, 616). The presence of slag at some of the campsites supports this interpretation. There is nothing to suggest that these were the campsites of the nomadic population – indeed, the presence of Iron Age pottery reflects a different material culture to that of the Wadi Fidan 40 cemetery, and indicates instead that they were temporary on-site accommodation for the workers.

Such temporary workers' accommodation close to the mining and smelting sites would have been essential, as one of the characteristics of occupation in early Iron Age Faynan is the lack of villages. The only excavated evidence of permanent domestic occupation in all of Faynan is at Area W at Khirbat an-Nahas. This was part of a larger complex structure that seems to have been some sort of 'neighbourhood' within the site, constructed in the 10<sup>th</sup> century and abandoned sometime in the 9<sup>th</sup> century BCE. It consisted of structures with multiple rooms, interpreted as spaces where people lived and worked, along with storage and possibly some cultic activity, and therefore a domestic area (Levy et al. 2014, 184-202). This was an extensive area, large parts of which remain unexcavated (but are visible surrounding Area W in Fig. 2). It was not an autonomous village, but workers'/craftsmen's housing/workspace within the central copper production and administrative complex of Khirbat an-Nahas. This is likely to have been the workers' permanent base, several kilometres distant from the mines and



other smelting sites. The campsites found in Wadi Jariya would have been their temporary accommodation while working at those sites, as well as for workers who had travelled in from outside, particularly from the Negev Highlands (for which see below).

As well as a lack of evidence connecting the Faynan nomads with the industrial-level copper production from the 10<sup>th</sup> century BCE on, there are three strong arguments against the hypothesis that nomads developed a complex nomadic polity. Firstly, the hypothesis implies a long-term transition from nomadism to sedentarism at Khirbat an-Nahas. In fact, the opposite occurs: the appearance of sedentary and monumental architecture is sudden and short-lived.

Table 2 tabulates the nature of the evidence from Faynan in the three periods discussed above: 13<sup>th</sup> to 12<sup>th</sup> centuries BCE, late 12<sup>th</sup> to 11<sup>th</sup> centuries BCE, and 10<sup>th</sup> to 9<sup>th</sup> centuries BCE. What immediately stands out is the sudden change: from limited and technologically simple copper production, lack of any structures, restricted use of the sites, virtually no pottery, and no imports between the 13<sup>th</sup> and 11<sup>th</sup> centuries BCE, to the sudden, massive transformation seen in the 10<sup>th</sup> to 9<sup>th</sup> centuries BCE, with industrial-scale copper production, sophisticated technology and organisation of production, monumental elite buildings, huge amount of pottery, and imports from the western Negev, Cyprus and Arabia. There is no evidence of different, successive stages of architecture transitioning from nomadism to sedentarism or of any sort of incremental development, just an abrupt industrial, technological and cultural change. That such incremental evidence should be expected can be seen in the ‘nomadic’ phases at Iron I northern Negev sites, such as Tel Masos, Tel Beersheba and Tel ‘Arad, where nomadic occupation is characterised by the presence of pits and silos (Herzog 1994, Tebes 2003).

The hypothesis that local nomads experienced a sudden social and cultural transformational change from a semi-nomadic settlement pattern of limited and simple copper production, with no buildings, installations, or evidence of external contacts, to creating a wide-ranging, complex polity that developed a technologically sophisticated industrial site is a theory with no basis in evidence and no parallels. The nomadic polity hypothesis does not address where they would have acquired the resources for such a massive, instant change, nor are there any archaeological or ethnographic parallels for such abrupt transformational change in nomadic societies. In their only extended theoretical discussion of how this might have happened, Levy, Najjar and Ben-Yosef (2014, 990-94) argue that adaptive mechanisms of nomadic tribes allowed them to adapt and grow into a complex society and incorporate copper production into their socio-economic fabric, but they do not explain or provide any parallels for the abrupt and major change seen at

**Table 2.** Summary of the nature of the evidence from Iron Age Faynan.

13 <sup>th</sup> -12 <sup>th</sup> centuries BCE: very small-scale	Late 12 <sup>th</sup> -11 <sup>th</sup> centuries BCE: limited	10 <sup>th</sup> -9 <sup>th</sup> centuries BCE: industrial scale
‘Altar’ installation and hearth/oven	Some domestic/cooking activities	Monumental elite buildings
No structures	No structures	Expansion of use of sites
Crushed slag = small-scale and technologically simple copper production	Limited and technologically simple copper production	Industrial-scale copper production
No production installations	No production installations (but some evidence for furnaces)	Sophisticated technology and organisation of production
Single sherd of pottery	Very little pottery	Large amount of pottery
No imports	No imports	Imports from western Negev, Cyprus and Arabia



Faynan at the beginning of the 10<sup>th</sup> century BCE. Ben-Yosef (2019, 374) cites the Nabataeans as an example of a complex nomadic society that he claims for Faynan but fails to take into account that Petra has the sort of incremental evidence of development that is lacking at Faynan (Renel and Mouton 2013).

Secondly, the layout and arrangement of the domestic structures at Khirbat an-Nahas do not reflect any influence or antecedents in the archaeology of nomads. Such features are known at some Iron I northern Negev sites, such as the oval settlements found at Tel Beersheba and Tel Esdar (Herzog 1994; Tebes 2003).

Thirdly, at Khirbat an-Nahas (and, incidentally, at Timna) there is no evidence of live-stock exploitation markedly different from contemporary sites in the northern Negev, as might be expected from a settlement developed from nomadism. The ELRAP zooarchaeological study suggests a process by which the inhabitants, involved as they were in a pastoral lifestyle, transited from a ‘herding’ strategy during the earlier phases (13<sup>th</sup> to 11<sup>th</sup> centuries BCE) to practising ‘husbandry’ in the later phases (11<sup>th</sup> to 9<sup>th</sup> centuries BCE) (Muniz and Levy 2014, 659). In another study, Ben-Yosef related this data to the faunal assemblage discovered in the Timna Valley, whose similarity to that of Nahas would reinforce the idea that “the two production centres, which are located more than 100 km apart, were part of the same socio- political system at the time, the Edomite polity” (Sapir-Hen and Ben-Yosef 2022, 232).

However, although the faunal assemblage at Nahas shows a preponderance of caprovines and a low role of cattle, this does not differ much from zooarchaeological data found at Iron I-Iron IIA northern Negev sites like Tel Masos, Tel Beersheba and ‘Arad (Table 3). Raising of caprovines has been a consistent feature at sites located in the arid southern Levant from ancient to modern times, both in sedentary and nomadic societies (Sasson 2010), and Nahas differed little in its economic basis from sites in the northern Negev. From Table 3, two differences seem to contrast the assemblages at Nahas and Timna. First, the proportion of goat compared to sheep is much larger in Nahas and Timna than in the northern Negev sites. Aside from the problems of distinguishing between the remains of sheep and goat, this could be accounted for by the rugged and drier environment of the Wadi Arabah, where goat exploitation would be more suitable. However, a detailed study by Aharon Sasson of the archaeology of caprovine exploitation in the southern Levant has demonstrated that there is no direct relationship between the sheep/goat ratio and the geographical distribution of sites (Sasson 2010, 35-9). The second difference is the frequency of cattle remains at Tel Masos, which is unusually high compared with contemporary regional sites. This high percentage has been attributed to the intensification of dry farming in this period (Herzog 1994, 126), Tel Masos’ role as provider of cereals and secondary products to

**Table 3.** Caprovine and cattle exploitation at Iron I-IIA sites of the Negev and southern Jordan. Percentages deduced from the number of specimens.

Site	Caprovines	Relation Sheep/Goat	Cattle	Bibliography
Khirbat an-Nahas	81.6%	22/78	3.9%	Muniz and Levy 2014
Timna smelting camps	87.44%	25/75	0.61%	Sapir-Hen and Ben-Yosef 2022
Tel Masos III-II	76.16%	65/35	23.66%	Tchernov and Drori 1983
Tel Beersheba IX-VI	74.46%	72/28	11.70%	Hellwing 1984; Sade 2016
Tel ‘Arad XII-VI	91.25%	75/25	8.57%	Sade 1988

the south (Sapir-Hen, Gadot and Finkelstein 2014, 734), or the relatively small sample of cattle bones and the overrepresentation of cattle in the faunal assemblage (Sasson 2010, 49). There is also a lack of evidence of corrals for animals at Nahas, particularly in the domestic structures, in marked contrast with contemporary sites in the Negev Highlands (Haiman 2003, 74).

Ben-Yosef has defended his nomadic polity hypothesis by claiming that ascribing visible remains such as stone-built features only to settled societies is a positivist example of architectural bias, that ignores the social complexity of ancient nomadic societies. In a rather circular argument, he states that the existence of a nomadic polity at early Iron Age Faynan is known solely because of its unique archaeologically visible copper-production activities, while normally archaeology is unsuitable for assessing evidence for nomads (Ben-Yosef 2019, 375; 2020; 2021, 172). The weakness of that argument is that nomads *are* archaeologically visible at Faynan, at the Wadi Fidan 40 cemetery, and there is very little to connect them to the industrial-level copper production and construction of monumental, elite residences at Khirbat an-Nahas, and no evidence of a nomadic polity. The chemical analysis of teeth cited above proves that the majority of the nomads were not involved in copper production. Moreover, the characteristics of that sudden industrial development have no parallels in the archaeology and anthropology of nomads, and the proponents of the nomadic hypothesis have offered no explanation or evidence for the abrupt transformation in the 10<sup>th</sup> century BCE. The most that the evidence allows for is that there was a nomadic, pastoralist community living in close proximity to copper production sites until at least the mid-9<sup>th</sup> century BCE. Proximity alone might suggest that some of them could have interacted with Khirbat an-Nahas in different ways, and it is possible that a small number were involved in broader systems of exchange, procurement and transport. But they were certainly not in control of the copper industry or actively involved in copper production.

### ***Links to the western Negev***

If the local nomads were not responsible for the industrial transformation of Faynan in the 10<sup>th</sup> and 9<sup>th</sup> centuries BCE, then we need to look for a potential external agent, as there are no other local candidates.

One potential contender is the Levantine campaign of the Egyptian king Sheshonq I, traditionally dated to the second half of the 10<sup>th</sup> century BCE, who some scholars have suggested had a strong impact on the Negev and southern Jordan. Over two decades ago, Finkelstein (2002, 113-17) suggested that Sheshonq I's campaign obliterated the desert polity centred at Tel Masos, and with it the trade networks connecting the Mediterranean with Faynan and Arabia. With the more recent downdating of Tel Masos (see below), Finkelstein now thinks that Sheshonq I stimulated, rather than obliterated, the prosperity of the south (Finkelstein 2014, 96; 2021; also Fantalkin and Finkelstein 2006; Ben-Yosef et al. 2019, 8-10).

The ELRAP team associated the Egyptian finds at Faynan (Münger and Levy 2014) with Shoshenq I's military campaign in the Negev and Arabah, as a consequence of which copper production at Faynan was disrupted (Levy, Najjar and Ben-Yosef 2014, 984-85). The present authors feel that Sheshonq's impact has been exaggerated, for two reasons. Firstly, the big changes in Faynan, Tel Masos and the Negev Highlands

occurred in the early 10<sup>th</sup> century BCE, pre-dating Sheshonq's campaign; whatever its date, his campaign happened at a time when many copper-production sites were being abandoned (see Table 4). Secondly, the evidence for Sheshonq's presence at Faynan is problematic: the scarab attributed to him from Khirbat Hamra Ifdan was found out of context, has an unattested prenomen, and may in fact refer to another pharaoh altogether. While there are a number of Egyptian amulets at Faynan, many come from tombs and thus are notoriously difficult for dating. Those that do come from stratigraphic contexts all date to the 9<sup>th</sup> century BCE and point more to strong trade links with Egypt or local emulation than direct domination (Tebes *forthcoming*).

Fortunately, this quest for an external agent is helped by the plentiful archaeological evidence pointing to strong connections between early Iron Age Faynan and the western Negev (first pointed out by Knauf-Belleri 1995, 111), particularly the area stretching from the central Beersheba Valley southward to the central Negev highlands, including those sites in the north-eastern Sinai such as 'Ain el-Qudeirat. These links have been acknowledged before, but sometimes deliberately sidelined and/or integrated into an identification with early Edom.

The ELRAP final report acknowledged the similarities in architecture, ceramics and political institutions, and the wider socio-economic connections, between the Negev Highlands and the Faynan region. However, it pushed them aside in favour of the local nomadic polity hypothesis that interpreted Faynan as independent and the origin of the kingdom of Edom.

The most that the ELRAP excavators could accept was that the Negev sites may have played a role in the copper exchange network emanating from Faynan (Ben-Yosef, Najjar and Levy 2014, 815). Ben-Yosef (2021, 164) agrees that there are strong connections between the Arabah Valley and the Negev Highlands – though not Tel Masos – but he sees Faynan as the centre of this nomadic polity. Israel Finkelstein regards Faynan as oriented to the west and possibly controlled by the 'Tel Masos chiefdom', a nomadic desert polity extending from the Beersheba Valley to the Nahal Besor region, including the Negev Highlands, that acted as a trade network for distributing Faynan copper (Finkelstein 2005; 2020; Martin and Finkelstein 2013, 9-10, 39). The central role of the Tel Masos chiefdom was also highlighted by Tebes, who stressed its geographical position "both at the gates of an area of mineral productivity – the Arabah Valley – and of a zone that had a high demand for scarce resources – as was the Egyptian/Palestinian search for copper" (Tebes 2003, 72). Nadav Na'aman (2021) agrees that there was a polity encompassing the eastern Beersheba Valley, the Negev Highlands and the Arabah, whose centre was at Tel Masos and economic engine in Faynan, although he identifies this polity with early Edom (for arguments against an identification with Edom, see Bienkowski 2022).

There are five types of evidence that reveal close connections between early Iron Age Faynan and the western Negev (Bienkowski 2022, 126-28): architectural parallels; pottery imports from the Negev to Faynan; pottery parallels between the two areas; imports to the Negev Highlands from the copper districts of the Wadi Arabah; and chronological correlations, showing that the peak of copper production in Faynan was exactly contemporaneous with the settlement of the western Negev and similarly short-lived.

- Architectural parallels: The Area R building, the most prominent structure at Khirbat an-Nahas (measuring 13.16 × 14.75 m), has its closest architectural parallels in the

**Table 4.** Chronological sequence and interrelation of contemporary events in early Iron Age Faynan and the Negev.

Period	Absolute date BCE	Faynan	Tel Masos	Negev Highlands	Other
Iron I	12 <sup>th</sup> /11 <sup>th</sup> C.	Limited, opportunistic and technologically simple copper production, no structures, little pottery	Masos Str. III: fortress and structures, sophisticated bronze-working	First settlements in Negev Highlands (11 <sup>th</sup> C.)	Temporary interruption of Cypriot copper supply
Early Iron IIA	10 <sup>th</sup> C.	Industrial boom, sophisticated copper technology, monumental elite buildings Wadi Fidan 40 nomadic population unconnected to copper production	Masos Str. II: large-scale settlement, sophisticated bronze-working	Extensive settlement in Negev Highlands	Faynan copper exported to Mediterranean
Late Iron IIA	Late 10 <sup>th</sup> C.	Copper production sites at Khirbat al- Jariya and Khirbat al-Guwayba abandoned			Sheshonq I campaign (c. 925 BCE?)
	Early 9 <sup>th</sup> C.	All monumental buildings go out of use			Revival of Cypriot copper trade
	Late 9 <sup>th</sup> C.	End of copper production	End of Masos Str. II/I	Decline of settlement at Negev Highlands sites	

Negev Highlands, in particular some of the larger ‘fortress’ sites, which had buildings with entrances delineated with buttresses; some are smaller (Nahal Boqer:  $9.8 \times 9.8$  m., Nahal Avdat:  $9.9 \times 9.2$  m), while others are similar in size (Horvat Mesura:  $16.87 \times 10$  m., Atar Haroa:  $12 \times 8$  m) (Cohen and Cohen-Amin 2004, figs. 6, 9, 20, 33, and pp. 148-9). The ELRAP team also noted that the Atar Haroa building is almost identical, and both it and the Area R building went out of use by the mid-9<sup>th</sup> century BCE (Levy et al. 2014, 231-32; Shahack-Gross and Finkelstein 2008, 970; Boaretto, Finkelstein and Shahack-Gross 2010). The Area A gatehouse finds several parallels in the wider southern Levant. The ELRAP team concluded that it is one of the oldest four-chambered gatehouses in the region, with its closest parallels in the gates of Megiddo VA-IVB, ‘En Hazeva V, Tell en-Nasbeh and Tel Dan (inner gates) (Levy et al. 2014, 99-101). Beyond the debates on its dating,<sup>14</sup> it is clear that all these parallels come from urban sites or highly fortified locations established by southern Levantine sedentary polities, undermining any hypothetical ‘nomadic’ origin.

- Pottery imports: The most common imports at Khirbat an-Nahas were fine ware bowls, with petrographic analyses tracing its fabric to loess soil from the western Negev (Smith and Levy 2014, 410-11; Smith, Goren, and Levy 2014, 476).<sup>15</sup> Other imports include Cypro-Phoenician Black-on-Red juglets, with clay originating from Cyprus; Qurayyah ware from north-western Arabia; and rare or single ceramics originating in the Jerusalem area, the Syro-Lebanese coast and the Aegean (Smith and Levy 2014, 411-2; Smith, Goren and Levy 2014, 476-9). There is a clear shared pattern of pottery imports between Faynan and the western Negev, including northern Arabian Qurayyah pottery, which is present at Faynan, Tel Masos, ‘Ain el-Qudeirat, ‘En Hazeva, and Har Romem (Tebes 2007; 2013, 74-81); and Cypro-Phoenician Black-on-Red pottery, which is present at Nahas, Tel Beersheba and ‘Ain el-Qudeirat (Brandfon 1984, figs. 24:7; 30:8-9; Bernick-Greenberg 2007, fig. 11.12, pls. 11.2:19; 11.11.11; 11.19.4).
- Pottery parallels: Many of the early Iron II pottery types at Faynan have parallels at contemporary sites in the western Negev, including variants in local fabrics of the imported fine ware bowls (Smith and Levy 2014, 410-11, 449-50). Many parallels appear from the Iron IIA strata of Tel Masos (Fritz and Kempinski 1983, taf. 147:3 [kraters]; 138:14; 140:12 [pithoi]; 135:9; 137:11; 139:6; 152:6 [jugs]; 139:10; 144:12; 148:4; 161:8 [juglets]).<sup>16</sup>
- Exports to the Negev Highlands from the copper districts of the Wadi Arabah: these consist primarily of the very common slag-tempered wares from Faynan (or, less likely, Timna), perhaps taken back to the Negev Highlands by local inhabitants who worked at Faynan or Timna as miners and smelters (Martin and Finkelstein 2013, 36- 9). Lead isotope analysis confirmed that the slag was likely a by-product of the contemporaneous smelting operations at Faynan (Yahalom-Mack et al. 2015).

This would also help explain the lack of permanent settlement sites in the Faynan copper district, if the workers came from the Negev Highlands, perhaps working in copper production seasonally and living in the temporary campsites cited above. Exports also consisted of bronze objects, such as the bronze chisel found at Horvat Haluqim in the Negev Highlands that, according to lead-isotope data, originated in the copper ore from Faynan (Bruins, Segal and van der Plicht 2018; Bruins 2022, 138).



- Chronological correlations: The peak of social and industrial complexity at Faynan was in the 10<sup>th</sup> and 9<sup>th</sup> centuries BCE. This coincides precisely with the extensive and short-lived early Iron II settlement wave in the western Negev, with several hundred sites of different types (Cohen and Cohen-Amin 2004). Recent radiocarbon dates from Horvat Haluqim (Bruins 2022, table 2), Atar Haroa (Boaretto, Finkelstein and Shahack-Gross 2010, table 1) and Nahal Boqer (Shahack-Gross et al. 2014, table 2) have pushed the end of these sites to around 800 BCE or slightly later. Tel Masos Stratum II, believed by the original excavators, Fritz and Kempinski (1983), to be an Iron I site, is now mostly dated to the Iron IIA, thus coinciding with the Negev Highlands sites and Faynan (Herzog and Singer-Avitz 2004, 222-6).

While Ben-Yosef accepts the connections between Faynan and the Negev Highlands, he thinks that Tel Masos cannot be related to the Faynan copper-production entity, on the basis that it goes against the ceramic evidence, and that Masos and the eastern Beersheba Valley are distinctly separate from the Arabah Valley and the Negev Highlands (Ben-Yosef 2019, 376). His ceramic argument is based on Ben-Dor Evian (2017, 20), that the characteristic pottery of the nomads, Negevite ware, common at Faynan, is rare at Masos. However, one complete Negevite vessel and several sherds were discovered at Masos Stratum II in Area F (Fritz 1983, 91, taf. 161:7; see also Tebes 2006, 102; 2013, 114), and, as noted above, there are plenty of other ceramic parallels between Tel Masos, the whole of the Beersheba Valley, and Faynan.<sup>17</sup> Moreover, Tel Masos Stratum II had remains of copper workshops, with evidence of processing unrefined copper ore: Houses 314 (Area H) and 96 (Area A) had copper remains, slag, crucibles, tools, smelting kilns and ash layers (Fritz and Wittstock 1983, 40-41; Kempinski et al. 1983, 21; see also Tebes 2013, 64-5). A large number of bronze objects were excavated at the site, many with high tin content, indicating a technically sophisticated bronze-working industry described as operating on a high technical level (Gottlieb 2010, 95; 2018, 439, fig. 30.3; Bachmann 1983, 199-200).

Finkelstein has long argued that the location of Tel Masos at the northern limit of the arid zones, bordering on the settled land, fits an interpretation as a gateway community for the Arabah copper trade (most recently, 2020, 17; also Tebes 2003), and the pattern of imports across Tel Masos and other western Negev sites and Khirbat an-Nahas demonstrates that this whole region was located at the crossroads of the trade routes between the Mediterranean and the Arabian Peninsula.<sup>18</sup>

- Both Faynan and the western Negev have imports from the Mediterranean coastal zone: Phoenician Bichrome pottery at Tel Masos and Tel Beersheba (Fritz and Kempinski 1983, pl. 146.1; Herzog and Singer-Avitz 2004, 215) and an ivory lion head at Tel Masos (Crüseman 1983), and Cypro-Phoenician Black-on-Red pottery at Tel Beersheba, 'Ain el-Qudeirat and Khirbat an-Nahas (see above).
- From Egypt there are scarabs at Tel Masos (Giveon and Kempinski 1983), Tel Beersheba (Giveon 1984) and Khirbat an-Nahas (Münger and Levy 2014).
- From northern Arabia there is Qurayyah ware at Tel Masos, 'Ain el-Qudeirat, Har Romem, and Khirbat an-Nahas (see above).

All of this points to a shared trade economy across Tel Masos, the Negev Highlands and Faynan. The evidence cited above reflects strong links between Faynan and the entire

western Negev, with imports going both ways, architectural and ceramic parallels, a mobile workforce travelling between the two areas, and exact contemporaneity of prosperity and decline – all together suggesting a shared economy and administration.

### ***The industrial transformation of Faynan in the 10<sup>th</sup> century BCE***

How does this evidence explain the industrial transformation of Faynan at the beginning of the 10<sup>th</sup> century BCE? We can address this question by following the chronological sequence and interrelation of contemporary events between the 12<sup>th</sup> and 10<sup>th</sup> centuries BCE (Table 4).

After a hiatus during the Middle Bronze Age and much of the Late Bronze Age, copper production at Faynan restarted in the 12<sup>th</sup> and 11<sup>th</sup> centuries BCE, probably linked to a demand for local copper as a result of a temporary breakdown in copper exports from Cyprus (Muhly 1991; Hauptmann 2007, 153).<sup>19</sup> In this period, the evidence shows that copper production at Faynan was at a small scale. The technologically simple production was not accompanied by any structures or settlement, and there was virtually no pottery, and no imports or other indications of external influence. Ben-Yosef (2010, 371) describes this phase of production as ‘opportunistically initiated’ by the local nomadic tribes of Faynan.

Yet, despite this limited production at Faynan, the lack of external contacts and influences, and the likely opportunistic nature of the enterprise, Faynan copper was being exported, certainly by the 11<sup>th</sup> century BCE – ingots made of Faynan copper were found in the Neve Yam shipwreck off the Carmel coast, dated to the Late Bronze Age/early Iron Age (Yahalom-Mack et al. 2014, 174), and Egyptian royal figurines made of Arabah copper (from either Faynan or Timna) date to the Twenty-first Dynasty in the late 11<sup>th</sup> century BCE (Vaelske, Bode and Loeben 2019; Ben-Dor Evian et al. 2021, 11). Clearly, there was already some sort of effective trade route in operation.

At exactly the same time, Tel Masos Stratum III, dated to Iron I/12<sup>th</sup>-11<sup>th</sup> centuries BCE (Herzog and Singer-Avitz 2004, 222-3), located on the route between Faynan and the Mediterranean coast, was developing into the first permanent settlement at the site, with several structures and a fortress or administrative building, following a ‘semi-nomadic’ phase of huts and tents (Fritz and Kempinski 1983). Although no copper workshops were excavated in Stratum III, there was already a sophisticated bronze-working industry, with 15 copper-based objects found, some with a very high tin content (Gottlieb 2010, 95). This suggests that Tel Masos Stratum III was already taking advantage of and prospering from the trade of copper from Faynan (and there are parallels with Tel Masos Stratum III in the pottery from Khirbat an-Nahas; Finkelstein and Singer-Avitz 2009, 209).<sup>20</sup> This is further indicated by the commencement of settlement in the Negev Highlands along the copper trade route, at ‘Ain el-Qudeirat and Nahal Elah, radiocarbon-dated to late Iron I/11<sup>th</sup> century BCE (Bruins and van der Plicht 2005, 352; Fantalkin and Finkelstein 2006, 21).

As discussed above, the 10<sup>th</sup>-century BCE industrial boom at Faynan, with its abrupt introduction of sophisticated copper technology at a vastly increased scale, monumental buildings, social hierarchy and sudden appearance of imports, should not be attributed to the local nomads, as the evidence shows that they were not actively involved in copper production at that time and were unconnected to the industrial developments. Ben-Yosef (2010, 370) admits that it demonstrates a different and more complex social

organisation of production. The evidence displays all the attributes of an external takeover of copper production, and points instead overwhelmingly to Tel Masos as the instigator of the industrial boom. Tel Masos Stratum III had prospered as a result of the nascent copper trade – at the expense of Faynan itself – and Tel Masos is the only possible candidate with the resources, technical skill of sophisticated copper working, an architectural tradition (that would explain the carefully planned construction of the buildings at Khirbat an-Nahas) and evidence of an administrative hierarchy<sup>21</sup> that could take direct control of copper production at Faynan and expand it exponentially, developing it as an industrial site in order to increase the copper trade. At this time, during the 10<sup>th</sup> century BCE, Masos Stratum II grew and prospered even further, with public buildings, copper workshops, and rich material culture and imports with parallels at Faynan. The nomads of the Negev Highlands became increasingly involved in the copper trade, leading to the early Iron II settlement wave in the Negev Highlands, with around 400 sites from seasonal encampments to larger and more permanent settlements, some with close architectural parallels to the structures at Khirbat an-Nahas (Cohen and Cohen-Amin 2004). The evidence cited above shows that they probably made up the bulk of the copper-production workforce, commuting between their homes in the Negev Highlands and Faynan – just as, centuries earlier, Early Bronze Age metal workers at Faynan had come from the Negev (MacDonald 2015; Haiman 1996).

There is an ongoing debate on the nature of the economy of the Negev Highlands sites. While for some, the Negev Highlands sites did engage in dry farming (e.g. Haiman 2003, 74; Bruins and van der Plicht 2005, 360; Bruins 2022, 135–6), others conclude that they did not practice cereal agriculture, which only emerged in the Late Roman–Early Byzantine period (e.g. Shahack-Gross and Finkelstein 2008; 2015; Shahack-Gross et al. 2014; Avni 2022). While it is not the purpose of this paper to address this point, in both scenarios nomadic pastoralism is seen as the most important subsistence activity of the local population, complemented by the Faynan copper trade. Ironically, it was the nomads who took part in the production and transport of the Faynan copper: not the nomads of Faynan, as suggested by Ben-Yosef (2019, 2021), but the nomads of the Negev.<sup>22</sup> The evidence of tooth analysis cited above leaves open the possibility that a few of the Faynan nomads may have been employed in the copper industry of the 10<sup>th</sup> and 9<sup>th</sup> centuries BCE – for example, in food provisioning, acquisition of fuel for smelters, or transport – but the majority were not, and pursued a pastoralist lifestyle unconnected to copper.

## 5. Summary and conclusions

The nomadic polity hypothesis proposes that local tribes in Faynan in the 10<sup>th</sup> and 9<sup>th</sup> centuries BCE created a hierarchical society with monumental, elite buildings, developed sophisticated, industrial-level copper technology and exerted control over the entire Arabah Valley, the Negev Highlands and the Edomite Plateau (Ben-Yosef 2019; 2021). Careful examination of the evidence shows that the hypothesis is not tenable (see also critique by Na’aman 2021, 15–7).

Between the 12<sup>th</sup> and 11<sup>th</sup> centuries BCE at Faynan, the evidence shows restricted, small-scale and technologically simple copper production, with no structures or production installations discovered, very little pottery, and no imports. At this stage, it seems that the copper was being opportunistically exploited by local nomadic groups.

This activity was contemporary with the development of Tel Masos Stratum III, on the route to the Mediterranean, with a fortress/administrative building, structures, and sophisticated bronze-working. It is likely that Tel Masos's prosperity at this time, and probably its very impetus for settlement, as well as the commencement of settlement in the Negev Highlands, were due to taking advantage of and prospering from the availability of Faynan copper, in response to a hiatus in the Cypriot copper trade.

At the beginning of the 10<sup>th</sup> century BCE, there was an abrupt and radical transformation of copper production and society in Faynan, characterised by an industrial boom with more sophisticated technology, expansion of copper working, complex organisation of production, and monumental elite buildings indicating a new social hierarchy, accompanied by huge amounts of pottery reflecting different approaches to cooking, dining and storage, and an influx of imports from the western Negev, Cyprus and Arabia. This sudden change should not be attributed to the local nomads. Evidence from the Wadi Fidan 40 cemetery – both material culture and chemical analysis of teeth – shows that most of its nomadic inhabitants were unconnected to the copper industry, although it cannot be excluded that a small minority were involved in broader support systems such as food or fuel procurement. Moreover, there is no evidence of a process of transition from nomadism to sedentarism at Khirbat an-Nahas, the central site in Faynan, and its architecture does not reflect any influence or antecedents in the archaeology of nomads, such as is known from elsewhere in the region. The same is true of the mortuary architecture: the tumuli graves found at Nahas, similar to those excavated at WF 40, were not related to the main phase of occupation of the site, rather belonging to post-collapse activities of the local pastoral population. Finally, the faunal assemblage recovered from Nahas reveals a subsistence economy not much different from that present in the contemporary northern Negev sites and very much unlike what is found at 'nomadic' sites.

Such an abrupt transformation points instead to an external takeover, and the evidence shows close material culture connections with the western Negev and the major site of Tel Masos. The scenario that best fits the evidence is that Masos, already prosperous from the copper trade in the 12<sup>th</sup> and 11<sup>th</sup> centuries BCE, and with sufficient resources and sophisticated technical knowledge of copper-working, took direct control of copper production at Faynan and developed it as an industrial site to exponentially increase the copper trade – Masos had the resources, technical skills, an architectural tradition, and connections to trade networks that the local nomads lacked and which were now brought in to transform Faynan. The result was the increased prosperity of Tel Masos Stratum II, with its public buildings, copper workshops and rich material culture. Along the trade route from Faynan in the Negev Highlands, hundreds of sites were settled by pastoralists who found employment both in production and transport in the burgeoning copper industry, and whose slag-tempered pottery and architectural parallels link them to Faynan.

The industrial transformation of Faynan, along with the settlement of Tel Masos and the Negev Highlands sites, was short-lived, and lasted little more than a hundred years. The rapid decline was probably the result of the revival of the Cypriot copper trade, which had begun in the late 10<sup>th</sup>/early 9<sup>th</sup> century BCE, and which was on a bigger scale and with more effective networks than the Arabah copper trade (Kassianidou 2013; Bienkowski 2023).<sup>23</sup> It is likely that demand for Faynan copper decreased, with a

consequent impact on its whole production and trade network and viability of settlement. One of us (PB) has previously suggested that at Faynan, from the late 10<sup>th</sup>/early 9<sup>th</sup> century BCE, there is a long process of regression, with reduction of administrative control, abandonment or re-use of the elite buildings, and abandonment of copper-production sites, and all copper production had ceased by the end of the 9<sup>th</sup> century BCE (Bienkowski 2022). This decline in evidence for administrative oversight is undoubtedly linked to the abandonment of the lead player, Tel Masos, in the mid-9<sup>th</sup> century BCE, while some activity at the Negev Highlands sites continued until the late 9<sup>th</sup> century BCE until the supply of copper from Faynan petered out (Finkelstein 2014, 98-9).

The prosperity and very existence of Faynan, Tel Masos and the Negev Highlands sites were interdependent and rooted in copper production and trade – and, like a house of cards, the whole precarious endeavour collapsed in the face of competition in a changing copper market. It would be a hundred years before the kingdom of Edom developed on the plateau, with different settlement patterns and an economy based on agriculture and the Arabian trade, not copper (Bienkowski 2022).

## Notes

1. Excavations at Khirbat an-Nahas actually commenced in 2002, but these were the final season of the Jabal Hamrat Fidan Project, directed by Russell Adams and Thomas Levy.
2. A preliminary version of this paper was presented by the authors at the American Society of Overseas Research 2022 Annual Meeting, Virtual Meeting (October 19–23 2022).
3. Slag was crushed in order to extract the remaining copper. Liss et al. (2020, 420) conclude that as a process it was only directly associated with the earliest occupation at Faynan, and was abandoned once smelting technology became more efficient.
4. Note that Area C was only a small probe into a slag mound.
5. There is inconsistency in the dating of Building 2 in Liss et al. 2020. In the text (p. 420), they state that it was constructed and initially occupied in the mid-11<sup>th</sup> century BCE. However, their Table 2 dates its initial phase (B2c) to the 10<sup>th</sup> century BCE (that is, contemporary with the first building phase at Khirbat an-Nahas), and makes it clear that no radiocarbon dates come from that initial phase.
6. Determining what is, or is not, ‘monumental’ is somewhat subjective, and despite their frequent use of this term in the final report, the ELRAP excavators nowhere defined what they meant by it. Ben-Yosef and Thomas (2023, 2), define it as “an extraordinary quality of physical construction typically associated with the expression of social and political power”.
7. Tebes (2022) has reassessed the archaeological and radiocarbon evidence from each area at Khirbat an-Nahas, and concluded that the structures in Areas F, M, T and W were constructed in the 10<sup>th</sup> century BCE, with the Areas A, R and S buildings constructed in the 9<sup>th</sup>, not the 10<sup>th</sup> century as suggested by the excavators. These redatings do not impact the main argument of the present paper, and for the sake of clarity, and to avoid confusion with a proliferation of alternative datings, the excavators’ original dates have been used throughout the paper.
8. Some of those tabulated, however, are even later, dating to the late Iron Age (Tebes 2022, table 9).
9. Some of the wealthiest graves were in fact those of children, leading to suggestions of ascribed status, inherited rank and perhaps competition between families (Beherec, Najjar and Levy 2014, 712–13), but this is not evidence of a hierarchy like that at Khirbat an-Nahas.
10. Eight cemeteries or graves with Iron Age pottery were also surveyed in the Wadi al-Jariya, five in the Wadi al-Guwayb, and nine in the Wadi Fidan (Beherec, Najjar and Levy 2014, 676).



11. The excavators also recorded similar circular structures in the western side of the Area A gatehouse, although these were reused by modern Bedouin and thus their date is uncertain (Levy et al. 2014, 205–6; figs. 2.199S, 2.200S).
12. In their conclusion, Beherec et al. (2016, 81) assert that high status women buried in the Wadi Fidan 40 cemetery were “actively engaged in copper production”, and imply a causal link between involvement in copper production and social status. This reads too much into one piece of evidence: the relatively rich Grave 92 was of a woman exposed to metal pollution as a young child, but such childhood exposure does not necessitate actual involvement in copper production, neither as a child and certainly not as an adult.
13. It is likely that the heavy flooding prevalent in Faynan carried away evidence of other temporary campsites (Ginat et al. 2018).
14. Based on the similarities in design, the excavators attempted to redate similar fortifications at Tall al-Khalayfi in southern Jordan and ‘En Hazeva in the northern Arabah to the Iron IIA period, a re-dating considered unacceptable on pottery considerations by Finkelstein and Singer-Avitz (2008, 17).
15. These are bowl types BL3a, BL15, BL16, BL24, and BL25. For the petrographic analyses, Smith and Levy (2014, 411) refer to Table 3.6 in Chapter 3, but no such table exists. Such analyses do appear in Tables 5.6 and 5.7 in Chapter 5 (i.e., Smith, Goren and Levy 2014). Here, however, only types BL25 and BL16 are described as made with ‘loess soil’.
16. Smith and Levy (2014, 307) lumped together all the BL3 triangular-section rim bowls into one big family “found at many sites in multiple strata spanning the entire Iron II in both Transjordan and Cisjordan from the ninth to sixth centuries BCE”. There are clearly subtypes that should be dated exclusively to the *early* Iron II or to the *late* Iron II. Among the former is a subfamily of small bowls with short black strokes on the rim (Tebes 2013, 101). Among the latter, there is *late* Iron II pottery which was wrongly dated to early Iron II, alongside other objects of late Iron II date (see Finkelstein and Singer-Avitz 2009, 209–11; Tebes 2022, 134, table 9; Bienkowski 2022, 127).
17. Ben-Dor Evian (2017, 20–24) notes that 45 per cent of the ceramic assemblage at ‘Ain el-Qudeirat (Kadesh Barnea) was Negevite ware, and argues that it was an important site on the southern route for transporting copper from Faynan.
18. The Beersheba Valley and the central Negev served as corridors for trade between east/south-east and west/north-west across the millennia, with Tel ‘Arad in the Early Bronze Age and Tel Beersheba in the late Iron Age operating as gateways in a manner similar to Tel Masos in the early Iron Age (e.g., Singer-Avitz 1999; Tebes 2003; 2013, 45–9; Erickson-Gini and Israel 2013; Finkelstein et al. 2018; Bar-Oz et al. 2022; Danielson 2023).
19. According to Kassianidou (2014, 266–7), Cypriot copper production was never interrupted, but in the 11<sup>th</sup> and 10<sup>th</sup> centuries BCE copper exports primarily went west to the Aegean and central Mediterranean rather than east.
20. Knauf-Belleri (1995, 112) suggested that, already in the 12<sup>th</sup>/11<sup>th</sup> centuries BCE, Tel Masos controlled the Faynan copper production, but the lack of evidence of external contacts at Faynan in that period points instead to local control.
21. The chiefdom of Tel Masos presented a clear administrative hierarchy, with differentiated architectural structures, social hierarchy and central storage. Tel Masos was the oldest, largest and most complex settlement in the Beersheba Valley, controlling smaller sites like Tel Beersheba, Tel ‘Arad, Nahal Yatir, and Tel Esdar (Tebes 2003, 68–9; 2013, 42–3).
22. Ben-Yosef (2019, 365) assumes that both Timna and Faynan were part of the nomadic polity controlling the entire Arabah Valley, which he identifies with early Edom. However, the early Iron Age evidence from Timna is very different and on a tiny scale compared with Faynan. There were no monumental, elite buildings at Timna, no evidence of a social hierarchy, and by the late 10<sup>th</sup>/9<sup>th</sup> century BCE there was just one smelting camp (Layer I at Site 30; Ben-Yosef et al. 2012, 52). Timna probably continued to be exploited by local nomads on a small scale until the 9<sup>th</sup> century BCE (much like Faynan in the 12<sup>th</sup>/11<sup>th</sup> centuries BCE) while Faynan was being developed into an industrial site linked to Tel Masos and the western Negev.

23. Another factor, admittedly difficult to judge, may be that the quality of Cypriot copper was preferred: for example, Faynan copper has one of the highest proportions of lead in the Eastern Mediterranean, whereas the lead content of Cypriot copper was very low (Hauptmann 2007, 201).

## Acknowledgments

The authors thank two anonymous reviewers for their extremely helpful comments and additional references, which we happily incorporated into the paper.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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