

8

Faynan and the Copper Trade During the Early Bronze Age of the Southern Levant

The purpose of this study has been to examine the development of copper metallurgy in the southern Levant during the Early Bronze Age, from the perspective of new evidence from the primary copper producing zone during this period, at Faynan in southern Jordan. In so doing it has sought to put this evidence within the broader framework of cultural developments within the southern Levant, to examine the transformations within this region during the period, and the factors which may have influenced the growth and changes in metallurgical production at this time.

The Early Bronze Age was a period during which major changes were taking place and which saw significant developments within virtually every aspect of society. These developments are also key to understanding changes within later Bronze and Iron Age cultures of the Levant, as the advances which can be traced to this period, set the pattern for all later developments.

Perhaps the single most important factor which influenced the direction of the Early Bronze Age southern Levant was the establishment of the ‘Mediterranean economy’, and the intensification of specialised horticulture. This factor, coupled with accumulating surpluses, the control and organisation of labour and the expansion of international contacts and trade provided the impetus towards the development of ‘urban’ populations and specialised production. These changes were also very important for both population growth during the period, and for the increased exploitation of virtually every environmental zone in the region at this time. As suggested above, the changes which occur also bring about for the first time

a reorganisation of the population into 'urban' and 'rural' segments of society, which likely created the divide between 'urban elites' and a 'rural peasantry'. This beginning of a differential between these elements of the population, resulted in an increasingly hierarchical society, which most likely played a significant role in the control of labour resources. Many of the new advancements during this period required increased control of labour, which included city defences, public buildings, and water control systems. This labour control was also an important aspect within the production of agricultural surpluses, which were then available for trade and redistribution within the economy, and which tended to reinforce the system, and make it cyclical with elites (political or religious) dominating agricultural production within society.

These factors are key to understanding the development of copper production in the later Early Bronze Age. In the same manner that the products of specialised horticulture, became important for maintaining surpluses for trade, so other crafts and industries supplied further highly valued and sought after products, as commodities, which could also be used in intra- and inter-regional trade. These specialised products included such items as ceramics and textiles, but probably the most important of them was copper.

The importance of copper in Early Bronze Age society should not be underestimated. It was during this period that copper became to be viewed as a valuable commodity on the basis of the material itself, as it provided a versatile medium which could be put to a variety of purposes, from manufacture of weapons, to production of tools (axes, saws, awls), and also for decorative purposes, of jewellery and ornamentation. The extreme versatility of copper, was no doubt quickly seized upon, since, once acquired, copper could be re-cycled and thus may have acted as one of the first permanent markers of value within society. As Marfoe (1987: 28) has pointed out, it was a 'durable, reputable, quality controllable resource...with a

degree of scarcity', and as such it was highly valued and allowed for accumulation of 'wealth' which could be put to a variety of purposes; in binding relationships, as a basis of trade, and as a means of restricting or re-distributing wealth within society. It is within this context that the development of copper production at Faynan should be viewed.

This study has demonstrated the changing nature of copper exploitation at Faynan, from its earliest record in the primary phase of the Early Bronze Age I, where the small indigenous village complex at Wadi Fidan 4 provided evidence of a low-scale, low intensity, dispersed, yet independent production within the confines of 'domestic' installations, to a more highly specialised level of production during the later Early Bronze Age, where production becomes a concentrated, large-scale, high-intensity system which most likely was the result of elite control of these attached specialists at Faynan. This trend towards intensification and more highly specialised production of copper began towards at the end of the Early Bronze Age I, and continued throughout the remainder of the Early Bronze Age II–III, as seen at the sites of Barqa el-Hatiye 1 and Khirbet Hamra Ifdan.

The evidence for the earliest phase of metallurgy at Wadi Fidan 4, indicates that the technology of copper production had not essentially changed from the earliest copper production methods of the Chalcolithic period. It shows similarities of production to that from sites of the Beersheva Basin where, within a comparable village setting, crucible based technology was used to smelt copper and manufacture objects. It is clear from evidence from the Beersheva Basin and elsewhere, that copper ore from Faynan had been traded or exploited from at least the developed phase of the Chalcolithic period onwards. The first indications of metallurgy within the mining zones, at Wadi Fidan 4 during the earliest phase of the Early Bronze Age I may, as Shalev (1994) has suggested, represent the first shift towards domination of these resources by a local population, and the beginning of the end of copper

smelting within the contexts of village settlements outside the mining zones.

At Wadi Fidan 4 there is substantial evidence for the indigenous aspect of the culture, as seen in the similarities of the pottery to the preceding Late Neolithic culture sequences in the region, and in the use of local wadi sands as the primary temper, which dominate the two main ceramic fabrics.

Within the confines of the village there is evidence of processing of copper ores, for smelting of copper to metal, but also for production of copper ore beads. The evidence for bead production is quite extensive and it has been suggested in this study that the production of both of these products likely reflects a degree of 'community specialisation' in exploiting the local copper deposits which were likely used as items of exchange, both for intra- and inter-regional trade. This is also supported by the evidence of shells, probably from the Gulf of Aqaba and Mediterranean, which may reflect trade in the opposite direction.

The evidence for copper production, on the basis of the crushed ores, slags and related metallurgical evidence, suggests a multi-stage production of copper metal. The actual processing of the ores, was done on a small scale with the use of crucibles which were heated from above, possibly by blowpipes.¹ The volume of copper produced however, would have been of an extremely limited quantity, and the investment of labour for the overall yield would have been very high.

The evidence for mining of copper comes primarily from the easily accessible copper carbonate deposits of the MBS geological formations, which were mined using open cast methods. The extremely limited exploitation of the lower DLS levels (also copper carbonates) at this time, is probably indicative of exposed deposits in wadi cuts, rather than deep mining activities, for which there is no evidence from this

1. The possibility of the use of blowpipes has been reviewed in Chapter 5. In summary, although there is no direct evidence for use of blowpipes (such as clay tips for reed pipes), the likelihood of them being used is suggested by the heating of the crucibles from above, which would required small directed injections of oxygen for maximum heat generation.

early phase of metallurgy.

In contrast to this limited production during the Early Bronze Age I, evidence from the Early Bronze Age II indicates a rapid expansion of production, and the introduction of several new technologies in exploitation of the copper deposits. One of the most striking features of this expansion is the development of deep shaft and gallery mines, used to exploit the copper in the DLS geological deposits. This development, suggests a significant investment of labour and extensive organisation which allowed access to significantly richer copper deposits, on a much larger scale. The extraction of the ores, however, would have been an extremely labour intensive activity, with the need to separate large amounts of copper from the tailings in the process of mining the ores. Much of the tailings were left in the mine, and used as backfill, but the volume of copper being mined indicates a significant injection of labour into copper mining at this time. Technologically, this development was significant, since several major problems regarding roof stability and ventilation had to be overcome, but the evidence suggests that these problems were resolved, and that extensive shaft and gallery mines were cut in the eastern Faynan region.

A further technological development for which there is evidence at Faynan is a completely new method of smelting, which utilised the natural draft and high winds of the region to fuel smelting furnaces located on the windward side of high hills. The bottoms of numerous furnaces discovered through survey and excavation provide clear evidence of the increased scale of the smelting activities which correspond well to the evidence of increased mining activities. The use of these furnaces would also have required significant labour in manufacture, in the constant provision of fuels, in the transportation of ores to the ovens, in the processing of the ores prior to smelting, as well as in the crushing of slags to remove copper after the smelting. This new smelting technology, although requiring significant labour in provision of ores and fuel, was comparatively less labour intensive in the smelting

process, since the thermodynamics of the oven suggest that the natural draft provided the energy to run these installations for extended periods at high temperatures. The increased volume of copper production using this technology was significant, and it is clear from the evidence that several ovens could be run in the same area simultaneously.

The evidence reviewed here indicates a major intensification of copper production at this time which, in utilising new technologies of mining and production, suggest major changes in the levels of consumption of copper within society, which reflect changing social patterns within the southern Levant and the neighbouring region of Egypt. Hauptmann's analysis of the changing scale of production at Faynan are of a shift from kilograms of copper produced during the Early Bronze Age I, to tons of copper produced in the later Early Bronze Age (Hauptmann *et al.* 1992, Chapter 4 this volume, note 1). Although both are surely an underestimate, the general trend of intensification is clear, and helps to underline the major changes in the scale of production taking place at this time.

The cultural evidence for the Faynan region at this time, as seen in the excavations at Barqa el-Hatiye 1, indicate that in contrast to the Early Bronze Age I, there is significant evidence of external connections between Faynan and the broader southern Levant. Evidence of changes in architectural styles and ceramic repertoires are a clear indication of these external connections, which suggest a very wide distribution of cultural influences. A preliminary analysis of the ceramic petrology of pottery from the site (Adams in prep.), indicates that connections were as far ranging as the central Judaeen Highlands, southwestern Palestine and the Negev region, and possibly as far as the borders of Lebanon. The appearance of these 'mainstream' ceramic styles at Faynan at this time, may suggest a permanent presence in this region of populations which have direct links to western Palestine. Whether this suggests that the indigenous population of the region was supplanted by a new

group, or whether the ceramic evidence suggests an assimilation into a broader Levantine cultural group, is not possible to answer on the current evidence. It is clear however, that the inhabitants of Barqa 1 were not simply an ‘expeditionary force’ sent to mine and produce copper, as the production of these new ceramic styles in both imported and obviously local fabrics, suggests a degree of permanency of occupation.

Of particular interest in the ceramics at Barqa 1, is the local fabric, and especially the coarse fraction. Due to the composition of the basement rock complexes in the area of Faynan, composed of various granites which have been fractured by specific volcanic episodes, the local wadis have a distinctive sand composition which includes quartz sands with high feldspar content (i.e. ‘arkosic’) and various basalts. This study has proposed that these ‘arkosic’ sands are likely the coarse fraction used in the so-called ‘arkosic’ pottery at the Early Bronze Age site of Arad in the Negev, rather than the more remote connections with the Sinai peninsula previously suggested. This relationship is further supported by the analytical work on copper from Arad, which Hauptmann (in press) suggests is of a Faynan origin. This relationship between Faynan and western Palestine in general and the city of Arad in particular, is a significant aspect to the development of copper production at this time. It has been suggested that the evidence indicates a relationship between these two areas during this period and an east–west trade of copper from the sources of Faynan into western Palestine. Although the question of the dominance of Arad (or indeed any other emerging polity) in this commerce can not be addressed on the current evidence, it seems likely that this site, the largest ‘urban’ site in western Palestine, did play some role in the distribution of copper, and may have acted as a ‘caravanserai’ on the east–west routes.

The endusers of the copper produced at Faynan during the later Early Bronze Age, can not at present be proven conclusively, but the available evidence suggests

that in addition to the increasing level of demand for copper amongst the developing 'urban' polities of western Palestine, perhaps the emerging Egyptian state provided the necessary large-scale enduser of copper. The changing patterns of consumption in Egypt, often in the form of conspicuous consumption by elites for burial and deposition, may have resulted in dramatic changes in demand for copper at this time and caused the increase in copper production at the beginning of the Early Bronze Age II.

The early evidence for trade with Egypt, which included copper as one of a number of items found in excavation of sites such as Maadi from at least the Chalcolithic period (Naqada I-IIa), suggest that the flow of goods in the direction of Egypt had a long history. Further evidence of rapidly increasing contact with Egypt during the Early Bronze Age Ia and early phase of the Early Bronze Age Ib (Naqada IIb—c1) indicate a growing trade relationship between Palestine and Egypt, which by the later Early Bronze Age I (Naqada III) is seen by extensive finds of Egyptian goods in southern Palestine and evidence of Palestinian olive oil and wine in late predynastic cemeteries, such as Abydos U.

The nature of this growing contact, which by the end of the Early Bronze Age I seems to have developed to a level of state sponsored trade by Egypt, is seen from Egyptian inscriptional evidence in the form of *serekhs* (see the detailed review in Chapter 6). Despite the abundance of evidence however, it is not possible to be sure of the nature of this trading contact, whether as simply state sponsored trade missions, trading stations within an Egyptian 'sphere of influence' or possibly even colonial domination through military means. All of these possibilities have been argued on various evidence, although no clear conclusions can be claimed. It seems likely however, that the first two are more likely than the last, since there is no clear evidence of a military style occupation of Palestine. Despite the uncertainty over the form this trade took, it is clear that commerce was undertaken on a very large scale,

and that the flow of goods was in both directions.

Evidence for the growing Egyptian demand for copper as a commodity can be seen by the increased number of copper finds in Egyptian tomb contexts. The finding of over 700 copper objects in the First Dynasty tomb of the Pharaoh Djer (Emery 1949) indicates the increased scale of consumption of copper by the elite components of Egyptian society at this time. This trend no doubt continued unabated, and may have been one of the reasons for the Egyptian expansion into southern Sinai under the pharaohs of Dynasty III, to control the closest copper (and turquoise) source.

If indeed Egypt was one of the primary markets for Faynan copper, the role of Arad as a factor in this trade is probable, as the site is located at a key position to control both the east–west flow of copper, and possibly also the flow of copper to the more northerly ‘urban’ polities of the Levant. Trade with Egypt would have been overland in a northwestern direction, across the Negev, to the coast, and then along the coast, ‘the way of Horus’, to the Pelusiac branch of the Nile River. This overland route, in the direct path of the majority of sites with indications for Egyptian–Canaanite interaction, seems on the basis of the archaeological evidence beyond dispute.

The continuation of this trade in copper to supply the increased level of Egyptian consumption, seems to have continued throughout the remainder of the Early Bronze Age II–III, and even into the period of ‘urban decline’ in Palestine during the Early Bronze Age IV. Although there is a significant decline in urban’ centres at the end of the Early Bronze Age III, and some centres, like Arad, go out of existence even earlier at the end of the Early Bronze Age II, the evidence from Faynan suggests a continued and sustained production of copper with no interruption due to the turmoil resulting from events in western Palestine. The collapse of Arad at this time could be argued as evidence for shifting patterns of control over the copper resources, and possibly even a shift to local control from the end of the Early Bronze Age II, since

it would be logical to assume that the decline of a major trade centre such as Arad, would cause some disruption in production. The clear evidence of continuity of production may suggest that by this period direct contact and trade with the endusers of copper had developed, and any hegemony which 'urban' polities of western Palestine may have had initially over the copper production at Faynan ceases or shifts to another more dominant power.

This trade in the late Early Bronze Age III and IV is clear from data from the site of Khirbet Hamra Ifdan, where extensive evidence of both the continuous production in the Early Bronze Age phases, and the terminal Early Bronze III structure on the site, indicate clear links with sites in the central Negev, which likely acted as trading stations on the now direct east–west copper trail to Egypt, and possibly also north to the Judaeian Highlands. The discovery of moulds for copper ingots at KHI and in the Barqa region attest to the extent of this trade, and the finding of the ingots in sites of the central Negev along two distinct trade routes, indicate their direct relationship with the production sites in Faynan. Further evidence of clear links in the pottery from the sites in the Negev and with the Faynan region, indicates a relationship between these two zones which may have been of a dependent nature. The continuation of these sites of the Negev to supply copper to Egypt until the end of the Early Bronze Age IV is suggested by the evidence.

The ultimate demise of the copper industry at Faynan, seems to have come not as a direct result of any political instability in the region, since the copper trade seems to earlier have weathered these events at the end of the Early Bronze Age III. Instead, the ultimate decline in copper production seems to have come about as a result of a new and most probably richer supply of copper to Egypt and the Near East from the emerging copper producing centres of Cyprus. Growing evidence for this trade is found in early Middle Cypriot contexts, and also in evidence from sites such as Mari on the Euphrates, which according to textual evidence was by 1900 BC, importing its

copper from Cyprus. The much richer sulphidic copper ore deposits of Cyprus, coupled with the ease of growing maritime transportation probably spelled the end of the trade of copper overland from Faynan to Egypt. The continued demand of copper in Egypt was therefore more easily filled by its own operations in the Sinai following the First Intermediate Period, as seen by the development of the temple at Serabit el-Khadim in the Wadi Magarah during the Twelfth Dynasty, and supplemented by maritime trade from Cyprus, possibly both directly and via the Lebanese littoral. To what degree the hostilities between Egyptians and Asiatics, clear from the end of the Old Kingdom onwards, may have played in this disruption and change in sources is difficult to say, but it seems likely that these hostilities were of an increasingly larger scale at this time, and perhaps the ultimate decline in commercial relations was the result of these conflicts.

Finally, the longevity of the copper production at Faynan and the trade of copper with Egypt from the Early Bronze Age I which lasted for nearly 1500 years through the Early Bronze Age, suggests a level of continuity over an extensive period which is lacking in evidence from this period in other parts of the southern Levant. It clearly supports the importance attached to copper during this formative period in the Levant, and the increasingly important role that metals played in cultural development.