Overturning Certainties in Near Eastern Archaeology

A Festschrift in Honor of K. Aslıhan Yener

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CHAPTER 4

The Metals Trade and Early Bronze Age Craft Production at Tell Tayinat

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Abstract

The Early Bronze Age witnessed the development of extensive long distance trade networks between the Anatolian highlands and the Syro-Mesopotamian lowlands, driven in part by the demands of increasingly urbanized lowland communities in search of the resources needed to sustain their expanding economies. The metals trade played a particularly formative role in this drive toward complexity. This paper will explore the evidence for Early Bronze Age metal production at Tayinat, strategically situated in the North Orontes Valley at the intersection between these two regions. The evidence points to Tayinat's emergence as an important center of metal refinement and specialized craft production.

Historical and archaeological evidence suggest that relations between the mineral-rich central Anatolian highlands and the agricultural societies of lowland northwest Syria played an important role in the cultural and economic growth of each region during the Early Bronze Age (3500–2000 BC). The development of long-distance trade networks was especially crucial in helping to facilitate interaction and the exchange of goods, peoples, and ideas. As argued by Yener in her seminal work, *The Domestication of Metals* (2000), this was also a transformative period in Anatolian metallurgical technology and production. The simple extractive technology that characterized the Chalcolithic period, with its various stages of production (from smelting of ore to casting of objects) occurring in proximity to the ore sources, evolved during the Early Bronze Age into a considerably more complex process of production and distribution involving multiple tiers or stages in the production process. This expanding metals trade was facilitated by technological innovations, most notably the

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alloying of metals to achieve specific physical properties better suited to the widening repertoire of tools and weapons increasingly sought by Early Bronze Age communities. Advances in the metals trade, not surprisingly, coincided closely with the rise of more complex political and economic powers in the later part of the third millennium, best exemplified by the Kingdom of Ebla, the first historically documented territorial state in northwest Syria.

Situated at a strategic intersection between these two regions, the Amik Ovası, or Amuq Plain, provides a particularly valuable glimpse into the evolving nature of this interregional interaction. Ongoing investigations, initiated as part of the Amuq Valley Regional Project (AVRP), and continuing with targeted excavations at the sister settlements of Tell Atchana (ancient Alalakh) and Tell Tayinat (known as Kunulua in the Iron Age), have demonstrated their complementary settlement histories as the royal cities for a succession of small regional kingdoms beginning in the mid- to late-third millennium BC and continuing through to the end of the Iron Age. These investigations indicate that Tayinat served as the central settlement in the region during the third millennium before settlement shifted to a new locale 800 m to the southeast to Tell Atchana at the end of the Early Bronze Age (terminal Amuq Phase J) when it gained ascendency as Alalakh, capital of the Kingdom of Mukish in the Middle and Late Bronze Ages (Woolley 1953). A second epochal shift then occurred, coinciding with the transition from the Late Bronze Age to the Early Iron Age, when Tayinat was resettled and became Kunulua, royal city of the Kingdom of Palistin/Walistin/Patina.

Excavations at Tayinat, in particular the renewed investigations of the Tayinat Archaeological Project (TAP), have begun to provide a wealth of artifactual evidence reflecting extensive interregional connections during the Early Bronze Age and its active participation in the expanding metals trade with highland central Anatolia. This paper will review the evidence at Tayinat obtained to date, with the aim of contributing to the broader discussion about the role of metallurgy in the development of long-distance trade networks during this period.

Historical Context

The Amuq Plain (Fig. 4.1), strategically situated at the junction between the Anatolian highlands, the Syro-Mesopotamian lowlands, and the eastern Mediterranean littoral, preserves some of the richest and most extensive archaeological remains in the entire Near East (Braidwood 1937; Yener *et al.* 2000; Yener 2005). Blessed with a wealth of natural resources, it provided a fertile

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environment for intensive agricultural, horticultural, and pastoral production, while the mineral-rich mountain ranges that surround the plain permitted ready access to critical raw materials, very likely accelerating the early development of complex social and economic life in the region in this period. Tell Tayinat and Tell Atchana are located together near the southern edge of the plain, at the point where the Orontes River enters from Syria and then flows west to the Mediterranean. The position of the twin mounds also placed them at the intersection of the principal north–south and east–west transit corridors transecting the region.

The rise of Ebla as a third millennium power raises important historical questions concerning the Amuq's political role in regional affairs. Our knowledge of the political and economic history of the third millennium in northwest Syria was changed forever with the discovery of a royal administrative archive in the Palace G complex at Ebla in the 1970s (Matthiae 1981). The archive, which documents approximately a 40–50 year time period prior to the destruction of the Palace G complex that likely transpired toward the end of the Early Bronze IVA (ca. 2500–2300 BC), represents the largest preserved collection of textual documents from the third millennium thus far found in northwest Syria. Detailed analysis of administrative documents preserved in the archive has begun to reveal a year-by-year political history of the final years of the Eblaite state (see in particular Archi and Biga 2003). These texts indicate that Ebla was ruled by a king (or *en*), and the operations of the royal palace were managed by a minister.

The epigraphic team studying the Ebla archive have also begun to link historical details preserved in these documents with an expanding inventory of toponyms, including settlements believed to have been located in the Amuq Plain (Archi 2006, 2008). Settlement data recovered by the Braidwood (1937) and AVRP surveys (Casana and Wilkinson 2005), meanwhile, suggest that the Amuq Plain was densely settled during the Early Bronze Age, and in particular EB IV, drawing this resource-rich region into the larger interconnected mosaic of regional polities that had emerged across the lowland plains of northern Mesopotamia and western Syria during the latter part of the third millennium (Welton 2012; see also Schwartz and Weiss 1992; Schwartz 1994; Weiss 1986; Wilkinson 1994, 2000; Casana 2003; Casana and Wilkinson 2005; Cooper 2006, 2010a, 2010b; Graff 2006; Ur 2010).

More specifically, the Ebla texts make reference to *A-la-la-ḫu*, which is identified as a dependency of Ebla, but administered by its own *ugula,* or superintending functionary (Archi 2006, 2008). The name *A-la-la-ḫu* bears obvious resemblance to Alalakh, the known name of Tell Atchana in the second millennium. Ironically, contra Woolley (1955), the archaeological sequence

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at Atchana does not indicate the existence of an extensive third millennium settlement (Williams and Hassert 1977–1978; Batiuk and Horowitz 2010; for the renewed investigations, see Yener 2005, 2010). Rather, the evidence indicates only an ephemeral phase corresponding to Amuq J, the terminal Early Bronze Age (EB IVB) horizon in the region. The archaeological evidence, moreover, appears to be corroborated by the textual record. Ur III texts, for example, mention both *Mu-ki-ish,* the later Middle Bronze Age name for the kingdom of *Alalakh*, and Ebla (Woolley 1955; Yener *et al.* 1996: 53–54; Yener *et al.* 2000). The emerging historical picture, though admittedly still fragmented and unclear, nevertheless suggests that Tayinat was the primary urban center in the Amuq Plain during the third millennium BC and most probably was the *A-la-la-ḫu* identified in the Palace G archive at Ebla.

The Ebla Economy

Ebla challenges our conventional assumptions about the economic development of Early Bronze Age cities, since its primary economic activity appears to have been commerce, not agriculture (Matthiae 1981: 179). The Palace G archive shows that the palace of Ebla had significant land holdings in the surrounding countryside and sufficient locally available agricultural resources to provide for its population while also supporting its other economic endeavors (Archi 1990). This economic stability enabled Ebla to build expansive commercial networks and achieve a sphere of influence that appears to have encompassed all of northern Syria, the northern Levant, and parts of southern Anatolia (Astour 1992; Archi 1993). The archival documents indicate these economic interests even extended into Mesopotamia, engaging with Kish, and as far east as Afghanistan (Pettinato 1981).

The nature of Ebla's control over, or relationship with, the regions and cities with which it traded remains a matter of dispute (Sollberger 1980; Archi 1982; Michalowski 1985; Astour 1988, 1992; Pettinato 1991). Diplomatic correspondence and economic texts preserved in the Palace G archive nevertheless suggest that commercial relations lay at the heart of Ebla's power and influence. These documents reveal the existence of an elaborate system of reciprocal exchange in which Ebla traders delivered finished metal and textile products to neighboring sovereign states and their rulers/families in exchange for "gifts" comprised primarily of precious metals, such as silver or gold (Archi 1985: 29; Schneider 1977: 24). However it came to be, Ebla's economic system was impressive and enabled it to accumulate considerable wealth, with staggering quantities of metal flowing into the city. Tablet TM.75.G.1841, for example,

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indicates that 8389 minas (10,486.25 lbs or 4790.12 kg) of silver were invested by Ebla over a three year period. A further 96 minas 56 shekels (121.36 lbs or 55 kg) of high purity gold, and 405 minas and 47 shekels (507.38 lbs or 26.02 kg) of lower quality gold was invested over a six year period (Pettinato 1981: 167–168; Archi 1982: 179–180).

The Palace G archive also indicates that Ebla allowed for a certain level of self-rule by local rulers, usually identified by the term *ugula*, within the territory it controlled (Archi 2006, 2008). The Ebla state was also organized into smaller territorial units that were governed by ministers, or viziers, who collected taxes from the towns and communities within their provincial unit. These taxes were paid in the form of livestock, textiles, or a variety of finished products including, most importantly, precious metals. These provincial taxes were called *mu-túm* or *mu-DU* (Archi 1985: 29–30), variously translated as "contribution" (Amadasi Guzzo 1988: 124), "delivery" (Archi 1982: 211), "tax" or "tribute" (Pettinato 1981: 188). They resulted in the accumulation of significant amounts of unworked silver and gold, and also copper and bronze weapons (with their value converted to silver), and provided the main source of Ebla's metal wealth.

Tablet TM.75.G.2286 (Waetzoldt 2001: Text 27) records the income from two of Ebla's 14 viziers/regional governors. Kun-Dami and Igriš-Halab together submitted a total of 3569 minas (4461.25 lbs or 2023.58 kg) of silver in ingot form, an additional 600 minas (750 lbs or 340.19 kg) in silver vessels, and another 4073 minas (5091.25 lbs or 2309.32 kg) of silver in various forms to the state as payment for the taxes from their territories. Gigi, another vizier, submitted 985 minas (1231.25 lbs or 558.49 kg) of silver and 1255 minas (1568.75 lbs or 711.57 kg) of gold in various forms to the state as *mu-túm* (Archi 1985: 29–30; Waetzoldt 2001). Metals acquired by the state were used as raw material for tools and weapons, but also as gifts for exchanges between states and even vassal cities. These gifts were known as *níg-ba*, and were often a way to acquire further gifts through a process of reciprocity (Archi 1985: 29).

Interestingly, the Palace G archive does not record the receipt of raw ores, nor are there any references to commercial activities involving the sources of the metals (Snow 2005: 157–161). This suggests that the production of finished products from roughly smelted material, primarily in the form of ingots produced at sources in the highlands, occurred in workshops at an intermediate stage prior to their shipment to Ebla. Archival documents support this hypothesis, inferring that the metals acquired by Ebla were pre-processed, although there are isolated references to what might be interpreted as "fusion loss", specifically the loss of metal weight as a result of refining (Pettinato 1979: Text 1867), indicating that some minor refining of copper or silver did occur. Ebla

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does not appear to have received tin as part of its metal consignments from *mu-túm*, which were restricted to gold, silver, copper, arsenical copper "master alloy" (specifically, *an-na*; probably to be understood as high levels of arsenic to be diluted in re-melting, rather than tin; see Snow 2005: 141–151), and already mixed tin-bronzes (*zabar*). As a result, it appears that Ebla's metal craftsmen could refine and re-melt copper, gold, silver, and alloy arsenical coppers, as well as re-melt and work ready-to-use bronzes, but they did not smelt metals, nor did they produce their own bronze by alloying copper and tin. Rather, Ebla appears to have depended on receiving processed metals from its vassal territories in the form of *mu-túm*.

EBA Metallurgy in the Amuq

The introduction of an intentional copper-tin alloy, and the production of tin bronze, marks an important metallurgical innovation in the early third millennium BC. As Yener was the first to observe (2009: 144–145; see also Lehner and Yener 2014: 544–545), the earliest recognized tin bronze products occur in the northeastern bend of the Mediterranean at lowland Early Bronze Age settlements in the Amuq and Cilicia, immediately south of the Taurus mountains. The Amanus mountains, which form the western boundary of the Amuq plain, are rich in gold, copper, and arsenic resources (Yener *et al.* 2000: 167). Whether these resources were exploited in antiquity has not yet been verified archaeologically. However, metal objects produced from arsenical coppers have been found in Late Chalcolithic (pre-Amuq G) contexts, and by mid-Amuq G, copper and tin smelting of raw ores appears to have been practiced based on the identification of crucible fragments with copper accretions found at Tell Judaidah (Braidwood *et al.* 1951: 88; Adriaens *et al.* 2002: 277). A series of pins, chisels (Braidwood and Braidwood 1960: 244–245, Fig. 185, nos. 3, 6; 296–298, Fig. 239, nos. 4–5; 373–379, Fig. 292, nos. 1–3, 5) and awls (Braidwood and Braidwood 1960: 244–245, Fig. 185, nos. 1–2; 296–298, Fig. 239, nos. 1–3, 8, 373–379; Fig. 292, no. 4) made of tin bronzes were also found in the same context.

Most importantly, a cache of six poly-metallic figurines made of tin bronze were recovered from a slightly later context at Tell Judaidah (Floor XIV-3 from Trench TT20) and securely dated to the terminal Phase G/early Phase H (Braidwood and Braidwood 1960: 260–262), not the later date attributed by others (see in particular, Seeden 1980; Marchetti 2000). Lead isotope analysis of the silver helmet of one of the figurines (see Fig. 4.2) indicated an ore source in the central Taurus for the silver (Yener *et al.* 1991). Noteworthy is the varied

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use of tin bronze and arsenical copper during this period (Braidwood *et al.* 1951: 91). During this initial phase of metallurgical production in the Amuq, tin bronze was restricted to cast objects, while arsenical copper continued to be used for forged implements. This pattern suggests a sophisticated understanding of the metallurgical properties of the two alloyed metals, with the more fluid properties of tin bronze in its molten state permitting a less porous final product, while arsenical copper, with its better recrystallizing characteristics, was important for forging (Snow 2005: 208).

Braidwood also conducted a series of deep soundings at Tell Tayinat in conjunction with the Syrian-Hittite Expedition's large-scale excavations of the Iron Age settlement. These soundings reached Early Bronze Age levels in a number of areas on the upper mound, and produced at least eight metal implements, including chisels (Braidwood and Braidwood 1960: 420–422, Fig. 324, nos. 1–4), daggers (Braidwood and Braidwood 1960: 453–455, Fig. 351, no. 6), needles (Braidwood and Braidwood 1960: 420–422, Fig. 324, no. 7; 453–455, Fig. 351, no. 5), and a shaft-hole axe (Braidwood and Braidwood 1960: 453, Fig. 351, no. 9, pl. 52, no. 10) that were dated to the end of the third millennium BC, specifically EB IVA (Amuq I) and EB IVB (Amuq J). Braidwood's Tayinat excavations tantalizingly also produced a multi-faceted clay metal mould (Fig. 4.3), recovered from a Phase J context (Braidwood and Braidwood 1960: 450–452, Fig. 350, no. 1), suggesting that bronze casting was part of the metallurgical industry at Tayinat during this period as well.

After a hiatus of sixty years, archaeological investigations were resumed at Tell Tayinat in 1999 by the University of Toronto's Tayinat Archaeological Project (TAP). The TAP investigations focused initially on a systematic surface collection and topographic survey (see further in Batiuk *et al.* 2005). Targeted excavations were initiated in 2004, expanding to full-scale excavations in 2005, and have continued on an annual basis since (for yearly reports, see Harrison 2007; Harrison and Batiuk 2010; Harrison *et al.* 2006, 2008, 2009, 2011, 2012, 2013, 2014). Early Bronze Age remains (either residual or *in situ*) have been uncovered in each excavation field opened on the upper mound (see Fig. 4.4), providing evidence that the third millennium settlement was at least 20 ha in size. Coring undertaken in the as yet unexcavated lower settlement has identified over 7 m of Early Bronze Age occupation, suggesting a long and likely continuous occupation throughout the period. Moreover, excavations in Field 1 (see Fig. 4.5) thus far have exposed almost 300 sq m of a large complex preserved in three discrete architectural phases that date to the terminal phase of Amuq I (i.e., EB IVA, and co-terminus with Mardikh IIB1, the Palace G phase at Ebla) and Amuq J (or EB IVB; for a more detailed presentation of the results of these excavations, see Welton *et al.* 2011; Welton 2012, 2014).

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The evidence for tin bronze production at Tayinat has been further reinforced by the results of the TAP excavations. Metallurgical material has been identified in two adjacent areas (Squares G4.55 and G4.65; see Fig. 4.5) but in stratigraphically separate contexts, specifically Field Phases 7 and 8, both dated to Amuq Phase J, or EB IVB. These include almost fifty percent of one ceramic tuyère fragment (SA 7288) measuring approximately 6 x 4.5 x 2.7 cm with a singular bore 1.3 cm in diameter from Field Phase 7, and fragments from two additional tuyères (SA 5538 and SA 4753) from Field Phase 8. A series of crucible fragments with slag accumulations (SA 7109 and SA 7149) and metallic slag (SA 7964 and SA 6918) have also been recovered from Field Phase 7 contexts. Although this metallurgical material dates to post-Ebla Palace G EB IVB levels, the cumulative evidence from the two expeditions indicates a long history of metallurgical processing in the Amuq, and more especially at Tayinat, including the smelting and alloying of metals, and the casting and forging of metal objects.

Metal Refinement and EBA Craft Production at Tell Tayinat

The archaeological evidence for interaction between highland central Anatolia and lowland northwest Syria during the third millennium BC is surprisingly limited. There is nevertheless unequivocal evidence that contact and trade between the two regions was both active and far ranging, and increased in volume in the latter part of the millennium (for documentation, see Kontani 1995; but see now also Welton 2014: 364). As Marfoe noted in a prescient paper (1987), this increased contact coincided with the emergence of large urban communities in the lowlands and a corresponding growth in demand for raw materials, most importantly the mineral wealth that existed in the central Anatolian highlands. Yener's identification of Tauride tin sources at Kestel and Bolkardağ, and now also Hısarcık near Kayseri (Yener *et al.* 1991; Yener 2009: 144–145), and tin processing at the EBA mining village of Göltepe (Yener 2000), has documented the key source extraction zone, while her analysis of lead isotope signatures in metal finds from lowland settlements has sourced these finished products to the central Taurus (summarized in Yener 2009: 144–145; Lehner and Yener 2014: 544–547).

The Palace G archive, meanwhile, highlights the central role the metal trade played in Ebla's economy and her rise to power. Yet, intriguingly, the textual evidence suggests that Ebla was not in the market for raw ores, nor engaged directly in smelting and the production of finished metal products. As we have seen, the source of Ebla's metal wealth appears to have come from the territories

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under its control, specifically in the form of refined copper, copper-arsenic, and gold and silver products primarily as part of the *mu-túm* tax obligations of these dependencies. The metal workers and workshops engaged in the production and refinement of finished metal products, in other words, were not situated at Ebla under its direct control, but rather were distributed throughout these vassal polities and dependencies. Moreover, they appear to have had independent access to the necessary metal resources through their own networks and spheres of circulation, such that even small municipalities could pay their taxes to Ebla in the form of finished metals (cf. Archi 1985).

Evidence of the extent of this metal-based economy is furnished by the rich collection of metallurgical finds distributed throughout EBA settlements in the Amuq (Batiuk and Harrison 2001). Even more importantly, as we have seen, there is compelling physical evidence that the Amuq, and Tell Tayinat specifically, was actively engaged in the smelting and alloying of metals to make tin bronze, and therefore likely had become a center for the refinement and production of finished bronze metal products. The lack of local tin sources in the Amuq Plain, meanwhile, would have necessitated access to sources further afield, almost certainly the central Taurus Mountains, as indeed the Tauride source for the silver utilized in the helmet of the Judaidah figurine (cf. Yener *et al*. 1991) has concretely demonstrated.

Yener's specialized metallurgical settlement model (2000; Lehner and Yener 2014: 545) posits that a two-tiered system of metal processing centers emerged during the third millennium BC. The first tier, or stage of production, occurred in the immediate vicinity of the metal ore sources and involved the production of semi-processed metals, primarily in the form of ingots. In time, a second-tier of settlements, or workshops, involving the specialized production and refinement of metal tools and weapons emerged within the urbanized third millennium communities that sought these finished products. Urban centers in the Amuq, and in particular the central settlement at Tell Tayinat, would have been recipients of processed metals from highland mining communities such as Göltepe, although the lack of ceramic links between the Amuq and the western Tauride region suggests that Tayinat likely received its metal supply through an intermediary settlement in the network.

In any event, the archaeological evidence supports a robust metallurgical industry in the Amuq region during the third millennium with a particular emphasis on the specialized refinement and production of finished metal products. This specialized production involved the alloying of tin bronzes, possibly the purifying of silver, and the processing of local sources of gold and arsenical copper. Although an apparent dependency of Ebla during the EB IVA, Tell Tayinat, or *Alalahu*, administered by its own *ugula*, had nevertheless become an

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important center of metallurgical production by the end of the third millennium. Its reputation as a renowned center of craft production would come to define the Bronze and Iron Age communities that made their home in the surrounding plain.

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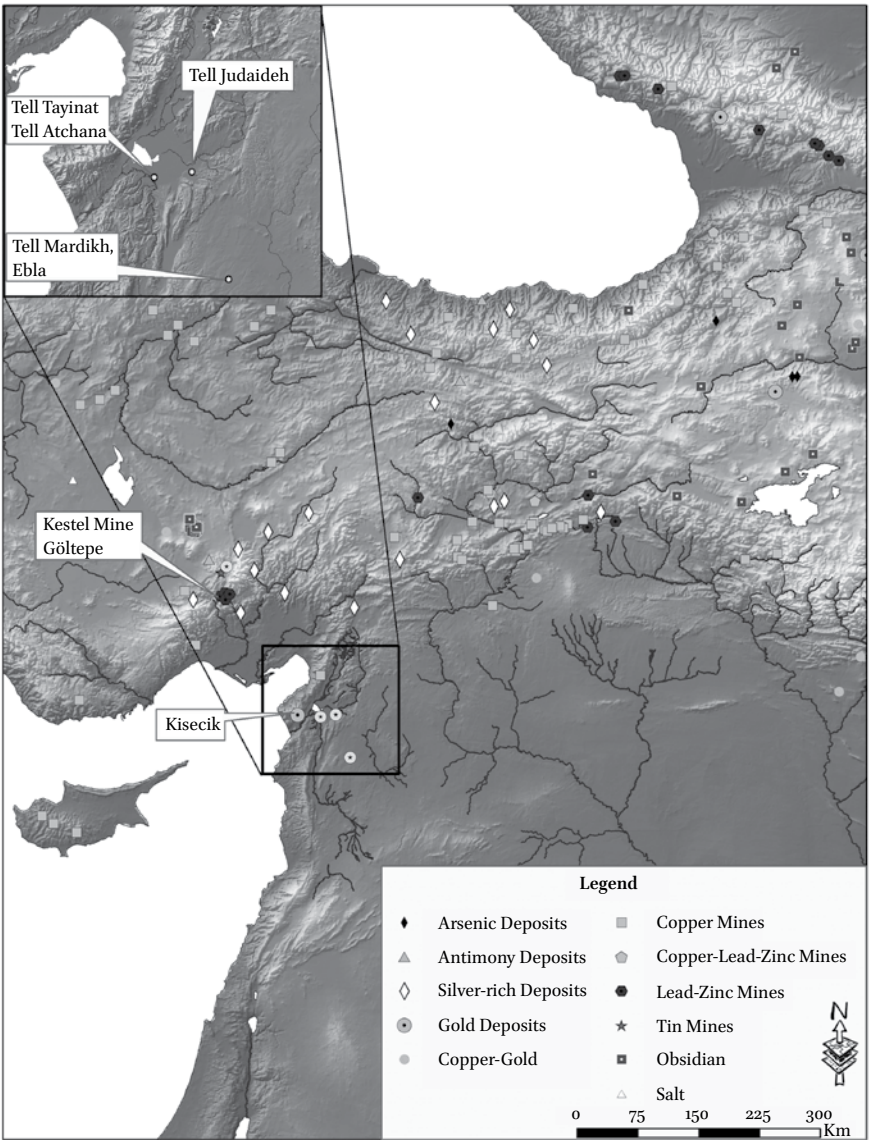

FIGURE 4.1 *Map of known ore sources and sites mentioned in the text. The Amuq Plain is the lowland area between and to the north of tells Atchana/Tayinat and Judaideh in the detail inset.*

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FIGURE 4.2 (*left*) *Phase G* (EB I) *Poly-metallic figurine uncovered in the excavations of Tell Judaidah* (*from Braidwood and Braidwood 1960: fig 241*); (*right*) *analysis of statue by Yener and Ercan Alp at Argonne National Laboratory, University of Chicago* (*in Steele 1998: 22*).

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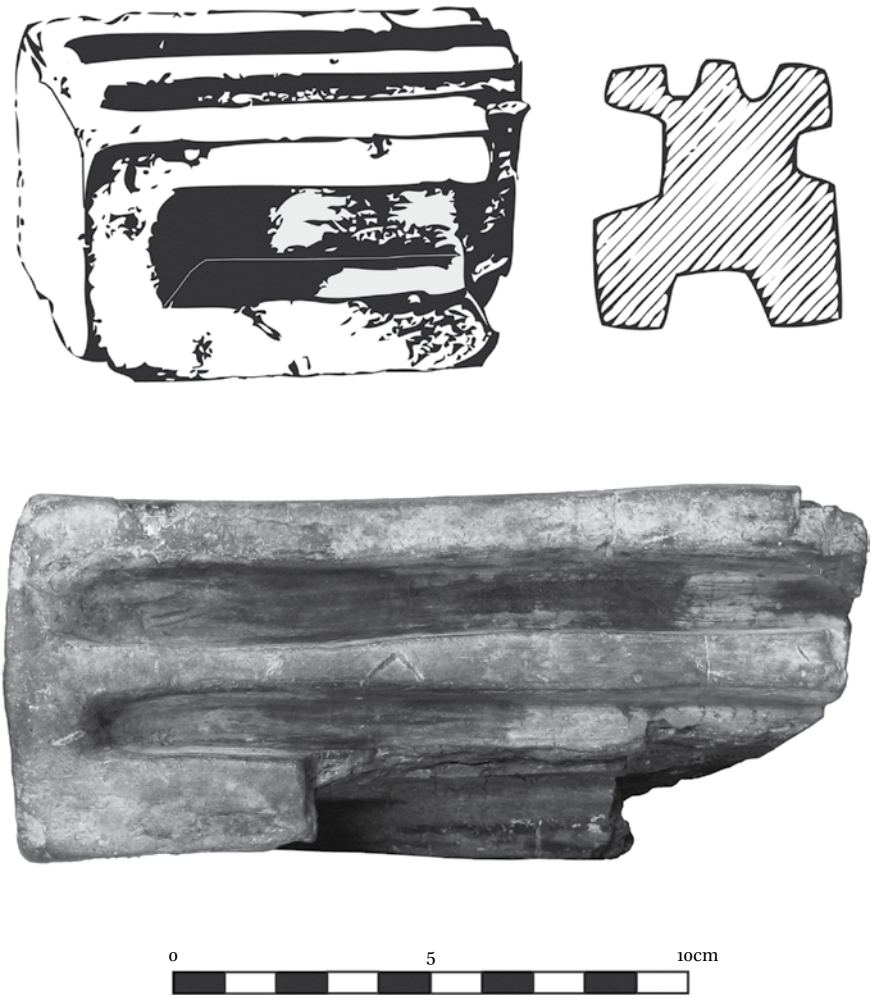

FIGURE 4.3 *Ceramic mold uncovered during the Syrian-Hittite excavations in T8 at Tell Tayinat (Braidwood and Braidwood 1960: fig. 350, no. 1).*

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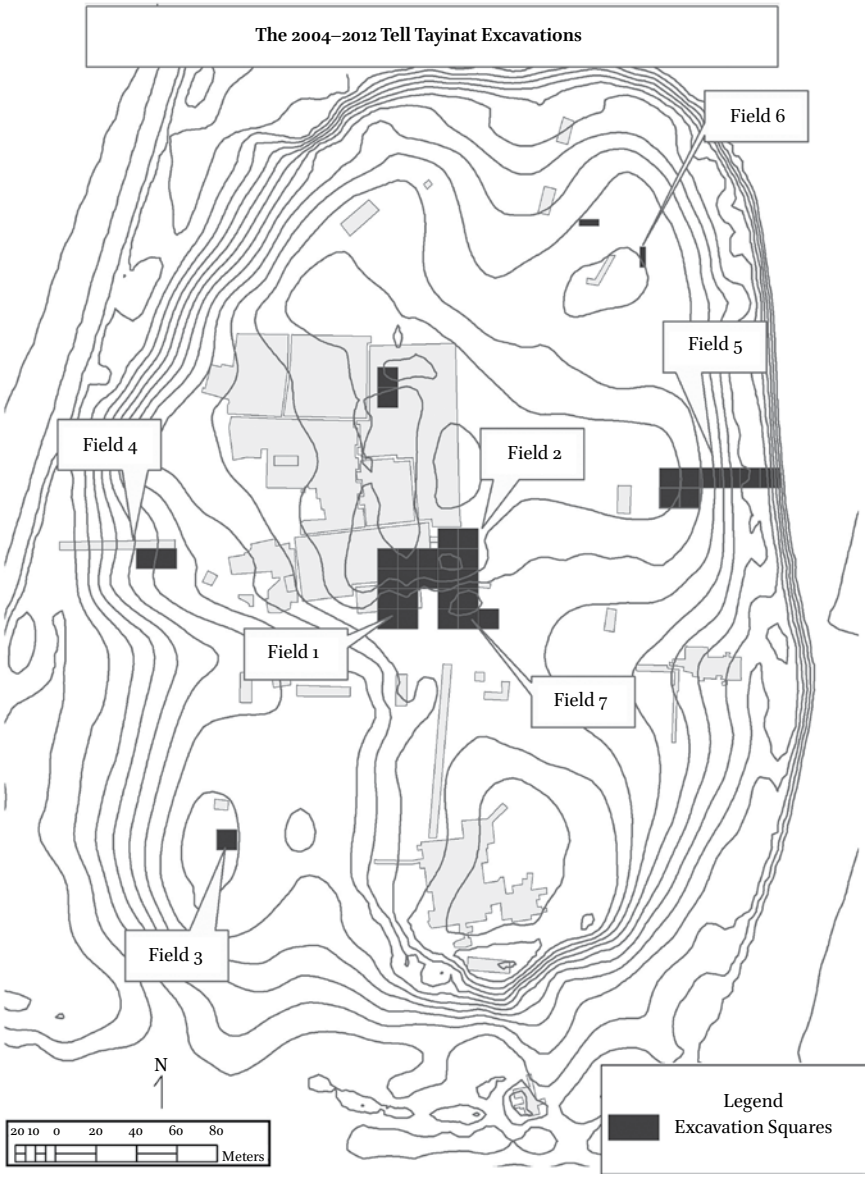

FIGURE 4.4 *Contour map of Tell Tayinat showing the TAP excavation areas.*

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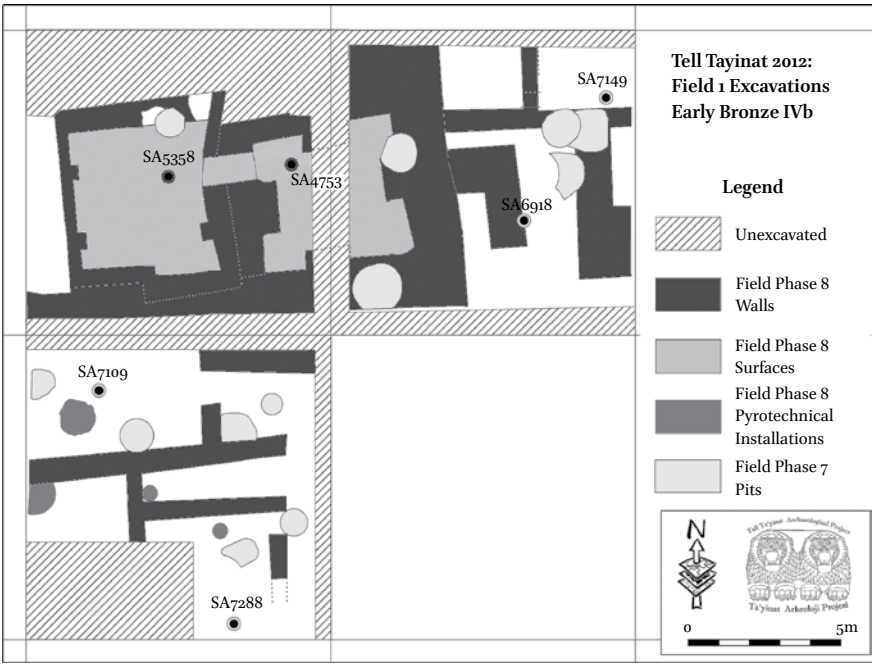

FIGURE 4.5 *Plan of Tell Tayinat Field 1 Early Bronze excavations, with find spots of the metallurgical remains.*

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