NEW EVIDENCE ON THE LATE BRONZE/IRON I TRANSITION AT MEGIDDO: IMPLICATIONS FOR THE END OF THE EGYPTIAN RULE AND THE APPEARANCE OF PHILISTINE POTTERY

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Abstract: *In this article, we present new evidence pertaining to the transition from the Late Bronze to the Iron I at Megiddo and analyse data from past excavations. Meticulous excavations of stratigraphic sequences in different parts of the site, accompanied by good control over ceramic typology and a rigorous programme of radiocarbon dating, enable observing minute developments in the history of the site. We shed light on the history of Megiddo in the later phases of the Late Bronze Age and early days of the Iron I, the end of the Egyptian rule and the appearance of Philistine pottery. All three issues have implications beyond Megiddo.*

Keywords: *Late Bronze, Iron I, Megiddo, 20th Dynasty, Philistine pottery, Egypt in Canaan*

The date and nature of the transition from the Late Bronze to the Iron I are central issues in the archaeology of the Levant, as they involve topics such as the withdrawal of New Kingdom Egypt from Canaan, the settlement of groups of Sea Peoples along the coast and the rise of Ancient Israel in the highlands. Megiddo has been a key site in the study of the first two of these topics. This is so because the site features a unique combination of finds: tight stratigraphy with significant assemblages of pottery for each layer (e. g., Arie 2006, 2013a, 2013b; Martin 2013); destruction at the end of the Late Bronze Age (Ussishkin 1995); 20th Dynasty Egyptian finds (Singer 1988–1989); Philistine bichrome pottery (Dothan 1982, 70–80); and a large set of radiocarbon determinations (Toffolo *et al.* 2014). Recent excavations in two areas at Megiddo provide new evidence on the stratigraphic relations, pottery and absolute dates of a dense system of Late Bronze II–III and Iron I layers and thus shed light on historical questions related to the transition between the two periods.

Preliminary Notes

A major question regarding the Late Bronze/Iron I transition is how to correlate the material finds with the major historical and cultural processes that took place in the late 2nd millennium BCE. According to one view (e. g., Ussishkin 1985; more below), the end of the Late Bronze Age should be assigned to the retreat of Egypt from Canaan in a later phase of the 20th Dynasty, probably in the days of Ramesses VI (1143–1136 BCE[1]). This subject is associated with the question of the settlement of groups of Sea Peoples, among them the Philistines, along the coast of the Levant. The chronology of this process has been debated. According to one group of scholars, the Philistines settled on the southern coast of Canaan immediately after their confrontation with Ramesses III, that is, c. 1175 BCE (Mazar 1985; Singer 1985; Stager 1995; Master, Stager and Yasur-Landau 2011). Other scholars asserted that the actual settlement of these groups (to differ from raids on the coasts of the Levant) occurred only after the withdrawal of Egypt from Canaan, that is, in the last third of the 12th century (Ussishkin 1985; Finkelstein 1995).

A related issue is the development of Philistine pottery. It is agreed by most researchers that the earliest forms include locally-made monochrome vessels, which derive in shape and decoration from Mycenaean IIIC:1b forms, and that bichrome vessels exist in the later phases of the Iron I. But the exact relationship between the two styles is uncertain. Most scholars see them in a stratigraphic-ceramic sequence – first monochrome-only, later gradually replaced by bichrome forms, with some

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[1] For the dates of Egyptian pharaohs, we follow Kitchen 2000 (for Ramesses III: 1184–1153 BCE, for Ramesses VI as per the text above). For a slightly earlier system, see Schneider 2010 (Ramesses III: 1195–1164; Ramesses VI: 1152–1144 BCE).

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overlap between the two; this is the basis for labelling the two families Philistine 1 and Philistine 2 (for instance, Dothan and Zukerman 2004). This scenario is not free of difficulties (e. g. Ben-Dor Evian 2017, 272–273).[2] We, therefore, prefer to use the terms monochrome and bichrome instead of Philistine 1 and Philistine 2.

In fixing the Late Bronze/Iron I transition, scholars also took into consideration the wave of settlement in the highlands west and east of the Jordan – settlements that eventually formed the core of the territorial kingdoms of the Iron Age. The beginning of the process was dated to the late 13th century or c. 1200 BCE, based on less-than-secure historical considerations, such as the Merneptah Stele's reference to a group named Israel in Canaan in his fifth regnal year (see recently Wiener 2014). Yet, so far, there is no direct evidence (radiocarbon determinations) for the absolute date of the commencement of this process.

Related to the question of the correlation of material finds with historical sources is the problem of nomenclature. Scholars used two different terms to deal with the period of the 20th Egyptian Dynasty's rule in Canaan: Iron IA (e. g., Mazar 1990) and Late Bronze III (Ussishkin 1985). We adhere to the latter, because we view the Egyptian rule in Canaan as the dominant characteristic of the Late Bronze Age, and as we see no reason to establish a sharp separation between the rule of the 19th and 20th Dynasties in Canaan. Apart from the geopolitical logic, this approach is advantageous because the date of the Egyptian pull-out from Canaan is not debated, to differ from the two other processes – the settlement of the Philistines along the southern coast and the beginning of the wave of settlement in the highlands. Obviously, though historically dictated, when we use the term Late Bronze III, we refer to the ceramic assemblage that characterises the last phase of Egyptian rule in Canaan.

Past Research

Most past information on the Late Bronze/Iron I transition at Megiddo was assembled by the team of the University of Chicago. We see no point in surveying the history of research in detail. Suffice is to summarise the evidence as viewed from the perspective of scholarship before our excavation of the relevant layers – Levels K-5 and K-6 in 2000–2004 and Levels H-11 and H-12 in 2010–2012.

1. Stratum VIIA is the final in a series of Late Bronze Age layers at Megiddo. It features the last monumental palace in Area AA (Loud 1948, 29, fig. 384). The next phase, marking the resumption of settlement activity, is the relatively poor Stratum VIB (for Area AA, see Loud 1948, fig. 385), dated to the early Iron I.
2. Monumental Temple 2048 in Area BB, functioned for centuries. The team of the University of Chicago affiliated its last phase of activity with Stratum VIIA (Loud 1948, 105, fig. 404). Yet, the pottery retrieved on the floor of the temple (Kenyon 1969, fig. 25) should be associated with Stratum VIA of the late Iron I (Mazar 1985, 97; Kempinski 1989, 77–83), meaning that the temple survived the collapse of the Late Bronze Age city.
3. The destruction of the Late Bronze Age city was partial; a thorough conflagration was mainly observed in the area of the palace (discussion in Finkelstein 2009; more below).
4. Many Late Bronze Age characteristics can be observed in the Iron I town, especially in the prosperous settlement of Stratum VIA, featuring the swan song of 2nd millennium material culture. Its complete devastation – more than the partial destruction of Stratum VIIA – marks the most dramatic turning point in the material culture of Megiddo and beyond during the Late Bronze and Iron Ages (Finkelstein 2003).
5. The city of Stratum VIIA features finds from the Egyptian 20th Dynasty (Singer 1988–1989). A base of a statue of Ramesses VI found in Area CC (Breasted 1948) provides the latest dated evidence for Egyptian presence at the site.
6. Scholars debated the appearance of Philistine bichrome pottery at Megiddo (no monochrome items had been known until 2000). According to Dothan (1982, 70–80) sherds belonging to this group appear in Stratum VIIA of the Late Bronze III. Mazar (1985) asserted that no such sherds were found in secure Stratum VIIA loci; therefore, he affiliated the sherds referred to by Dothan with Strata VIB and VIA of the Iron I.

[2] One of the authors (Finkelstein) will deal with this issue elsewhere.

The palace in Area AA

A major issue related to our discussion is the interpretation of the final years of the palace in Area AA. According to Loud, the palace suffered two destructions in the later years of the Late Bronze Age – one in Stratum VIIB (1948, 29), after which the edifice was rebuilt along very similar outlines, and one in Stratum VIIA (*ibid*., 33). It was the earlier of the two destructions, which Loud described as the more drastic event (*ibid*., 29). The destruction was mainly evident in central Courtyard 2041 and in shell-paved Room 3091 to its south, which were filled with masonry debris about a metre and a half deep.

Ussishkin (1995) interpreted the evidence differently. While conceding two building phases in the western wing of the palace, he argued that the remains in the central and northern sectors, assigned to Strata VIIB and VIIA respectively by Loud, in fact belong to one and the same building, which was erected in the time of Stratum VIIB and destroyed only once – at the end of Stratum VIIA. The lower walls, thicker and stone-built, formed the lower floor or basement of the edifice (Loud's VIIB), whereas, the upper walls on their top, brick-built and plastered (also painted), formed the main floor (Loud's VIIA). In a similar manner, Ussishkin assumed a single architectural phase for the eastern wing, with the floors built in Stratum VIIB and reused in VIIA. According to this reconstruction, the finds on the lower floors in the central and northern wings as well as the finds on the floors of the eastern wing should belong to the terminal phase of the palace (VIIA). In Ussishkin's scenario, the transition between Stratum VIIB and VIIA was peaceful.

There are, however, several problems with Ussishkin's reconstruction. If the central courtyard was indeed a large roofed hall, its prominent size would have required at least one row of pillars to support the roof (Mazar 2002, 264–265). The ceiling level of Ussishkin's lower floor (1.55–1.65 m) – i.e. the floor level of Loud's Stratum VIIB (Ussishkin 1995, fig. 6) – in central Space 2041 was barely high enough for a human to stand upright (Samet 2009, 82–83). It beggars the imagination to accept that such a low ceiling, in a palatial structure, would roof anything else than an auxiliary unit. However, downgrading the "lower floor" of Space 2041 to an auxiliary basement means ignoring the central function of this part of the palace altogether. Its prominence is clearly signalled by its sumptuous architectonic elements: shell-paved Room 3091 with its central water installation (Loud 1948, fig. 51), interpreted as an ablution chamber (*ibid*., 25) or a bathroom (Mazar 1997, 244), and two elaborate entrances with T-shaped Egyptian-type thresholds in the south-west and north-west of central Courtyard 2041 respectively. There can be little doubt, then, that this part of the palace was a focal room suite, probably related to royal receptions or ceremonies. It seems inescapable, therefore, to reconstruct a much higher ceiling for the central space, or (as Mazar) no ceiling at all. Finally, some of the pottery in loci that according to Ussishkin belong to Stratum VIIA can only be dated to the time of Stratum VIIB (Loud 1948, pls. 64: 1, 65: 15; for the dating of these types, see Martin 2013, 362–363, 379–383).

In sum, it seems that Ussishkin's amalgamation of Strata VIIB and VIIA in parts of the palace is untenable. We, therefore, propose that Loud's original reconstruction of two destructions of the palace at the end days of these layers should be retained (see also Mazar 2002; more below).[3]

[3] A word should be said about the rich collection of 41 vessels in Room 2131, just west of the city gate (Loud 1948, 165). Originally attributed to Stratum VIIB by Loud, this assemblage was reassigned to Stratum VIIA by Finkelstein and Zimhoni (2000, 234). This was based on the presence of S-profiled bowls (typical of Stratum VIIA), the absence of carinated bowls (absent in Stratum VIIA), and (accepting Ussishkin's paradigm of a single destruction) the notion that such a rich collection must belong to a destruction horizon. However, it has recently been shown that S-profiled bowls make their first appearance already in the time of Stratum VIIB (Martin 2013, fig. 10.20: 1). Carinated bowls are already very rare in Stratum VIIB (Martin 2013, 362–363), and their absence is no straightforward argument for a Stratum VIIA affiliation. Locus 2131 yielded a LH IIIA2/B flask (Loud 1948, pl. 67: 1; Leonard and Cline 1998, 7; Stockhammer 2011, 285). In the time of Stratum VIIA this vessel would have been an heirloom (cf. Mazar 2002, 265–268). The assemblage also includes three Egyptian-type household vessels (Loud 1948, pl. 65: 3, 19–20; Martin 2011, Types BL3a, JR6). In the southern Levant the production of these shapes ceased rather abruptly with the end of the Egyptian hegemony over Canaan. Adhering to a late end of Stratum VIIA in the palace area, half a century or more after the Egyptian retreat (below), these vessels would have to be heirlooms – an unlikely explanation for purely utilitarian forms. In sum, we suggest that Locus 2131 should remain in Stratum VIIB.

Another question concerns the appearance of Philistine bichrome sherds in the destruction of the Stratum VIIA palace. Only two Philistine sherds were suggested as belonging to this context: a body sherd from Locus E=2041 (meaning east of Locus 2041), assigned by the team of the University of Chicago to Strata VIII–VIIA, and a sherd form Locus E=2086 (east of 2086), assigned to Stratum VIIB (Dothan 1982, 75, pl. 17: 1–2). It is impossible to associate these sherds with a specific stratum with certainty. Still, considering that Philistine sherds cannot be expected in Stratum VIIB and that destruction debris separates Strata VIIA and VIB, the two sherds most likely originated from Stratum VIIA.[4]

New Evidence

We reached remains relevant for the Late Bronze III/Iron I transition mainly in our two stratigraphic trenches – Areas K and H (Fig. 1).

Area K

Area K is located on the edge of the mound, in the south-eastern sector. So far, 12 levels have been excavated, covering a sequence from the Iron IIB down to the Middle Bronze II. Twelve squares with remains of Levels K-8 and K-7 (LB IIB), K-6 (LB III) and K-5 (early Iron I) have been excavated. Throughout the periods of occupation, Area K is characterised by a large building which was probably part of a belt of houses constructed on the edge of the mound (Fig. 2). Levels K-6 to K-4 feature an open space to the west of the building, in the direction of the centre of the town; this was probably the situation also in Levels K-8 and K-7. In the periods discussed here the houses were of the courtyard type. There were no fortifications, but the houses seem to have created a continuous line along the periphery of the mound. These structures, and especially the spaces to their west, provide evidence for different types of crafts, such

Fig. 1 Aerial photograph of Megiddo, showing the location of Areas K and H and the Area AA palace excavated by the team of the University of Chicago in the 1930s

[4] We are refraining from re-evaluating the stratigraphic affiliation of Philistine sherds found in Areas BB, CC and DD at Megiddo (Dothan 1982, 74–76) due to the complexity of establishing a secure stratigraphic association of loci in these areas.

Fig. 2 Remains of Level K-6

Fig. 3 Assemblage of vessels from Level K-6

as copper production (Yahalom-Mack and Shalev 2006; Yahalom-Mack *et al.* 2017; Weiner *et al.* in press; for flint industry in the Iron I, see Gersht 2006; for olive oil production in the LB II and Iron I, see Martin in press b).

Levels K-8 and K-7 date to the Late Bronze IIB (Martin 2013). No destruction by fire was identified during these layers, but the relatively rich assemblage of pottery unearthed in Level K-8 testifies to a disturbance at its end (*ibid.*, 411).

Level K-6 dates to the Late Bronze III (Figs. 3–4; for the stratigraphy and architecture, see Arie and Nativ 2013; for the pottery, Arie 2013a). It ended in partial destruction, detected mainly in the north-eastern sector of the area. No Philistine sherds – not even a single fragment – were recovered from this layer.

Level K-5 (Gadot *et al.* 2006) dates to the early Iron I (for the pottery, see Arie 2006). The evidence is not sufficient to decide if the settlement recovered immediately after the partial destruction of Level K-6, or whether there was a short occupational gap before activity was resumed. The pottery assemblage of this level was limited (Arie 2006, figs. 13.51–13.52). Still, two sherds of a Philistine bichrome bowl were retrieved here. In addition, Level K-5 yielded an almost complete "Late Helladic IIIC-style" stirrup jar, locally made on the Acco plain (Yasur-Landau 2006, Fig. 5). This vessel can be described as belonging to the monochrome family (more below).

Level K-4 (Gadot *et al.* 2006) dates to the late Iron I (for the pottery, see Arie 2006). It ended in a major destruction event. The rich pottery assemblage included several Philistine bichrome items. Eleven sherds were petrographically analysed: five were imports from Philistia (three skyphoi, two strainer jugs), four were local to Megiddo (three skyphoi, one bowl), the origin of the remaining two was less clear (Martin 2017).

Area H

Area H is located on the edge of the mound in the north-western sector, in proximity to the Late Bronze and late Iron I palaces (Building 2072 for the latter) unearthed by the team of the University

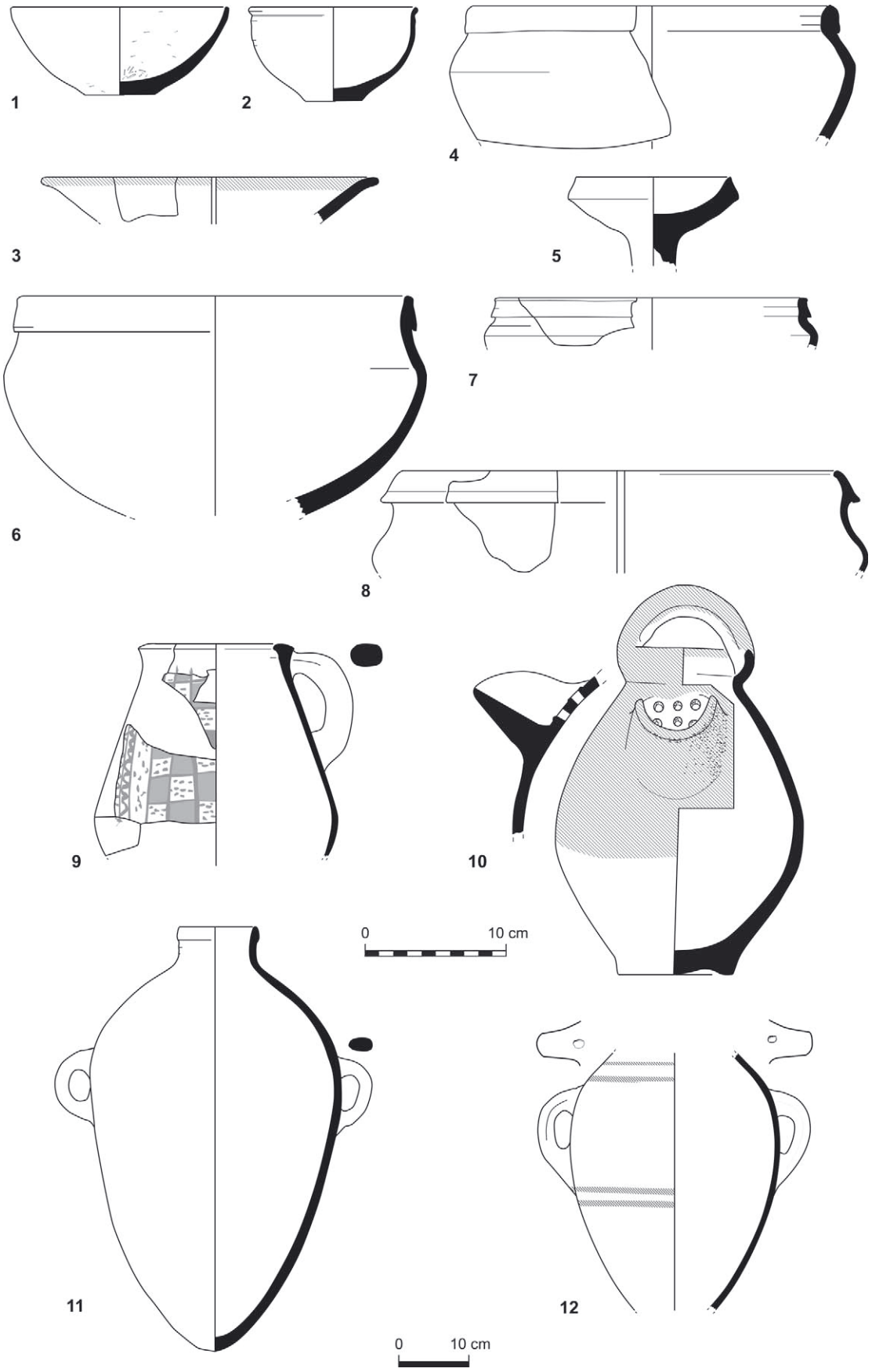

Fig. 4 Pottery of Level K-6

Table for Fig. 4: Pottery of Level K-6

No.	Reg. No.	Vessel type	Comments	Reference
1	04/K/43/VS1	Bowl	Buff clay	Arie 2013a, fig. 12.67:1
2	04/K/68/VS1	Bowl	Buff clay	*Ibid*., fig. 12.64:1
3	04/K/68/VS3	Bowl	Reddish brown clay	*Ibid*., fig. 12.64:3
4	02/K/76/VS1	Krater	Light brown clay	*Ibid*., fig. 12.62:4
5	04/K/43/VS2	Chalice	Reddish brown clay	*Ibid*., fig. 12.67:8
6	04/K/27/VS2	Cooking pot	Dark brown clay	*Ibid*., fig. 12.68:1
7	00/K/111/VS2	Cooking pot	Dark brown clay	*Ibid*., fig. 12.68:3
8	00/K/107/VS2	Cooking pot	Grayish brown clay	*Ibid*., fig. 12.61:2
9	04/K/19/VS6	Jug	Buff clay; red decoration	*Ibid*., fig. 12.62:6
10	04/K/44/VS1	Strainer jug	Reddish brown clay; red slip	*Ibid*., fig. 12.62:8
11	04/K/42/VS3	Storage jar	Light grey clay	*Ibid*., fig. 12.61:11
12	04/K/42/VS2	Storage jar	Light brown clay; red decoration	*Ibid*., fig. 12.61:12

Fig. 5 LH III-style (monochrome) stirrup-jar from Level K-5

of Chicago in Area AA. Indeed, for the periods discussed here it yielded evidence that the residents belonged to the more affluent sector of the society relative to the inhabitants of Area K (Sapir-Hen *et al.* 2015). Sixteen levels have been excavated so far, covering the period from the Iron IIC down to the Middle Bronze III. The relevant levels for the discussion here are H-13 to H-10. Seven squares with remains of Levels H-13 and H-12 and eight squares with remains of Levels H-11 and H-10 were excavated. The fact that the Area H trench is only two squares wide (to differ from three square-wide Area K) makes it difficult to decide on the architectural plan of the structures exposed. Still, here too the Late Bronze and Iron I layers may feature remains of courtyard houses. Of the four levels, only H-11 was destroyed by fire.

Level H-13 yielded a modest assemblage of sherds, which date to the Late Bronze IIB. The pottery included Mycenaean and Cypriot imports (Martin in press a).

Level H-12 features a mixture of Late Bronze III and early Iron I ceramic forms (Arie in press a). Indeed, a c. 70 cm thick layer of courtyard striations (Fig. 6), representing the raising of floors (Arie in press b), testify that it was long-lived. It seems, therefore, that the settlement represented by this layer had been established in the Late Bronze III and that it continued undisturbed into the early years of the Iron I. Eight Philistine sherds of the bichrome tradition were found in Level H-12 – the earliest such forms known at the site. (To repeat, no Philistine pottery was found in the strictly Late Bronze III Level K-6.) Petrographic study of seven of these sherds indicates that all were imports from the south – four from the southern coastal plain (three shallow angular bowls, one skyphos), two from the Shephelah or Samarian foothills (one bell-shaped krater, one strainer jug [?]) and one (skyphos) that probably originated from the Samarian-Judaean highlands (Martin 2017).

Level H-11 features the remains of a well-built structure, surrounded by three large courtyards (Arie in press b; Figs. 7–8). It was violently destroyed, with evidence of a thick accumulation of collapsed bricks and conflagration (Fig. 9). This is the only destroyed layer in Area H between the Late Bronze I (Level H-15, partial disturbance) and the late Iron I (Level H-9, total devastation). In other words, this is the only event that can be correlated with the destruction of the Stratum VIIA palace in Area AA, located only several metres away to the east. Another find that may hint at this

Fig. 6 Striations representing rising floor levels in Level H-12 and destruction debris of Level H-11

correlation is a rich jewellery hoard that was found hidden in one of the structure's rooms (Arie in press c). It is most logical that the hoard's owner was related to the palace system. The Level H-11 destruction yielded a large assemblage of intact and restored pottery vessels, which dates to the early Iron I (Arie in press a; Figs. 10–11). It includes two complete bichrome Philistine jugs, one found lying on the floor of a courtyard (10/H/92), while the other was uncovered in a thick debris of collapsed burnt bricks in Room 10/H/16 (Figs. 12–13). Nine additional Philistine sherds were affiliated with this level. Petrographic investigation of the material shows that, while the majority of the items were imported from Philistia (including the two complete jugs), northern products appear for the first time. Eight items were imported from the southern coastal plain (three skyphoi, one shallow angular bowl, four jugs), one from the Carmel coast (skyphos), one probably originated from the Judaean-Samarian highlands (skyphos) and one was locally produced at Megiddo (bell-shaped krater; for all this, see Martin 2017).[5] Comparison of the pottery assemblages from Levels H-12–H-10 and K-6–K-5 is complicated; still, it seems that the assemblage of Level K-5 better fits Level H-10 than H-11, while the assemblage of Level H-12 is closer to that of Level K-6 (but not similar – the chronological overlap between the two is partial). These observations are

Fig. 7 Aerial photograph of Area H, showing remains of Level H-11

[5] Two additional vessels were analysed: a skyphos from a less reliable locus (probably Level H-11) and a closed vessel (jug?), the Philistine inspiration of which is not entirely straightforward. The former was imported from the southern coastal plain; the latter is a local Megiddo product.

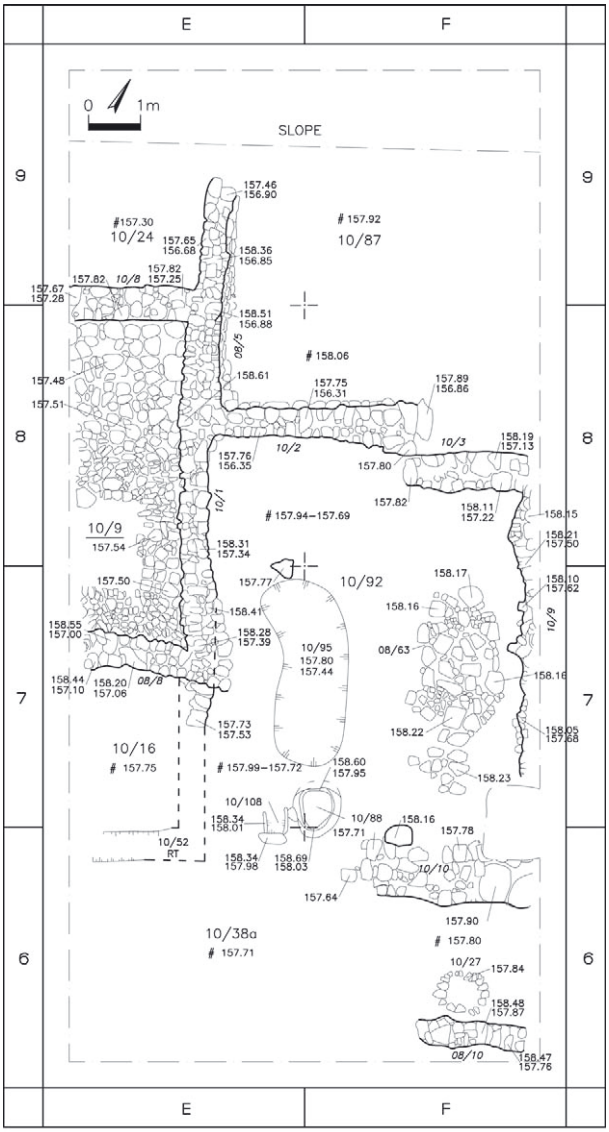

Fig. 8 Plan of the remains of Level H-11

based on several characteristics, such as the ratio of the types of cooking pots and the types of storage jar forms as well as the presence or absence of other types which are characteristic of either the Late Bronze III or early Iron I, e. g. cooking jug with low neck and flaring rim, carinated chalice with flaring rim and strainer jug with carinated body and basket handle (Arie in press a).

Level H-10 seems to feature part of a pillared house (Arie in press b). The pottery belongs to the early Iron I and includes two Philistine sherds (Arie in press a).

Level H-9 (Arie 2013b) dates to the late Iron I (Stratum VIA of the team of the University of Chicago). It ended in a devastating conflagration contemporary with that of Level K-4. The rich pottery assemblage (Arie 2006) included three Philistine sherds.

Radiocarbon Dating

The Areas K and H layers were subjected to an intensive radiocarbon dating programme. The transition dates between the layers are given in Tables 2–3. Two Bayesian analyses were administered: one on the entire set of Megiddo Late Bronze and Iron Age results (Toffolo *et al.* 2014) and the other specifically for the current paper, adding two new determinations (Boaretto in press) and taking into consideration only the relevant layers: K-8 to K-5 and H-13 to H-10.[6] Both analyses were performed using the OxCal program (Bronk Ramsey 1995, 2001, 2009), with the calibration curve of Reimer *et al.* (2013). Our procedure (for the latter model) – slightly different than

Fig. 9 South-west corner of Area H, destruction debris of Level H-11 in the baulk. Two Philistine jugs were found in the debris – similar to the vessel seen in the foreground

[6] The Level K-4 and H-9 dates were also included, in order to "seal" the model from below. Number of samples, for Area K: K-8 = 5; K-7 = 3; K-6 = 8; K-5 = 1; K-4 = 7. For Area H: H-13 = 3; H-12 = 7; H-11 =4; H-10 = 5; H-9 = 4.

Fig. 10 Assemblage of vessels from Level H-11

that of Toffolo *et al.* (2014) – is discussed in detail elsewhere (Finkelstein and Piasetzky 2010, 2015). Megiddo Levels K-8 to K-4 and H-13 to H-9 provided 47 dates (Table 1; more details on 45 of these samples can be found in Toffolo *et al.* 2014, tab. 3). From the full dataset we removed five dates (about 10%) which are inconsistent with the model (these are marked by the "strikethrough" utility in Table 1) and received a 72% agreement index of the model with the data (calculated by OxCal).

The data in Table 1 was inserted into the model shown in Fig. 14. The model was constructed with two parallel sequences, one for Area H and another for Area K. Layers which ended in destruction were constructed as two phases, one representing the duration of the phase and the other the destruction at the end. The two sequences were enforced to synchronise at the end of Levels K-4 and H-9, as the destruction of these layers must have taken place at the same time. No other constraints were enforced on the model. The ranges for the transitions between the layers are reported in Tables 2–3. They were given the broadest 68% calculation – between the early limit of the end of the phase before and the late limit of the beginning of the phase after (details in Finkelstein and Piasetzky 2010).

In general, the two models supplied close results. Differences between them are mainly in the beginning possibility for the first transitions in both Areas K and H, perhaps because the new model is not "closed" by data from earlier layers. Differences can also stem from the introduction of two new dates and the dictate that Levels H-9 and K-4 ended in the same event.

Differences between the areas may stem from the fact that each may feature a different settlement history (there is no reason to expect similarities in situations other than the total destruction of the site at the end of the late Iron I). Most obvious is the difference in the early Iron I, which is represented by a single layer in Area K, while in Area H it features at least three layers; also note that the single layer in Area K (K-5) is represented by a single sample, which may cause bias.

The most important result for the discussion in this paper is the difference between two of the destructions: according to the new model, Level K-6 came to an end no later than 1083 BCE, while Level H-11 was devastated no earlier than 1073 BCE (both 68.2% probability).[7] This means that the ceramic evidence and the radiocarbon results

Table for Fig. 11: Pottery from Level H-11

No.	Reg. No.	Vessel type	Comments	Reference
1	10/H/36/VS3	Bowl	Reddish clay	Arie in press a, fig. 59:1
2	08/H/80/VS1	Bowl	Buff clay; red decoration	*Ibid.*, fig. 68:2
3	10/H/36/VS2	Bowl	Whitish-gray clay	*Ibid.*, fig. 59:2
4	10/H/24/VS7	Krater	Reddish-brown clay	*Ibid.*, fig. 60:1
5	08/H/45/VS10	Chalice	Yellowish clay	*Ibid.*, fig. 61:4
6	08/H/45/VS13	Cooking pot	Dark reddish-brown clay	*Ibid.*, fig. 61:8
7	10/H/107/VS4	Cooking pot	Dark gray clay	*Ibid.*, fig. 65:4
8	10/H/107/VS3	Cooking pot	Dark grayish-brown clay	*Ibid.*, fig. 65:5
9	10/H/109/VS5	Cooking jug	Dark brown clay	Ibid., fig. 61:6
10	10/H/36/VS1	Strainer jug	Buff clay; jug containing jewellery hoard	*Ibid.*, fig. 59:5
11	10/H/9/VS1	Storage jar	Light brown clay	*Ibid.*, fig. 59:15
12	10/H/92/VS1	Storage jar	Buff clay	*Ibid.*, fig. 66:9

[7] A single sample, charcoal of an olive beam found between the courses of the Late Bronze Age gate near the palace of Area AA, provided an uncalibrated result of 2945±25, 1208–1120 BCE (68.2% probability; Carmi and Segal 2000), earlier than the date for the end of Level H-11. Yet, the beam represents the construction phase of the gate (or a certain renovation), rather than its destruction.

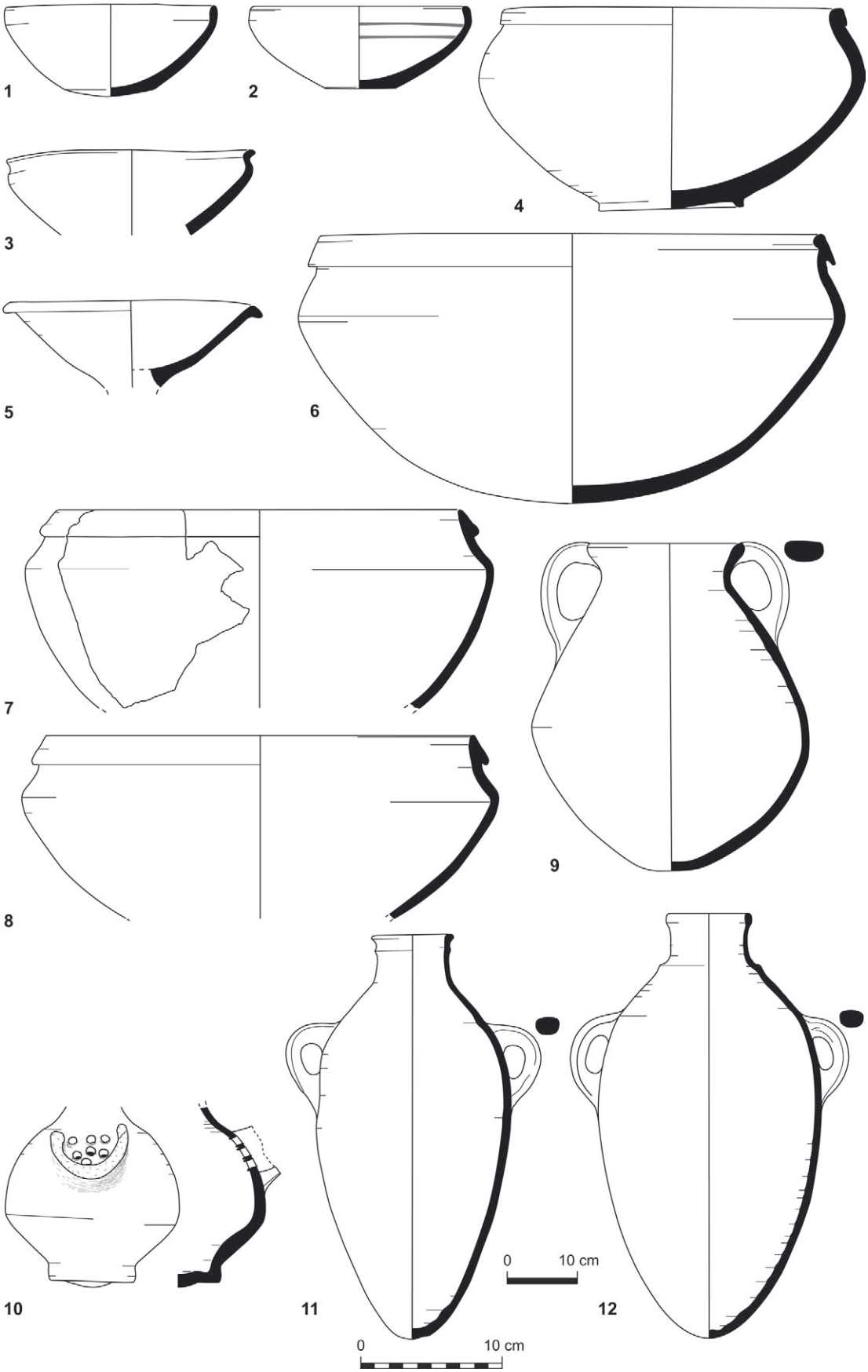

Fig. 11 Pottery from Level H-11

Table 1: Uncalibrated radiocarbon dates (all from short-lived samples) used in the new Bayesian model presented here, listed according to the stratigraphic sequence of each of the two areas. Determinations marked with the "strikethrough" utility have been excluded from the model (see text). Determinations marked with an asterisk are from a destruction at the end of the phase.

Level	Laboratory number	Uncalibrated date	From Destruction	Comments
H-13	RTK 6771	3000±45		
	RTK 8055	2935±22		Not in Toffolo *et al.* 2014
	~~RTK 6772~~	~~3170±40~~		
H-12	RTK 6282	2902±28		
	RTK 6283	2898±29		
	RTK 6762	2825±40		
	RTK 6763	2840±45		
	RTK 6768	2865±40		
	~~RTK 6769~~	~~2810±45~~		
	RTK 6770	2915±40		
H-11	RTK 6280	2920±31	*	
	RTK 6281	2886±28	*	
	RTK 6409	2871±29	*	
	RTK 6410	2925±28	*	
H-10	RTK 6275	2898±26		
	RTK 6276	2882±26		
	RTK 6277	2871±29		
	RTK 6278	2880±26		
	RTK 6279	2859±29		
H-9	RTK 6274	2866±30	*	
	RTT 5496	2837±16	*	
	RTT 5497	2835±16	*	
	RTK 6273	2881±26		
K-8	RTT 5501	2920±40		
	RTT 5502	2945±40		
	RTT 5503	2980±40		
	RTT 5882	2990±55		
	RTK 7660	2967±12		Not in Toffolo *et al.* 2014
K-7	RTT 5504	2935±40		
	RTT 5884	2980±50		
	~~RTT 5885~~	~~2835±50~~		
K-6	~~RTT 4501~~	~~2775±25~~	~~*~~	
	RTT 4499	2892±19	*	
	RTT 4500	2933±19	*	
	RTT 5080	2982±15	*	
	RTT 5081	2961±21	*	
	RTT 5082	2970±15	*	
	RTT 5083	2970±18		
	RTT 5883	2965±55	*	
K-5	RTT 5078	2894±15		
K-4	RTT 3945	2882±30		
	RTT 3946	2907±26		
	RTT 3939	2804±24	*	
	~~RTT 3940~~	~~2767±25~~	~~*~~	
	RTT 3942	2846±20	*	
	RTT 3943	2853±28	*	
	RTT 3944	2920±30	*	

Table for Fig. 12: The two Philistine jugs of Level H-11

No.	Reg. No.	Vessel type	Comments	Reference
1	10/H/16/VS6	Strainer jug	Light brown clay; light slip; red and black decoration	Arie in press a, fig. 62:1
2	08/H/77/VS1	Strainer jug	Reddish-brown clay; light slip; red and black decoration	*Ibid*., fig. 62:1

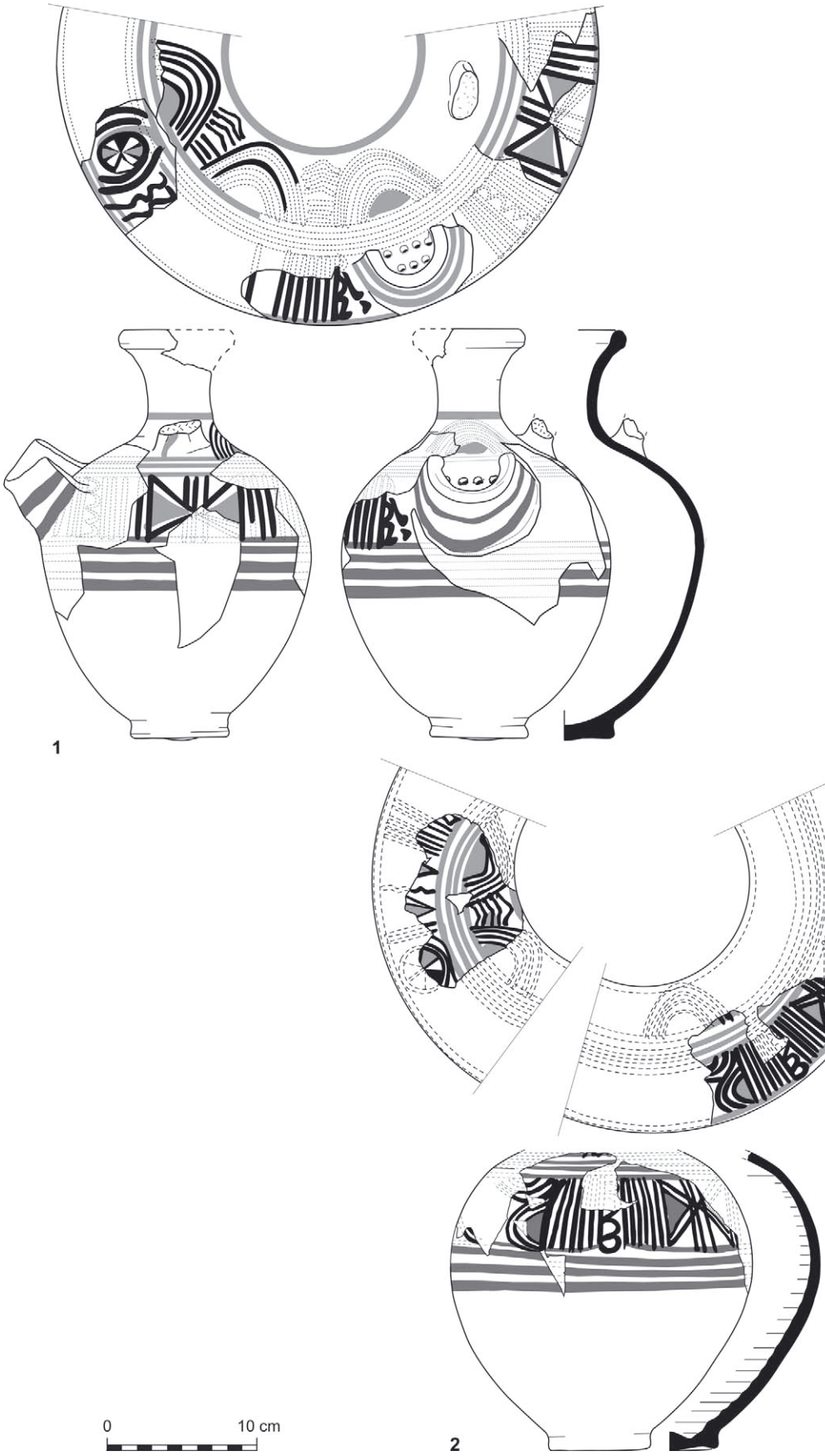

Fig. 12 The two Philistine jugs of Level H-11

Table 2: Megiddo absolute chronology, transitions between levels in Area K (68.2% probability).

Transition	Periods	Toffolo *et al.* 2014	Model for this article
K-8/K-7	LB IIB/LB IIB	1245–1170	1211–1161
K-7/K-6	LB IIB/LB III	1185–1135	1185–1136*
K-6/K-5	LB III/early Iron I	1135–1090**	1136–1083*
K-5/K-4	Early Iron I/late Iron I	1100–1060	1103–1031

* No date related to Rameses VI enforced on the model.

** A date no earlier than 1135 (because of the statue base of Ramses VI found at Megiddo) forced on the model; in fact, should be c. 1140–1090 if we force a date not earlier than a few years after his accession to the throne.

Table 3: Megiddo absolute chronology, transitions between levels in Area H (68.2% probability).

Transition	Periods	Toffolo *et al.* 2014	Model for this article
H-13/H-12	LB IIB-early [?] III /LB III	1125–1070	1146–1084
H-12/H-11	Within early Iron I	1095–1045	1108–1062
H-11/H-10	Within early Iron I	1060–1025	1073–1031
H-10/H-9	Early Iron I/late Iron I	1035–1010	1047–1011

Fig. 13 The two Philistine jugs of Level H-11

are in accordance, that is, Level K-6 features an LB III assemblage, while Level H-11 displays forms which are typical of the Iron I (more below).

Discussion

Summary of the Evidence, Old and New

- Level K-8 of the Late Bronze IIB ended in a disturbance, dated to the late 13th or early 12th century BCE.
- Level K-7, the pottery of which can still be defined as LB IIB, dates to the early 12th century BCE.
- Level K-6 of the Late Bronze III was destroyed in the late 12th or early 11th century BCE (and no later than 1083 BCE), probably before the appearance of Philistine pottery at Megiddo.
- Level K-5 of the early Iron I yielded a complete Mycenaean IIIC-inspired stirrup-jar made in the plain of Acco. This layer dates to the 11th century BCE.
- Level H-13 yielded a limited assemblage of sherds, which seem to date to the LB IIB. The model hints that it may have continued in the LB III.
- Level H-12 seems to have commenced in the LB III (that is, during the days of Level K-6),

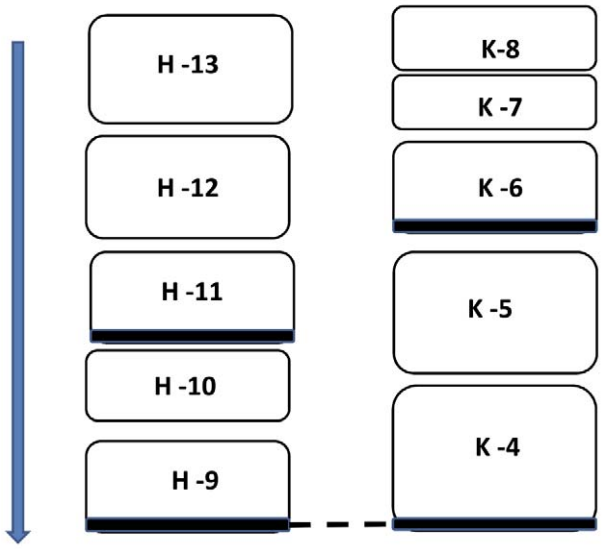

Fig. 14 The new Bayesian model discussed in this article. Destructions are marked in thick black lines. Time flow is shown by an arrow. The dashed line indicates a command imposed on the model that the destructions of Levels H-9 and K-4 represent one and the same event

and continued undisturbed into the early years of the Iron I. It dates to the late 12th and very early 11th centuries BCE. Philistine bichrome appears at Megiddo during its existence, probably in its later days.

- Level H-11 of the early Iron I dates within the first half of the 11th century. It was destroyed sometime in the middle decades of the 11th century, not earlier than 1073 BCE. It features two complete Philistine bichrome vessels.
- Level H-10 of the early Iron I dates to the middle-to-second half of the 11th century BCE.
- Levels K-4 and H-9 of the late Iron I commenced in the late 11th century (not necessarily together) and were destroyed in a single event, in the 985–935 BCE range (Toffolo *et al.* 2014).

These data have ramifications for the history of the palace in Area AA. As argued above, the palace displays evidence for two destructions: at the end of Stratum VIIB (Late Bronze IIB) and at the end of Stratum VIIA. The latter should probably be equated with the destruction of Level H-11 a few metres away, to the west. Dating the end of the Stratum VIIA palace in the early Iron I is supported by ceramic evidence. 1) a complete Iron I cooking jug with low neck, flaring rim and one handle (Arie 2006, 202; 2013a, 500) was found on the floor of Room 3061 (Loud 1948, pl. 67:14); 2) two Philistine sherds seem to have originated from the destruction debris.

Gradual deterioration of Late Bronze–early Iron I Megiddo

The data presented above imply a period of instability and gradual deterioration of Megiddo that lasted over a century, between the later phase of the Late Bronze IIB and the early days of the Iron I – ca. 1200 to the early decades of the 11th century BCE. Three disturbances/destructions have been detected. The first occurred at the end of Level K-8; the relatively large assemblage of restorable pottery from this layer hints at a certain turbulence. This can be correlated with the upheaval at the end of Stratum VIIB in the palace in Area AA. No evidence of this event has been detected in Area H. The date of this turbulence can be fixed at around 1200 BCE (for the pottery, see Martin 2013). Historically, this event can be associated with the period of instability in the transition from the 19th to 20th Dynasties. The city soon recovered and life continued peacefully for several decades (Levels K-7 and especially K-6), until the partial destruction of Level K-6 in the late 12th century BCE. This event may be connected to the withdrawal of Egypt from the area during the days of Ramesses VI or with events that took place immediately thereafter. The data presented in the University of Chicago reports is not sufficient for determining if the Level K-6 event affected other parts of the city (e. g., Area CC). This turmoil is not attested in the palace in Area AA and our nearby Area H, meaning that life in the palace continued without major interruptions. The final blow to Megiddo came a few decades later, in the middle of the 11th century BCE or slightly earlier, with the destruction of the palace of Stratum VIIA in Area AA and the nearby auxiliary structures in Area H. The fact that our meticulous work in Area K did not reveal evidence of a disturbance between the end of Level K-6 and the end of Level K-4 may indicate that the turmoil in the former (K-6) was succeeded by an occupational gap, meaning that Level K-5 was established after the demise of Level H-11.

All this indicates that the University of Chicago's Stratum VIIA commenced in the early days of the 20th Dynasty (a pen case bearing the name of Ramesses III was found in the destruction debris of the Stratum VIIA palace – Singer 1988–1989) and continued for about a century. In other words, it survived the withdrawal of Egypt, suffering only partial disturbance at that time (end of Level K-6). The broader and more important inference is that the decline of Megiddo in particular

and Late Bronze Age Canaan in general was probably a gradual, complex process, with the pull-out of Egypt having been part of broader circumstances in the Levant and beyond. A continuation of an LB III site after the withdrawal of Egypt is also hinted at by recently published radiocarbon determinations from Jaffa, which put the end of Phase RG-3a in the 1127–1098 BCE range (64.3 % probability; Burke *et al.* 2017, 123, fig. 35). Deteriorating climate conditions, which brought about droughts and famine, especially in the desert fringe of the Levant and in Anatolia in the 1250–1100 BCE time range, could have been the "prime mover" behind this process, bringing about a prolonged period of unrest, with the situation worsening toward the end of this period (Langgut, Finkelstein and Litt 2013).

Our data has a more general, methodological value: they indicate the possibility of a gradual decline of settlements in periods of crisis, usually difficult to detect archaeologically. It is not surprising that past excavations at Megiddo as well as recent excavations at other sites (in Philistia and beyond) did not reveal this complexity in the Late Bronze/Iron I transition; the new Megiddo evidence makes this observation possible because it provides detailed intra-site stratigraphic and ceramic data, accompanied by a large number of radiocarbon determinations.

Philistine Pottery: Megiddo and Beyond[8]

The new Megiddo evidence is related to the much-discussed issues of relative and absolute dating of Philistine pottery.

Regarding relative chronology, the new evidence supports Dothan's interpretation of the University of Chicago's data, according to which Philistine bichrome pottery appears at Megiddo during the days of Stratum VIIA (Dothan 1982; *contra* Mazar 1985). Megiddo does not shed light on the question of sequence of Philistine pottery in the south.[9]

As for the absolute chronology, our results show that Philistine bichrome pottery appears in the north in the late 12th or early 11th century BCE, and in any event, after the end of Level K-6, probably to be correlated with the consequences of the withdrawal of Egypt from Canaan. Petrographic investigations (Martin 2017) show that the earliest Philistine wares at Megiddo (Level H-12) were all imported from the south. One should, therefore, concede a short lapse of time between initial production and export.

Finds at several sites in the heartland of Philistia have recently been cited as shedding light on the date of the appearance of Philistine pottery. At Tell es-Safi, location of Philistine Gath, the advent of Philistine material culture has been placed "during the 13th century" (Asscher *et al.* 2015a, 847). This conclusion not only contradicts all that we know from both traditional research and all radiocarbon models; it is based on problematic stratigraphy, contexts and ceramic affiliations (Finkelstein 2016). In fact, similar to Lachish VI, Sera IX and Jaffa (for the latter more below), at Tell es-Safi the only area with a broad exposure of remains from the time of the 20th Egyptian Dynasty – Area E (Shai, Uziel and Maeir 2012) – did not yield even a single Philistine sherd (Gadot, Yasur-Landau and Uziel 2012).

At Qubur el-Walayda in the Nahal Besor area, the appearance of Philistine pottery (a single monochrome piece) was radiocarbon-dated to 1185–1140 BCE (Asscher *et al.* 2015b). Yet, the date of the relevant layer (1-5c) was reached by mathematical manipulation, with no samples for radiometric dating, not to mention that also at Qubur el-Walayda, the stratigraphic sequence and ceramic typology are far from being secure (Finkelstein 2016).

It has been argued that Ashkelon produced evidence for the appearance of Philistine monochrome during the rule of the 20th Dynasty. But the finds providing the ostensible testimony – a Ramesses III scarab found in Phase 20 of Grid 38 (Master, Stager and Yasur-Landau 2011, 274) – may be residual.[10]

At Jaffa, LB III Phase RG-3a, which was destroyed at the end decades of the 12th century, is free of any Philistine pottery. The excavators argued that the "absence of Philistine ceramics from Phases RG-3b or RG 3a … supports the traditional pattern of physical and temporal separation between 'Philistine' sites and Egyptian centres" (Burke *et al.* 2017, 127). We doubt the "physical" alternative. The only available uncontested

[8] The conclusions expressed in this section are only partially shared by one of us (Martin).

[9] The complete Mycenaean IIIC-inspired stirrup-jar found in Level K-5 together with Philistine sherd/s does not provide clear evidence because it may be labelled as an heirloom.

[10] The same holds true for the jar fragment stamped with the cartouche of Ramesses III, found under a Phase 19 floor.

evidence comes from six sites, where the LB III layers of the time of the 20th Dynasty, which were destroyed in the later part of the 12th century BCE, are devoid of any Philistine material. We refer to Lachish and Azekah in the Shephelah (for the latter see Webster et al. 2017), Tel Sera and Tell es-Safi (Area E, see above) in Philistia, Jaffa on the northern border of Philistia and Megiddo in the Jezreel Valley. We believe that this evidence calls for a reversal of the traditional view: Philistine monochrome and bichrome appear after the destruction of these sites, unless otherwise proven.

For now, the only solid evidence for the appearance of Philistine bichrome in Philistia comes from the radiocarbon dating of Beth-Shemesh 6 and Tel Miqne (Ekron) VI to the second half of the 11th century (Finkelstein and Piasetzky 2015; Boaretto, Sharon and Gilboa 2016; Piasetzky 2016). This creates an awkward c. half century "gap" between the heartland of Philistia and the Jezreel Valley, where bichrome appears no later than the beginning of the 11th century. At this point we have no remedy for this problem.[11]

Conclusion

The data presented in this article reveal that in the later phase of the Late Bronze IIB, Late Bronze III and early years of the Iron I Megiddo experienced three events of turbulence/destruction. The first, late in the Late Bronze IIB, has been observed in Level K-8 of the current excavations and in the contemporary Stratum VIIB of the University of Chicago excavations in the palace in Area AA. It had occurred c. 1200 BCE and can be associated with the weakening of Egyptian rule at the transition from the 19th to the 20th Dynasties. The second, detected in Level K-6 of the Late Bronze III, occurred in the late 12th century and may be associated with the consequences of the withdrawal of Egypt from Canaan. The final event – the destruction of Stratum VIIA in the palace and adjacent Level H-11 building – took place in the early Iron I, in the middle decades of the 11th century BCE. The Megiddo data indicates, then, that the withdrawal of Egypt from Canaan was part of a broader, longer and gradual process that lasted for over a century, possibly related to predicaments brought about by a period of dry climate in c. 1250–1100 BCE.

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[11] According to Finkelstein, at least part of this gap is related to the 'monochrome first, bichrome added somewhat later' paradigm; he will deal with this issue elsewhere.

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