TO DATE OR NOT TO DATE: RADIOCARBON AND THE ARRIVAL OF THE PHILISTINES

Israel Finkelstein, Tel Aviv University

Abstract: *Here I deal with two recent attempts to radiocarbon-date the transition from the Late Bronze to the Iron I and the arrival of the Philistines based on samples from Tell es-Safi/Gath and Qubur el-Walaydah. I first detail five conditions for constructing a proper radiocarbon model aimed at resolving a historical question, especially in the case of a dispute involving no more than a few decades. I then demonstrate that the situation in the relevant areas at Tell es-Safi/Gath and Qubur el-Walaydah – stratigraphy, contexts and control over ceramic typology – do not adhere to these conditions. Finally, I assemble and compare all available radiocarbon data for the Late Bronze IIB/III and the Late Bronze III/Iron I transitions and comment on two issues related to the traditional Philistine paradigm.*

Keywords: *Radiocarbon dating, Tell es-Safi/Gath, Qubur el-Walaydah, Late Bronze, Iron I, Late Bronze/Iron I transition, Philistine chronology, Philistine pottery*

Introduction

Two recent articles attempt to radiocarbon-date the transition from the Late Bronze to the Iron I and the arrival of the Philistines in southern Canaan. One focuses on the finds from the large urban center of Tell es-Safi/Gath (hereafter Tell es-Safi) in the Lower Shephelah (Asscher et al. 2015a) and the other treats the small rural settlement of Qubur el-Walaydah in the Besor region farther south, near Gaza (Asscher et al. 2015b). In what follows I wish to deal with questions of context, relative chronology and radiocarbon results, as well as historical implications related to these studies.[1]

To begin, though three researchers, including the lead author, are involved in both studies, the two articles use different terminologies, and these must be clarified before results can be compared. For the same period, usually associated with the last phase of Egyptian administration in Canaan during the rule of the 20th Dynasty, the Tell es-Safi article authors use the term Early Iron I (following, e.g., Mazar 1990), while the Qubur el-Walaydah authors use the term LB III (following, e.g., Ussishkin 1985, used by me here). The latter will be used here. This means that the main emphasis in the two articles is not exactly the same. To use my terminology, the Tell es-Safi team emphasizes the transition from the LB IIB to the LB III, while the Qubur el-Walaydah group deals with the transition from the LB III to the Iron I. In the background looms the question whether the earliest Philistine pottery appears in the LB III (Mazar 1985; Singer 1985; Stager 1995; Master, Stager and Yasur-Landau 2011) or in the beginning of the Iron I (Ussishkin 1985; Finkelstein 1995).

In the Tell es-Safi article, the authors put their LB IIB/Iron I (here LB IIB/LB III) transition in the 1310-1250 BCE range (1σ: the "combined cultural-stratigraphic model" – without the samples from Area F the model is simply too frail) and argue that the *"Late Bronze to Iron Age transition in Tell es-Safi/Gath shows that Philistine 1 pottery appeared during the 13th century BC"* (Asscher et

[1] I decided not to publish this rejoinder in *Radiocarbon*, where the Tell es-Safi and Qubur el-Walaydah papers appeared, because it deals mainly with methodological questions related to the archaeology side of the equation, and not with models and results; in fact, I argue that good control over stratigraphy, context (the way I understand the word) and ceramic typology are pre-conditions for reliable models and results. I also wish to say that the authors of the two articles are friends and much respected colleagues of mine, and I have worked with most of them closely for a number of years now. I am writing this critique in the best tradition of a *yeshiva* deliberation (similar to my many disputes regarding topics related to Ancient Israel studies with my close friend Nadav Na'aman), only in order to advance research – in this case on field archaeology and chronology. I am convinced that my comments will be accepted in this spirit.

Ägypten und Levante/Egypt and the Levant 26, 2016, 275–284

al. 2015a, 847).[2] The Qubur el-Walaydah authors say that the LB IIB/III transition dates to the 1185-1140 range (1σ; according to them this is also the range for the appearance of Philistine pottery) and that the LB III/Iron I transition dates to the 1140-1095 BCE range (1σ; Asscher et al. 2015b, 90-91).

These results raise several questions. First, in general, how is it that two studies – of sites located in the same geographical-cultural area, located ca. 50 km from each other, came to such significantly different conclusions? Since in the case of two neighboring sites, both of which are in Philistia, cultural "delay" is highly unlikely (to put it mildly), at least one of the results *must* be wrong, even without probing the details! If so, the question should be, which of the two is wrong and why (or, are they both wrong)? And then, is the problem to be found in the stratigraphy, the ceramic affiliation of the different layers, the nature of the samples or in the measurements?

Methodology

In order to answer this question, I must start with the basics. It is essential that radiocarbon dating of a sequence of archaeological layers, especially when aimed at resolving a delicate chronological/historical problem, be based on the following foundations:

- *Stratigraphy*: the first requirement is a solid, well-established and well-controlled stratigraphy, preferably of domestic layers with occupational debris. In the latter I refer to material found on floors, not pits, fills and other types of accumulations of sediment. It is also preferable that the stratigraphic sequence be tied to well-understood architectural units; this diminishes the risk of errors in the stratigraphic affiliation of the finds, including samples for radiocarbon dating.
- *Exposure*: these layers should be exposed in reasonable areas, in order to avoid confusion that may result from local, not completely clear situations.
- *Samples*: items for dating must come from well-checked primary contexts (more below), mainly from occupational accumulations (floors); and they should come in clusters, since single samples could migrate from one location to another as a result of, e.g., bioturbation.
- *Ceramic typology*: good control over relative chronology is crucial. The preferable situation is restorable assemblages (which make distinction of minute phasing safer) and if not, large assemblages of sherds. In the latter case relative chronology is dictated by the latest sherds (even in primary contexts, for instance sherds on floors, early items can originate from deteriorated bricks, etc.).
- *Continuity*: it is preferable that a full sequence of the ceramic phases in question is present, with no gaps, which may result from abandonment of the site or removal of sediments by later occupants. In the case of missing phases, the researcher must introduce to the model assumptions regarding the length of such gaps; even if assumptions such as this can be tested statistically for accuracy, they introduce major uncertainties into the model.

This means that with all due respect, microarchaeology investigation of primary context – a centerpiece of the two articles (Asscher el al. 2015a, 832; Asscher et al. 2015b, 81-82; see also Boaretto 2015) – is but a segment of one of the five conditions for a good Bayesian model; moreover, the meaning of primary context can be debated, as indeed demonstrated below.

An example which matches the above-listed requirements, or, at least, comes close to matching them, is provided by the two stratigraphic trenches at Megiddo – Areas K and H (Toffolo et al. 2014 and bibliography there).[3] Both have well-established stratigraphic sequences with floors connected to architectural remains (ibid., Figs. 3-4); in both, the different layers were exposed in relatively large areas; most samples originated from clusters associated with living surfaces; control over ceramic typology has been firm (the models are "anchored" in three destruction layers with rich assemblages of restorable vessels); and in both areas, no occupational gap has been detected. Still,

[2] The two articles confuse two issues which are not necessarily connected – the transition from the Late Bronze to the Iron Age and the appearance of Philistine material culture (this, in a way, is also the reason for the confusion of terminologies). Still, my comments below relate to both themes.

[3] Another example of radiocarbon results based on well-established stratigraphy with good control over ceramic typology is Tel Rehov (Mazar et al. 2005). I mention this in a footnote rather than in the main body of the article only because the results have not been entered into a Bayesian model.

even these "ideal" conditions do not make the model immune to difficulties, such as slightly different results between the areas, probably due to minute, unobservable ceramic nuances,[4] and even certain inconsistencies within an Area.

The question is: do the areas investigated at Tell es-Safi and Qubur el-Walaydah adhere to the pre-conditions listed above?

Tell Es-Safi

Stratigraphy

In all three areas discussed in the Tell es-Safi article the stratigraphy is weak. In most spots there are no floors and there is no clear connection with architectural remains. Moreover, the stratigraphy of Area A – the anchor of the study – is not consistent and is not continuous, e.g., in the south of this area Stratum A3 of the Late Iron IIA sits directly on Stratum A6 of the Middle Iron I (Asscher et al. 2015a, 835).

No less problematic, some of the layers must be fills. This is apparent in the two most crucial layers in the Tell es-Safi sequence – in fact, the two linchpins in the entire model.

The first is Stratum A6 in Area A – a phytolith-rich layer that was relatively easy to identify. In Locality I the Stratum A6 accumulation – with no architecture and no clear floor within the accumulation – is 1.2 m thick (idem, 835; Figs. 6, 12), containing much animal dung (represented by a large quantity of spherulites), probably burnt; the sediments are "highly bioturbated" (ibid.). Obviously, a) there is no 1.2 m thick occupational layer unless in a major destruction and collapse situation (which is not the case here), hence this must be a fill; b) the presence of pottery shows that not all the sediment represents decomposed dung, so where did this pottery come from? c) if there is bioturbation, charred organic material not in clusters (three of the five samples [!] – see Table S2 in the supplementary material) could have "migrated" to this spot from other locations. The phytolith layers, if continuous, may indicate that the sediments were not moved or damaged in later periods, but they do not negate the possibility that material was initially brought here to serve as fill, e.g., from garbage on the slope of the mound. Indeed, the only indication of a floor – a hearth – is found at the top of this accumulation. Evidently, then, primary context in the sense discussed by Asscher et al. in both articles is one thing (material resting *in situ* since deposition – an important but insufficient observation), while primary context the way I understand it is another thing (samples related to a floor, in their original place of usage).[5]

The second crucial layer is Locus 126405 in Area F. In order to give a date to their LB IIB/Iron I transition, the Tell es-Safi team evidently needed results from the Early Iron I (LB III here). Since this phase is missing in Area A, the authors were forced to turn to old dates from Area F, Locus 126405 (Toffolo et al. 2012). Yet, this is a highly problematic location on the slope of the mound, with the samples found close to the surface (idem, Fig. 2). The difficulties with this context have been explained before in detail (idem, especially 385-387), so I am citing only the most crucial part here:

"[T]he mode of deposition of Locus 126405 plays an important role, as indicated by the fact that short-lived samples show older dates compared to the long-lived ones. This can be explained in 2 ways. First, Area F is located on a very steep slope, and it is likely that colluvium from the top rolled down the hill, thus mixing older and younger material. It is not possible to state whether this happened during the occupation of this locus or after its abandonment. Secondly, it is possible that Locus 126405 underwent a long-term sedimentation process that led to the deposition of allochthonous material, either younger or older"; and: *"the broad timespan of this context is most probably the result of the mixing of old and young single fragments of charred material within the same locus, caused by a long-term sedimentation process"*; therefore *"each of the samples dated*

[4] A specific (in this case observable) example for the period discussed here is the comparison between Levels H-12 and K-6. Archaeologists tend to assume that layers in different areas of a site start and end contemporaneously; this is not always the case: a thorough investigation of the pottery assemblages (Arie forthcoming) indicates that Level H-12 probably started during the lifetime of Level K-6, and continued after the partial destruction of this layer.

[5] In Locality V two Stratum A7 samples are ca. 60 cm apart vertically (Asscher et al. 2015a: Figs. 10, 12). The lower seems to have originated from a pebble floor, while the upper is marked (idem: Fig. 10) as located at the bottom of the Stratum A6 accumulation rather than at the top of the Stratum A7 material (see somewhat similar, confusing description for Locality III – idem: 837-838).

should be regarded as being the result of different depositional events" (for all three citations see Toffolo et al. 2012: 387).

The importance of this location should not be underestimated, because it serves as the upper (late) boundary for the transition discussed in the article. Without this location there is simply no model. And if samples here are old, the result of the entire model is distorted, introducing dates that are too early.

There is also a broader lesson here. The authors emphasize that Locus 126405 is characterized by the presence of a well-preserved, phytolith-rich layer, indicating no later remixing of the sediments. In this case mixing must have occurred in antiquity, when material was deposited here. This example too shows, then, that "primary context" (Asscher et al. 2015a, 826) is a good definition for the final event, e.g., *in situ* firing, but not necessarily for the origin of datable material in the sediments.

Exposure

Much of what is described by the Tell es-Safi team comes from soundings which are ca. 1 × 1 m in size; I refer to three of the five Localities in Area A (II, III and V – Asscher et al. 2015a, 836, 837 and 838 respectively). Needless to say, a small area such as this does not allow for good control over either stratigraphy or ceramic typology (for the latter see below). For example, in Area A – the focus of the study – the Late Bronze architecture "is less understood since it was exposed only in soundings and other limited exposures" (idem, 827).

Samples

Here too, it is important to focus on the two most crucial layers in the stratigraphic sequence and hence in the model – Stratum A6 in Area A and Locus 126405 in Area F:

1) Five samples from Stratum A6 were dated; only two of them originated from clusters. What looks to me like the best sample comes from a feature (a hearth) at the top of the 1.2 m thick sediments (RTT 6983, 2903±32 BP, 68% – the youngest uncalibrated age of the five). The other cluster was collected from the bottom of this accumulation (RTT 7095, 2968±30 BP 68%) and may in fact have originated from the top of the layer below. The other three samples are of a single olive pit each, found in dry sieving.
2) The three short-lived samples from Locus 126405 in Area F are described in Table S2 in the supplementary material as "olive pit assemblage" (Asscher et al. 2015a), but in the original article they are specifically referred to as "samples of charred single olive pits," which is also the essence of the citations above (Toffolo et al. 2012, 377).

Ceramic Typology

None of the contexts discussed in the Tell es-Safi article can be associated with a restorable pottery assemblage, which would provide clear affiliation with a relative chronological phase. Therefore ceramic classification of the different phases – a key factor in the model – was done according to collection of sherds. Most of these collections are limited in scope; some originated from the 1 × 1 m soundings. And all but one of them contained a mix of sherds from different periods. Needless to say, in a situation such as this, the early sherds have no importance, as they may be residual (e.g., coming from the deterioration of bricks, material introduced as floor make-up, etc.). The crucial sherds are therefore the latest; they dictate the period of activity in the given location. Let us take the pottery from Loci 142206 and 142201 of Stratum A6, dated by the authors to the Middle Iron I, as an example (Asscher et al. 2015a, Fig. 3). Imported Cypriot sherds and cooking pots with everted rims in the Late Bronze tradition may be residual; but where to put the latest sherds? The collection is small and far from being clear – the latest items may date to the Middle Iron I, Late Iron I, or even somewhat later. Another example for the same case: the authors describe a mix of Aegean imports in both Strata A7 of the LB IIB and A6 of their Middle Iron I (idem, 830). This means that in Stratum A6 they are residual; looking at local sherds, can we really know what is residual and what is the latest?

Indeed, let us take a look at the listing of the sherd collections (Table S2 in the supplementary material):

- In Locality I, Basket 1420258 in Stratum A6 (dated by the authors to their Middle Iron I), yielded EB, LB and Iron I sherds, as well as 35 Iron I/II sherds. Basket 1420332 gave 70 LB sherds, 1 Iron I, 2 Iron I/II and 1 Iron IIA; in Basket 16A90C091 there are 33 LB, 11 Iron I and 1 Iron IIA sherds. According to this, the latest sherds in the ostensibly Middle Iron I lay-

er date to the Iron IIA! I am not trying to re-date Stratum A6; only to point to the problem.
- In Locality II, the Late Bronze sample comes from a basket with no indicative sherds. The same holds true for Locality III: a sample for the Late Bronze comes from a context with no indicative sherds. How, then, were the layers dated?
- In Locality V: Basket 16A80B024, associated with the LB IIB, yielded 55 LB sherds but also 7 LB/Iron I sherds. Basket 16A80B199, affiliated with the Late Bronze, yielded 21 LB/Iron I sherds.
- The pottery from the context of Area F is a mix of 1 MB/LB, 4 Iron II and 3 Myc IIIC1b bowls. With 4 Iron II sherds here, how has this context been taken as representing the Early Iron I (LB III here)?

To be clear about this point, if the sherds collection in a given location is mixed (for whatever reason), how can samples for dating, especially single items, be associated with only one of the periods represented?

This is not all. Stratum A7, which closes the model from below (early), is dated to the LB IIB. No earlier Late Bronze layer has been excavated, which makes it difficult to establish an accurate relative chronological location for A7. Note, for example, that at Megiddo the LB IIB (Levels K-8 and K-7, H-13) cover about a century, from early in the 13th century to the early days of the 12th century BCE (Toffolo et al. 2014). How can we know where in the LB IIB to put the Tell es-Safi samples? For the sake of argument, perhaps early, which requires the introduction of a gap in the model after this stratum. This is especially crucial in the case of Area P: with no real sequence and with only six (!) sherds, how can we precisely date the Late Bronze layer? Without knowing this, there is no way to accurately determine the LB/Iron I transition.

Table 1 (Asscher et al. 2015a, 828–829) demonstrates the problem, in the sense that on the right side column comparisons to a given Tell es-Safi layer are given to strata representing more than one period:
- Stratum A7 is compared to layers from different phases of the LB II: Hazor XIII of the middle of the 13th century, Megiddo VIIB which continued until the early 12th century, and Ashdod XIV which may have continued deeper into the 12th century (Finkelstein and Singer-Avitz 2001).
- Stratum A3 of the Late Iron IIA is compared, among other sites, to Qasile X of the Late Iron I.
- For Stratum A4, which is assigned to the Late Iron I, most comparisons are to Iron IIA layers.
- In the sector discussed in the article, Stratum A5 is apparently represented by no more than a single wall (Asscher et al. 2015a, Fig. 2) with no datable material (idem, 841). Comparisons are therefore given for what was assumed to belong to this layer elsewhere; but with Stratum A5 missing in parts of the area, how was the correlation established?[6]

Obviously, a change in the relative chronology (ceramic phase) affiliation of one of these layers would lead to different result for the LB IIB/Early Iron I (LB III here) transition.

To this one should add the problem of establishing relative chronology connection between different areas when relying on sherds rather than restorable pottery (at Megiddo such connections are established first and foremost according to four destruction layers that yielded rich pottery assemblages – Toffolo et al. 2014). Let me cite again: *"Contexts from Locality V in Area A, Area P, and Area F...had no clear stratigraphic relation with Localities I to IV in Area A and were assumed to be contemporaneous based on associated material culture assemblages"* (Asscher et al. 2015a, 840). The "associated material culture assemblages" are collections of sherds, some of them described vaguely as LB/Iron I.

The authors admit that *"based on sherds alone, it is difficult to determine the stratigraphy of the area"* (idem, 831, referring to Area A); since pottery does not dictate stratigraphy, by "stratigraphy" they must mean affiliation with ceramic phases; if it is, indeed, difficult to determine the ceramic affiliation of the layers in this area, there is no model – clear and simple.

Continuity

In Area A – the main field to yield samples for the Tell es-Safi study – two periods are missing: the

[6] Incidentally, note that Izbet Sartah II dates to the Early Iron IIA rather than to the Late Iron I, and that Ashdod X-IX are probably also later than the Late Iron I (Finkelstein and Piasetzky 2006; Finkelstein and Singer-Avitz 2001 respectively).

Early Iron I (LB III here), and the Early Iron IIA (Asscher et al. 2015a, 830).[7] In addition, one of the five layers in the model – Stratum A5 – has no pottery to help define its relative date (idem, 841). These obstacles call for the introduction of several assumptions into the model; an accumulated error can easily distort the results.

There is another major problem related to the issue of continuity which I have already partially discussed above. The question posed by the Tell es-Safi team is the date of transition from the LB IIB to the Early Iron I (LB III here). The latter phase is overlaid by layers from the Middle Iron I and Late Iron I, while the former is not underbuilt by earlier Late Bronze layers. As a result, the dates for the LB IIB are not sealed from below. This would naturally broaden to older but not younger ages; to achieve more precise dates for the earlier periods it is necessary for them to be buttressed by results from earlier layers. In short, it seems to me that an elementary requirement in a model like the one presented here is to include dates for at least one layer below and above the ones for which the question is posed, so that the model is "sealed" on both sides.

To sum up my attitude to the Tell es-Safi samples (and model), the contexts described by the authors do not fit any of the requirements listed in the Methodology section above. The stratigraphy is problematic at best, with phases missing; many (most?) of the samples do not come from clean, *in situ* original contexts; exposure is insufficient and the pottery (collection of sherds) does not allow for the establishing of a reliable sequence of ceramic phases. And above all this looms another tantalizing question: the pivotal period in the article – when according to the authors Philistine material culture appeared (their Early Iron I, LB III here) – is thus far missing at Tell es-Safi all together (in other words, for the time being its existence comes from a theoretical construct);[8] is it a good idea, then, to try date such an elusive period only statistically? And one must not forget: in a Bayesian package the results stem from the setting of the data; entering a missing phase, for example, and giving it a certain number of years, would result in one date; eliminating this phase could mean a different date altogether.

Qubur El-Walaydah

Qubur el-Walaydah is a small, less complex site, and hence the stratigraphy and relative chronology affiliations are perhaps somewhat easier to establish. Still, here too there are difficulties which need to be addressed.

Stratigraphy, Exposure and the Nature of the Samples

The Qubur el-Walaydah samples come from three locations. It is not clear if and how the accumulations in Squares D106 and B104 are related to architectural elements and floors, and to each other. The local pottery – which is prevalent here – does not support an answer to this question. Moreover, except for Phase 1-5d, there are no clear floors with dateable material at the site, certainly not in the pit. Add to this the limited exposure of the early sediments, and it is clear that here too we are far from the Megiddo example, that is, a sequence of datable assemblages on clearly defined floors (see above).

The material for dating comes from sediments that were dry-sieved (Asscher et al. 2015b, 83). All samples except one are of *single* barley seeds (idem, 87). Ostensibly, only samples from "primary contexts" were used for Bayesian modeling (idem, 81); as shown above, this term refers to material that was found *in situ* in its final place of deposition, but not necessarily to samples that can date the given layer.

The first two locations (in Squares D106 and B104) are characterized by layers with spherulites which represent dung deposits. The dung was burnt *in situ* in antiquity. But it could have been brought from another location originally; for instance, the lower sediments in the sounding could have served as a fill for the construction of the brick building. In this case, the samples would be older than the final act of deposition.

The pit in Square C102 is the best example of this problem. It contains accumulation of sediments with black lenses which show evidence of

[7] Note the confusing description: "Stratum A4 is associated with different phases in different parts of Area A.... In the southern part of Area A ... Stratum A4 is associated with the Late Iron I period. In the middle part of Area A ... Stratum A4 is associated with the Early Iron IIA period."

[8] For the reasons specified above I do not regard the samples from Area F as representing a genuine *in situ* layer. Note that the excavation of remains from this period in large exposure in Area E (Shai, Uziel and Maeir 2012) did not yield even a single monochrome (Philistine 1) sherd (Gadot, Yasur-Landau and Uziel 2012).

high temperatures; these lenses have much datable material. Seven stratified episodes of burning were identified in the pit. Here too the meaning of primary location is that the samples were charred *in situ*. But a pit is a pit – it is dug first and then filled. So where did the sediments in it originate from? They may represent activity older than the digging of the pit.

Ceramic Typology and Continuity

Only Phase 1-5d is characterized by complete vessels on floors (Asscher et al. 2015b, 80). All other decisions regarding relative chronology, decisions that dictate the nature of the model and the results, were taken according to collections of sherds. And the number of sherds that anchor the model is small: There are 12 sherds for all phases of Stratum 1-5 (!), and Layer 1-4_10 in the pit yielded 2 LB III and 2 Iron I sherds.

Moreover, no LH III and Cypriot imports, which can help in relative dating, were found *in situ* (idem, 80); this means that the pottery that served in establishing relative chronology is mainly local. This too makes distinction between LB II and III difficult (idem, 79). In the case of local pottery, the same is true for the distinction between LB III and Early Iron I; information regarding Philistine bichrome pottery (especially in the pit) is not provided. The difficulty of deciding between the LB III and the Early Iron I is expressed in the comparison of the local material with the LB III layers of Beth Shean VI and Lachish VI of the LB III, but also with Ashdod XIII (idem, 80), at least part of which may date later (Finkelstein and Singer-Avitz 2001).

The authors put the transition from the LB II/III to the LB III between Phases 1-5d and 1-5c, because there were no imports in the latter. But in any event there were no imports in clean contexts here (idem, 80). So how, after all, was the place of the transition in the sequence decided? Why here and not somewhat later or earlier?

In Phase 1-5c, a single, almost complete bowl of locally produced LH IIIC (or Philstine 1) was found, but the context is not described in detail. This phase did not supply any sample for radiocarbon-dating. The item was found associated with Late Bronze pottery (numbers are not given); but as noted above, how can one distinguish local LB III from local Early Iron I?

In the case of Qubur el-Walaydah, too, the layers representing the transition are not sufficiently sealed from below (early) and above (late). On the one hand, there are no clear late LB IIB samples and on the other, at least some of the samples in the pit, which ostensibly seal the transition from the side of the Iron Age, may have originated from older activities.

To sum up this part, Qubur el-Walaydah may answer the basic requirements for a radiocarbon dating program better than Tell es-Safi, but it is far from being a prime location for such an endeavor – especially for an attempt to resolve a critical chronological problem involving a dispute over no more than a few decades. Some of the layers are not connected to architectural elements; there are almost no floors with occupational accumulation and most of the samples for ^{14}C dating are not associated with floors; the pottery is generally comprised of sherds; because we are dealing with sherds, mostly local, in many (most?) cases decisions regarding the ceramic phase in the LB-IA sequence was difficult to establish; some of the layers did not produce samples for dating; and the date of the ostensibly crucial layer (1-5c, with the monochrome bowl) was reached by mathematical manipulation (regarding the length of period with no samples for dating). In the case of Qubur el-Walaydah too, then, one error, or an accumulation of errors, can change the result of the model.

Discussion

The Tell es-Safi and Qubur el-Walaydah results should be evaluated against the background of other models available for the LB IIB/III and LBIII/Iron I transitions (Tables 1-2).

The bold-faced numbers mark results which are not consistent with the others. For the first transition (LB IIB/III) both Tell es-Safi and Qubur el-Walaydah – mainly the former – give results earlier than the other, quite consistent models. For the second transition (LB III/Iron I) the Qubur el-Walayda date is consistent with the other models, while the Tell es-Safi determination is significantly earlier, with no overlap in the 68% (1σ) range.

The date given by the Tell es-Safi team for the appearance of Philistine material culture "during the 13th century" (Asscher et al. 2015a, 847) is far too early for:

a) Both the Middle and Low Chronologies for the appearance of Philistine material culture based on stratigraphic/ceramic and historical considerations (the high chronology is correctly described by Asscher et al. 2015b, 91 as obso-

Table 1 LB IIB/III transition according to radiocarbon-based models/results

Site/Model	*Transition from-to*	*Date BCE (1σ)*	*Reference*
Tell es-Safi	A7 to F Locus 126405	**1310–1250**	Asscher et al. 2015a
Qubur el-Walaydah	1-5d to 1-5c	**1230–1185**	Asscher et al. 2015b
Megiddo	K-7 to K-6	1185–1135	Toffolo et al. 2014
Lachish	VII to VI	ca. 1200–1140	Webster 2015, 80
Aegean pottery model	LH IIIB2 to LH IIIC Early 2/Middle 1	1205–1132 1188–1132*	Fantalkin, Finkelstein and Piasetzky 2015
Beth Shean destruction of N-4		1210–1125	Mazar 2009, 26

* Transition from LH IIIC Early 1 (Tell Tweini 7a) to LH IIIC Early 2/Middle 1 (Beth Shean S-3a)

Table 2 LB III/Early Iron I transition according to available radiocarbon-based models

Site/Model	*Transition from-to*	*Date BCE (1σ)*	*Reference*
Tell es-Safi	F Locus 126405 to A6	**1230–1155**	Asscher et al. 2015a
Qubur el-Walaydah	1-5a to 1-4	1140–1095	Asscher et al. 2015b
Megiddo	K6 to K5	1135–1090	Toffolo et al. 2014
Aegean pottery model	LH IIIC Early 2/Middle 1 to LH IIIC Middle 2	1145–1083*	Fantalkin, Finkelstein and Piasetzky 2015
Full Iron Age model	Megiddo K-6, Lachish VI, Rehov D-6 to Miqne VIIB, Dor D2/13	1125–1071	Finkelstein and Piasetzky 2010
Destruction Lachish VI		1208–1112 1150–1110**	Finkelstein and Piasetzky 2009
Destruction Beth Shean S-3a		1195–1120	Mazar 2009, 26

* Combining the LH IIIC Early 2/Middle 1 with the LH IIIC Middle 2 and calculating the transition between them and the LH IIIC Late does not change the result significantly (Fantalkin, Finkelstein and Piasetzky 2015).

** Allowing historical constrains (finds from the days of Ramesses IV in this layer).

lete). According to the former, this took place in ca. 1175 (e.g., Mazar 1985; Singer 1985; Stager 1995; Master, Stager and Yassur-Landau 2011), while according to the latter it occurred ca. 1125 BCE (e.g., Ussishkin 1985; Finkelstein 1995).

b) The radiocarbon-established date for the appearance of Philistine pottery according to the Aegean and Cypriot ceramic sequences; the 13th century (and even the early 12th) is covered by the earlier LH IIIB (Fantalkin, Finkelstein and Piasetzky 2015).

c) The radiocarbon-based chronology for layers with Philistine material culture in the southern coastal plain and the Shephelah (Finkelstein and Piasetzky 2015); note that the Bichrome (Philistine 2) layers of Beth-shemesh 6 and 5 and Tel Miqne VIB and VB do not predate the middle of the 11th century BCE. Placing the appearance of the monochrome (Philistine 1, if indeed it appears before and independent of the bichrome – see below) in the 13th century gives it an impossibly long period of over 150 years! The date given to the appearance of Philistine pottery at Qubur el-Walaydah (1185–1140 BCE) also leaves an overly long phase of a century or more for the monochrome.

d) The detailed model for Megiddo (Toffolo et al. 2014), which places the appearance of Philistine pottery (during the life-time of Level H-12) in the late 12th century (Toffolo et al. 2014 and Arie forthcoming).[9]

[9] The discrepancy between the appearance of Philistine bichrome (Philistine 2) pottery in Philistia (ca. 1050 and at Megiddo (more than half a century earlier) may stem from the possibility that there was no independent monochrome (Philistine 1) phase in the south (see below), or, that there was a phase when the two appeared together; these scenarios are not expressed in most of the existing models.

The conclusion is unavoidable: for the reasons described above – problematic stratigraphy, contexts and ceramic affiliation – the Tell es-Safi dates should be viewed with considerable suspicion. Accepting this conclusion, there is no need to propose, against all knowledge – radiocarbon and historical – that:

a) *"Philistine culture appeared in certain locations in Philistia perhaps even a century before the Egyptian withdrawal from the region"* (Asscher et al. 2015a, 847); if so, how is it that Philistine material is not found in "classic" LB IIB layers?
b) The *"cultural transition in Philistia in the south was prior to the transition in the northern site of Meigddo"* (idem, 847); these areas are only ca. 100 km apart, represented in well-established towns which are located along the major routes of the Levant (to differ from remote villages).

Two final comments on Philistine chronology are in place here. The first: no site in Philistia has thus far produced clear-cut evidence for one of the main foundations of the Middle Chronology for Philistine material culture, that a Philistine 1 (monochrome) pottery phase preceded a Philistine 2 (bichrome) pottery phase, with no mixing of the two (e.g., Mazar 1985; Stager 1995; Master, Stager and Yasur-Landau 2011). To the contrary, recent research has strengthened doubts (expressed by Ussishkin, in a lecture in Vienna, 2003) regarding this theoretical construct (Ben-Dor Evian 2014, 212–214).[10] The second: over thirty years after Ussishkin (1985) suggested that the Philistine settlement took place after the withdrawal of Egypt from Canaan based on the Lachish evidence, and over 20 years after my first discussion of the broader picture supporting Ussishkin's idea (Finkelstein 1995), no evidence has surfaced to dismiss this assertion. That is, evidence for Philistine 1 pottery in layers representing the rule of the 20th Egyptian Dynasty in Canaan.[11] The only such evidence – a Ramesses III scarab found in Phase 20 of Grid 38 at Ashkelon (Master, Stager and Yasur-Landau 2011, 274) – may be residual.[12] In light of the discussion above, the Philistine 1 bowl from Qubur el-Walaydah does not contradict this statement.

Evidence for the Philistine Middle Chronology is still missing, and the urge to resolve a BIG historical question with a single radiocarbon strike should be suppressed if the five conditions listed above are not obtainable.

References

Arie, E.

Forthcoming The Late Bronze III and Early Iron I Pottery from Levels H-12, H-11 and H-10. In: Finkelstein, I., Martin, M.A.S. and Adams, M.J., eds., *Megiddo VI: The 2010-2014 Seasons* (Monograph Series of the Institute of Archaeology, Tel Aviv University).

Asscher, Y., Cabanes, D., Hitchcock, L., Maeir, A.M., Weiner, S. and Boaretto, E.

2015a Radiocarbon Dating Shows an Early Appearance of Philistine Material Culture in Tell es-Safi/Gath, Philistia. *Radiocarbon* 57, 825–850.

Asscher, Y., Lehmann, G., Rosen, S.A., Weiner, S. and Boaretto, E.

2015b Absolute Dating of the Late Bronze to Iron Age Transition and the Appearance of Philistine Culture in Qubur el-Walaydah, Southern Levant. *Radiocarbon* 57, 77–97.

Ben-Dor Evian, S.

2014 *Egypt and Philistia in the Early Iron Age: The Textual Record and the Archaeological Remains*. Ph.D. thesis, Tel Aviv University. Tel Aviv.

[10] Indeed, the idea that a system of well-established strata (that is, settlements) with one type of pottery would terminate (with no obvious reason such as destruction) in favor of a new system of strata with a new type of pottery is perhaps possible in theory, but difficult to explain in real life.

[11] At Tell es-Safi, the only area with broad exposure of the relevant period (Area E – Shai, Uziel and Maeir 2012) did not yield even a single Philistine 1 sherd (Gadot, Yasur-Landau and Uziel 2012).

[12] A sherd with a Ramesses III cartouche found in relation to Phase 19 at Ashkelon (Master, Stager and Yasur-Landau 2011: 275), a Ramesses III scarab from Stratum XII in Area G at Ashdod (Brandl 1993), and a Ramesses IV scarab found in Stratum XIIb in Area H at Ashdod (Keel and Münger 2005: 276) – all later than the days of the 20th Dynasty even according to those adhering to the Middle Philistine Chronology – demonstrate the risk of using such items for minute absolute dating.

Boaretto, E.

2015 Radiocarbon and the Archaeological Record: An Integrative Approach for Building an Absolute Chronology for the Late Bronze and Iron Ages of Israel. *Radiocarbon* 57, 207–216.

Brandl, B.

1993 Scarabs, a Scaraboid and a Scarab Impression from Area G (1968–1970). In: Dothan, M. and Porath, Y., eds., *Ashdod V. Excavations of Area G. The Fourth-Sixth Season of Excavations 1968–1970* (‘Atiqot 23). Jerusalem, 129–142.

Fantalkin, A., Finkelstein I. and Piasetzky, E.

2015 Late Helladic to Middle Geometric Aegean and Contemporary Cypriot Chronologies: A Radiocarbon View from the Levant, *BASOR* 373, 25-48.

Finkelstein I.

1995 The Date of the Settlement of the Philistines in Canaan. *Tel Aviv* 22, 213–239.

Finkelstein, I. and Piasetzky, E.

2006 The Iron I-IIA in the Highlands and Beyond: ^{14}C Anchors, Pottery Phases and the Shoshenq I Campaign. *Levant* 38, 45–61.

2009 Radiocarbon-Dated Destruction Layers: A Skeleton for Iron Age Chronology in the Levant. *OJA* 28, 255–274.

2010 Radiocarbon Dating the Iron Age in the Levant: a Bayesian Model for Six Ceramic Phases and Six Transitions. *Antiquity* 84, 374–385.

2015 Radiocarbon Dating Khirbet Qeiyafa and the Iron I-IIA Phases in the Shephelah: Methodological Comments and a Bayesian Model. *Radiocarbon* 57, 891–907.

Finkelstein, I. and Singer-Avitz, L.

2001 Ashdod Revisited. *Tel Aviv* 28, 231–259.

Gadot, Y., Yasur-Landau, A. and Uziel, J.

2012 The Late Bronze Age Pottery. In: Maeir, A.M., ed., *Tell es-Safi/Gath I: The 1996-2005 Seasons* (Ägypten und Altes Testament 69). Wiesbaden, 241–264.

Keel, O. and Münger, S.

2005 The Stamp Seal Assemblage. In: Dothan, M. and Ben-Shlomo, D., eds., *Ashdod VI: The Excavation of Areas H and K (1968–1969)* (IAA Reports 24). Jerusalem, 273–279.

Master, D.M., Stager, L.E. and Yasur-Landau, A.

2011 Chronological Observations at the Dawn of the Iron Age in Ashkelon. *Egypt and the Levant* 21, 261–280.

Mazar A.

1985 The Emergence of the Philistine Culture. *IEJ* 35, 95–107.

1990 *Archaeology of the Land of the Bible, 10,000–586 B.C.E*. New York.

2009 Introduction and Overview. In: Panitz-Cohen, N. and Mazar, A. eds., *Excavations at Tel Beth-shean 1989-1996 Vol. III: The 13th-11th Century BCE Strata in Areas N and S*. Jerusalem, 1–32.

Mazar, A., Bruins, H.J., Panitz-Cohen, N. and van der Plicht, J.

2005 Ladder of Time at Tel Rehov: Stratigraphy, Archaeological Context, Pottery and Radiocarbon Dates. In: Levy, T.E. and Higham, T., eds., *The Bible and Radiocarbon Dating: Archaeology, Text and Science*. London, 193–255.

Shai, I., Uziel, J. and Maeir, A.M.

2012 The Architecture and Stratigraphy of Area E: Strata E1-E5. In: Maeir, A.M., ed., *Tell es-Safi/Gath I: The 1996-2005 Seasons* (Ägypten und Altes Testament 69). Wiesbaden, 221–233.

Singer I.

1985 The Beginning of Philistine Settlement in Canaan and the Northern Boundary of Philistia. *Tel Aviv* 12, 109–122.

Stager, L.E.

1995 The Impact of the Sea Peoples in Canaan (1185-1050 BCE). In: Levy, T.E., ed., *Archaeology of Society in the Holy Land*. London, 332–348.

Toffolo, M.B., Maeir, A.M., Chadwick, J.R. and Boaretto, E.

2012 Characterization of Contexts for Radiocarbon Dating: Results from the Early Iron Age at Tell es-Safi/Gath, Israel. *Radiocarbon* 54, 371–390.

Toffolo, M.B., Arie, E., Martin, M.A.S., Boaretto, E. and Finkelstein, I.

2014 The Absolute Chronology of Megiddo, Israel, in the Late Bronze and Iron Ages: High-Resolution Radiocarbon Dating. *Radiocarbon* 56, 221–244.

Ussishkin, D.

1985 Levels VII and VI at Tel Lachish and the End of the Late Bronze Age in Canaan. In: Tubb, J.N., ed. *Palestine in the Bronze and Iron Ages: Papers in Honour of Olga Tufnell*. London, 213–230.

Webster, L.

2015 *Developing a Radiocarbon-Based Chronology for Tel Azekah: The First Stage*. MA thesis, Macquarie University.