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Excavations at Tell Fadous-Kfarabida: Preliminary Report on the 2016 Season of Excavations

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Abstract—This report presents the main results of the final season of excavations in 2016 at Tell Fadous-Kfarabida, located on the north Lebanese coast 2 km south of Batroun.
Excavations focused on four areas. In Area II we worked only in Squares 310/295 and parts of 305/295, where the excavations in 2015 did not reach a satisfactory end. We continued to excavate in and under the northern rooms of Building 4 (Phase III, Early Bronze Age III) and reached the earlier Phases II (Early Bronze Age II) and Phase I (Chalcolithic) in very limited areas.
In Areas III and IV, we continued the work begun in 2014 and 2015. Area III is located on the southern slope of the tell. In 2016, work mainly focused on exposing domestic architecture from Phase III (Early Bronze Age III). Area IV is situated at the eastern edge of the site, where we continued the investigation of the Early Bronze Age fortification system with a monumental gate (Phase III, Early Bronze Age III). Area V, situated in the north-central part of the tell, was newly opened in 2016. Here remains of substantial buildings, attributable to Phase III (Early Bronze Age III) were uncovered.
In addition to the general overviews of the main features exposed in the different areas during the 2016 season, this report contains specialist reports on ceramic material and small finds from various phases as well as progress reports of ongoing archaeozoological and isotopic investigations.

Keywords: Tell Fadous-Kfarabida, Lebanese coast, Chalcolithic, Early Bronze Age, Middle Bronze Age, potmarks, beads, metallography, chemical analysis of metal finds, archaeozoology, isotope analysis.

Introduction

Hermann Genz and Alison Damick

The first phase of the Tell Fadous-Kfarabida archaeological project took place between 2004 and 2011 (Badreshany, Genz and Sader 2005; 2007; 2008; Genz *et al*. 2009; Genz *et al*. 2010; Genz *et al*. 2011). After the 2011 season, we started to embark on the final publication of the results. However, in 2014 a second phase of excavations was launched at the site (Genz *et al*. 2018). There were three reasons for the resumption of the fieldwork. First, as one of the owners intended to initiate a construction project in

Plot 1408, which would have led to serious damage right in the central part of the site, we were asked by the Directorate General of Antiquities to check the archaeological potential of this particular plot. It was also hoped that the continued presence of archaeologists at the site would discourage the owners from inflicting further damage on the site. Second, due to time constraints at the end of the 2011 season, we did not reach a satisfactory end of excavations in the northern part of Area II, where especially in Square 310/295 parts of the large bulldozer section were still exposed and thus affected by erosion. Third, during the work on the publication of the results of the first phase of excavation it became clear that more information was urgently needed for the understanding of the layout and function of the early urban settlement. The excavations during the first phase in addition to a small exposure of the Early Bronze Age fortification in Area I mainly focused on the exposure of elite and administrative buildings in Area II. The results from Area II were therefore certainly not representative for the entire site. Therefore, in addition to continuing work in the northern part of Area II, we decided to open up new areas with the aim of broadening our understanding of the site by focusing on non-elite contexts.

Area III is located at the southern slope of the tell, Area IV is located at the eastern edge of it, whereas Area V is situated in the north-central part of the tell (**fig. 1**).

In addition, during the first week of the 2016 season we conducted an intensive pedestrian survey of an area of roughly 500 m around the site, to check if there was any evidence for a lower or outer town.

Below we report on the preliminary results of the final season of excavations in 2016.

The fieldwork in 2016 lasted from June 13 to July 17, 2016 (Cahier de charges 826). The team was directed by Professor Hermann Genz (American University of Beirut – AUB) and Alison Damick, MA (Columbia University) and included Jana Alameh (AUB), Miza Chahine (AUB), Daniel Hofmann (AUB), Emilia Jastrzębska, MA (Warsaw), Jaqueline Kassouf (AUB), Christian Krug (photographer, Berlin), Martin Makinson, MA (Paris), Mahmoud Mardini (AUB), Ashley Naim (AUB), Naseem Raad, MA (AUB), Sidney Rempel, MA (surveyor, Arizona State University), Anja Rutter, MA (University of Hamburg), Berj Wanessian (AUB), Marshall Woodworth, MA (University of Oxford) and Dr Zuzanna Wygnanska (University of Warsaw).

The fieldwork in 2016 was financed by a Research Grant from the University Research Board of the American University of Beirut, International Travel and Research Grants from the Graduate School of Arts and Sciences at Columbia University and the Elessar and Enkidu Foundation, Beirut. The processing of the Early Bronze Age IV and the Middle Bronze Age pottery was supported by the Gerda Henkel Foundation, Germany. The phytolith processing was supported by a National Science Foundation Doctoral Dissertation Improvement Grant.

We would also like to thank Mr Remi Feghali (Kfarabida) for his constant logistical support of the project, as well as Clara and Rita Khoury for helping us with the organisation of tours and events for the local community. The Directorate General of Antiquities, especially its Director General Mr Sarkis el-Khoury as well as Mrs Samar Karam helped in every possible way to facilitate the season.

Area II

Zuzanna Wygnanska and Martin Makinson

Excavations in the North-Western Extension of Room 3

Introduction

The exploration of various rooms of the Early Bronze Age III (Phases III–IV) Building 4 in Area II since 2010 revealed a set of discrete functions attributed to each of its rooms (**fig. 2**). For instance, the 2014 season focused on Room 4, and uncovered separate compartments from the earliest Early Bronze Age III layers (Phase III). This, added to limited floor development during this period, as well as the absence of doors, firmly demonstrated its storage function, which possibly survived in Phase IV (later part of the Early Bronze Age III).

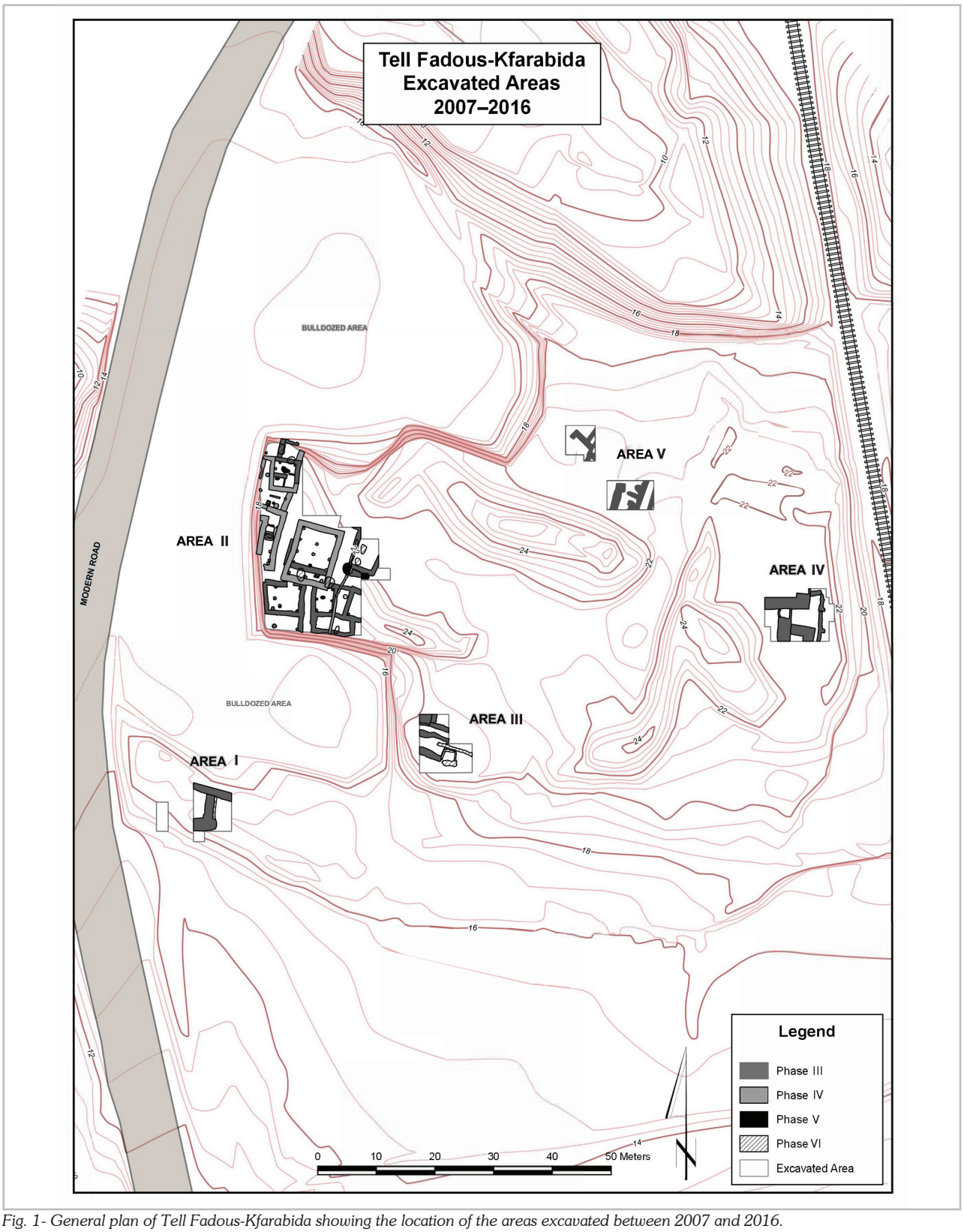


Fig. 1- General plan of Tell Fadous-Kfarabida showing the location of the areas excavated between 2007 and 2016.

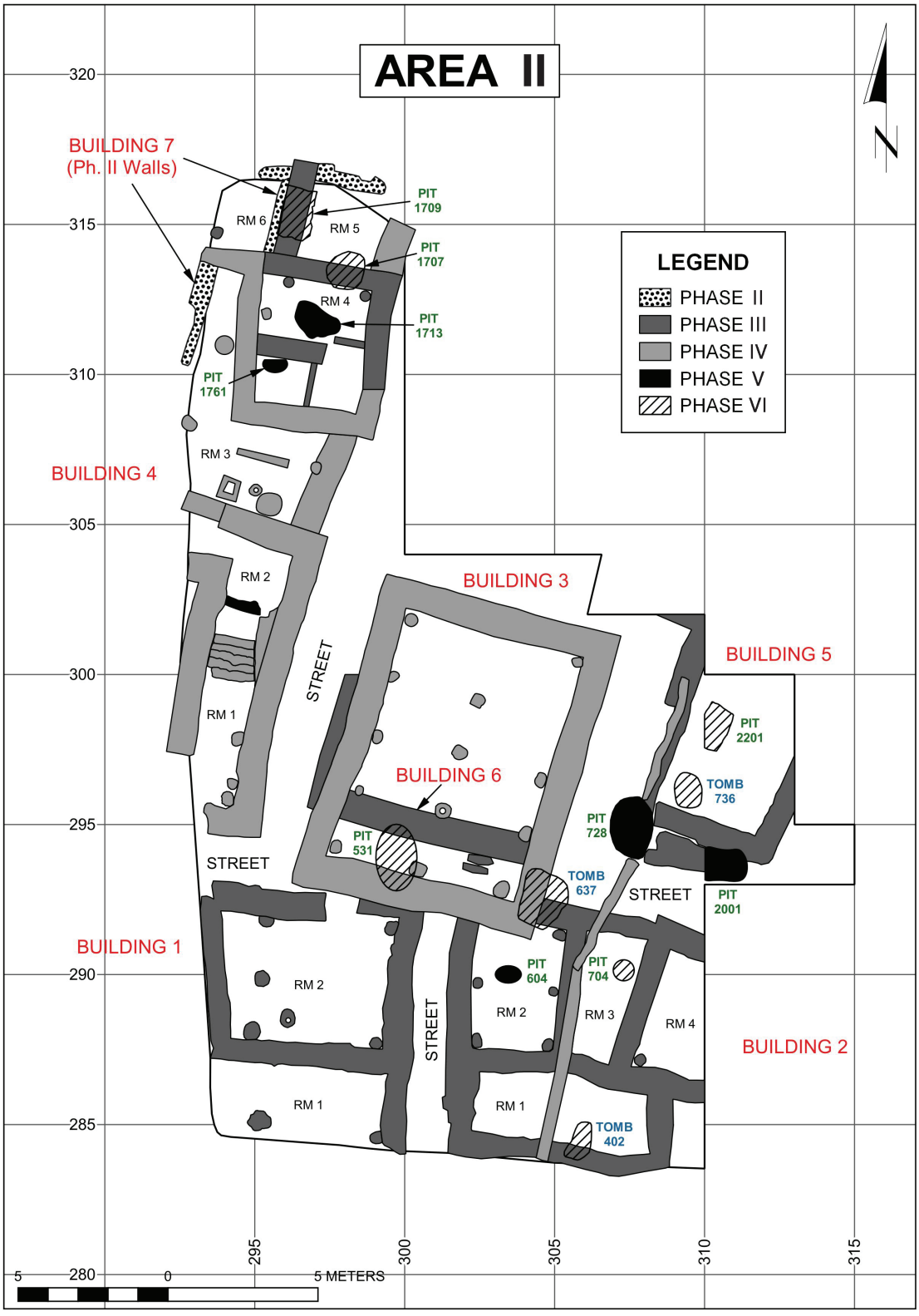


Fig. 2- Schematic plan of architecture and features uncovered in Area II.

In Room 5 to the north, excavations in 2015 and 2016 revealed successive layers of pebble and flagstone floors, as well as a rectangular compartment along the northern face of Wall 1733, features in themselves revelatory of the room's use. In Room 6, excavated between 2011 and 2015, accumulation of plastered floors below the level of a Phase IV stone silo built in the south-western corner was proof of domestic functions attributed to this space, which was partly destroyed by the northern and western bulldozer sections. The north-western extension of Room 3 was explored essentially in 2015 and 2016. Thirteen floors, mostly plastered and belonging to Phases III and IV, were painstakingly uncovered and allowed Room 3 to be seen as a living space, supported by the presence of a number of installations, hearths, and working surfaces along Wall 1720 that emphasised the domestic activities taking place in this room.

The 2016 season therefore led to the systematic clearing and removal of seven of the thirteen floors (the latter are 1783 to 2397 and 2405) marking the life of the north-western extension of Room 3 during the time of use of Building 4. What became clear as we reached the basal layers of Phase III was that Room 4 was originally a free-standing square construction, probably meant for storage, which early on in Phase III was integrated into Building 4, which developed to the south, north, and west. Something that is now also evident about Area II is that what was explored between 2011 and 2016 are the eastern rooms of what must have been an elite residence. Domestic and working areas and storage spaces were restricted to the innermost recesses of the construction, which stood at least two stories tall. Residential rooms must have been located further to the west, as well as on the upper floors, both of which have disappeared, the former because of the bulldozer section, the latter after the abandonment and collapse of the building. Sleeping and reception rooms of this elite structure must have therefore been located in places refreshed by a sea breeze or on the upper floors.

The 2016 season allowed glimpses on earlier periods, i.e. the Early Bronze Age II (Phase II) and the Chalcolithic period (Phase I). Phase II is represented by Building 7, which shows an orientation slightly different from that of the walls of Building 4. Chalcolithic finds consisted of scattered remains of pottery, and no architecture from this period was encountered. The Chalcolithic 'level' (Phase I) was therefore neither a living surface nor a structure, but simply sherds in a fill directly above geological layers.

Problems with excavating Room 3's north-western extension in 2015–2016

The removal of fills, pits and floors in the north-western extension of Room 3 was increasingly problematic as one descended into a complex stratigraphy of some 2.5 m in thickness. Disturbances were larger and more damaging to floor preservation as we went down, due to the building techniques of Building 4. Early Bronze Age III architecture in the Central Levant – for instance at Byblos and at Arqa – is marked by the use of wooden pillars on stone bases, themselves lying on heaps of rubble placed in large pits. These pillars and bases were generally placed in positions to ensure stability of the architecture, either directly at corners of walls, against the middle of the walls, or at close distances through the middle of rooms. In the north-western extension of Room 3, three instances of pits that likely supported pillars (2340, 2321, and 2380, **fig. 3** and **4**) were discovered and mostly emptied, creating a 'Swiss cheese' effect as regards stratigraphy. The earliest of these rubble-filled pits (2380) was found at the southern edge of Square 310/295, and almost reached sterile soil, with its base at 18.03 m (40 cm above Phase I). Another pillar base pit (2364), measuring 2.15 m from north to south and 0.96 m east-west, obliterated a large percentage of the Phase III floors explored in this part of Room 3. The room's north-eastern corner,

Fig. 3- Pillar base Context 2320 from east.

Fig. 4- Pillar base Context 2340 from north.

at the angle of Walls 1748 and 1720, was likewise very much disturbed by a semi-circular stone-filled pit propping up square pillar/support 2307 (**fig. 5**). Moreover, two successive rubbish pits (2399 and 2386) in the northern part of the room, close to the western section, were very damaging to the Phase II Wall 2386, its associated Floor 2428/2430 and the lowest Phase III surfaces.

Due to the above-mentioned disturbances and the often-different nature of coeval Phase III and IV floors encountered, a north-south division was generally maintained during excavation. The southern part of this part of the room was generally ashier, contained less plaster (with the notable exception of basal Floors 2397 and 2405), and possessed installations of a domestic nature, such as for instance a small fireplace along Wall 1720 or in early Phase IV a long working slab (2357; **fig. 6**) uncovered in 2015.


Fig. 5- Pillar base 2307 and foundation pit with rubble fill Context 2366. View from south.

A last important point concerns the division into phases of the thirteen Early Bronze Age III floors encountered. If indeed Floor 1783, the top surface (dug in the last days of 2014), which contained much restorable pottery, can be ascribed to Phase IV, and if 2401 and 2417 (the earliest surfaces) are evidently from Phase III, then intermediate floors such as 2371 and 2377 indicate continuous reuse and reconstruction of floors in this room across those phases. Therefore, it is not yet possible to attribute a specific phase to each floor in terms of relative chronology. The succession of floors, like the thin layers of a cake, can be ordered stratigraphically, but a definite attribution to phases must await absolute dating and the study of the pottery found in the fills between the floors.

The north-western extension of Room 3

The 2015 season had already shown that there was often a division between north and south of this north-western extension of Room 3. Floor 2358, the last surface excavated in 2015–and possibly the earliest surface attributable to Phase IV in the room–was ashy and located to the south of the above-mentioned rectangular slab (2357 next to 2346; **fig. 6**), which was a working installation contemporary with several surfaces, including the one immediately below 2358 (2371). Surface 2371 was plastered, but could also be related to domestic activities, as it was associated with a tilted grinding stone located under a contemporary fireplace (2356).

Fig. 6- Stone slab Context 2346 set against Wall 1720. View from south.

The partition between the two sectors of the room was indicated by a division of sorts (Context 2349). This division consisted of a line of irregular stones set in an east-west line, contemporary with both Floor 2358 and 2371 below it.

Although as a general rule, the northern half of the room was more often plastered in Phases III and IV, this was not the case of Floor 2377, from the same sub-phase as Floor 2371 to the south. The fact that there was an original plastering of 2377, although it has been mostly destroyed, is indicated by the existence of a small patch of gypsum extending below the neck of a jar lying flat on the floor. This northern surface (2377) could only be explored in a limited way because, as said above, it was affected by the pits likely supporting pillar bases (in particular 2321, 2340, and 2366). It appears, nonetheless, that 2377 was used at the same time as another round pillar base (2378), a possible indication of the presence of a second storey in earlier sub-phases of Building 4.

Upper Phase III (under Floors 2371 and 2377)

Two or 3 cm under Floor 2371, in the southern half of Room 3, another partly plastered floor (2382) was cleared. Again, we suggest that we are dealing with a domestic surface covered with very fine, white powdery sediment. In the floor's southern edge, near the excavation area's limits, plaster became rarer, and all that was left was a brown patch of trodden earth with flat-lying sherds. The presence of domestic activities was indicated by the presence of a semicircular installation (2391) filled with loose brown loamy soil: this feature seems to have been a bin for small-scale storage (different from the compartments in Room 4).

In the northern half, traces of Phase III floors contemporary with 2382 were much harder to detect, due to the intrusion of circular Pit 2383, itself dug into the larger disturbance 2399. The only element of flooring contemporary with 2382 was a surface of brown clay (2389). Flat sherds and a bone awl suggest that this was also a living and working surface.

Early floors of Phase III in Room 3

By removing Floor 2382 in the southern half of the room, it was surprising to find a harder and shinier surface (2397) at an elevation of 18.52 m, which rose slightly against the eastern Wall 1720. This surface also had a white crust of plaster. The finds on this floor were also domestic and included yellow and whitish flint flakes. Another revelatory feature was a sheep mandible embedded in this plaster floor, as well as another semicircular installation (2395) of stone and more sheep mandibles protruding from the section at 18.59 m. It is likely that plaster Floor 2397 extended in the northern half of the room as well; certainly, it continued under stone partition 2379/2348.

South of 2395, close to the southern section separating Squares 305/295 and 310/295, an unusual number of sherds, including at least partially restorable vessels, were uncovered.

In this early sub-phase of Phase III, the northern and southern halves of the room appear to have had similar functions, with no partition evident between Floor 2397 and the patches of surface (2405) lying to the north.

The beginning of Phase III in Room 3: Floors 2401 and 2417

Below Floor 2397, an even better-preserved plaster surface (2401) was uncovered at 18.44–18.46 m. Despite the traces of fallen stones on the plaster, 2401 was quite an even floor (**fig. 7**). In the northern half of the room, this plaster surface was almost completely obliterated. It was also disturbed in that area by a round cobble (2412) surrounded by several boulders. 2401 was not only the thickest plaster surface, it was also the earliest one. Pieces of plaster removed from the floor measured up to 2 cm in thickness. To the north, the earliest Phase III surface was elusive.

Fig. 7- Floor Context 2401 in the north-western extension of Room 3. View from south.

The construction of the building

In 2011, while removing the Phase IV Floor 1726 in Room 4, a 1.5 m thick fill of cobbles, was uncovered. This deliberate infill of stones seems to have been created to separate Phase III from Phase IV, which was also a phase of reconstruction of some (but not all) of the walls. The preparation for the construction of Building 4 at the beginning of Phase IV was also marked by the levelling of space in the north-western extension of Room 3 (and in Room 5) with 15–30 cm cobbles. Unlike in Phase V, these cobbles were not river-worn, but are limestone blocks that resemble construction material. It is therefore theorised that they may have been removed from earlier structures of Phase II to contribute to the redesign of the building in Phase IV. The levelling stones filled an oval pit dug into the soil (2424). The base of the fill of rubble lies above sterile soil in this part of the room.

The construction of rubble-filled Pit 2428 is also the reason why no floors of Phase II survived in the northern half of the room. The rubble fill, moreover, was at its densest in the central part of the room, while near Wall 1720 only loose brown earth was found, which seems to be filling of a wall foundation trench. This indicates that the levelling of the entire surface for Building 4 went hand-in-hand with the construction of the walls surrounding Room 4 (1720, 1604, 1733, and 1731).

A series of architectural observations was made while removing the earliest remains of Phase III. We noticed that Walls 1720, 1731, 1733, and 1602 went much deeper than other walls of Phases III, for instance 1748 (**fig. 8**). Building 4 seems to initially have been a free-standing square storage room before additional spaces (Rooms 3, 5, and 6 to the south, west, and north) were added. An additional element supporting this hypothesis was observed while looking at the corners of Walls 1731 and 1733, of 1733 and 1720 and finally of 1720 and 1602. In these corners up to 70 cm long, rectangular well-carved blocks of limestone were inserted, set on top of each other in a header-stretcher fashion. The depth of floors and installations discovered inside Room 4 in 2014 and

their comparable elevations also strengthen the idea of a free-standing square room or tower before its inclusion into a larger structure (Building 4) later in Phase III.

Fig. 8- Foundation of Wall 1748 between Rooms 3 and 6. View from west.

disappeared. The top of Wall 2386 was encountered around 45 cm above sterile soil. Wall 2386 shows that the Phase II structure had a slightly different orientation than Building 4 above it (**fig. 9**).

Fig. 9- Wall 2386 (Phase II). View from south.

Phase II

In the north-western extension of Room 3, Pit 2432 obliterated much of the Phase II levels. Round pits in the same space (for instance 2399) also played an important part in levelling Wall 2386, which went under Phase III's Wall 1748. The bulldozer section also resulted in irretrievable damage done to Wall 2386's western face. Only one or two courses were preserved. In the southern half of the area excavated in 2016, the wall, oriented north-east to south-west, had entirely

Obviously, the attribution of Wall 2386 to Phase II must await pottery dating from related floors. Very little of the latter, however, were found: Context 2428/2430, a hard-trodden surface with sherds lying flat was cleared in a 1.60 × 1.70 m sounding made in the southern half of the room (in an area unaffected by rubble-filled Pit 2432). It contained a lot of charcoal and its elevation is coherent with the base of Wall 2386. A patch in the northern half, near the middle course of Wall 2386, was encountered slightly higher up, at 18.17 m, and could be the same Floor 2428/2430 sloping up.

Phase I

A sounding measuring 1.45 × 0.93 m was opened below Floor 2428/2430, in order to reach sterile soil and ascertain whether any Chalcolithic (Phase I) occupation was present. Two infant burials of this period had been encountered in the western section in 2005 (Badreshany, Genz and Sader 2005: 28, 29). In this small sounding, Chalcolithic sherds were encountered (see *infra* contribution by Baldi). Though the concentration of sherds was quite dense, no structural remains were identified. As in Room 6 in the north-west corner, sherds were found directly on top of sterile deposits (Genz *et al*. 2018: 50–52). This would imply that occupation during this phase was much less dense than in the Early Bronze Age II–III phases.

Excavations in Room 5

Phase III

Only the southern part of Room 5 was preserved; the northern part of the room was destroyed by bulldozer activity (**fig. 2** and **10**). This part of the room was excavated during the previous seasons to the level of an early Phase III (Early Bronze Age III) flagstone Pavement 2363 at 18.79 m asl (**fig. 11**). A goal of the 2016 season was to define layers contemporary with the pavement in other parts of the trench and to identify the pre-pavement stratigraphy in this part of the building.

During early Phase III, Room 5 and Room 6 to its west were not separated by north-south running Wall 1727 as in the subsequent phase. Room 5 seems

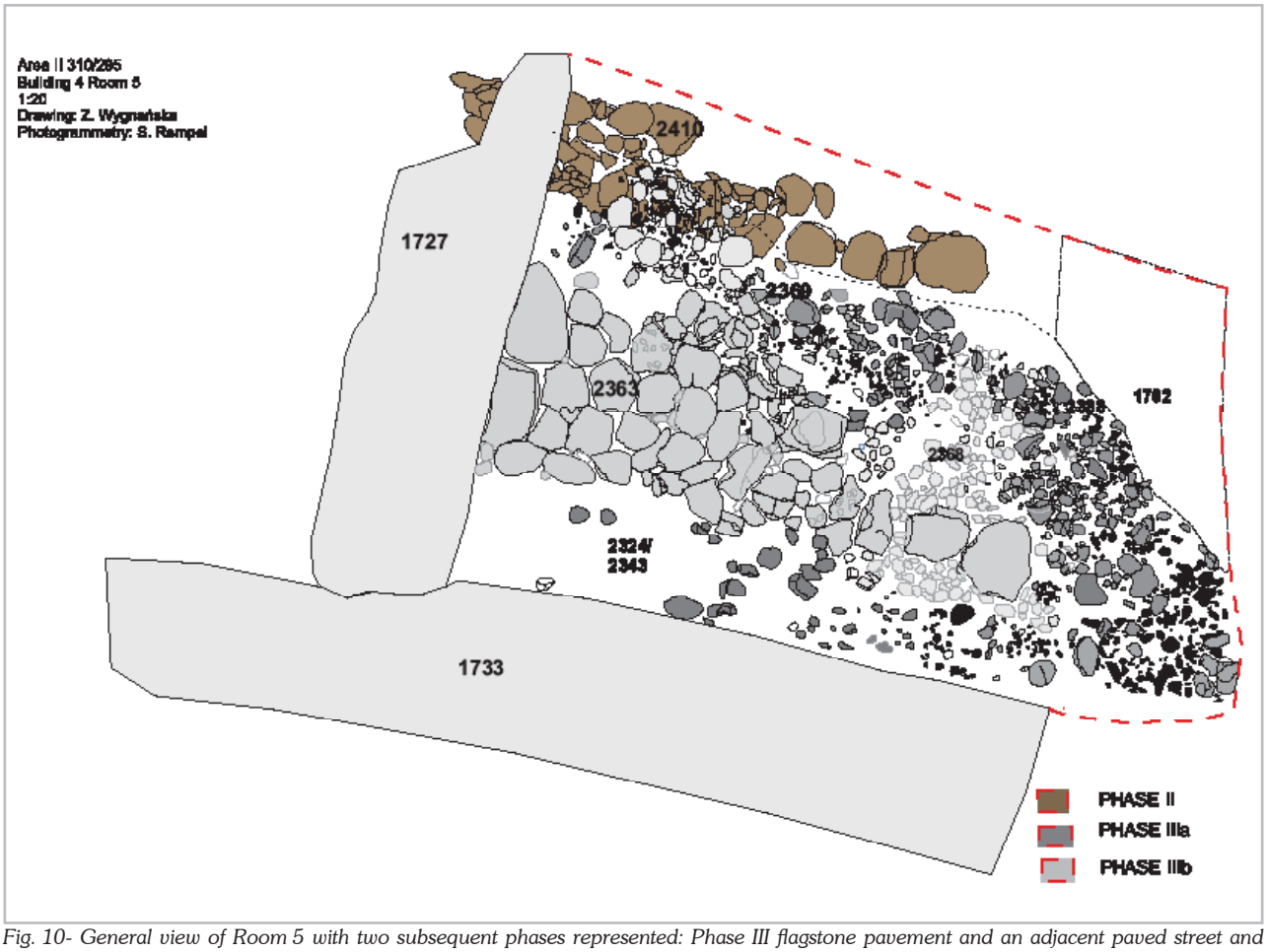


Fig. 10- General view of Room 5 with two subsequent phases represented: Phase III flagstone pavement and an adjacent paved street and Phase II Wall 2410.

Fig. 11- General view of the Phase III layers in Room 5 from east.

to have functioned as an open-air space. The east-west running flagstone Pavement 2363 in the middle of the room turned out to be constructed of two layers of flagstones set in two rows and in some spots filled by layers of pebbles. In its eastern part, the pavement was partly covered by characteristic white, naturally smoothed pebbles (2373) originating most probably from the beach. This pavement is theorised to have originally extended through Room 5 into Room 6 (although remnants of such pavement were not actually found there).

Contemporary with the Pavement 2363 was also the so-called street extending along the eastern side of Building 4 and running southwards towards the central part of the site, probably one of the main communication arteries in Phase III (**fig. 2**, **10**, **12**, **13** and **14**). It was an alleyway almost 1 m wide, which sloped westwards. A series of three sequential trodden surfaces were uncovered in this alleyway (2354 at 18.89 m, 2367 at 18.84 m, 2388 at 18.74–18.58 m asl) separated by *ca* 10–15 cm thick fills. All three trodden surfaces were characterised by packed-down dark brown soil mixed with densely scattered pebbles, multiple sherds and animal bones, and they seem to have been level with and open to the pavement Surface 2363 (**fig. 14**). This street seems to have been abandoned after the Wall 1727 was built separating Room 5 from Room 6. Following this event, the street was filled with approximately 1 m of soft debris and refuse (2311, 2317) as observed already last season.

At the time of the pavement construction, some repairs seem to have also been made in Wall 1733 – the northern wall of Room 4. It is especially visible in its eastern corner of the lowermost level where the wall

Fig. 12- Northern face of Wall 1733 and street section east of it. View from the north.

was built of irregular bigger and smaller undressed stones, unlike the upper courses built of rather massive hewn stones (**fig. 12** and **13**). The level of these repairs also corresponds with fills upon the Street 2367.

Despite some rearrangements conducted in the later part of Phase III (abandonment of the street, building of the partition Wall 1727) there was, however, a clear continuity in the use of Room 5 between the earlier and later sub-phase. Leaving a vacant lot between the southern Wall 1733 and the western Wall 1727 indicates that the Compartment 2324 dug next to a cobbled Surface 2319 was used already in the earlier part of Phase III (**fig. 10**). This rectangular pit measuring *ca* 2.1 × 0.6 m and of 1 m in depth abutted the Pavement 2363 from the south (its bottom was at 18.58 m asl). The feature was filled with patches of white plaster interlaid with ashes, with some olive pits in its western half and rather compact soil mixed with stones, some olive pits and scarce pottery pieces in the eastern part. It might have been associated with olive storage although it also produced phytoliths for wheat (*Triticum sp.*) and barley (*Hordeum sp.*), which were sitting on a bed of visibly white residue that produced phytoliths for sedge (*Cyperaceae sp.*) and reeds (*Phragmites*), likely used to line the bin. This evidence, along with phytolith results for storage compartments in Rooms 2, 3, and 4, is in preparation for publication by A. Damick (see also Damick 2019).

Fig. 14- View to one of the lowest trodden surfaces in the street in Room 5 and the superimposed fill.

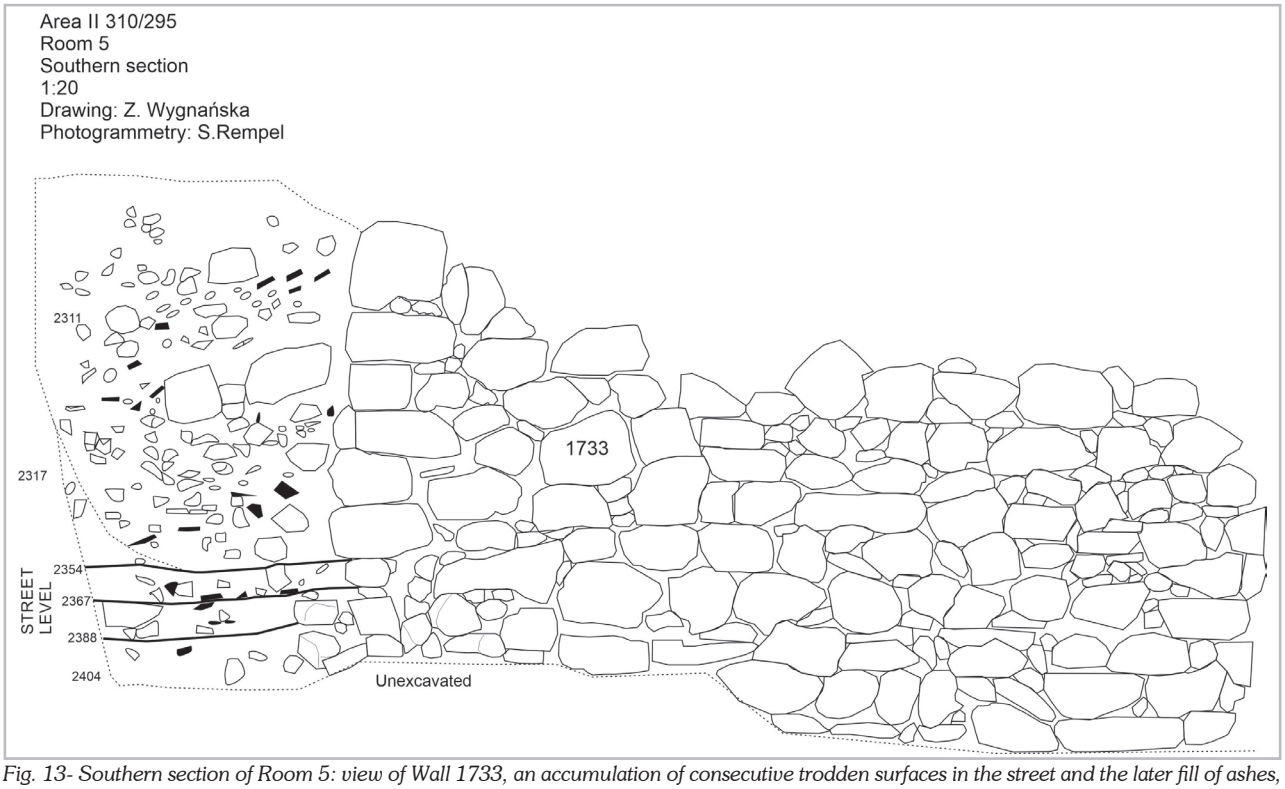


Fig. 13- Southern section of Room 5: view of Wall 1733, an accumulation of consecutive trodden surfaces in the street and the later fill of ashes, pottery pieces and bones sloping gently east of Wall 1733.

A pebbled surface 2368 (C. 2348 = 2368) abutted the Pavement 2363 from north at the level corresponding to the later level of the street (2367). A circular installation 2369 constructed of pebbles and filled with crumbled soil, sherds, and small stones was found in its north-western part (at 18.72 m asl). A spot of ash with white plaster-like substance and a handful of charred olive pits, possibly associated with the installation, were found between 2369 and the Wall 1727.

Transitional Phase II to III

The level below the pavement starting from *ca* 18.60 m asl is associated with an early phase of the Early Bronze Age III during which the abandoned walls of Phase II were covered and levelled (**fig. 15**). A sequence of superimposed fragmentary floors (topmost one 2394 extending towards Room 4 and 2406 in the western part at 18.57 m asl) and fills between them (2381, 2402/2404, 2408) were built up all over the room. The floors were only patches of trodden surfaces often containing flat-lying sherds, animal bones and lithics mixed with pebbles. Interfaces between the floors and the fills were difficult to distinguish. These trodden surfaces were subsequently partly destroyed in the central and north-eastern part of the trench by pits with stone rubble (2385 and 2403 in the north-east part of the trench at *ca* 18.63 m asl) slightly sloping northwards. The pits were filled with cobbles in their upper layers (perhaps remnants of the collapsed Phase II structures) but had a dense fill of sherds, bones and lithics coming from lower levels (which may represent Phase II material, into which the pits were dug). They are probably contemporary with the levelling actions undertaken in Room 3 prior to construction of Building 4. There was no indication, however, in Room 5 as to their function; it seems that in this area, the stone rubble-filled pits were part of a short phase of abandonment.

Phase II

Below Room 5, Phase II remains were represented by debris composed of brown soil deposits (2423 and 2426), a wall (2410) and a huge garbage pit (2461), as well as a series of slightly later superimposed floors and fills. A single wall (2410) running on the north-west to south-east axis was found at the north-western limit of the trench and is so far the earliest architectural remnant under Room 5 (**fig. 2**, **10** and **15**). It was founded at 17.94 m asl and preserved only two courses high. Its masonry consists of two rows of big undressed stones packed with smaller stones and pebbles and the foundation in the northern part is reinforced by massive ashlars. The wall extends towards Room 6, where its continuation further to the west was destroyed by the bulldozer (**fig. 16**). A few large stones sloping northwards from the top of the preserved wall mark its final collapse level. There were no other architectural features associated with Wall 2410 in Room 5, although it was probably identical with Wall 2332 in Room 6 and possibly also joining perpendicular Wall 2330 (Genz *et al*. 2018: 50, 51). These walls are probably contemporary with 2386 in Room 3 and possibly, with the Floors 2428/2430 found at the foundation level of 2410.

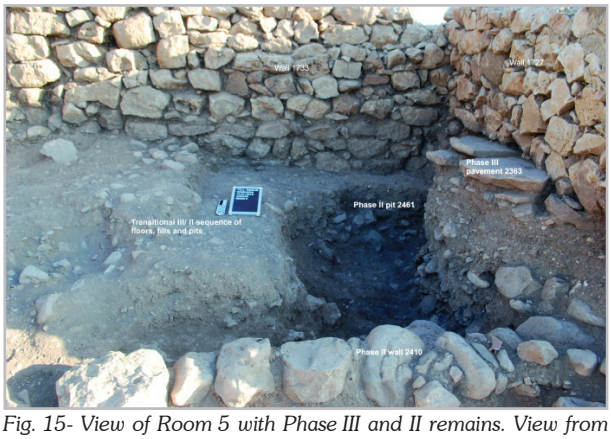


Fig. 15- View of Room 5 with Phase III and II remains. View from north.

Fig. 16- View of Rooms 5 and 6 from the north: Phase II Wall 2410 below Phase III Wall 1727.

Not much of the original intramural levels from this phase was preserved below Room 5. Spots of white plastered floors were found mostly in the western half of the trench in this phase (2411 over the pit 2421 at 18.31–18.24 m and 2420 in the middle of the trench at 18.30 m asl). These were perhaps the only levels of use, which were originally associated with the Wall 2410 in the Phase II horizon. Significantly, they were approximately 0.3–0.4 m higher than the Phase II floors found in Room 3, although this could be related to post-depositional shifts in the strata. The Phase II level was not reached in the eastern half of Room 5.

The cause of the bad state of preservation in the western half of the room is the later excavation of a huge, at least 1.8 × 1.8 m, garbage Pit 2421 located in the south-western part of the trench (**fig. 17** and **18**). It was dug from the level of 18.26 m (*ca* 10 cm below the uppermost fragmentary Phase II floors) through the Phase II layers to sterile soil at 17.74 m asl. The pit was partly filled with a loose brown soil matrix containing multiple stones and large pottery pieces. There are also a number of empty pouches in the fill of the pit and silty layers of light-brown colour between the stones, which may indicate the presence of decayed organic material.

The earliest Phase II remains consist of compact brown debris of soil (2423 and 2426) with scanty pottery sherds and lithics spotted only in the north-western and south-eastern corners of the trench where the pit did not disturb it. The top of this deposit was at 18.27 m asl and its bottom at *ca* 17.96 m asl; its full extent, however, was not clarified. It seems that the Wall 2410 was dug into the debris and thus, it probably postdates it. However due to the limited exposure of the debris this relation is not clear.

Phase I

Phase I (Chalcolithic) was reached only in a small sounding in the SW corner of Room 5.

It was a *ca* 10–15 cm thick layer of a deep brown, compact soil (2436) with scarce sherds characteristic of the Chalcolithic period. There were no architectural features associated whatsoever. The Layer 2436 was deposited directly on sterile soil, reached at 17.70 m asl.

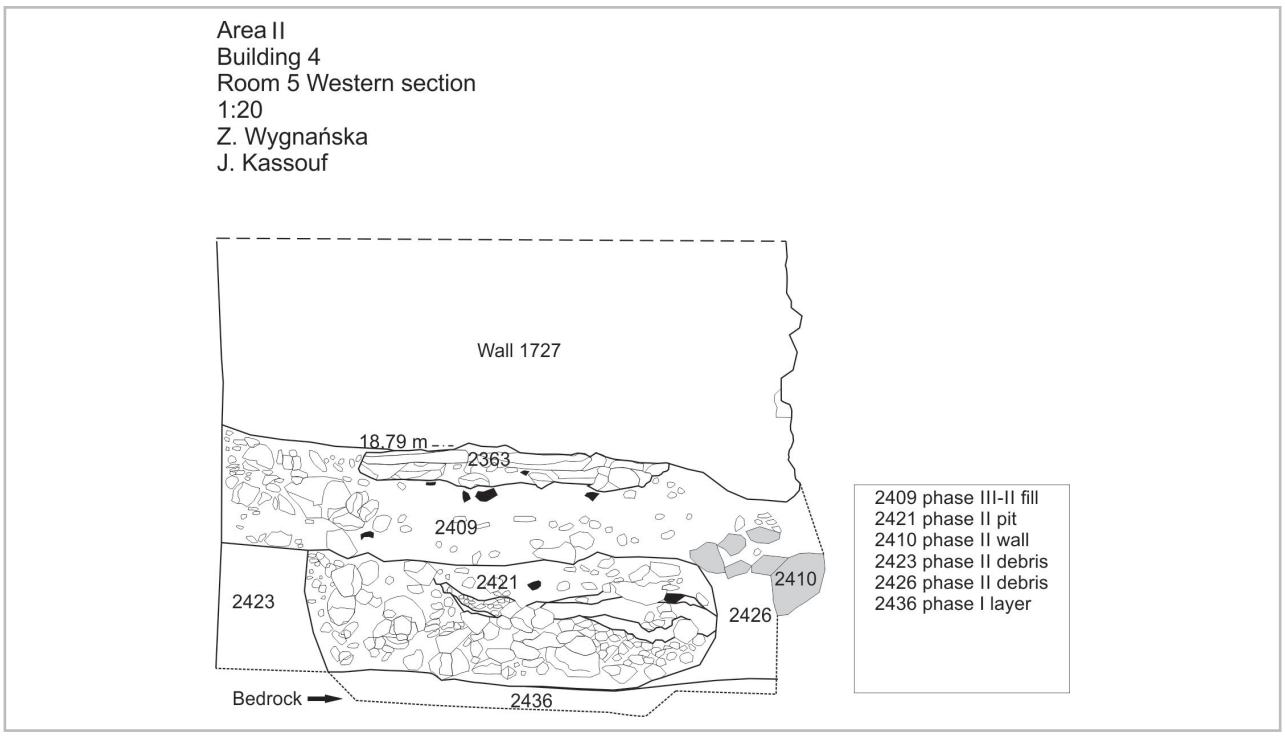


Fig. 17- Western section of Room 5 with the later Phase III Wall 1727 separating Room 5 from Room 6, the Phase III/II trodden surfaces below the Pavement 2363 and the large Phase II Pit 2421.

Fig. 18- Pit 2421 below Pavement 2363.

Area III

MARSHALL WOODWORTH and MAHMOUD MARDINI

The excavation of Area III was initiated in 2014. During this season, excavations were largely restricted to the removal of topsoil and dark, heavy clay fill used to backfill trenches and pits constructed by the Syrian army during and after the Lebanese civil war. Some archaeological features were also exposed, including a stone wall dating to Phase VI (Middle Bronze Age) that is aligned with a generally east-west orientation (Context 3001) as well as a potential archaeological feature along the east section of the square defined in the following year as Middle Bronze Age Tomb 3109. Work in 2015 consisted of opening Square 260/325 and excavating the Middle Bronze Age Chamber Tomb 3109 (Genz *et al*. 2018: 54, 55).

The 2016 excavation season consisted of opening up Square 265/320 as well as continued work in Square 260/320. Work in Square 265/320 was carried out only for a few days, but as the excavations there still provided evidence of modern disturbances, work was stopped there (**fig. 19**).

At the end of the 2015 season, it was speculated that compartment-like structures west and east of Tomb 3109 suggested the presence of further chamber tombs (Genz *et al*. 2018: 54). However, as indicated above, the area east of Tomb 3109 in Square 265/320 was heavily disturbed, and the same turned out to be

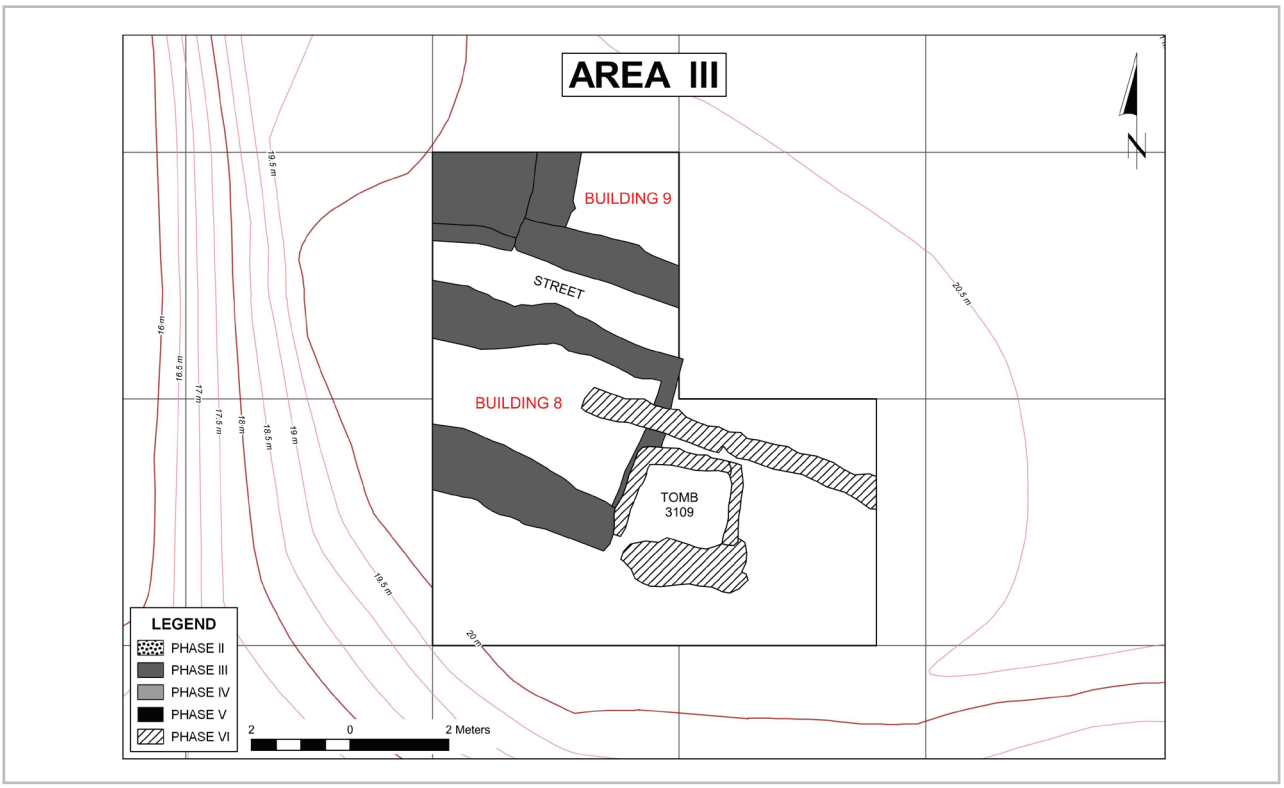


Fig. 19- Schematic plan of architecture and features uncovered in Area III.

true for Square 260/320 west of Tomb 3109, which in 2015 looked like the most promising candidate for another chamber tomb (Genz *et al*. 2018, fig. 20; **fig. 20**).

The results of the subsequent excavation during the 2016 season indicated that the supposed capstones were possibly a result of the collapse of other architecture or subsequent disposal and not an intentional construction. Additionally, the western wall of the suspected compartment was determined to be a modern-period wall (Context 3202/3006), constructed by the Syrian army during its occupation of the tell. A modern ash pit (Context 3044) and a small layer of dark, heavy clay (consistent with other modern fill contexts in the area) directly underlying the base of the wall suggest that this feature is a modern installation. No human remains or other materials that might be associated with a funerary context were recovered from this area. The lower strata, excavated after the removal of the modern wall (Context 3202/3006), are consistent with those of Building 8.

Fig. 20- Context 3030, suspected to be another chamber tomb before the beginning of the excavations in 2016. View from south.

Excavation of Squares 260/320 and 265/320 revealed two Early Bronze Age buildings, tentatively attributed to Phase III. Building 8 is located in the northern portion of Square 260/320 and southern portion of Square 265/320. Building 9 is located in the north-eastern portion of Square 265/320. The two buildings are separated by a narrow street, with a roughly east-west orientation and slightly varying width of approximately 1.5 m (**fig. 21**). The street deposits (Contexts 3209 and 3212) were rich in material such as pottery sherds, animal bones, olive pits, lithics, and groundstone objects.

Fig. 21- View of the street separating Buildings 8 and 9. View from east.

Of Building 8 one room of rectangular shape, orientated east-west, was uncovered. The western wall of the room was not determined due to the building's continuation past the western baulk of Square 260/320. The upper layers excavated during 2016 included a fill context with some modern debris (Context 3038) above a light ash layer (Context 3039). This deposit was only a few centimetres in thickness (as observed from the western baulk and under the modern retaining wall; Context 3006). A few partially restorable vessels suggest that this context may represent a floor. Under Context 3039 a deep fill context was encountered (Context 3040). During the excavation of this context, it was observed that the southern wall of Building 8 bowed significantly northwards into the building. It is possible that the underlying Context 3040 was filled in during occupation to shore up subsidence of the southern wall to allow continued habitation of the building. Beneath Context 3040, an apparent floor context was encountered (Context 3041). The apparent floor slopes downward significantly in the southern portion of the context. Extensive pottery collections, many of which appeared to have been burnt post fracturing were encountered. Continued excavation revealed a lower context (3046) in which

restorable pottery was encountered in the south-west corner as well as a possible plaster surface in the eastern part (**fig. 22**).

A small sounding was conducted along the southern wall of Building 8 below Floor 3046. The nature of the material quickly transitioned to red clay-rich soil with a high frequency of fist-sized rubble cobbles. The nature of the soil and inclusions are similar to that of an upper fill context (3040). Excavation was terminated due to concern for potential destabilisation of the southern wall of the building.

Initial excavation of Square 265/320 revealed a very thick disturbance layer (Context 3201, approximately 70 cm deep) under a thin stratum of topsoil most probably caused by the Syrian army's occupation of the tell. Context 3201 yielded a single notable out-of-context limestone anchor probably from the disturbed Early Bronze Age or Middle Bronze Age contexts (FAD16.265/320.43). Another modern architectural disturbance also found was characterised as a retaining wall (Context 3202) that is a continuation of the wall excavated in Square 260/320 (Context 3006).

Three main features were excavated in Square 265/320 during the 2016 season: Building 9 (Contexts 3204 and 3213); a pavement that probably formed an entrance (Contexts 3214 and 3215) to Building 9; and a street (Contexts 3209 and 3212; as described above). Found directly under the modern disturbance layer (Context 3201), the southern wall (Context 3204) belonging to Building 9 has an east-west orientation extending approximately 2 m in length where it forms a corner with the western wall (Context 3213) while the eastern extent continues into the baulk. It is composed of flat dressed limestone measuring *ca* 40 × 30 cm; however, some of the lower courses are made up of smaller-sized undressed fieldstones. Only four stone courses were exposed by the end of the 2016 season yet more most probably remain to be excavated underneath. A huge corner stone measuring approximately 75 × 61 cm was found at the western edge where the southern wall (Context 3204) connects to the western wall (Context 3213). The corner stone also acted as a stabilising foundation for the Building 9 and may be indicative of the substantial size of the building.

The western wall of Building 9 (Context 3213) has a north-south orientation extending approximately 1.6 m in length and continues into the northern baulk into the unexcavated Square 270/320. Abutting Context 3213 to the west is a pavement (Context 3214) composed of huge flat limestone boulders measuring approximately 55 × 50 cm. The probable entrance structure (Context 3214) has boulders laid in a flat manner perhaps to facilitate walking on a surface leading into Building 9. The exposed area of the pavement (Context 3214) measures approximately 1.5 × 1.3 m while the rest of the structure expands into the northern and western baulks.

A small step (Context 3215) was found abutting the southern edge of the pavement and it is composed of two medium-sized dressed limestones measuring approximately 30 × 20 cm. The step appears to act as a way to access the entrance pavement of Building 9 from the street (as described above; **fig. 23**).

Fig. 22- View of Floor 3046 in Building 8. View from east.

Fig. 23- Street and Building 9. The pavement probably representing the entrance to Building 9 is visible on the lower left. View from west.

The 2016 excavation of Area III in Squares 260/320 and 265/320 was conducted to clarify the nature of the architectural elements exposed during previous excavation as well as to examine potential lower levels of occupation that might provide further evidence of the nature of the occupation of the site during Phases III and IV, the main periods of occupation on the site. We especially hoped to encounter traces of domestic habitation in contrast to the 'public building' nature of the architecture in Area II. While the construction technique is characteristic of the Early Bronze Age III buildings found in Area II (Genz *et al*. 2010; Genz *et al*. 2011; Genz *et al*. 2018), no evidence of administrative and storage activities was found in Area III. The walls of Building 8 are constructed with smaller stones and smaller width than those typically observed in Area II. The narrowness of the street as well as the inconsistent orientation of the buildings is another difference in the architectural nature of Area III. Based on the preliminary analysis of the architecture, pottery and associated finds, it is perhaps reasonable to suggest that Area III is a domestic quarter in character. A preliminary study of the pottery indicates that Buildings 8 and 9 should be assigned to Phase III. It should be noted that these results are preliminary due to the incomplete exposure of the buildings and the effects of modern damage.

Area IV

Naseem Raad and Anja Rutter

Area IV was opened in 2014 in the hope of finding the eastern border of the settlement, possibly characterised by living quarters or workshops of a less prestigious nature than the buildings on the western, seaward side of the tell uncovered in Area II. During the 2014 and 2015 seasons, excavations revealed two massive walls (Contexts 4013 and 4021), characterised by two courses of rather large, partly dressed limestone blocks, the likes of which had not previously been encountered at Tell Fadous-Kfarabida. They rest on a foundation layer of dark, clayey soil and lie perpendicular to each other, forming a single structure filled with tightly packed rubble and overlain with the notorious red sediment observed throughout the area. This impressive piece of architecture is indicative of a fortification context, suggesting that we had indeed reached the easternmost edge of the tell. This was further corroborated by the outer north-south walls in the eastern area of the square, composed of Contexts 4014 and 4050, which lie at a slope on the tell (Genz *et al*. 2018: 57). Excavations in 2015 also exposed several phases of construction, most clearly depicted in the Walls 4115 and 4120, which blocked an earlier thoroughfare south of the fortification Wall 4013. They abut perpendicularly against 4013 and 4110; this discontinuity also supports a characterisation of these blocks as part of a more recent phase of construction. Any other archaeological features that might have existed east beyond the current scope of excavation were lost by the construction of a now-defunct railway line to the east of Area IV.

For the 2016 season, the aim was to determine the extent of the above-mentioned features, to shed further light on the various phases, and to better understand the function of the main walls uncovered so far. Consequently, Area IV was expanded towards the south into Squares 280/380 and 280/385, and west to explore the area inside the gate uncovered in 2015 (**fig. 24**). This report outlines some of the major developments of the 2016 campaign and suggests several phases according to stratigraphic sequences and architectural relationships.

The Fortification Walls

As has been discussed in more detail previously, at least three phases can be differentiated based on the architecture in Area IV (Genz *et al*. 2018: 55–59), though this season's results may have identified a fourth. The first architectural phase is associated with Walls 4013, 4021, and the western extension of the fortification wall (4105). These features rest on a thick, black clay that appears to form the foundation layer. They were erected as part of a fortification structure, as attested by the carefully carved outer face infilled with rubble. No inner face has been identified. These features extend to the north and west, but due to time constraints, their full extent was not determined.

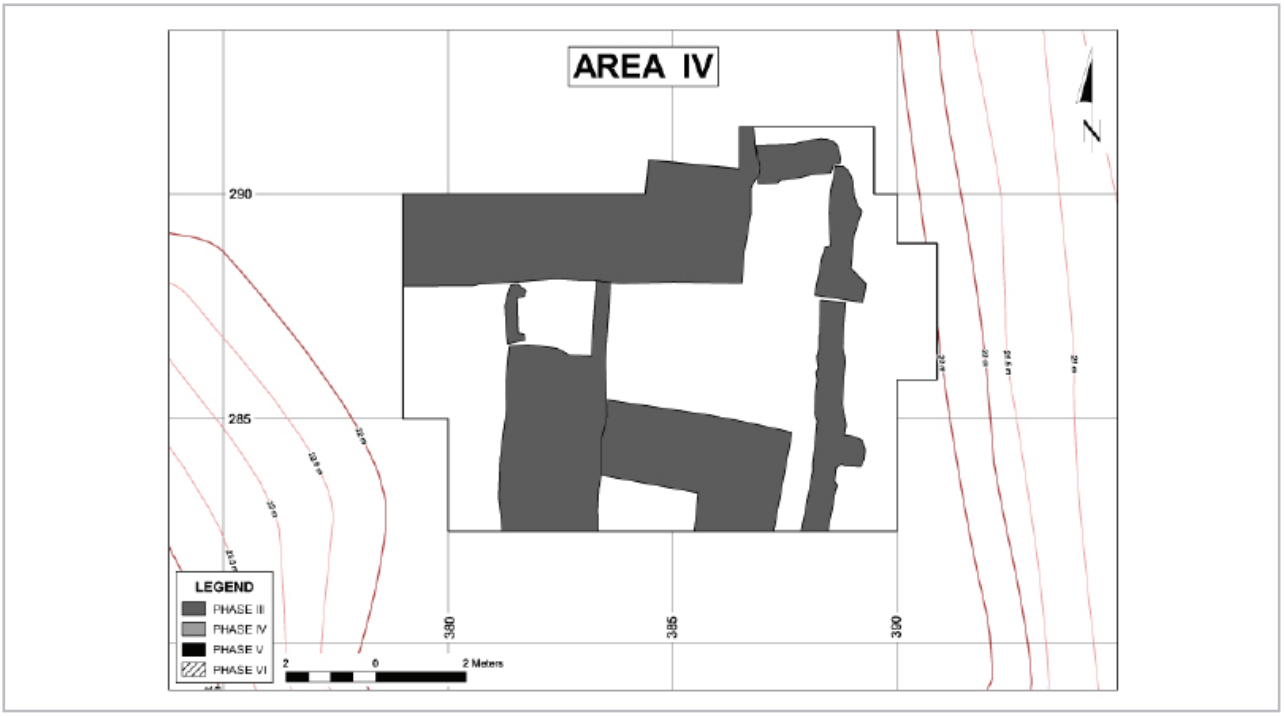


Fig. 24- Schematic plan of the architecture uncovered in Area IV.

Parallel to Wall 4021, two walls running east-west (4212 and 4227) were uncovered in 2016, forming an 'L' shape and extending into the southern section. Curiously, the southern face (4212) is far more carefully executed than the northern one, and lies on a foundation layer of thick black clay interspersed with fist-sized limestone cobbles. The northern face lies on a foundation layer of loose, brown, organic-rich soil adjacent to the street Context 4320. There is also a distinct break in the red sediment observed in the section, replaced instead with a loose, black soil (**fig. 25**). Finally, several strata of surface layers were uncovered in the south-eastern corner of the trench, between the outer city wall (4317) and 4227. Thus, it is tempting to propose two different phases of construction for 4212 and 4227, though the fact that they are parallel and infilled with rubble makes such an assertion difficult to prove definitively.

There is no clear break between these newly discovered walls (**fig. 24**; left side of the figure) and Wall 4110 to the west, and, as such, they should all be taken as a continuous infilled wall. This further corroborates the proposition that features 4115 and 4120 are blocking walls that came in a later construction phase, enclosing the western space uncovered in 2015 (see Genz *et al*. 2018: 58). This prioritisation of city walls and a subsequent organisation of possible domestic areas following and according to the outer fortification appears to be a common characteristic of the Early Bronze Age II–III in the Levant (Nigro 2013: 198; Sebag 2005: 229).

Fig. 25- View of Area IV from the east at the end of the 2016 season.

The Western Chamber

The enclosed space in the western portion of the square, an area of at least 2.75 × 2.75 m (the western extent of Wall 4105 was not identified), has been discussed previously (Genz *et al*. 2018: 58, 59). In 2016, the excavators expanded north and south to further trace Walls 4013 and 4105, and attempt to define the limits of the chamber. The identification of Wall 4133 in the 2015 season was an indication of the southern extent, which was further exposed in 2016.

The room or courtyard was filled with thick layers and patches of ashy sediment, very soft in some places, rather compacted and plaster-like in others, which contained huge numbers of tightly packed limpet shells, as well as other shells and fish remains. As a result, pending further examination, the interpretation of this space is that it formed a courtyard or room in a residential quarter that was then used as a dump (**fig. 26**).

The collapse found in the western portion of the square (4135) indicates a flimsy wall with a west/north-west to east/south-east orientation. It continues beyond the area, resting on some tough reddish clay (4143) that likely serves as a foundation layer. However, the archaeological layers that continue under these contexts clearly point to them being later phases.

Another wall (4133) abuts 4135. Wall 4133 is at least three courses high and oriented east-west, enclosing a space between the fortification wall and 4135. A remarkably large stone, wedged into place with two oblong ones, covers the feature and gives the impression of blockage, or of a threshold, though no wear marks are discernible. Neither is there any indication why such a striking piece of masonry should guard access to the rather indistinct rubble south of it (4219). That the flimsier walls of rooms and courtyards should follow directly inside gate constructions and sometimes even abut fortification walls is a common feature of Early Bronze Age fortified settlements in the region, see for example, Habuba Kabira in Syria (Strommenger 1980) and Khirbet ez-Zeraqon in Jordan (Douglas 2007).

Fig. 26- Contexts 4133 and 4135 with courtyard dump. View from the north.

Altar or Large Foundation Stones?

The most intriguing feature, a rectangular structure situated within the western end of Wall 4105, came to light at the very end of the excavation. Two fairly large stones form the face of the wall here, similar to the corner of 4013 and 4021, but on a layer of smaller stones (**fig. 27**). There was no time to ascertain whether they indeed form a corner – the lower layers and rubble packing run on to the west and north. A gap in the wall face between 4013 and 4105 shows wear marks that point to its use as a threshold, and at least one rectangular cut stone, though tilted out of its original position, leads as a step up to the rectangle of 4145.

This feature is noticeably better constructed than the flimsier walls of the area (e.g. 4051), of carefully squared and smoothed limestone, and unusually rectangular, given the great range of stones we have encountered. The large south-eastern corner stone is no longer quite *in situ*; it was used to form a line with the others. However, the feature does not align with any other in this area. It is set into the rubble packing 4104 of the north wall and is filled with grey, soft, silty sediment between the worked stones. Similarly, high amounts of ashy soil (4146) and of organic material with many traces of burnt clay (4147) were observed to the east and south-east respectively, apparently continuing under the rubble packing north of 4105.

The feature is reminiscent of a Late Bronze Age altar in Myrtou-Pigadhes (see Courtois 1973, fig. 15) and a much later altar at Sarepta, similarly set into an earlier context (Pritchard 1975: 14–18, fig. 34). However, a cultic nature of the feature is far from certain.

Unfortunately, there was no time to determine the extent of 4146 within or under the rubble packing, or the number of layers formed by the worked stones.

Fig. 27- Northern face of the gateway Context 4105 with large stones. View from south.

Conclusion

The 2016 season exposed a greater degree of complexity in the architectural phases, with diverse functions. Preliminary analysis suggests possibly four phases based on foundation layers, architectural relationships, and stratigraphic sequences. In the first phase, the large fortification wall and outer city wall were erected, with an active street running east-west. Between 4014 and 4021, a number of dense, clay surface layers were excavated, indicating that this space was regularly used, possibly as a space for guards or some other fortification-related function. These features also appear to be contemporaneous with the central street context identified in 2014 and 2015.

The second phase saw the erection of Wall 4212 running east-west. The parallel Wall 4227 may have been built in a distinct phase, since different surface layers that overlay the street context were identified in context with 4227, indicating a later phase of construction. However, this could also be attributed to later disturbances, and not an initial differentiation of construction phases. Thus, we are grouping the 'L' feature under a single phase, and making note of nuances in sequences.

In the third phase, blocking Walls 4115, 4120, and 4317 were constructed, creating an enclosed space in the former gate passage. A subsequent packing of thick clay and pebbles against the eastern face of 4120 is here proposed as a fourth phase, further establishing our theory of a later blocking. To conclude, excavators are confident that the area represents the eastern limits of the site (**fig. 28**), and the contexts identified represent fortification walls and a gate situation with several periods of use.

While hardly any restorable pottery was found *in situ*, a preliminary analysis of the pottery from Area IV suggests that all four building phases discussed above should fall into the general Phase III (earlier phase of the Early Bronze Age III), as defined in Area II.

The monumentality of the fortification system is truly a remarkable feature of the settlement. This monumentality suggests that despite its small size of only 1.5 hectares, the site must have played an important role in the settlement system of the Early Bronze Age III in the region (see also Genz *et al*. 2016). The many subphases referred to above provide evidence for the constant maintenance and strengthening of the fortification, an observation made at most other Early Bronze Age fortifications in the Levant (Douglas 2007).

Fig. 28- Southern section of Square 285/385 after the 2014 season depicting a continuous layer of red soil sloping towards the east. View from north.

Area V

Berj Wanessian and Jana Alameh

Excavation of Area V was initiated only during the 2016 season. Located to the east of the area damaged in 2004 by modern machinery, its section clearly

demonstrated that there was substantial archaeology in the area, as the length of an almost complete wall was, and still is, visible. The excavation of Area V was conducted at the request of the Directorate General of Antiquities, who wished to ascertain the presence of archaeological remains. Work in the area lasted for three weeks.

Three squares were excavated in Area V: a 3 × 5 m trench in Square 305/350, a 5 × 5 m square in 305/355, and a 5 × 5 m square in 315/345 (**fig. 29**). Archaeological remains appeared at shallow levels (app. 10–15 cm), as opposed to the rest of the site, where up to 1 m of topsoil is generally attested. Some of the *in situ* wall stones were even visible on the surface in this area. The presence of modern artillery shell casings suggested that it was perhaps the military tanks, stationed at Tell Fadous-Kfarabida during the late twentieth century AD, which were responsible for the removal of the topsoil. Due to the time constraint and the immediate encountering of archaeological remains, the team was not able to go very deep in the squares (app. 80 cm). Nonetheless, numerous walls that seem to form rooms were uncovered, as well as several restorable vessels, which will be discussed below.

Building 10

Square 305/350

In Square 305/350 a 3 × 5 m trench was excavated for eight days, and work began by removing a thin layer of topsoil (Context 5000) which still contained a fair amount of modern remains. The first architectural feature found was a large wall (5001) which was approximately 3.3 m long, 1.3 m wide and oriented in a north-south direction. Wall 5001 was constructed of two lines of dressed stones with a 0.4 m wide rubble fill in between, and of which two courses were exposed. The width of the wall indicated that it belonged to a large structure. Wall 5001 formed a corner with feature (5002) that was a rectangular layout of stones with a stone fill in the centre (**fig. 30**).

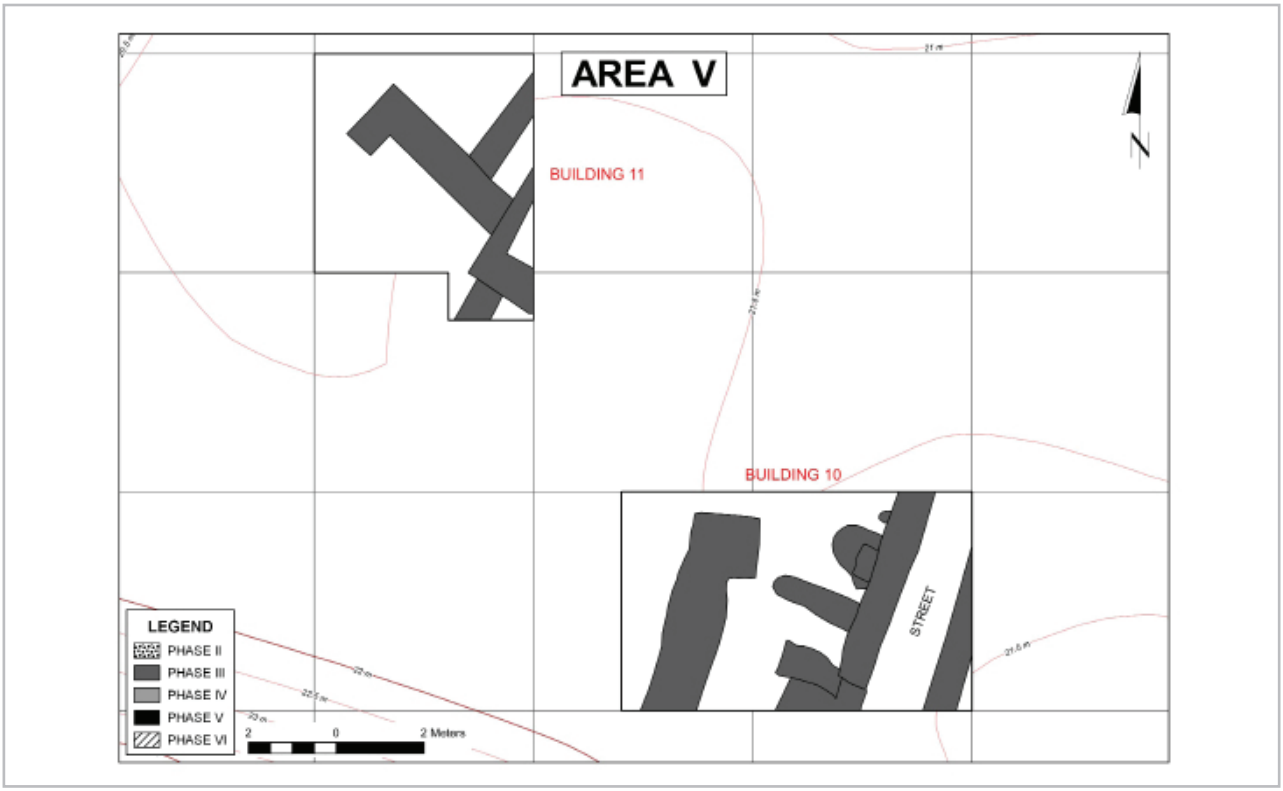


Fig. 29- Schematic plan of the architecture uncovered in Area V.

To the west of Wall 5001 was Layer 5005, which mainly comprised burnt organic remains with very little sediment in between. It was lying partially on top of Fill 5008, which was a burnt circular deposit composed of oxidised clay and that seemed to serve a structural purpose. However, due to its close proximity to an extension into the western section, not much can be said about its function. Underneath Layer 5008 was Pit 5009 which contained a large amount of organic remains and charcoal. It contained a few partially restorable vessels, a stone maul and a broken grinding stone. To the south of this burnt area was a line of stones (5010), which may have been connected to the burnt area and served as its lining.

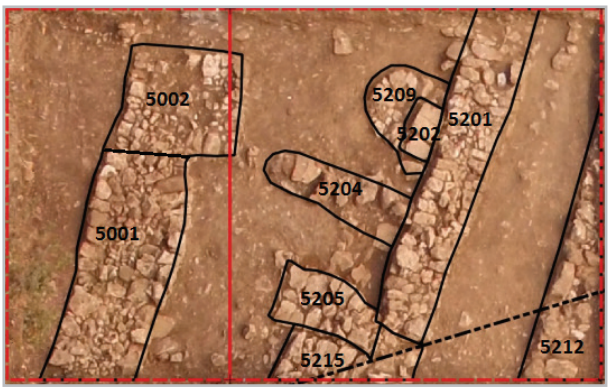


Fig. 30- Building 10 architectural features.

Square 305/355

Square 305/355 was the third square to be opened in Area V, and its purpose was to expand the excavation area that began in Square 305/350. It was excavated for seven days, and similarly to Square 305/350 also had a thin layer of topsoil (Context 5200) which led to the belief that the area had been damaged by past military activities.

The first structure to appear was a north-south wall (5201), made of two lines of dressed stones with a rubble fill in between which was about 90 cm wide (**fig. 30**). It was approximately 4 m long and 1.5 m wide; however, its base was not reached. From its central western side, a line of stones (5204) abutting it was exposed and it extended in east-west direction. Context 5204 was found in a deteriorated state and it approximately has the same alignment as Wall 5002 from Square 350/350. It seems unlikely that they are connected since they have little or no resemblance in appearance, size, and building technique. From the north-western side of Wall 5201, and close to the southern edge of the square two structures appeared. The first was Wall 5205, which extended in north-west to south-east direction and which continued beyond the trench's limits. Wall 5205 appears to have been built contemporaneously with Wall 5201 since their stones were conjoined and they formed a corner. Abutting Wall 5205 and running parallel to it from the south was Wall 5214. Only a small fragment of Wall 5214 was visible since it seemed to have mostly extended further south beyond the limits of the square. Both of the Walls 5205 and 5214 sloped downward from west to east.

Abutting Wall 5205 on its north-western side is a structure composed of two features: a semicircular installation of rectangular stones (5209), which surrounded a broken slab (5202). There are two possible functions for this structure. It could either have served as an entrance/threshold, or it could have been used as some sort of working installation. However, there is not enough evidence to corroborate or negate either of these suggestions. Directly north of 5209 is a flat circular stone (5215) that may have been a pillar base.

In the western part of the square was a large fill (5207). Underneath it was a pebble fill (5210). In the southern part of the square and between Wall 5201 and 5205 was a yellowish-brown layer (5208) that was only partially excavated. Along the eastern side of the square was a wall (5212) made of beach rock that continues into the section, and it was running parallel to Wall 5201. It was built similarly to Wall 5201 and its base was not exposed. Those two walls were separated by approximately 1.5 m. The space in between contained three fill layers, 5206, 5211, and 5213 that were lying right on top of each other. They did not yield any significant finds except for the high concentration of olive pits in 5206 directly next to Wall 5201. This area in between the two walls most likely is a street; however no actual street surface was reached.

It is possible that the Walls 5001 and 5201 formed the outline of one large building with the other features serving as inner walls and installations. If that is the case, then the beachrock Wall 5212 belonged to another structure which extends found further east. Those features were named Building 10 (**fig. 29**).

Building 11

Square 315/345

In essence, this 5 × 5 m square had the most notable artefacts of the area in the form of restorable vessels, but also the least clear architectural elements. There is a main wall going south-east to north-west across most of the square (Context 5103) that connected to several poorly preserved walls (5102 and 5104), which formed a few clear corners (**fig. 31**). The clearest corner is the one it forms with 5106, a wall that runs perpendicular to 5103 at its southern end, with a large, dressed ashlar (110 × 45 cm) making a 90° angle with 5103 (**fig. 31**). Because 5103 was only one course deep while 5106 was at least four, it is likely that 5106 predates 5103, but their exact relationship remains unclear. In order to see if Wall 5106 extended further outside the square, and if it was indeed comprised of large stones, a 2 × 1 m extension was carried out in the south-east corner. This extension showed that Wall 5106 did extend to outside of the square, but that not all of its stones were of the same size. The extension also revealed two stones that seem to form a wall with the large stone of 5106, which runs adjacent to 5103 and also in a south-east to north-west direction, though further excavation work is needed to confirm this. The walls within Square 315/345 have been designated as part of Building 11 (**fig. 29**).

Fig. 31- Building 11 architectural features.

Almost as soon as the excavation began, large pieces of pottery began to appear in the south-eastern part of the square, in the southern corner between 5103 and 5106 and shortly after the neck of a *pithos* began to appear. When fully exposed, the *pithos* was approximately 1m high and 40 cm wide at its widest. As for the preservation of the vessel, one side was mostly intact, except for the base (FAD16.315/345.38; **fig. 32**). There was also the upper part of a medium-sized jar (FAD16.315/345.56; **fig. 33**) near the *pithos*, and large fragments of other vessels. Unfortunately, neither of the restorable vessels seemed to be resting on any discernible floor. Thus, it seems that the vessels were deposited in a pit that must postdate the architecture.

Fig. 32- Pithos *(FAD16.315/345.38) found in Context 5107.*

Fig. 33- Upper part of a medium-sized jar (FAD16.315/345.56) found in Context 5107.

Conclusion

In conclusion, Area V yielded most likely two separate buildings, Building 10 and Building 11. No clear indications concerning their function have been obtained, but the use of large dressed ashlars in at least Building 11 is reminiscent of the public buildings in Area II. Further excavations are required in both Buildings 10 and 11 to identify their function. A preliminary assessment of the pottery suggests a date of these buildings within Phase III, i.e. the earlier part of the Early Bronze Age III.

The Survey Around Tell Fadous-Kfarabida in 2016

Sidney Rempel, Alison Damick
and Hermann Genz

Introduction

A five-day pedestrian survey preceded formal excavations at Tell Fadous-Kfarabida during the 2016 season. The survey was conducted locally in the vicinity of the tell and focused on accessible, privately held plots of land under various states of agricultural use. The main goals of the survey were to:

– Broaden our understanding of local terrain and modern land use to better characterise the site's immediate agro-economic context and potential.
– Assess and characterise 'off-site' artefact typologies and distributions.
– With the results of goal 2, hypothesise a horizontal model of local occupational growth and/or decline.
– Discover and characterise new or undocumented local sites.

A more thorough characterisation of the local environment, both past and present, combined with a sampling of chronological indicators will aid in contextualising Tell Fadous-Kfarabida's socio-economic status within the wider network of its Bronze Age counterparts.

Local Land-Use

Landforms selected for survey in the vicinity of Tell Fadous-Kfarabida were restricted primarily by degrees of development: As with much of the central Lebanese coast, development has steadily increased in the form of urban expansion, resort and villa construction, as well as infrastructure and road improvement. Those areas that remain undeveloped are almost certainly under active agricultural use, or lie fallow. There are virtually no landforms in the immediate area that are undeveloped, apart from several karstic limestone outcrops and the coastal beach itself. The net effect over time has been a steady conversion of arable land to permanent structure use; an effect prompting a timely inventory and assessment of accessible lands in the form of local survey.

Local agriculture is currently focused on mainly orchard and seasonal crop production. Orchard varieties consist mainly of olive, fig, and some citrus, which are typically placed apart far enough to allow very good ground visibility. Orchard terracing in topologically contoured bands has substantially altered the ancient landscape, but has prevented downslope movement of sediments and potentially accompanying artefacts. Cereal and pulse crop fields are often found in differing states of production. During the 2016 survey, the fields selected were in a post-harvest state with moderate visibility due to chaff coverage, or were in fallow and obscured heavily by weed coverage.

Methodology

Surface survey was accomplished by a daily team of 4 to 6 persons, walking linear transects approximately 10 m apart. Where possible, each plot of land was covered by uniform pedestrian transects, however, the irregularity of some landforms/terraces required flexibility in coverage (**fig. 34**). In addition, due to the variability in vegetation cover, transect widths were adjusted for maximum visual coverage as necessary. Artefacts were recorded and collected when present. Features and survey plot locations were recorded with GPS in UTM Zone 36N coordinates (**tab. 1** and **tab. 2**).

Results

While the finds still have to be processed in detail, a cursory overview suggests that almost all finds collected either pre- or postdate the periods attested on the tell. Lithics, Neolithic, or earlier, are attested in almost all surveyed areas. The dense concentration of lithics in survey Plot 6 is part of the site of Fadous South, reported by Copeland and Wescombe (1966: 158) and rediscovered by our team in 2005 (Badreshany, Genz and Sader 2005: 100, 101).

Beside the site of Fadous South, the only architectural features worth noting was a small arched structure built out of limestone between survey Plots 8 and 9 (**fig. 35**). The excellent preservation of the masonry

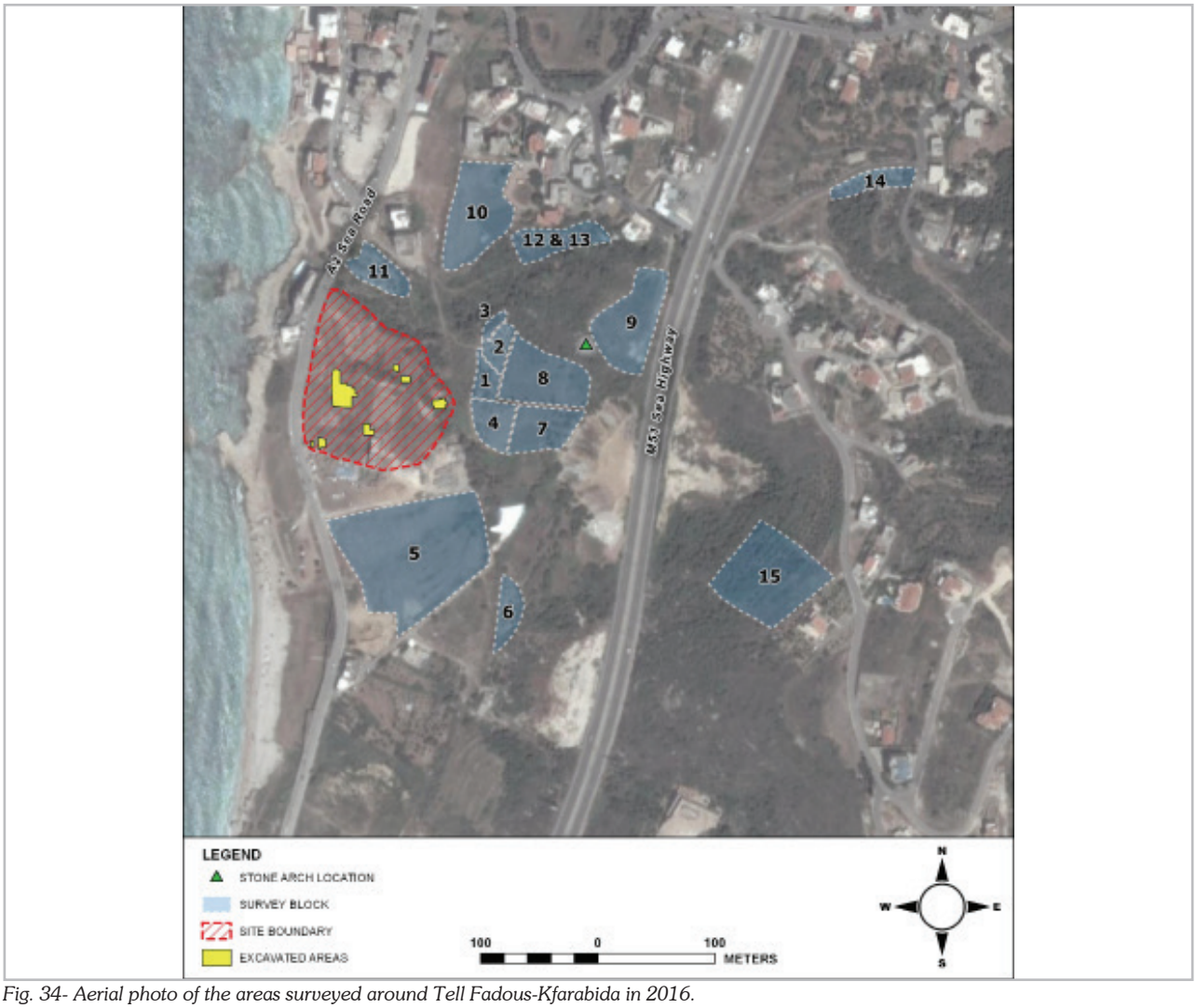


Fig. 34- Aerial photo of the areas surveyed around Tell Fadous-Kfarabida in 2016.

suggests that this structure is of fairly recent date, possibly the 19th or early 20th century's. Although the small chamber under the arch was cleaned of modern debris (**fig. 36**), no hints for the function or date of the structure were obtained.

Pottery, mostly medieval or modern, was picked up in the areas east and north of the tell. The thin scatter of pottery sherds does not suggest the presence of sites, but should be interpreted as evidence of limited off-site activities or even manuring.

Most important is the clear absence of Early Bronze Age pottery sherds in all areas outside the fortification line of the site. This negative result clearly precludes the existence of a lower or outer settlement during the Early Bronze Age II–III, and strengthens our arguments that the small, but heavily fortified site of

Fig. 35- Arched structure between survey Plots 8 and 9.

Fig. 36- Cleaning the interior of the arched structure.

Survey Block/Feature	Easting	Northing
Stone Arch	744758	3790228
1	744672	3790199
2	744683	3790227
3	744679	3790246
4	744679	3790162
5	744611	3790051
6	744691	3790001
7	744721	3790157
8	744721	3790200
9	744797	3790248
10	744665	3790342
11	744581	3790292
12 & 13	744733	3790318
15	744915	3790031
14	745005	3790368

Tab. 1- Locations of survey blocks and stone arch feature. Coordinates in UTM Zone 36N. See figure 34 for survey block locations.

Survey Block	Land-use	Area (m^2)
1	Mixed Orchard	651.7
2	Fig Orchard	683.6
3	Orchard Terracing	242.7
4	Fig Orchard	1258.2
5	Agricultural Terracing	10443.8
6	Olive Orchard	1029.4
7	Orchard, Crop	1928.6
8	Crop	3162.2
9	Crop	3504.3
10	Crop	3939
11	Orchard	1318
12,13	Orchard	1713.1
15	Orchard	5253.4
14	Orchard (?)	1085.4
Total		**36213.4**

Tab. 2- Assessed survey blocks with current land-use and area in square meters. See figure 34 for survey block locations.

Tell Fadous-Kfarabida played an important economic and possibly political role as a satellite of Byblos in the region (Genz *et al*. 2016).

Chalcolithic Pottery

JOHNNY BALDI

Sterile soil was only reached in two squares (285/295 and 310/295) in Area II. While in Square 285/295 Phase II (Early Bronze Age II) remains directly rested on sterile soil, in Square 310/295 substantial quantities of Chalcolithic pottery, unfortunately generally mixed with Phase II pottery, came to light. Due to the limited area of exposure, no architectural remains for Phase I have been encountered so far. Thus, the only securely stratified contexts for Phase I are the two burials (Contexts 67 and 107) found in the western section in 2005 (Badreshany, Genz and Sader 2005: 28, 29).

Chalcolithic pottery, however, was found as upcasts in all excavated areas in later phases, thus pointing towards a substantial Chalcolithic occupation at the site. About 1,800 sherds can securely be attributed to the Chalcolithic period based on type and fabric. The exact size and nature of the settlement during this period, however, remain unknown due to the limited exposure.

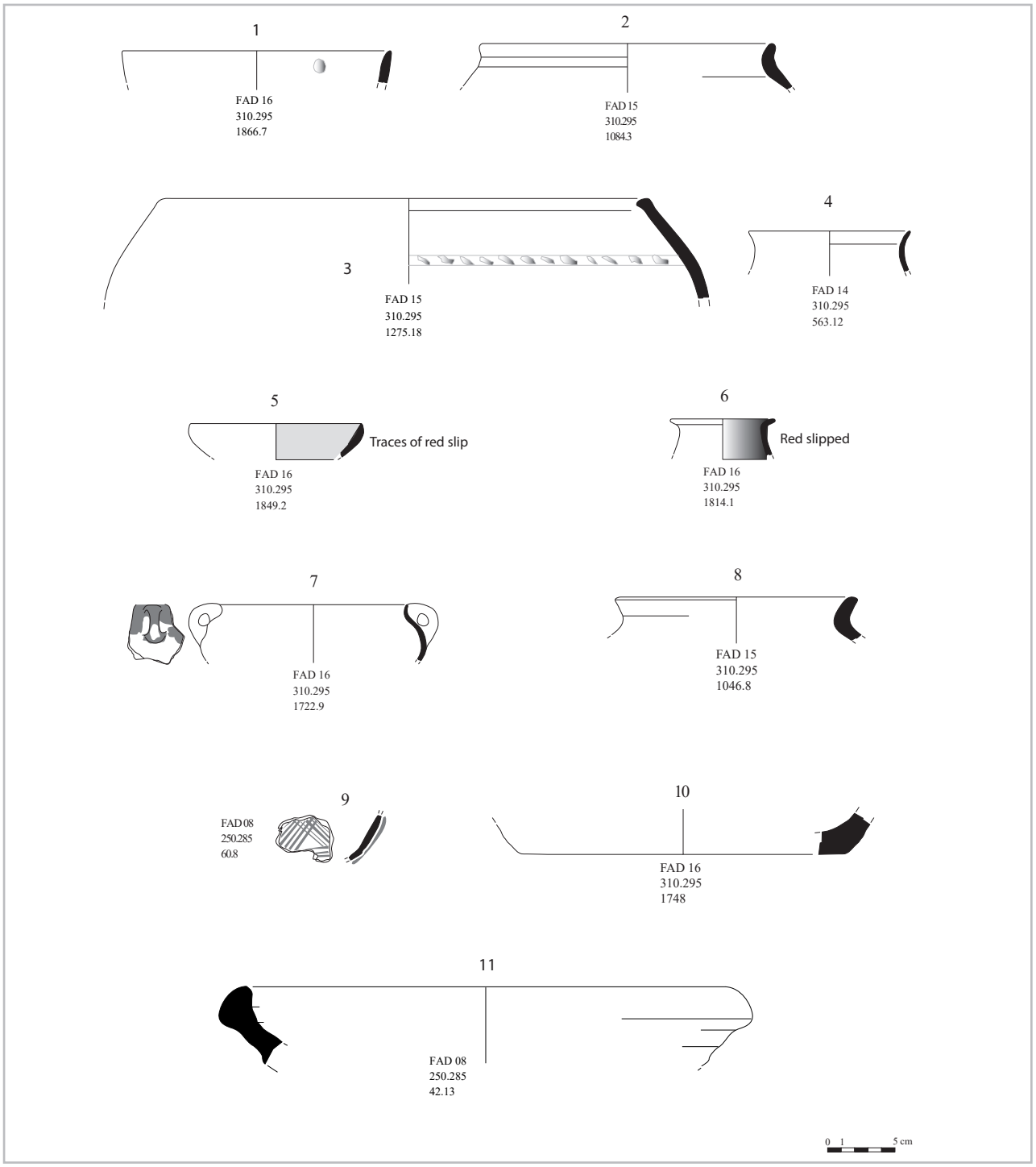
It is not surprising that the best comparisons for the typological study of the Chalcolithic assemblage from Fadous-Kfarabida can be identified in the *Énéolithique ancien* and *récent* of Byblos (Dunand 1973: 268–301).[1] Nevertheless, Chalcolithic ceramics from Byblos have never been systematically published. On the other hand, data from the Beqaa Valley mainly come from surface collections and well-stratified ceramics are very rare (Badreshany 2013; Baldi and Boustani, forthcoming). However, the overall appearance of the Chalcolithic assemblage of Fadous-Kfarabida is not surprising if compared to the panorama of the Central and Northern Levant. Its most striking feature is the presence of a quite limited, but not negligible, quantity of reddish or red-slipped pottery (almost 7 per cent of the assemblage; **pl. 1: 5** and **6**). Red-slipped pottery is a distinctive ware, but not a fine production. In fact, on the one hand, the slip is frequent on cooking pots (as a merely functional solution for waterproofing containers), while, on the other hand, it is also attested on pots produced using a very widespread calcareous fabric (**pl. 1: 8**).

As a matter of fact, in the Central and Northern Levant, a red-slipped or burnished surface characterises a late version of Dark Faced Burnished Ware since the 6th millennium BC, as also documented in the Amuq (R. J. Braidwood and L. Braidwood 1960: 159, fig. 123.4), in the southern Syrian Leja plateau, for instance at Tell Qarassa (Godon *et al*. 2015, fig. 17.1, 17.6), in the Beqaa Valley (at Tell ʿAyn asch-Schmāl, Tell Arḍ at-Tlail and Tell ʿAyn as-Saʿūda; Badreshany 2016, fig. 14: A, B, D) or on the Lebanese coast (Baldi 2017, pl. IV. I.3, IV.3, V.13). Later, in the 5th and early 4th millennia BC, the quantity of red-slipped ceramics decreases sharply, and its quality becomes quite rough until it disappears.

During the Late and Terminal Chalcolithic (or Early Bronze I), under an apparent ceramic stagnation, several changes occur. Red-slipped and burnished pottery decreases in number and actually disappears; typical 5th millennium V-shaped wheel-coiled bowls[2] are a common production and the wheel-coiling technique rises as an increasingly widespread innovation (Godon *et al*. 2015: 164, 169). Handles are vertical, sometimes punctuated or indented (**pl. 1: 7**).[3] The general tendency to the morphological differentiation invests both in bases (low and high pedestals, disc, annular, rounded, and flattened bottoms; **pl. 1: 10**) and rims (simple, rounded, pinched, and bevelled). Basins, hole mouth jars (**pl. 1: 3**) and large bowls sometimes have little triangular pierced lugs, plastic applied bands or rounded knobs (**pl. 1: 1**).[4] Concerning decorations, some samples of red painted bands are documented among bowls (Lovell 2001, fig. 3.34.7), impressed (Lovell 2001, fig. 4.16.5), applied bands, rounded knobs and 'spatula indented' incisions (**pl. 1: 3**; Artin 2009, fig. 58. C; Commenge, Levy and Kansa 2006, fig. 10.18) are also attested.

Beyond some superficial general similarities, the most typical shapes of the Ghassulian and Southern Levantine Chalcolithic (i.e. churns, cornets, and streaky wash surface treatment) are absent at Fadous-Kfarabida. The same can be stated as far as the quite sporadic parallels with Sidon Stratum 1[5] and with the Chalcolithic Golan.[6] On the other

hand, similarities with the published materials from Tell el-Khazzami (about 25 km south-east of Damascus)[7] and Tell Qarassa North (Godon *et al*. 2015, fig. 18. 1, 2, 6) in southern Syria are much more evident. Likewise, the Beqaa Valley, for instance the finds from Kāmid el-Lōz (Marfoe 1995: 87, fig. 44–47) offers very close comparisons with Fadous-Kfarabida. Even from a technical point of view, Late Chalcolithic



Pl. 1- Chalcolithic (Phase I) pottery from Tell Fadous-Kfarabida.

sherds from Fadous-Kfarabida closely recall examples from central and northern Lebanon both for their yellowish fabrics and their abundant calcite inclusions (Baldi and Boustani, forthcoming; Badreshany 2013: 252, fig. 3.29 from Tell Ghasīl; Baldi 2017: 134). The overall picture that can be drawn on the basis of these parallels shows a substantial similarity to an area including not only central and northern Lebanon, but also southern Syria. A clear split appears between this region, characterised by highly symmetric curvilinear shapes and short everted rims (**pl. 1: 2** and **4**)[8] in yellow calcareous pastes (Baldi 2017, pl. II. III13, II.7), and the Southern Levant, where churns and cornets with a streaky wash treatment are the most distinctive types (Commenge, Levy and Kansa 2006). It does not depend on just on the meso-regional fragmentation of the ceramic panorama (that reaches its peak during the last centuries on the 5th millennium BC) within a generic Ghassulian Levantine repertoire. Indeed, it manifests a marked typological divide between the Northern and the Southern Levant.

Parallels with the Central and the Northern Levant become more and more significant in the Terminal Chalcolithic. The actual existence of an occupation in the first half of the 4th millennium is suggested by some hundreds of sherds (most of them out-of-context) showing both a clear continuity with the Chalcolithic repertoire and some very specific features. The assemblage remains essentially composed of everted rim jars, hole mouths, and plain bowls. But the presence of high-necked everted-rim jars with vertical handles (**pl. 1: 10**)[9] is typical of this phase, as the two sherds of 'Line-Painted Ware' (**pl. 1: 9**)[10] and several (12) specimens of so-called hammerhead bowls (**pl. 1: 11**), a north-Mesopotamian widespread shape that has some parallels in the Central Levant[11] and is largely documented in the Amuq Phase F (R. J. Braidwood and l. Braidwood 1960, fig. 174).

Ceramics from Fadous-Kfarabida are entirely consistent with those of the late 5th and early 4th millennia BC in the Levant, but they reflect the fragmentation of this region. Namely, the assemblage displays specificities that fit well the Lebanese and southern Syrian panorama and shows some close parallels with the Jordan Valley. These results suggest that, between the end of the 5th and the early 4th millennium BC, significant ceramic similarities have to be sought according to the logic of 'proximity networks' of production and distribution in relatively small mesoregions.

The Early Bronze IV (Phase V) Pottery from Tell Fadous-Kfarabida

Marta D'Andrea

The Early Bronze IV (Phase V) pottery from the 2004–2016 excavations at Tell Fadous-Kfarabida includes several restorable vessels and *circa* two hundred sherds. It comprises vessel types representing different functions, mainly belonging to local wares, although a small but significant amount of non-local wares is attested too. The Phase V pottery is not associated with architectural features and has been mostly recovered from pits; yet it constitutes the third-largest assemblage of northern Lebanese ceramics from this period known thus far, after the collections from Tell Arqa and Byblos. The entire corpus will be the subject of a forthcoming publication (D'Andrea, forthcoming) in the final report on the Early Bronze IV and Middle Bronze Age stratigraphy and materials from the site. Therefore, in this section, we only introduce the repertoire considering the most representative vessel shapes and techno-stylistic characteristics in order to frame the ceramic materials in their regional and chronological contexts.

Tell Fadous-Kfarabida is a key site for the study of Early Bronze IV in northern Lebanon, because it is one of few settlement sites in this region where a phase of occupation dating from this period has been exposed thus far (see the regional study in Genz 2010b: 207, 208).[12] Absolute dates for Early Bronze IV are not thus far available for Tell Fadous-Kfarabida. However, radiocarbon determinations from Tell Fadous-Kfarabida place the end of Early Bronze III at the site around 2500 BC (Höflmayer *et al*. 2014). This date is consistent with the rest of the Levant,[13] and it has been suggested that *ca* 2500 BC may be the upper chronological boundary of the Early Bronze IV period in northern Lebanon (Genz 2015: 102;

2017: 76). Although there is still some criticism (e.g. Nigro *et al*. 2019, for the Southern Levant), growing scholarly consensus is that this period spans roughly the second half of the 3rd millennium BC in the Levant as a whole (see Regev *et al*. 2012: 559–561 for the Southern Levant; Genz 2017: 76, 77 for Lebanon and Schwartz 2017: 88, 89, tab. 5.1, 97–114, tab. 5.1–5.5, fig. 5.8–5.15 for western inland Syria).

It is worth recalling that, for northern Lebanon, the periodisation of the Early Bronze IV period is based on the site of Tell Arqa in the Akkar Plain, due to its continuous occupation from Early Bronze III to Early Bronze IV and from Early Bronze IV to Middle Bronze I (that is part of a longer occupational sequence; Thalmann *et al*. 2006). In fact, the latter site provided the framework for regional phasing of Early Bronze IV with two sub-phases, anchored to radiocarbon determinations: Early Bronze IVA (Level 16), from *ca* 2500/2450 to *ca* 2250 BC, and Early Bronze IVB (Level 15) from *ca* 2250 to *ca* 2000 BC (Thalmann 2013: 257–259, fig. 1; Roux and Thalmann 2016: 98, tab. 1; see also Genz 2010b: 206, tab. 1). This thus far unique multi-layer Early Bronze IV stratum may provide a tool to fine-tune the relative chronology of the Phase V pottery from Tell Fadous-Kfarabida. In fact, as it is further elaborated below, close parallels can be established between the pottery assemblages of Tell Fadous-Kfarabida Phase V and those of Tell Arqa Phase P, as well as with Byblos, and, finally, with tomb groups from Mougharet al-Hourriye.

The Phase V pottery from Tell Fadous-Kfarabida includes vessels used for drinking and serving food and beverages, as well as, possibly, for special (ritual?) purposes, and vessels for cooking and storage; the main vessel types attested are described below, according to each functional category.

Bowls are rarely attested in the Phase V assemblage (**pl. 2: 1**). Differently, goblets and cups are the dominant vessel shapes in the Phase V repertoire. Two rim fragments (**pl. 2: 2** and **pl. 3: 6**) may belong to one-handled goblets with vertical burnish typical of the Early Bronze IV period that are well represented at Tell Arqa (Phase P, Level 16: Thalmann *et al*. 2006, pl. 56: 24, 27) and that developed from prototypes first appearing in Early Bronze III at Tell Arqa, Tell Fadous-Kfarabida, and Byblos (Thalmann 2008: 70, 71, fig. 6: 1, 2; 23, 24; Roux and Thalmann 2016: 104, 105, fig. 4: 22, 23; Genz 2010a, fig. 12: 2; 2015, fig. 8: 2). Besides these vessel shapes continuing from the previous period, the Phase V assemblages include quite a broad range of open vessel shapes that apparently spread at sites in northern Lebanon only during Early Bronze IV. Plain, non-decorated, conical-shaped goblets with oblique walls, simple or pointed rim and flat base (**pl. 2: 3**) are the simplest drinking vessels attested in northern Lebanon in the Early Bronze IV period. At Tell Fadous-Kfarabida this shape is not frequent, while at Tell Arqa is very well represented all through the Early Bronze IV sequence (Phase P, Level 16: Thalmann *et al*. 2006, pl. 56: 1, 2; Level 15: Thalmann *et al*. 2006, pl. 56: 3). Cylindrical goblets (**pl. 2: 4**) and goblets with S-shaped profile (**pl. 2: 5** and **3: 5**), both decorated with red-slipped bands combined with vertical burnish and/or horizontal combing are attested in the Phase V corpus.

Bell-shaped cups are attested in the Phase V assemblages of Tell Fadous-Kfarabida (**pl. 2: 6** and **7**, **pl. 3: 3**, **pl. 4: 1**); the one restorable exemplar has no handles, but, for most of the sherds analysed, the fragmentary state of preservation does not allow us to exclude that some of our bell-shaped cups might have originally been handled, like several specimens from Tell Arqa (see for no. 6: Phase P, Level 15: Thalmann 2008, fig. 6: 31 = Roux and Thalmann 2016, fig. 4: 37; for no. 7: Phase P: Roux and Thalmann 2016, fig. 4: 38), Byblos and Mougharet al-Hourriye (see for no. 7: Dunand 1937, pl. CLXIX: 5340; Beayno and Mattar 2008, fig. 25: the first vessel from the right; with no handle: Beayno, Mattar and Abdul-Nour 2002, fig. 15: the second vessel from the left, pl. 3: 9). Cups with splaying rim and tapering base are present too, though fragmentary (**pl. 2: 8** to **10**). These vessel types are attested either without handles or with a typical high loop handle; at Tell Fadous-Kfarabida, some fragments have part of the handle preserved (**pl. 2: 10**), while for other sherds it was not possible to determine the presence or absence of the handle (**pl. 2: 8** and **9**). Parallels to these vessels can be found at Mougharet al-Hourriye (for no. 8: Beayno and Mattar 2008, fig. 24: the second vessel from the left; for no. 9: with one high

loop handle: Beayno, Mattar and Abdul-Nour 2002, fig. 15: the third vessel from the left = Beayno and Mattar 2008, fig. 25: the first vessel from the left, pl. 4: 40; with no handles: Beayno, Mattar and Abdul-Nour 2002, pl. 3: 10, 12; and for no. 10: Beayno, Mattar and Abdul-Nour 2002, pl. 4: 13, 6: 14) and Byblos (for no. 9: Dunand 1937, pl. CLXIII: 3405; for no. 10: Dunand 1958, fig. 658: 13117, 13246, 13044; and for no. 11: Dunand 1954, fig. 450: 11146). In addition, footed and pedestalled cups are very frequent in the Phase V assemblages from Tell Fadous-Kfarabida (**pl. 2: 11** to **17**). Pedestalled cups (**pl. 2: 12**) are well represented at the site, and paralleled at Byblos (Dunand 1954, fig. 450: 11146). Pedestalled cups and handled cups with button base (**pl. 2: 13** and **14**), solid foot (**pl. 2: 15**) or disc base (**pl. 2: 16** and **17**) are frequent at Tell Fadous-Kfarabida too and are paralleled at Byblos (for no. 12: Byblos: Dunand 1954, fig. 450: 11146; for no. 13: Dunand 1939, fig. 281: 5310; for no. 14: Dunand 1939, fig. 281: 5310; for no. 16: Dunand 1937, pl. CLXIII: 3523; 1939, fig. 275: 5094; and for no. 17: Byblos: Dunand 1958, fig. 798: 14236) and Tell Arqa (for no. 16: Tell Arqa, Phase P, Level 16: Thalmann *et al*. 2006, pl. 57: 3).

With one exception, spouted vessels are thus far not attested in the Early Bronze IV pottery assemblage from Tell Fadous-Kfarabida, while they are known from pottery assemblages from the Beqaa (Genz 2010b: 210, 211, fig. 2–4). Conversely, jugs are the most popular vessel shape for pouring liquids. Two classes of jugs occur most frequently at Tell Fadous-Kfarabida. One class is characterised by the decoration composed by concentric white painted lines on the upper part of the body, either spiral-painted or obtained by painting and wiping-off the colour with a pointed tool on a rotatory device; it is represented by jugs with globular flat-based body, wide mouth and pinched rim (**pl. 2: 18**). The second class is characterised by creamy and white painted concentric bands all over the body with the addition of a thicker red painted and polished band on the shoulder (**pl. 2: 19** and **20**); it includes ovoid-shaped jugs, either with slender body and narrow mouth (**pl. 2: 19**) or with larger body and wide mouth (**pl. 2: 20**). Similar jugs are attested at Tell Arqa and at Byblos too (for **pl. 2: 18**: Tell Arqa, Phase P, Level 16: Thalmann *et al*. 2006, pl. 59: 13, 60: 1; for **pl. 2: 19**: Tell Arqa, Phase P, Level 16: Thalmann *et al*. 2006, pl. 59: 12,13; 60: 1; Byblos: Dunand 1958, fig. 453: 11296).

Close-shaped pots with globular body and modelled rims (**pl. 2: 21** and **22**) are frequent in Phase V, too. Their function is not clear, but, for now, we have placed them within the same category as vessels for serving and/or consuming food and beverages. No parallels are known thus far for the early Bronze Age IV period, but a few comparable vessels were found at Sidon in Phase 5 (Doumet-Serhal 2006, pl. 72: 3). This may be further evidence for ealy Bronze Age III–IV continuity in the Tell Fadous-Kfarabida repertoire.

Finally, vessels for special uses include a few fragments of lamps retrieved at Tell Fadous-Kfarabida from Phase V contexts; two types seem to be attested. Four-spouted lamps (**pl. 2: 23**) represent a vessel shape typical of the Early Bronze Age ceramic tradition of Lebanon and the Southern Levant at least since Early Bronze II–III (Thalmann 2012: 177, 178, fig. 2, 180, 181) that, during Early Bronze IV, spread in the area between central Syria and the Southern Levant (Thalmann 2012: 179, fig. 6 and 180; for parallels from northern Lebanon for the lamps from Tell Fadous-Kfarabida, see Mougharet al-Hourriye: Beayno, Mattar and Abdul-Nour 2002, fig. 5, 6, pl. 3: 12, 13, pl. 5: 8). Single-spouted lamps (**pl. 2: 24**) represent a typical Middle Bronze Age vessel shape that entirely replaced the four-spouted lamps in the 2nd millennium BC, but that seems to have been attested already towards the end of the Early Bronze IV at Tell Arqa (Thalmann 2012: 178, fig. 5: 01/338.002) as well as in the Southern Levant (D'Andrea 2014a: 220, pl. XLIX: 3–6; 2019: 72, fig. 4: 5).

As for food preparation, large vats with modelled rim and combed decoration that were very popular at Tell Fadous-Kfarabida and Tell Arqa (Thalmann 2008, fig. 4: 3) in the Early Bronze Age III (Badreshany and Genz 2009, fig. 3: C1.2; Badreshany, Genz and Sader 2005: 41, 42, pl. 1: C1.1, 2: C1.2, 43, 61, pl. 6: 5.10), and were still attested at Tell Arqa and Byblos during Early Bronze IV (Thalmann 2008, fig. 4: 1, 2; 4, 5) were virtually absent from Tell Fadous-Kfarabida in the latter period. In fact, a few fragments of only one large basin were found in Phase V (**pl. 5: 1**).

As is discussed below, this observation may have some implications for understanding the nature of the Early Bronze IV frequentation of Tell Fadous-Kfarabida. Conversely, cooking pots are frequently attested in Phase V, and, although they are mostly fragmentary, they document well the presence at the site of the typical cooking vessels with globular body with no neck and upright or slightly everted rim (**pl. 5: 2**). This is another class of vessels that developed continuously from the Early Bronze II–III periods into the Early Bronze IV, not only in northern Lebanon, but more generally, in the Central Levant and in the northern areas of the Southern Levant (D'Andrea 2014a: 282–284, pl. XCVI: 4, 5).

Finally, storage vessels were not numerous at Tell Fadous-Kfarabida in Phase V. A few rim fragments were found that might belong to Early Bronze IV storage vessels (**pl. 5: 3** to **5**). However, the paucity of stratified Early Bronze IV assemblages from northern Lebanon makes any attribution to Early Bronze IV of any sherd that has no parallels in the key site of Tell Arqa rather difficult. This difficulty might be explained by general continuity in the use of wares in the local pottery all through the Early and Middle Bronze Ages. However, as for the lack of vessels for food preparation, the absence of storage vessels at Tell Fadous-Kfarabida (compared to their abundance at Tell Arqa: Thalmann *et al*. 2006: 125–128, pl. 67–74; Thalmann 2008: 64, fig. 2: 4–21) might be correlated with the function of the site in the Early Bronze IV period.

In terms of pottery technology,[14] we can observe evidence for hand coiling and wheel finishing (**pl. 4: 1**); in a few cases, spiral coiling was recognisable (**pl. 4: 5**). Cooking pots (**pl. 4: 2**) and storage jars (**pl. 4: 3**) were hand-coiled and wheel-finished and often the rim was added separately to the body. However, mostly wheel coiling was used for cups and jugs (**pl. 4: 1, 4, 7** to **9**), although it could be observed that some jugs had been hand-coiled or made with a mixed technique (partly handmade, partly wheel-coiled). String-cut bases are very frequent, particularly on open-shaped vessels (**pl. 4: 6**). In general, the observation of substantial use of wheel-coiling techniques for the pottery from Tell Fadous-Kfarabida Phase V is consistent with the evidence from Tell Arqa in Phase P. In fact, according to Roux and Thalmann (2016: 14, 15, fig. 13), in the pottery assemblages from the latter site, a defined technological difference between Early Bronze III and IV is due to progressively increasing use of rotatory kinetic energy during the entire process of pottery making in Early Bronze IV.

The most frequently used surface treatments are thick red-polished slip (**pl. 3: 1**) and red-burnished slip (**pl. 3: 2**) all over the vessels' body, also associated with horizontal combing (**pl. 3: 3**), or bands of red paint associated with vertical burnish (**pl. 3: 4**) and/or combing (**pl. 3: 5**). Vertical burnish without slip is attested on goblets, with irregular strokes (**pl. 3: 6**) and on footed goblets and juglets with more regular strokes. Jugs are often decorated with yellowish and white paint often in the 'reserved slip' style, i.e. applied in thicker bands from which the colour has been wiped off subsequently with a pointed tool while rotating the vessel to obtain thinner concentric or subparallel lines (**pl. 2: 18** to **20** and **pl. 3: 7**). These features highlight further techno-stylistic similarities between Tell Fadous-Kfarabida and Tell Arqa in the later Early Bronze IV (Roux and Thalmann 2016: 102, tab. 2, 104, 105), and are comparable also to the evidence from Byblos (e.g. Dunand 1937, pl. CLXVI: 5090, CLXVII: 5125, 5149, CLXIX: 5340; 1954, fig. 114: 7590, 453: 11206) and Mougharet el-Hourriye (Beayno and Mattar 2008, fig. 24, 25).

In terms of provenance, the majority of the sherds and restorable vessels retrieved at Tell Fadous-Kfarabida from Phase V contexts represent local wares, but there are a few sherds that might have been imported from other areas. A fragment of a dark grey goblet with incurving wall and upright slightly thickened inside rim with two whitish painted bands on the rim has been recently identified as a fragment of a Black Wheelmade Ware vessel possibly originating from the Beqaa (Genz, Badreshany and Jean 2021, fig. 21.2.5). This find is very interesting because it allows us to include Tell Fadous-Kfarabida in the area of distribution of this ware, typical of the Beqaa, where it is attested by finds from Rafid (Mansfeld 1970) and Tell Hizzin (Genz and Sader 2008b: 187, 188, pl. 1: 2–4, pl. 7; Genz 2010b: 210, 211, fig. 2–4), and of the northern valleys of the Southern Levant (see D'Andrea 2014a;

2014b; 2017, with relevant bibliography), and occasionally also found at Byblos (Dunand 1954: 117, fig. 114: 7585) and Tell Arqa (Genz, Badreshany and Jean 2021, fig. 21.2). Another fragment of a goblet similar in shape and decoration but with a buff slip points to connections with the Upper Orontes Valley; in fact, it belongs to a class of goblets typical of the site of Tell Nebi Mend (Kennedy, Badreshany and Philip 2018, fig. 4: 9; Kennedy 2019: 435–437 and fig. 5: 1, 5). The petrographic analysis in progress will confirm or contradict our hypothesis that some fragments might be imports from western Syria (see also Genz 2014a: 73) and the Southern Levant.

As for ceramic chronology, the Phase V pottery from Tell Fadous-Kfarabida is comparable to that of Levels 16 and 15 of Tell Arqa Phase P (see *infra*), that is, to ceramic assemblages from both Early Bronze IV phases at the latter site; this is due to remarkable continuity in pottery production between Early Bronze IVA and IVB at Arqa. Thalmann (2008: 63) commented already on this phenomenon, suggesting that strong similarities between Level 16 (Early Bronze IVA) and Level 15 (Early Bronze IVB) might be due to a dominant presence of pottery from the destruction layer of Level 16, radiocarbon-dated to *ca* 2200 BC, and from Level 15, that implies that true Early Bronze IVA is less known than Early Bronze IVB. This observation may allow us to fine-tune the relative chronology of the Phase V pottery assemblages from Tell Fadous-Kfarabida, and support its attribution to Early Bronze IVB (see *infra*). Moreover, some vessel types, such as the single-spouted lamps, and the bell-shaped cups with one handle are paralleled by Early Bronze IVB vessels only (see *supra* references). A further element supporting a date of the Phase V pottery from Tell Fadous-Kfarabida to an Early Bronze Age IVB date may be the similarity to vessels in the tomb groups from Mougharet al-Hourriye that are associated with a radiocarbon date falling within the last two centuries of the 3rd millennium BC (Beayno, Mattar and Abdul-Nour 2002: 170; Genz 2010b: 206, tab. 1).

Finally, the Phase V pottery assemblages from Tell Fadous-Kfarabida may allow us to make some considerations on the possible nature of the occupation of the site in the Early Bronze IV period. As we have discussed above, the assortments of pottery types and styles within the Phase V assemblages place them in the second half of the Early Bronze IV period, parallel to the Early Bronze IVB. This supports previous hypotheses that there might have been a hiatus in the occupation of the site during the first half of Early Bronze IV, followed by renewed frequentation of the site in the second half of this period, corresponding to Early Bronze IVB (Genz *et al*. 2011, tab. 1 and Genz *et al*. 2016: 81, tab. 1). Virtually no Early Bronze IV structures have been identified at Tell Fadous-Kfarabida thus far, and the pottery from this period originates from pits, whose nature is still obscure.

On the one hand, this might suggest that Early Bronze IV represented a phase of decline of settlement at Tell Fadous-Kfarabida, which would stand in contrast to narratives of continuous urbanism emerged for this period at nearby sites in northern Lebanon, such as Tell Arqa and Byblos (Thalmann 2008: 75, 76; 2009: 2–5; 2010: 91–95; Genz 2015: 102–105; 2017: 76, 77). On the other hand, we have to consider that the Early Bronze IV exposure is limited compared to the original extension of the site and that the absence of permanent occupation in Phase V might be just apparent and due to documentary biases. For the time being, we might hypothesise that the absence of architecture and the presence of pits might mirror not just a phase of squatter occupation, but a change in the site's function and nature from Early Bronze III to IV and that 'special' activities, possibly ritual, were performed at the site during Early Bronze IV (Genz 2015: 103). This consideration might be supported by the typological assortment of Phase V pottery from the site. In fact, as we have mentioned before, several restorable vessels were recovered from the pits, many of which are finely decorated and connected with serving and drinking liquids, while, as we said before, large storage vessels and vats for food processing are rare in the Phase V ceramic assemblages from Tell Fadous-Kfarabida.

Acknowledgements

The Phase V ceramic corpus was analysed by the author of this section in the fall and winter of 2016. The author wishes to express her gratitude

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Middle Bronze Age Pottery

Metoda Peršin

The excavations undertaken at the site between 2007 and 2016 yielded remains dating from the early 4th to the early 2nd millennium BC with the Middle Bronze Age representing the last occupation phase of the Tell until the twentieth century AD (Badreshany *et al*. 2005, Genz *et al*. 2018)

Middle Bronze Age remains were found in Areas I, II, and III. In Area I, located on the southern slope of the Tell, a room dating to the Middle Bronze Age was constructed outside of the Early Bronze Age fortification wall (Genz 2010–2011: 116). Due to the limited area of excavation, the room in question was partially excavated, however, on a floor made of compacted earth, large quantities of Middle Bronze Age sherds were discovered (Genz 2010–2011: 116).

In Areas II and III on top of the Tell, no Middle Bronze Age buildings were uncovered. The Middle Bronze Age features there consist of several pits (Genz 2010–2011: 116), three single burials (Genz *et al*. 2010a; Genz *et al*. 2010b) and a chamber tomb containing skeletal remains of two adults and a child (Peršin in Genz *et al*. 2018: 54). In addition, Middle Bronze Age pottery was recovered from the top soil layers of almost all squares in Areas I to III.

A preliminary report on the Middle Bronze Age pottery and the main archaeological features was published by Hermann Genz (2010–2011). Here, some additional Middle Bronze Age pottery will be discussed. The material consists of bowls, baking trays, straight-walled cooking pots, hole mouth jars, globular jars, jugs, jars, miniature vessels, and lamps.

Middle Bronze Age bowls at the site appear in a variety of types and sizes. Besides hemispherical bowls that were discussed previously (Genz *et al*. 2010a: 187; Genz *et al*. 2010b: 249), additional types appear frequently. Flat bowls with sharply inverted rims and flat bases (**pl. 6: 1** and **tab. 3**) found at the site, have parallels in the Royal Tombs in Byblos (Tufnell 1969, fig. 3: 19), at Tell Arqa Phase N (Thalmann *et al*. 2006, pl. 80: 19) and Phase M (Thalmann *et al*. 2006, pl. 95: 17), Tell Hizzin (Genz and Sader 2008, pl. 2: 6), Tell Mardikh/Ebla MB IIA (Nigro 2002, fig. 20: 5) and Megiddo where they date to Middle Bronze Age IIA (Amiran 1970, pl. 25: 8).

Bowls with short flaring rims and a neck-like construction that are characterised by a marked carination (**pl. 6: 2**) have not been uncovered elsewhere in Lebanon so far. Parallels for such bowls can be found at Tell Mardikh/Ebla IIIA2, Middle Bronze Age IB (Nigro 2002, fig. 7: 8) and IIIBI, Middle Bronze Age IIA (Nigro 2002, fig. 20: 9).

Quite common are also deep bowls with simple, slightly flaring rims that have a double thickening on the outside of the rim (**pl. 6: 3**). Similar bowls come from Shechem from Stratum XIXs (Cole 1984, pl. 13g) and Stratum XVIIIs (Cole 1984, pl. 13i).

Only one type of baking tray is attested at the site. It is represented by rather large and flat vessels that are always handmade. Their rim diameters are around 40 cm. The bases often bear rows of incisions (**pl. 6: 4**). Baking trays have comparisons at Tell Arqa in Phase N (Thalmann *et al*. 2006, pl. 80: 1) and Phase M (Thalmann *et al*. 2006, pl. 105: 12). They also appear in Shechem in Stratum XVIIIs (Cole 1984, pl. 45: 1).

There are two main types of cooking vessels that appear among the Middle Bronze Age ceramics at Tell Fadous-Kfarabida. These are globular jars with a marked neck and a short simple flaring rim (**pl. 6: 5**) which are the most common type at the site, followed by the cooking pots with short necks and gutter rims (**pl. 6: 6**). Cooking pots with simple flaring rims have comparisons at Tell el-Burak (Badreshany and Kamlah 2010–2011, fig. 8: 14), in Sidon (Doumet-Serhal 2004, fig. 37: S/1874; 2009, fig. 1: 7, 8), Tell Arqa Phase N (Thalmann *et al*. 2006, pl. 92: 10, pl. 94: 2–9) and Phase M (Thalmann *et al*. 2006, pl. 105: 4), in Kamid el-Loz (Catanzariti 2010–2011, fig. 6: 1, 2), at Tell Hizzin (Genz and Sader 2008, pl. 3: 1), as well as in Mishrifeh/Qatna (Iamoni and Morandi Bonacossi 2010–2011,

fig. 6: 15), and Megiddo dating to the Middle Bronze Age I (Amiran 1970, pl. 24: 12, 20), as well as at Tell el-Dab'a in Stratum G/1–3 (Aston 2002, fig. 11: 2). Cooking pots with gutter rims have comparisons in the Royal Tombs in Byblos (Tufnell 1969, fig. 7: 58), at Tell el-Burak (Badreshany and Kamlah 2010–2011, fig. 13: 1–7), in Aphek in MBIIA Phase 2 (Kochavi and Yadin 2002, fig. 16: 4–7) in Ashkelon in Phases 14 and 13 (Stager 2002: 355) and in Shechem Stratum XVIIs (Cole 1984, pl. 8c).

Jugs and juglets are not very common in the assemblage; however, they are represented by a variety of types. Complete examples were already discussed elsewhere (Genz *et al*. 2010a: 187, 190; Genz *et al*. 2010b: 249) and from the sherd material the most common jugs have simple flaring rims (**pl. 6: 7**). Jugs with folded rims, flaring at the bottom (**pl. 6: 8**) have comparisons at Aphek in Middle Bronze Age IIA (Kochavi and Yadin 2002, fig. 12.15).

The majority of the Middle Bronze Age assemblage consists of jars. They show a variety of rim forms. The elongated folded rims (**pl. 6: 9**) and elongated folded rims with a marked ridge below (**pl. 6: 10**) are the most common, followed by flaring rims with a marked angular thickening on the outside (**pl. 6: 11**). Jars with elongated folded rims have comparisons at Tell el-Burak (Badreshany and Kamlah 2010–2011, fig. 8: 2, 17, 18) and Shechem in Stratum XVIIIs (Cole 1984, pl. 42: l). Jars with elongated folded rims with a ridge have parallels in Sidon (Doumet-Serhal 2004, fig. 53: S/1853), at Tell Arqa Phase N (Thalmann *et al*. 2006, pl. 91: 18), in Aphek Phase 2 (Kochavi and Yadin 2002, fig. 17: 11, 12, 15–23) and in Phase 3 (Kochavi and Yadin 2002, fig. 24: 4, 5, 7, 9–11) and in Ashkelon in Phases 14–12 (Middle Bronze Age IIA) and with flatter and more everted rims in Phase 11 (Middle Bronze Age IIB; Stager 2002: 354, 355), as well as in Shechem in Stratum XIX (Cole 1984, pl. 41b), Stratum XIXs (Cole 1984, pl. 41e) and Stratum XX (Cole 1984, pl. 41g) and at Tell el-Dab'a in Stratum G/4=d/1 (Aston 2002, fig. 1: 2–4, fig. 2: 2, fig. 7: 2, 5, 7, 8), in Stratum G/1–3=c (Aston 2002, fig. 4: 2, fig. 9: 6), Stratum H=d/2 (Aston 2002, fig. 5: 4–8), Stratum H-G/4=d/2-d/1 (Aston 2002, fig. 6: 1, 2, 6–8) and Stratum G/4-G/1–3 =d/1-c (Aston 2002, fig. 8: 5–8). Jars with thickened angular rims have parallels at Tell Arqa Phase N (Thalmann *et al*. 2006, pl. 91: 2), at Tell el-Burak (Badreshany and Kamlah 2010–2011, fig. 8: 9), in Kamid el-Loz (Catanzariti 2010–2011, fig. 8: 2), in Baalbek (Genz 2008, pl. 4: 7) and Shechem Stratum XVIIs (Cole 1984, pl. 32b).

Miniature vessels (**pl. 6: 12** and **13**) rarely appear at the site. They are usually related to religious and burial activities and indeed two of these vessels at Tell Fadous-Kfarabida come from burial contexts. It is also possible that children produced such vessels (Uziel and Avissar Lewis 2013).

Currently, there are diverse chronological subdivisions used for the Middle Bronze Age in different regions of the Levant (Gerstenblith 1983: 2, 3) and no uniform chronology exists for Lebanon as well. Therefore, the sites in Lebanon dating to the Middle Bronze Age use chronologies adopted from different regions of the Levant. The sites dating to the Middle Bronze Age in the Beqaa Valley either adopt the chronology of the Southern Levant, such as Tell el-Ghassil with the Middle Bronze Age IIA = Niveau 11, Middle Bronze Age IIB = Niveau 10 and Middle Bronze Age IIC/III (Doumet-Serhal 1996, 8); or the Northern Levant, like in Baalbek (Genz 2008) and Kamid el-Loz (Catanzariti 2010–2011: 48) with the division into Middle Bronze Age I and Middle Bronze Age II.

The Middle Bronze Age in Sidon is represented by eight phases. Three phases are represented by remains in the sand layer above the Early Bronze Age occupation and are all dated to the Middle Bronze Age IIA. Phase 1, that is the earliest phase in the sand, is dated to the end of Middle Bronze Age I/Middle Bronze Age IIA. Phase 4 is the first level above the sand layer and dates to the Middle Bronze Age IIA/B. Phases 5 and 6 date to the Middle Bronze Age IIB. Phase 7 represents Middle Bronze Age IIB/C and phase 8 the end of Middle Bronze Age (Doumet-Serhal in Doumet-Serhal and Kopetzky 2011–2012: 9, 10).

The other main site for the Middle Bronze Age in Lebanon, Tell Arqa in northern Lebanon, is the only site using an independent chronology. It uses the division of the Middle Bronze Age into two phases. Middle Bronze Age I, which corresponds to the Phase N = Niveau 14, is dated to *ca* 2000–1850/1800. Middle Bronze Age II or Phase M = Niveau 13 at the site is dated to 1850/1800–1525 (Thalmann *et al*. 2006: 136).

Based on the comparisons above, the ceramic material from Tell Fadous-Kfarabida should be dated to the Middle Bronze Age I/Middle Bronze Age IIA or to the transition from the Middle Bronze Age I–II/Middle Bronze Age IIA–B at the latest.

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The Egyptian Pottery from Tell Fadous-Kfarabida

Karin Kopetzky

At Tell Fadous-Kfarabida imported Egyptian pottery was found in Middle Bronze Age pits and tombs, that cut from the surface into the layers of the Early Bronze Age. Although the number of Egyptian sherds retrieved from this site is rather small compared to the material coming from sites like Sidon (Kopetzky 2012), Byblos (Kopetzky 2010–2011, fig. 6–8) or Tell Mirhan (Genz *et al*. forthcoming) it nevertheless testifies to possible contacts with seafaring people coming from and going back to Egypt. Whether this happened directly or via Byblos cannot be verified here. The corpus consists of fragments of storage vessels, but also of cooking pots and open shapes dating to the Middle Kingdom (Genz 2010–2011, fig. 14).

Large *zirs*[15] made of marl clay (**pl. 7: 1** to **3**) most likely reached Lebanon by ship, on which they might have been used to store fresh water supply. Beside this function, these vessels were probably used to transport goods that needed to be protected from rodents on the journey such as salted meat or fish. Examples of the latter (Nile perch) were found at several sites in the Southern Levant, Cyprus, Turkey, and in Lebanon at Sarepta (Lernau 2004: 301). Yet, with their bulky shape, *zirs* are not a classical transport vessel and were thus mostly found among settlement material in Egypt, where they were used to store all different kinds of commodities. While several examples were found half buried in the ground, to keep their contents cool (Czerny 2015: 337, plan 8, pl. 2), other free-standing ones might have cooled rooms through the evaporation of the water kept inside.[16] *Zirs* can be part of technical constructions as an example from a Middle Kingdom palace in Tell Basta shows, where such a vessel was used as part of a water supplying system (Van Siclen 1996, fig. 7) or in a fort in Nubia where it was used to collect water (Dunham 1967: 144, pl. LXXXVII/B). Only occasionally, these large jars were found in tombs in Egypt (Allen 1998, fig. 1B/31; 3/9; Seiler 2005, fig. 30, 31, Schiestl 2009, fig. 308/14). However, three examples made their way into tombs in Byblos. Two are coming from the Royal Tombs II and III (Montet 1928, no. 789) and one from a tomb that was found inside the Hyksos rampart (Dunand 1964, pl. II/1, 2) containing animal bones (Dunand 1964: 32). Surprisingly, their use as containers for burials is very rare, given that their voluminous body shape and wide opening is ideal for this purpose. There is only one example known from Sidon Level 2, where a child is buried inside such a vessel (Doumet-Serhal 2003, fig. 13; Bader *et al*. 2009, fig. 1) and another one from Tell el-Dabᶜa, again used for a child burial (Bietak 1991, fig. 260).

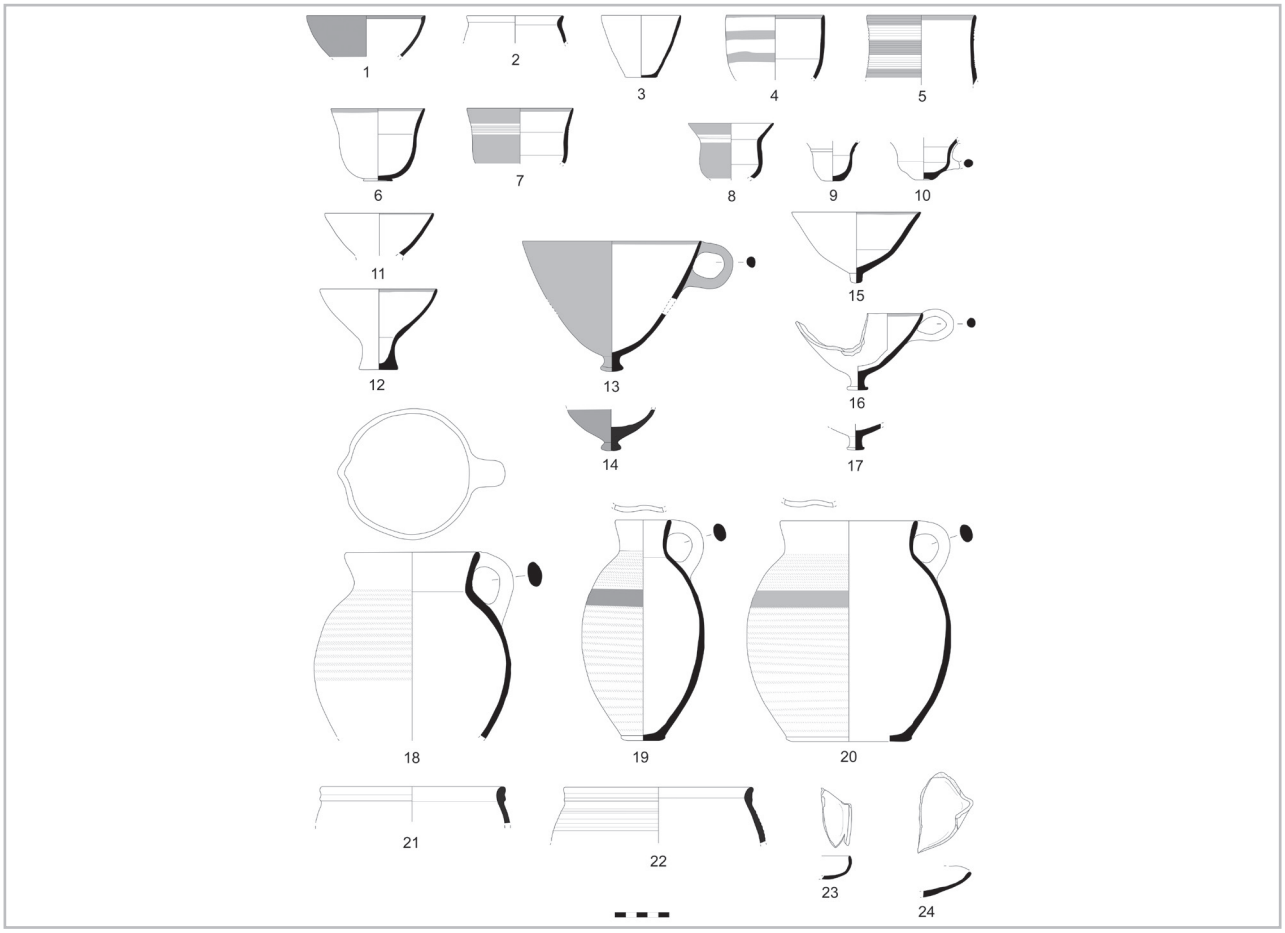
Even broken *zirs* often had a second life. Their rims might function as pot stands, while their bases could be used as fireplaces (Bader 2001: 156), and their body sherds as stoppers, scrapers or to cover up jar burials (Kopetzky 1993, fig. 89/3).

All *zirs* were handmade, their bodies coiled and their rims attached on a slow turning device. On the inside of these vessels often crude traces of finger marks are visible, where the potter tried to connect the individual coils and to smoothen its surface. The outside is covered with a whitish self-slip. In some cases, probably an additional thin watery slip was applied with a brush as diagonal traces on the surface suggest. In many cases, one or more potter's marks can be found inside, outside or on top of the rim as well as on the upper part of the body. Most of them were already incised before firing, but there are also examples where the markings were made afterwards.

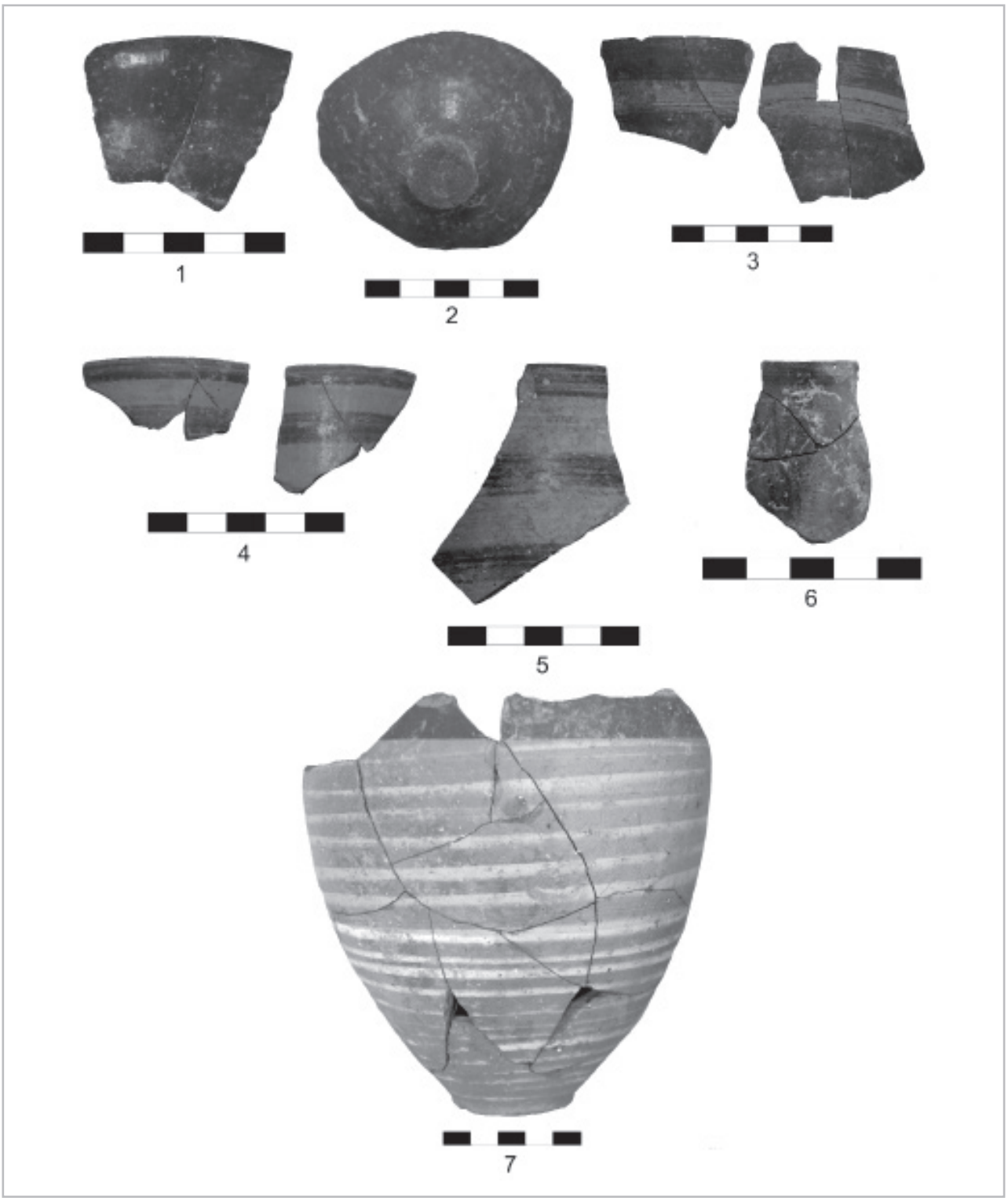
So far, all *zirs* dating to the 12th and 13th dynasties were made of fabric Marl C-1.[17] The origin of this clay is believed to come from the Memphite-Fayum region (Arnold 1981). It seems that from there, vessels made of this fabric and their contents were distributed in an organised way all over Egypt and Nubia.

At Tell Fadous-Kfarabida only small fragments of these vessels were found. Among them is the rim of a *zir* type 1 (**pl. 7: 1**; see also Czerny 2015, fig. T85–T89). This type appears in Egypt from the late First Intermediate Period/early Middle Kingdom until the middle of the 12th dynasty (Czerny 2015: 338). With a rim diameter of about 30 cm, this piece fits well into the size range of this type. Although this piece is a surface find, it is one of the oldest imports of its kind to Lebanon. Similar pieces were found among the Sidon material. The two base fragments with their diameter between 25 and 30 cm fit well into this picture. Such flat and large bases are attested for *zirs* of the 12th and first half of the 13th dynasties (*zir* Types 1–3; Kopetzky 2010, fig. 48). During this period, the diameter of the rim nearly equals the size of the base. One of these bases was found in the fill of Middle Bronze Age tomb Context 637 (**pl. 7: 2**), while the other comes unfortunately from the topsoil in Area I (**pl. 7: 3**).

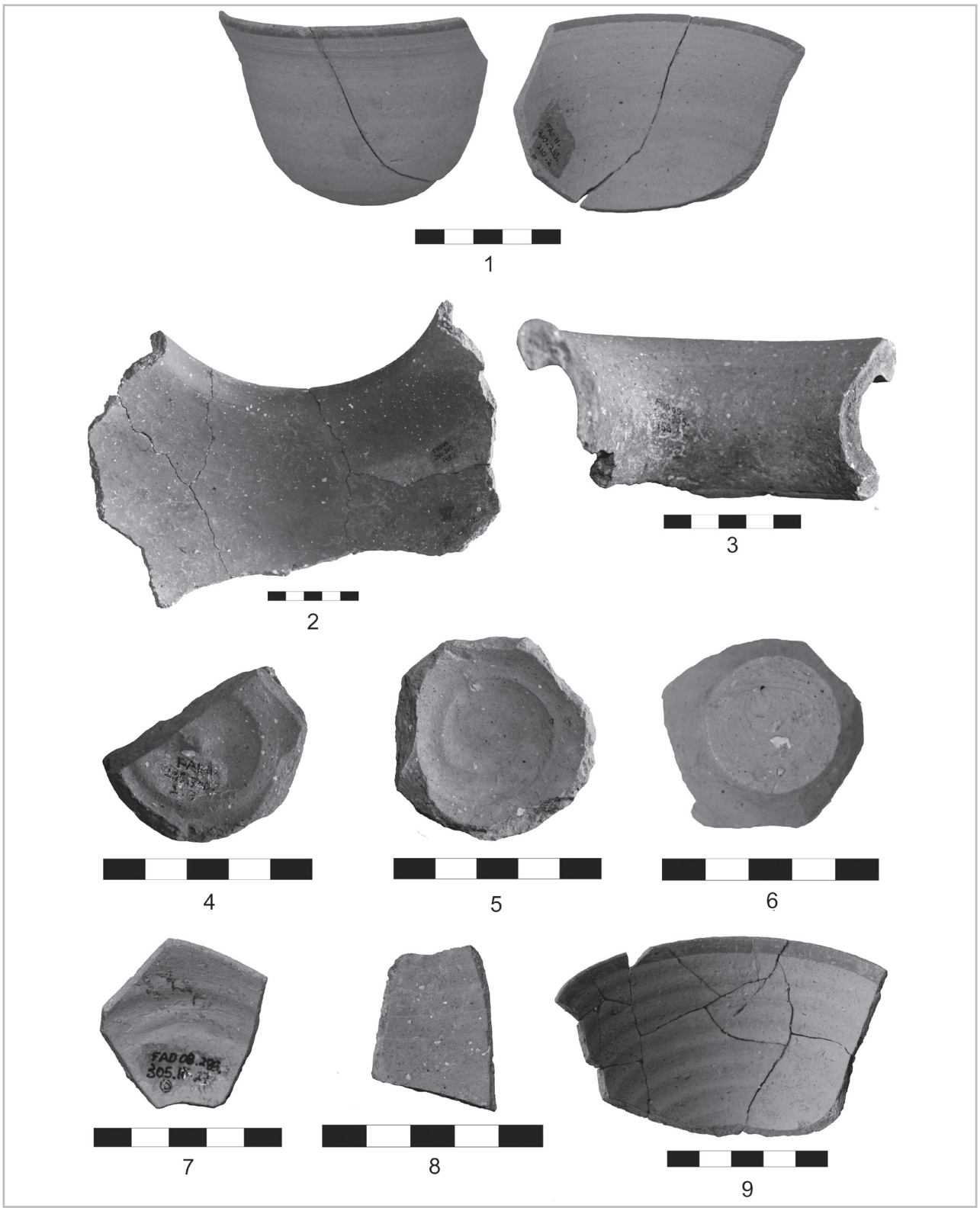
Although none of these fragments come from an *in situ* context, they nevertheless are indicators for an otherwise hardly attested trade between Egypt and the Levantine coast during the earlier parts of the Middle Kingdom (Marcus 2007). While the *zirs* mark one end of this exchange, early Levantine Painted Ware juglets found in the Middle Kingdom layers of Ezbet Rushdi and dating most likely to the reign of Amenemhat II, represent the other end (Czerny 2015: 357–359; Bagh 2013, fig. 5). According to Tine Bagh, these monochrome painted juglets have close similarities to material known from Byblos and are among the earliest of their type (Bagh 2002: 96, 97, fig. 4). The remnants of this trade between Egypt and the Levant can help to pinpoint the beginning of the Middle Bronze Age in the Levant.



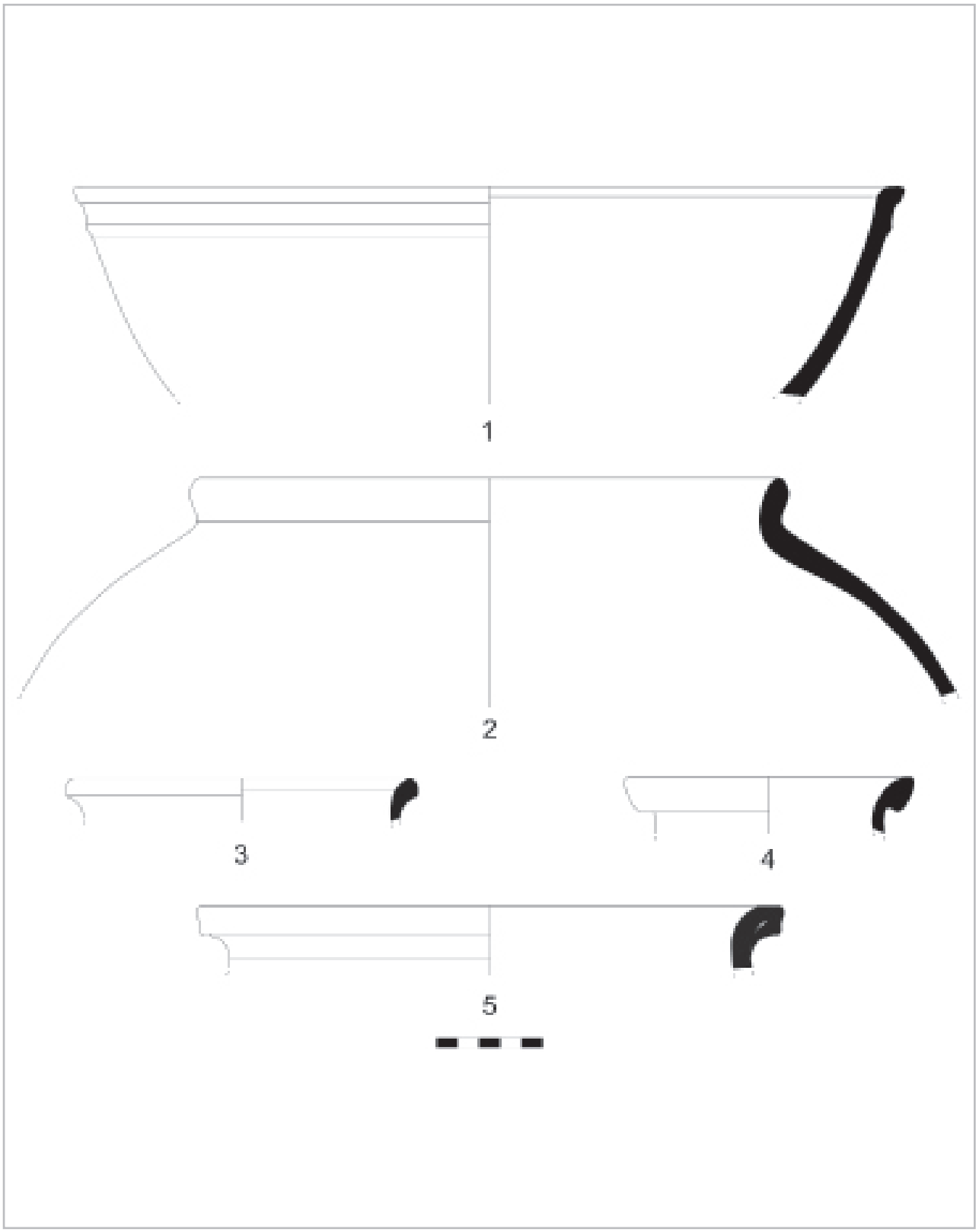
Pl. 2- Early Bronze IV (Phase V) vessels shapes at Tell Fadous-Kfarabida: vessels for drinking and serving food and beverages.



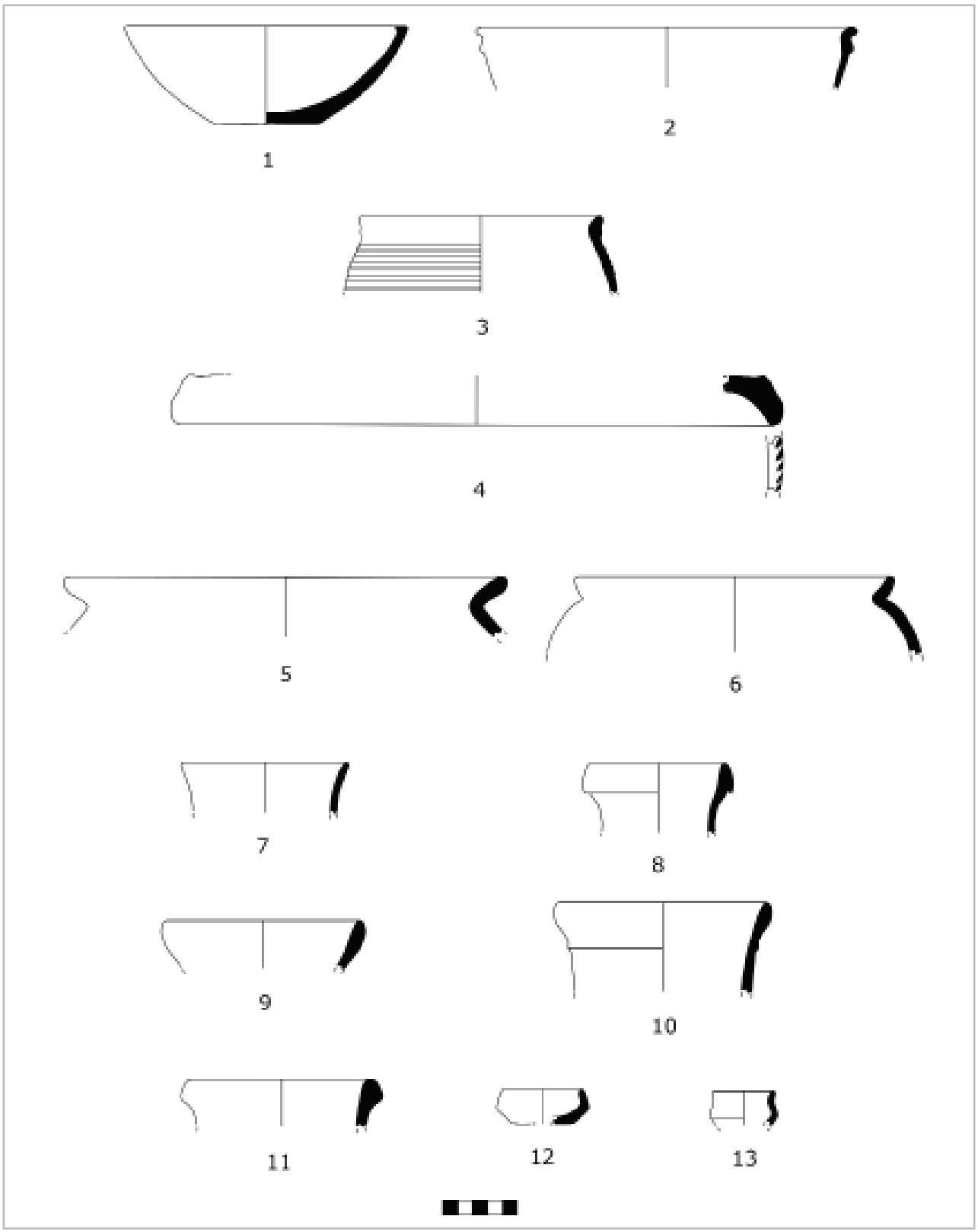
Pl. 3- Most frequent surface treatments and decorations on Early Bronze IV (Phase V) pottery from Tell Fadous-Kfarabida; 1) red-polished slip; 2) red-burnished slip; 3) red-polished slip and horizontal combing; 4) bands of red paint associated with vertical burnish; 5) bands of red paint associated with vertical burnish and horizontal combing; 6) one band of red burnished paint and yellowish and white paint in the 'reserved slip' style; 7) vertical burnish.



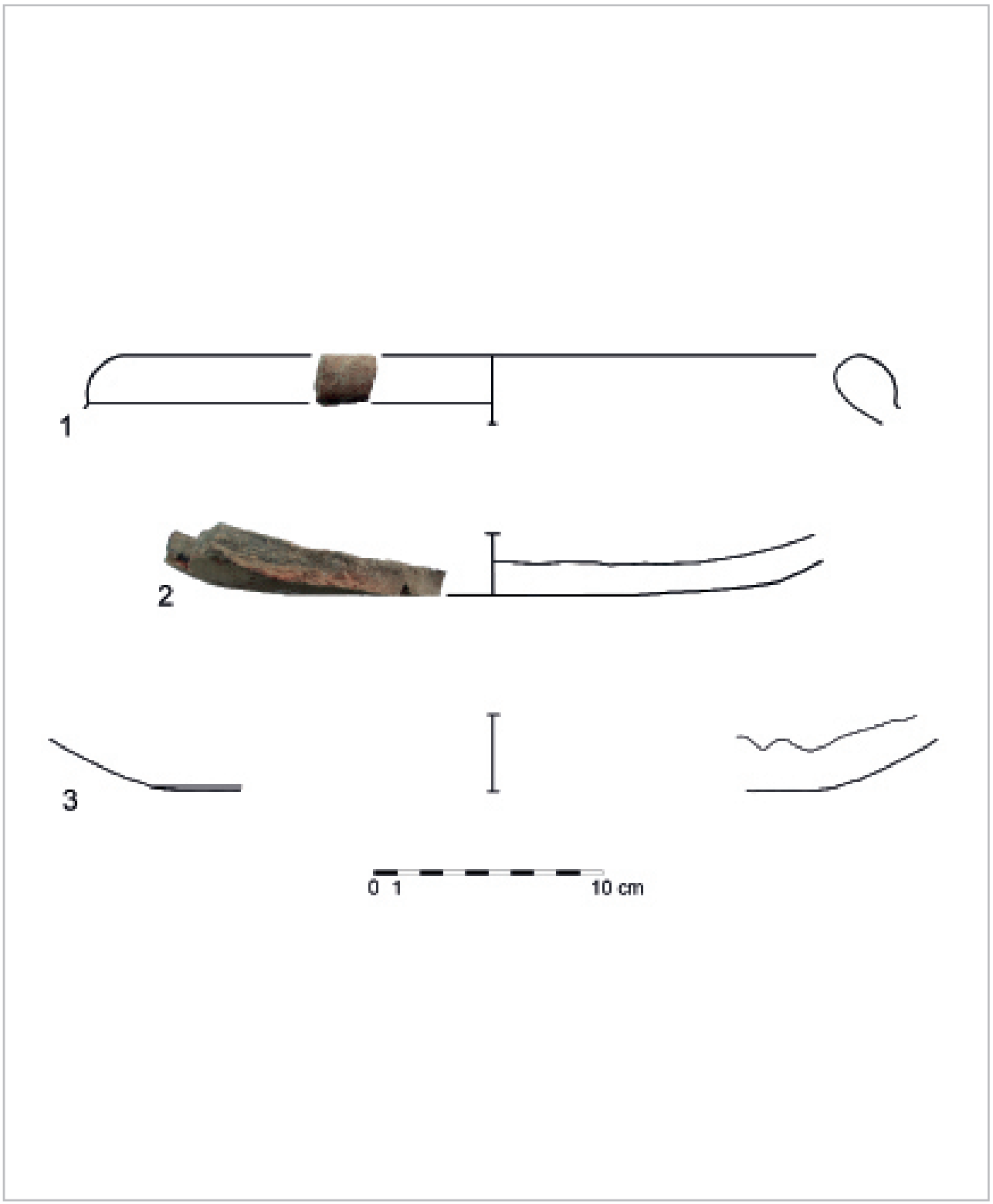
Pl. 4- Traces of manufacturing techniques on Early Bronze IV (Phase V) pottery from Tell Fadous-Kfarabida; 1, 5) vessels hand-coiled and wheel-finished; 2,3) vessels with hand-made and wheel-finished bodies and wheel-made rims; 4, 7–9) wheel-coiled vessels; 6) string-cut base.



Pl. 5- Early Bronze IV (Phase V) vessels shapes at Tell Fadous-Kfarabida: cooking pots and storage jars.



Pl. 6- Middle Bronze Age (Phase VII) pottery from Tell Fadous-Kfarabida.



Pl. 7- 1) Rim of an Egyptian Marl zir *Type 1 (FAD11.290/310.10.4, Context 2000; photo: H. Genz); 2) Base of an Egyptian Marl* zir *(FAD10.290/300.151+161+166+175, Context 637; photo: H. Genz); 3) Base of an Egyptian Marl* zir *(FAD07.250/285.2.7, Context 1200; photo: H. Genz).*

Pl.	Reg.no.	Context	Type	Description
6:1	FAD11.310/295.186	1710	Bowl	Reddish-brown clay with dark grey core. Medium amount of fine to large angular grits (calcite, 1-3 mm). Well fired. Wheelmade. Outside+inside: reddish-brown, wheelmarks. One body sherd from FN187 joins.
6:2	FAD08.250/280.67.11	1103	Bowl	Reddish-brown clay with medium amount of fine subangular grits (limestone+red particles, up to 1 mm). Well fired. Wheelmade. Outside: reddish-brown, wheelmarks. Inside: reddish-brown, roughly smoothed.
6:3	FAD08.290/295.28.5	505	Bowl	Brown clay with medium amount of fine subangular grits (limestone, up to 1 mm). Well fired, wheelmade. Outside: yellowish-brown, horizontal combing. Inside: yellowish-brown, smoothed, but wheelmarks still visible.
6:4	FAD11.290/310.11	2000	Baking tray	Reddish-brown clay with light brown core. Medium amount of fine to large angular grits (limestone+calcite, 1-3 mm). Medium-well fired. Handmade. Outside+inside: reddish-brown, roughly smoothed. Incised decoration.
6:5	FAD08.250/285.40.2+4	1211	Globular jar	Reddish-brown clay with many fine to large angular grits (limestone+calcite, 1-3 mm). Medium-well fired. Handmade. Outside+inside: yellowish-brown to brown, smoothed.
6:6	FAD10.310/295.31.4	1708	Globular jar	Reddish-brown clay with medium amount of fine to medium-sized subangular grits (limestone+red particles, 1-2 mm). Well fired. Wheelmade. Outside+inside: reddish-brown, wheelmarks.
6:7	FAD11.295/295.341.2	800	Jug	Light brown clay with grey core. Medium amount of fine to large subangular grits (limestone, 1-3 mm). Very well fired. Wheelmade. Outside+inside: light brown, wheelmarks.
6:8	FAD09.290/295.285.5	531	Jug	Reddish-brown clay with light brown core. Many fine to medium-sized subangular grits (limestone+calcite, 1-2 mm). Well fired. Wheelmade. Outside: light brown, wheelmarks. Inside: yellowish-brown, wheelmarks.
6:9	FAD14.260/320.322.3	3009	Jar	Reddish-brown clay with black core. Medium amount of fine to medium-sized subangular grits (limestone+red particles, 1-2 mm). Well fired. Probably wheelmade. Outside+inside: reddish-brown, eroded.
6:10	FAD08.250/285.17.9	1218	Jar	Yellowish-brown clay with medium amount of fine to medium-sized angular grits (limestone, 1-2 mm), some organic particles. Well fired. Wheelmade. Outside+inside: yellowish-brown, smoothed but wheelmarks visible.
6:11	FAD08.250/285.32.2	1202	Jar	Reddish-brown clay with grey core. Medium amount of fine to medium-sized subangular grits (limestone+grey particles, 1-2 mm). Well fired. Probably wheelmade. Outside+inside: reddish-brown, smoothed.
6:12	FAD08.250/285.17.10	1208	Miniature vessel	Yellowish-brown clay with greyish-brown core. Medium amount of fine to medium-sized angular grits (limestone, 1-2 mm). Medium-well fired. Probably handmade. Outside+inside: yellowish-brown, smoothed.
6:13	FAD09.295/295.27.23	802	Miniature vessel	Reddish-brown clay with few fine subangular grits (limestone, up to 1 mm). Well fired. Wheelmade. Outside+inside: reddish-brown, irregular burnishing.

Tab. 3- Description and contextual information for the Middle Bronze Age pottery illustrated on plate 7.

Potmarks

Metoda Peršin

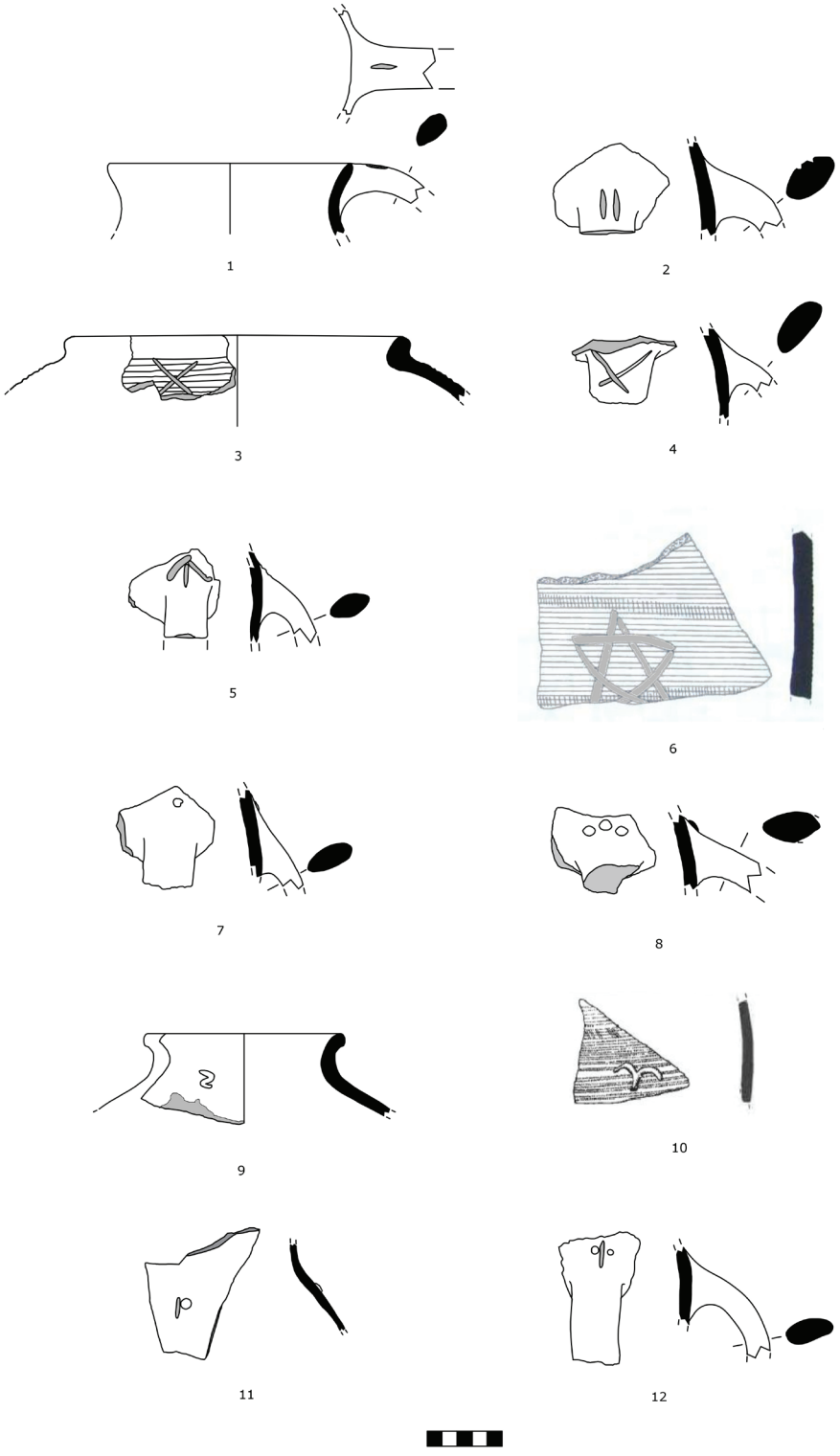
Potmarks are generally defined as isolated signs on a ceramic vessel that were created by incising, excising, impressing or painting (Sconzo 2013: 223). They were discovered at several sites in the Near East. However, no uniform conclusions on their function(s) were reached. Potmarks were often analysed as a by-product of another study, such as in relation to writing or where they happened to appear on a specific group of vessels, such as imported or decorated pottery. Often very small and isolated assemblages of potmarks were studied leading to different interpretations. A thorough discussion of the history of research on potmarks is not in the scope of this contribution. However, a few recent studies should be mentioned both due to the number of potmarks they analysed, as well as to their approach. Larger studied assemblages come from Early Bronze Age sites Khirbat az-Zayraqūn in Jordan (Genz 2001) and Tell el-'Abd in Syria (Sconzo 2013) and Late Bronze Age contexts from Anatolia (Glatz 2012). In addition, studies of Late Bronze Age potmarks in Cyprus should be mentioned (Hirschfeld 2002; 2011; 2012), which sum up some possible interpretations suggested in the past. In the studies mentioned above, potmarks could represent identification of a potter, workshop, merchant, or owner. They could denote quality or quantity of the contents of the vessel, as well as price, batch, point of origin or destination, or other information (Hirschfeld 2002: 49). Although no systematic study of potmarks has been done in Lebanon so far, they were found at several sites and occasionally published: Tell Fadous-Kfarabida (Badreshany, Genz and Sader 2005, pl. 13: 6–8), Tell Arqa (Thalmann *et al*. 2006; 2016), Kamid el-Loz (Catanzariti 2010–2011) and Sidon (Doumet-Serhal *et al*. 2006).

At Tell Fadous-Kfarabida, approximately 150 potmarks were identified so far among the ceramic material. The vast majority of potmarks can be dated to the Early Bronze Age and only a few can be attributed to the Middle Bronze Age contexts at the site. Although some marks are not well preserved, many are complete and enable a typological grouping of signs. Many different signs can be recognised and can generally be divided into three main groups based on the marking technique employed. One group are the incised signs, the second are applied signs and lastly several potmarks consist of a combination of incisions and applications. Incised signs range from simple lines (**pl. 8: 1** and **tab. 4**) that can also come in groups (**pl. 8: 2**) and can also have more complex forms such as crosses (**pl. 8: 3** and **4**), arrows (**pl. 8: 5**) or pentagrams (**pl. 8: 6**). Applied marks can consist of simple applied knobs (**pl. 8: 7**) that can also appear in groups (**pl. 8: 8**), or can have more complex shapes, such as snakes (**pl. 8: 9**) or the so-called ram's heads (**pl. 8: 10**). Combinations of incisions and applications encompass a variety of incised shapes paired with applications that can differ in number and shape (**pl. 8: 11** and **12**).

Many of the signs have parallels at other sites in Lebanon. Signs like incised arrows have comparisons at Tell Arqa (Thalmann *et al*. 2006, pl. 66: 1) and Sidon (personal observation). Incised crosses and tree motifs have parallels at Sidon and Tell Koubba (personal observation). Snake applications and combinations of applied knobs with a variety of incisions have parallels in Sidon (personal observation).

Several signs also have comparisons beyond the area of Lebanon. Signs like simple incised lines, crosses, pentagrams and tree motif can be found in Khirbat az-Zayraqūn in Jordan (Genz 2001: 217). Signs with several parallel simple incised lines and cross signs can be found at Tell el-'Abd in Syria (Sconzo 2013, fig. 6.3), as well as circles (Sconzo 2013, fig. 6.13) and tree motifs (Sconzo 2013, fig. 6.16).

Potmarks at Tell Fadous-Kfarabida can also be classified according to visibility. The majority of the signs are located either on the handle, neck, or shoulder of the vessels and were therefore easily recognised by the user of the vessel. Only a few potmarks are located on the bases and therefore not immediately visible to the user. Potmarks are not evenly distributed on all types of vessels. Visible signs occur mainly on jars and jugs, hole mouth jars, globular jars and rarely vats. On bases they are confined to jugs. Potmarks at Tell Fadous-Kfarabida never appear on platters and only one mark appears on a bowl. Only one sign per vessel appears at the site and the majority of potmarks were done pre-firing.



Pl. 8- Potmarks from Tell Fadous-Kfarabida.

Plate	Reg.no.	Context	Type of vessel	Description of ware
8:1	FAD08.285/305.69.4	417	Jug	Reddish-brown clay with few fine angular grits (limestone, up to 1 mm). Well fired. Wheelmade. Outside+inside: reddish-brown, wheelmarks. Incision before firing on handle.
8:2	FAD11.290/310.38.4	2005	Handle	Reddish-brown clay with yellowish-brown core. Medium amount of fine to medium-sized subangular grits (limestone, 1-2 mm). Medium-well fired. Handmade. Outside: reddish-brown, smoothed. Incision before firing. Inside: reddish-brown, smoothed.
8:3	FAD10.290/305.188.24	711	Globular jar	Reddish-brown clay with very dark grey core. Medium amount of fine to medium-sized angular grits (calcite, 1-2 mm). Medium-well fired. Body handmade, rim wheel-finished. Outside: reddish-brown to black, horizontal combing. Mark incised before firing. Inside: reddish-brown to black, smoothed.
8:4	FAD09.290/305.100.7	713	Handle	Yellowish-brown clay with few fine angular grits (limestone, up to 1 mm). Well fired. Handmade. Outside: yellowish-brown, smoothed, incision before firing. Inside: yellowish-brown, whipping marks.
8:5	FAD07.285/300.73.5	326	Handle	Red clay with grey core. Medium amount of fine to medium-sized subangular grits (limestone+red particles, 1-2 mm). Very well fired. Manufacturing technique unclear. Outside: red, eroded, mark incised before firing. Inside: red, eroded.
8:6	FAD05.1.5	0	Body sherd	Reddish-brown clay with greyish-brown core. Many medium-sized angular grits (limestone, 1-2 mm). Very well fired. Handmade. Outside: reddish-brown, combed. Incision before firing. Inside: reddish-brown, roughly smoothed.
8:7	FAD07.285/300.48.11	317	Handle	Reddish-brown clay with grey core. Medium amount of fine to medium-sized subangular grits (limestone, 1-2 mm). Well fired. Handmade. Outside: grey slip (?), smoothed, applied mark. Inside: dark greyish-brown, roughly smoothed.
8:8	FAD11.310/295.304.16	1738	Handle	Reddish-brown clay with medium amount of fine subangular grits (limestone+calcite, up to 1 mm). Well fired. Handmade. Outside: yellowish-brown, smoothed, applied mark. Inside: reddish-brown, wiping marks.
8:9	FAD07.285/295.132.1	218	Jar	Reddish-brown clay with grey core. Medium amount of fine to medium-sized angular grits (limestone+black particles, 1-2 mm). Well fired. Wheelmade. Outside+inside: reddish-brown, wheelmarks. Plastic application outside on shoulder.
8:10	FAD10.290/305.285	725	Body sherd	Reddish-brown clay with brown core. Medium amount of fine to medium-sized angular grits (limestone+red particles, 1-2 mm). Well fired. Handmade. Outside: reddish-brown, smoothed, pattern burnish, ram's head application. Inside: reddish-brown, roughly smoothed.
8:11	FAD08.285/295.142.2	219	Body sherd	Reddish-brown clay with greyish-brown core. Medium amount of fine to medium-sized subangular grits (limestone, 1-2 mm). Very well fired. Manufacturing technique unclear. Outside+inside: reddish-brown, eroded. Incision before firing+application.
8:12	FAD07.285/300.14.1	305	Handle	Brown clay with dark-greyish brown core. Medium amount of fine subangular grits (limestone+calcite, up to 1 mm). Well fired. Handmade. Outside: pale brown to brown, smoothed, incised+applied mark. Inside: pale brown to brown, whiping marks.

Tab. 4- Description and contextual information for the potmarks illustrated on plate 8.

The analysis of potmarks from Tell Fadous-Kfarabida is still ongoing. However, some interpretations of the function of potmarks from comparable sites can be omitted already. The fact that the potmarks at Tell Fadous-Kfarabida appear only on certain vessel types and are not evenly distributed on all types of vessels would speak against the interpretation of these marks as potters' marks. At the same time, the large number of different signs appearing at a rather small site does not seem likely to represent individual potters or workshops.

Potmarks are often interpreted as signs of ownership. In this case we would expect repetition of the same sign on many vessels within a room or a building on the site. At Tell Fadous-Kfarabida, this is not the case. Buildings at the site show a variety of signs which are repetitive in several different buildings and show no concentration in specific buildings or rooms. Furthermore, the same signs appear in both the domestic buildings of Phase III at the site, as well as in public buildings of Phase IV. Although it is believed that the land ownership at the site changed in between these two phases, the marking system seems to have stayed the same. No obvious concentration of specific signs in buildings would also seem to speak against their relation to administrative activity.

The relation of the signs to the volume of the vessels at Tell Fadous-Kfarabida also does not seem likely. The same signs can appear on small and large vessels and at the same time, several different signs are known from the same type of the vessel. It is possible though that the potmarks were related to the content of the vessels. Since the majority of the potmarks at the site were made before firing, it seems that the potter would have had an idea what the vessel might have been used for. As only a portion of vessels were marked, this could be either as the potmarks indicated vessels with special functions and the unmarked ones were used for any other purposes, or the vessels were produced and transported in batches and not every individual vessel needed to be marked.

Acknowledgements

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Report on the Beads from Seasons 2007–2016 from Tell Fadous-Kfarabida

Zuzanna Wygnańska

Methods

This report covers 104 beads from all the seasons of excavations at Tell Fadous-Kfarabida between 2007 and 2016. The specificity of this collection is that almost all the beads, with one sole exception, came from occupation layers rather than – as would be more usual – from graves. As a result, the finds are fewer, accidental and lack their original context. All these factors obscure the patterns of their original use and distribution on the site. Nonetheless, several interesting observations still can be made regarding the identity of the beads users as well as the extent of trade contacts via which the beads had found their way to the site.

Beads: Terminology

Beads presented in this report were studied with a magnification glass and measured with a caliper. Stones were identified visually with a magnification glass at the Department of Geology at AUB by Professor Abdel Rahman to whom I owe many thanks. Classification of the bead types follows that presented in Horace Beck's work on the bead nomenclature (1928), however, I used here his simplified descriptive system referring to a combination of longitudinal and transverse sections. Length (L.) – the distance between the two ends, or apices, of a bead (often the length of the perforation), and diameter (diam.) represent basic bead dimensions, and the ratio between them classifies a bead as disc, short, standard, or long.

Materials, Forms, Technologies

Organic materials

Most beads found at Tell Fadous-Kfarabida were made of organic materials – predominantly marine shells but also animal bones, antler, and fish vertebrae

(Genz 2016), thus exhibiting a great deal of invention in the exploitation of local resources obtained from the immediate vicinity of the site for the production of personal ornaments. Beside the actual beads, intentionally worked and perforated to be strung, there were also those with an entirely natural shape only minimally worked (most often just pierced). Such finds of organic materials were interpreted as beads because they are perforated and, thus, suitable for threading and because they were found in occupation layers which made them good candidates for lost/discarded personal adornments.

Of the locally occurring marine species, *Conus ventricosus* and *Columbella rustica* sp. shells were commonly used as beads (total = 22). They tend to have standard dimensions of around 13.0 mm in length which suggests that small shells were preferentially selected for jewellery (**pl. 9: 1**), although larger shells were also used (**pl. 9: 2**). These simplest of beads were made by removing the shell apex to enable threading.

An especially numerous group of adornments (total = 24; 17 complete, 7 incomplete) are rings trimmed from cone shells (**pl. 9: 3** to **5**). Typologically, they are either actual rings (**pl. 9: 4**) or convex truncated cone disc beads with an extra-large perforation (**pl. 9: 3**; called 'discoid beads' in Genz *et al*. 2010: 261–263) with a round, triangular or square transverse section. The cone shell rings were quite meticulously trimmed from the sown off spire part of the cone shell with the apex removed. The obtained discoidal or conical slice was subsequently shaped by grinding.

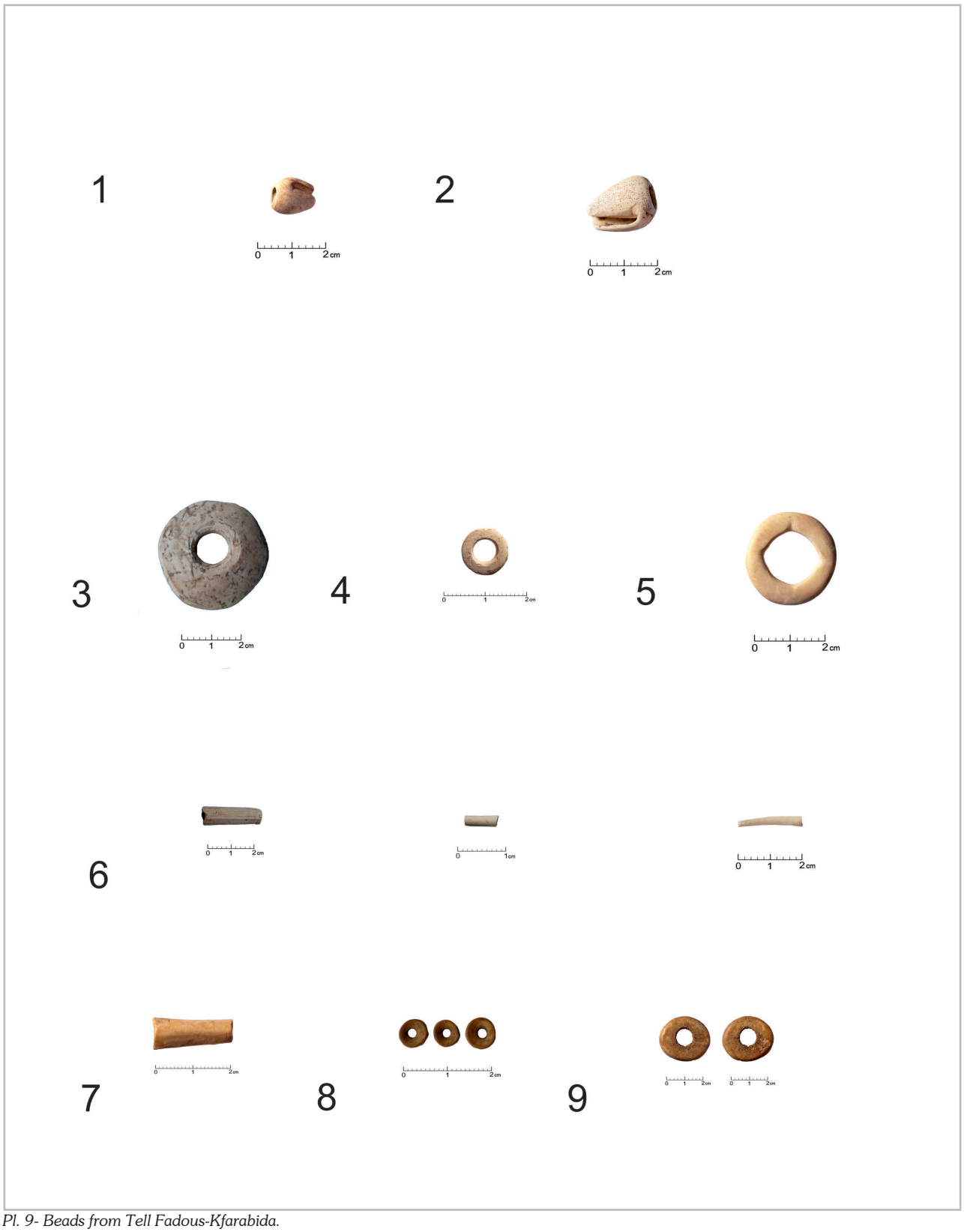
Six rings in this collection have either two or four grooves perpendicular to the bead perimeter on the upper and bottom surfaces (**pl. 9: 5**). Such grooves must have resulted from the friction of a thread or strap against the bead surface, indicating the possible way of attachment. It cannot be stated at this point whether the rings were elements of a garment or headdress application, or a belt's, or some other leather object's decoration, however, they seem not to have been strung in a way specific to necklaces or bracelets. In general, the cone shell rings are a ubiquitous type of adornment in graves appearing throughout the Near East in different periods beginning with, at least, the 5th millennium BC (Spycket 1996). Unlike the plain rings, the grooved specimens do not have, as yet, any parallel beside the Early Bronze Age finds from Tell Arqa (Jean-Paul Thalmann, personal communication). This characteristic type of personal adornment may probably be perceived as an expression of a local (regional?) identity.

Scapophod shell (*Dentalium* or/and *Antalis* sp.) fragments (total = 9) were found in occupation levels of Phases III and IV. None of them bears any apparent traces of working (**pl. 9: 6**). The edges of almost all of the fragments are jagged, either as a result of a natural breakage or later taphonomic processes. Like some of the cone shells mentioned above, also these objects were probably natural in origin but might have been turned into jewellery. The Scapophod shells were in general scarce at the site; they were not identified in the material collected until 2011 and studied by Vanhecke (2012) although they were locally available. This might suggest a deliberate procurement of the fragmented shells to be used as tubular beads as there was no other interest in this mollusc.

Animal bones

All animal bone beads (total = 6) were recovered from Area II, from contexts dated to Phase III. They are made from hare tibia. They have naturally tubular shapes, measure between 32.0 mm and 21.0 mm in length and *ca* 8.0 mm in diameter (**pl. 9: 7**). Most of them still maintain their shining surfaces probably resulting from deliberate smoothing aimed to give them an attractive look. The lengthwise linear incisions, probably left by the polishing process, are visible on some of the beads. The edges of the beads were also smoothed.

At least ten pierced fish vertebrae were found in Area II. Some of them might have been naturally pierced (**pl. 9: 8**). It is not certain if all were used as beads. In one case, a cluster of three pierced vertebrae was discovered on a Phase III floor in Room 5 of Building 4 (C. 2405) suggesting that they had actually been worn together. Apart from the two specimens found in insecure Phase V contexts (pit fills in Building 4), all the others were retrieved from Phase III in residential Area II.



Pl. 9- Beads from Tell Fadous-Kfarabida.

A unique bead trimmed of an antler is an ovoid disc (**pl. 9: 9**). Its surface is smoothed and shined, possibly also from wearing. The internal, soft part of the antler was removed, creating a large perforation (7.0 mm in diameter). The bead was found in a Phase III/IV fill in Room 5, Building 4.

Stone beads

Local materials – local production?

A variety of stone beads found at the site were made of locally (in Lebanon), or regionally (Syria, Turkey) available materials. These include chert/flint, limestone, calcite/onyx and basalt.

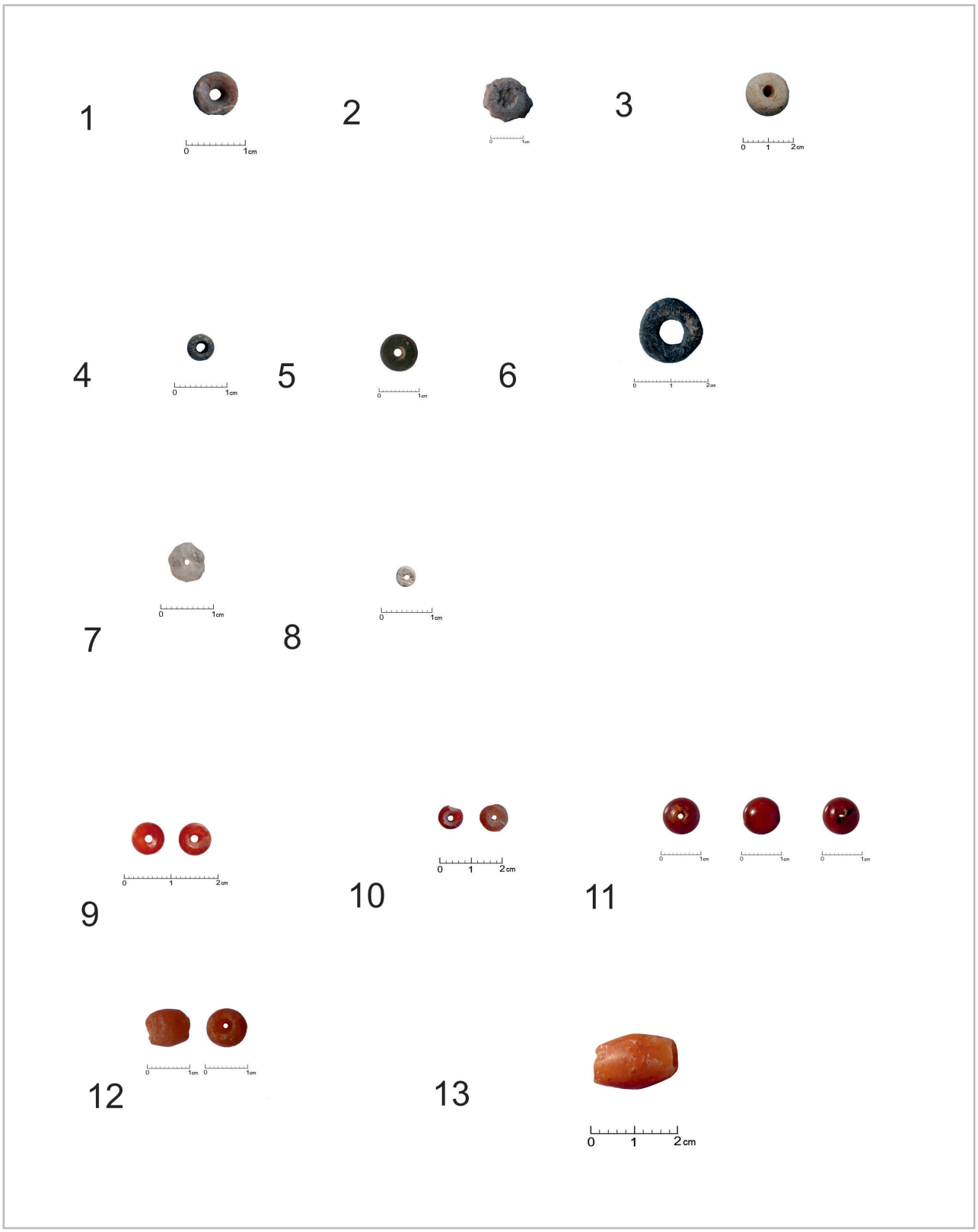
Four short cylindrical beads made of chert/flint occurring locally or relatively close to the site were found in Area II in layers dated to Phase III (**pl. 10: 1**). Additionally, two short barrel-shaped beads of opaque limestone (**pl. 10: 3**) as well as one bead of semi-translucent quartz and one of calcite/onyx, both in the shape of short barrels were retrieved. All represent regionally accessible materials (a possible location of these materials was consulted with Professor Abdel Rahman). The beads have biconical tapering perforations indicating that they were drilled with the pecking technique. This technology involves the use of a pointed stone tool that is struck against the bead and gradually fractures tiny conical points that eventually break off to create a wide hole and an hourglass-shaped perforation. Such technique was used since 6000 BC in Mesopotamia and slightly later in Egypt and India (Kenoyer 2003: 16, 17; Kenoyer and Frenez 2018). The drill-hole diameter varies from 1.0 mm to 1.5 mm. The surfaces of these beads were precisely polished and smoothed but not shined. The surfaces of the chert/flint beads have even characteristic chipping traces done during the shaping of the bead.

A probable chert bead blank was recovered from the early Phase III fill in Building 2, Area II (Context 344; **pl. 10: 2**). It is round, plano-convex in section, about 14.0 mm in diameter and 3.0 mm thick. Its edges are chipped and roughly smoothed but not polished. It bears at least eight drilled conical indentions probably from pecking clustered in the central part of the convex side. The object may be regarded as an indication of on-site local stone-bead production, however, with due caution as neither debitage nor appropriate tools were as yet identified at the site.

Imported beads

Besides local materials, there are also several beads produced of basalt, serpentinite, rock crystal, and steatite – minerals originating from the wider region (northern Lebanon, Syria, and Turkey) but not attested in the direct vicinity. All these stones are relatively soft and easy to shape so their production did not require specialist skills. Nevertheless, there has been no indication so far that such beads were produced locally. Among such products are short cylindrical basalt beads (total = 3) and beads of unidentified black stone (2). The basalt beads have slightly porous, uneven, and shiny surfaces. Their perforations are biconical and tapering, probably pecked (**pl. 10: 4**). The black-stone beads are different in appearance: they are matt and visibly less porous, finely shaped with a well-ground surface (**pl. 10: 5**). Unlike the basalt beads, their perforations are regular holes, *ca* 1.5 mm in diameter, most probably drilled with a stone drill; the drilling traces were smoothed. A single serpentinite (soft stone) bead is a disc with a 14.0 mm diameter and a large perforation hole (6.0 mm in diameter) without drilling traces around perforation (**pl. 10: 6**). A single, very thin groove/incision visible on the edge and inside the perforation might be a use-wear trace from suspension.

Only two rock-crystal beads were found, both dated to Phase III and found in Area II (Room 3 in Building 4; **pl. 10: 7**). They represent a broadly occurring bead type: discs with diameters of 7.0–8.0 mm and length of 3.0 mm, made of a semi-translucent stone. The surface, although smoothed, was not uniformly ground. Also, the edges of the beads are not perfectly rounded, yet they are smoothed. Good-quality rock crystal suitable for carving is available in Iran, Turkey, and Cyprus (Moorey 1998: 95) so the beads must be imports. Rock crystal is, however, not a good chronological indicator – it appeared in Mesopotamia and Anatolia from the 6th millennium BC onwards.



Pl. 10- Beads from Tell Fadous-Kfarabida.

Steatite microbeads

The steatite microbeads (total = 9) were concentrated in the residential Area II of the site (**pl. 10: 8**). These beads produced of a raw material unavailable neither in Lebanon nor in the coastal Levant and requiring specialist knowledge must have been imported. Eight of them were found in secure occupation contexts dated to the Early Bronze Age III (mainly Phase III) and one came from Early Bronze Age IV (Phase V). A sole steatite bead was found outside this cluster in a modern disturbance in Area III. The beads are either short cylinders or short barrels, circular, wedge, or rhombic in transverse section. They measure approximately 2.84 mm–4.24 mm in diameter and 1.68–2.56 mm in length.

Seven of the beads were analysed using OM, SEM/EDX and XRD by Damick and Woodworth (2015). Composition of the Early Bronze Age III beads was characteristic of an early vitreous material: enstatite–steatite transformed by heating. General material characteristic obtained by non-destructive methods by Damick and Woodworth did not allow placing the beads within any particular production area (2015). However, given other information from Fadous-Kfarabida regarding other imports (Genz *et al*. 2016) as well as the proximity and availability of the source material, it is justified to presume that the beads were brought as ready products either from Egypt or from Anatolia. The latter candidate seems especially likely. The raw material is available in Central Anatolia and enstatite beads were produced, for example, in the Chalcolithic period at Çamlıbel Tarlası (Pickard and Schoop 2103). There is also evidence of the use of steatite or enstatite microbeads in the Early Bronze Age (3100–2800 BC) in graves at Başur Höyük in south-eastern Turkey (Hassett and Sağlamtimur 2018, fig. 9; Gonca Dardeniz Arikan, personal communication).

The single bead coming from the Early Bronze Age IV displayed, however, different characteristics and it turned out to be a quartz based frit or faience (Damick and Woodworth 2015). This may be proof that the bead from the later phase was manufactured differently, and perhaps, came from a different workshop but a tradition of use of similarly looking beads seems to be continued.

Carnelian – a hard semiprecious stone

A total of eleven carnelian beads were discovered. Eight beads of various shapes were found, the majority of them in Building 4, Area II, in contexts dated to Phase III. Three other beads were assigned to a later Phase VI (Middle Bronze Age) and came mostly from fills. Some differences reflecting various technological approaches and possibly different workshops can be traced within this collection. There are, for example, at least four methods of perforation attested for the carnelian beads: pecking and three methods of drilling using different drills. This shows that the particular beads have different histories, including their possible chronological differentiation and different trajectories of their procurement.

Simple short beads: cylinders (4; **pl. 10: 9**) and barrels (4; **pl. 10: 10**) are the dominant shapes. They were made of good quality carnelian, a semi-translucent, deep-orange stone. Overall, the working of the beads is not perfect: their surfaces bear traces of knapping, they are polished and smoothed but not finely shined. The sides of the barrel-shaped beads are precisely rounded and polished. All of the short beads were perforated by pecking. The pecked perforations are large – *ca* 7.0 mm in diameter as are the drill holes: approximately 1.2–1.5 mm in diameter. Stones quality and the technological characteristics of these beads are paralleled by 4th–3rd millennium BC beads originating in Egypt or Arabia. Such types were also broadly distributed in the Southern Levant, especially in the Early Bronze Age III–IV periods (Ludvik 2018: 207). Carnelian pecked, short cylinders are present in the necklace from Khirbet al-Batrawi (Nigro 2012). They were also found in Chalcolithic jar burials in Byblos (Artin 2009: 112, fig. 55C).

Two longer carnelian beads were manufactured in a different way. A small, standard barrel bead was made of poor-quality, light-orange opaque stone (**pl. 10: 12**). Its surface and edges were only roughly polished and the sides are not precisely rounded. Different sizes of the perforation at each end and the shape of the drill hole suggest the bead might have been perforated with a constricted cylindrical stone drill. The bead has good analogies among the so-called Indus-style beads produced between 2600–1900 BC, characteristic of the Early Bronze Age IV levels in the

Southern Levant and the broader Near East. Yet the specimen from Fadous-Kfarabida is earlier as it comes from the fill of a Phase III street.

Another long bead biconical in shape is made of poor quality, opaque, milky-orange stone (**pl. 10: 13**). Its surface is polished and smoothed but not shined. The shape is not precisely executed. This specimen, with wide tapered perforation hole made from two sides was probably drilled with a solid copper drill and hard abrasives. It was found in a fill dated possibly to Phase VI (Middle Bronze Age). Similar, long biconical or barrel-shaped beads were common at Early Bronze Age I–IV sites in the Southern Levant. Beads of this type probably originated from the Old Kingdom and First Intermediate Period Egypt or from workshops in the Southern Levant. It is also possible that workshops in Syria or Anatolia emulated the Egyptian style and technology (Ludvik 2018: 432, 425). A rich collection of the beads of this type constituted part of the Early Bronze Age IIIB necklace from Khirbet al-Batrawi (Nigro 2012, fig. 7 upper row). Multiple beads of the type are also displayed in the National Museum in Beirut as belonging to the necklaces from the 'Montet jar' hoard from Byblos dated to 3200–2000 BC.

A single very good quality spherical bead (**pl. 10: 11**) was originating from Phase VI (Middle Bronze Age) and was found out of context in a fill in Area I. It is made of dark orange semi-translucent stone and is perfectly polished to a high lustre. A small regular perforation (drill hole diameter is 1.5 mm) without traces of drilling was most probably made with a copper drill and abrasives and a bow drill. Such beads appeared in the Levant in the Middle Bronze Age and were continuously used through the ages.

There are various potential directions of import of the ready carnelian products to the site. The most opulent sources of the stone were known since antiquity in the Indus Valley but carnelian was also found in the deserts of Egypt and Arabia as well as in Turkey (Zöldföldi 2011). The similarity of the Phase III beads from the site to the specimen found in the Southern Levant suggests possible direction of import from that region, Egypt or Arabia. The beads were probably distributed indirectly and might have arrived in Lebanon via a net of intermediaries.

Contextual Summary

The finds originating from the layers dated to Phase III, an early phase of the Early Bronze Age III included hare bone beads, pierced fish vertebrae, cone shells with removed apices, as well as chert cylindrical beads, and the majority of carnelian beads, especially short cylinders and barrels. Additionally, a few beads of local stones and possibly produced at the site, were found. Most of the beads were found in the area of the Buildings 1 and 4. In particular, Building 4/Area II produced a considerable quantity of finds, some laying on the floors or inside fills of the household installations. Imported carnelian beads deserve here particular attention. The short pecked cylindrical and barrel carnelian beads concentrated on Building 4 were found in Room 3 on the Floor 2371 and in the Fill 2313; two in Room 5, both from Fill 2310.

Some changes in the bead types and materials occurred in Phase IV, the later Early Bronze Age III period at the site. Imported artificial enstatite microbeads as well as the 'local' shell rings, very few in Phase III, were found. The first ones were concentrated in Building 4/Area II. The multiple shell rings were likewise coming mainly from residential Area II but were also found in other buildings. So were other imported beads: basalt short cylinders and rock crystal beads. The characteristic grooved shell rings made of locally available materials might have been a characteristic adornment representing the identity of the inhabitants of Fadous-Kfarabida in this phase but also perhaps people from neighbouring settlements.

Two trends are visible in the Early Bronze Age III collection from the site: use of valuable imported beads as well as the beads made of materials of local or regional provenience. Some of such beads, usually greyish, were not visually attractive and it seems that it was the raw material itself that might have been embedded with a symbolic meaning for their wearers. Remarkably, Alison Damick observed a similar preference for locally available materials in the Early Bronze Age ground-stone industry from the site although, unlike with the beads, in this case, economic factors might have played a deciding role in choosing the local resources (Genz *et al*. 2016: 103).

As the character of the settlement changed in the Early Bronze Age IV, the beads almost disappeared from

archaeological contexts. Phase V is actually lacking in beads apart from a few shell rings and fish vertebrae occasionally found in pits. Also Phase VI was not rich in finds although it contained three carnelian beads. At least one typically Early Bronze Age form short cylindrical bead was found in secondary context in Area II (1715) and occurred together with the typically Early Bronze Age IV long barrel type. Both beads might have been curated from earlier periods and reused. A single spherical bead from a fill in Area I was characteristic for the Middle Bronze Age and later periods and represents the post-Early Bronze Age period of the site's occupation.

Acknowledgements

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Metallography and Chemical Analysis of Metal Finds from Tell Fadous-Kfarabida

Ziad El Morr

Introduction

The Near East has witnessed the use of metals as early as the 8th millennium BC. Many of the defining metallurgical techniques were invented or used early on, during the Chalcolithic, probably due to the presence of several copper ore deposits in Iran, Anatolia, the Southern Levant, and the Caucasus. The territory of present-day Lebanon is devoid of any non-ferrous ores. However, it must have served as an important link in technological and/or material transfer between the South and the North. Indeed, the first copper tools found in Byblos are dated to the *Énéolithique ancien* which is possibly contemporaneous to the Chalcolithic in the Southern Levant (Artin 2009: 12; Garfinkel 2004). Many researchers have assumed that many techniques have diffused from the North were several metallurgical domains existed such as in Anatolia and Iran, to the South (Roberts, Thronton and Pigott 2009). Others have seen the Southern Levant as innovating metallurgical district in its own right (Amzallag 2009). However, this will remain conjectural as long as there are no reliable data retracing the development and transfer of technologies as well as circulation of raw materials and finished metal goods throughout the Near East. In this regard, the territory of Lebanon might have been essential in this exchange network due to its location. However, research in this field has been sporadic at best with most of the data coming from Middle Bronze Age (MBA) finds (El Morr and Pernot 2011; El Morr *et al*. 2013; El Morr and Mödlinger 2014; Le Roux, Véron and Scholz 2009; Véron *et al*. 2011–2012). Tell Fadous-Kfarabida is a site that has been excavated with modern archaeological methods, it presents a clear stratigraphic sequence and its occupation phases are well defined. The work there has revealed metal implements from the Chalcolithic, the Early Bronze Age II–III and the Middle Bronze Age, making it one of the very few sites in Lebanon where the development of metalwork practices and metal goods can be traced from their early beginnings.[18]

The finds

Seven finds were sampled as part of the first metallography campaign (**pl. 11** and **tab. 5**). These will be presented here according to their inventory number (i.e. FAD05.0.106, FAD09.295/295.40). Among this group, only FAD05.0.106 is from Phase I (Chalcolithic). It was found in a child burial jar which has been dated by radiocarbon to the first half of the 4th millennium BC. It should be reminded that such burial customs were similar to Byblos during the *Énéolithique* period (Artin 2009). All other items are from the Early Bronze Age III (Phase IV). FAD09.290/300.82 and FAD10.305/295.58 were found on floors inside Building 3 and Room 3 of Building 4 respectively and can be considered in primary position. FAD11.310/295.379 was found in a fill in Room 6 of Building 4. FAD09.295/295.61, FAD09.295/295.40 and FAD10.295/295.150 were

discovered in a street fill between Buildings 3 and 4. While their exact use might be difficult to define, all the finds from the Early Bronze Age III seem to be tools such as awls or wires except for FAD09.295/295.40 which might be a pin fragment. FAD05.0.106 is a lump of metal with undefined function.

Reflected light microscopy was used to perform metallographic observations. The grain boundaries of the crystalline structure were revealed by etching the polished surface with an alcoholic ferric chloride solution as described by Scott (1991: 72). The full result of this investigation will be presented elsewhere.

Pl. 11- Metal objects from Tell Fadous-Kfarabida. 1) FAD05.106; 2) FAD09.295/295.40; 3) FAD09.295/295.61; 4) FAD09.290/300.82; 5) FAD10.295/295.150. 7: FAD10.305/295.58.

Methods

A sample was collected from each of the seven finds by cutting a small piece of metal with a fine jeweller's saw. The samples were mounted, then ground and polished to a 0.25 μm diamond finish in order to create a surface suitable for metallographic observations and chemical analyses.

Additional observations and the characterisation of the alloy composition were carried out using a Scanning Electron Microscope-Energy Dispersive Spectroscopy (SEM-EDS).[19] The operating condition is an acceleration voltage of 15 kV in a 'Low Vacuum' environment (10 Pa). In the present paper the sum of the measured amounts, expressed in weight percentage (Wt per cent), is normalised to 100 per cent. Although results of elementary composition below

0.5 Wt per cent lack quantitative precision, they are mentioned in the general composition as they hold qualitative information. Each result (**tab. 5**) represents the average of all the measurements made on a sample. The size of the measurement area and the number of area analyses performed on each sample depend on the shape and dimensions of the observed sample surface as well as its preservation. Generally, the largest area of measurement containing exclusively un-corroded metal was used for analysis. Most of the measurement areas were larger than 2500 μm^2.

FAD05.0.106 presents intergranular porosity and secondary phases typical of an as-cast copper base alloy. Indeed, the shape and the grain structure of this find suggest that it was simply a drop of liquid metal.
The chemical analysis revealed that all artefacts contain mainly copper and various amounts of other elements (**tab. 6**). We were particularly interested in the ones that might have constituted Chalcolithic and Early Bronze Age alloys such as arsenic (As), antimony (Sb), tin (Sn) and lead (Pb) as well as others that might be related to the ore composition and smelting process such as nickel (Ni), cobalt (Co), zinc (Zn), bismuth (Bi),

Find reference	Find	Context	Context Type	Context Dating	Position
FAD05.0.106	lump	107	Burial	Phase I (Chalcolithic)	Primary
FAD09.295/295.40	elongated fragment /pin?	802	Street fill between Buildings 3 and 4	Phase IV? (Early Bronze Age III?)	Secondary?
FAD09.295/295.61	awl?	802	Street fill between Buildings 3 and 4	Phase IV? (Early Bronze Age III?)	Secondary?
FAD09.290/300.82	wire?	614	Building 3, floor	Phase IV (Early Bronze Age III)	Primary
FAD10.295/295.150	elongated fragments	802	Street fill between Buildings 3 and 4	Phase IV? (Early Bronze Age III?)	Secondary?
FAD10.305/295.58	awl	1606	Building 4, Room 3	Phase IV (Early Bronze Age III)	Primary
FAD11.310/295.379	elongated fragment/awl?	1740	Building 4, Room 6, fill	Phase IV (Early Bronze Age III)	Secondary

Tab. 5- Description and contextual information for the metal objects illustrated on plate 11.

Results and Discussion

The metallographic observation of FAD09.295/295.61 revealed that it is completely corroded. As a consequence, its current composition does not necessarily reflect the original metal. All the other finds, except for FAD05.0.106, show signs of plastic deformation such as elongated copper sulphide inclusions and the partial or complete absence of porosity. This observation is in line with what might be expected for tools; they should exhibit a suitable hardness and toughness which is in part provided by plastic deformation (e.g. hammering) and recrystallisation of the grain structure (i.e. annealing).

silver (Ag) and Iron (Fe). In most cases, the amount of these elements was too low to have been measured accurately (<0.5 Wt per cent) or to have any tangible influence on the properties of the metal tool.
Elements such as Sb, Pb, Bi, Co, and Ag were detected but in amounts lower than 0.5 Wt per cent. This is also the case for tin, except for FAD09.290/300.82, which contains 0.8 Wt per cent Sn. However, this amount is too low to have any significance on the property of metal items and should be considered as an unintentional 'impurity'. Zinc was not detected in any sample. Nickel was detected in FAD11.310/295.379 and is present in significant amount, 2.5 Wt per cent Ni, in FAD05.0.106. Arsenic was present in all finds

Find number	n.a.[1]	Al	Si	S	Fe	Co	Ni	Cu	As	Ag	Sn	Zn	Sb	Au	Pb	Bi
FAD05.106	4	det[2]	det	det	det	det	2,5	95,2	1,4	det	det	n.d.	det	det	det	det
FAD09.295/295.40	5	det	det	det	0,7	det	n.d.[3]	97,3	0,7	det	det	n.d.	det	det	det	n.d.
FAD09.295/295.61	2	det	1,2	25,5	det	det	n.d.	72,5	det	det	det	n.d.	det	n.d.	n.d.	n.d.
FAD09.290/300.82	6	det	det	det	det	det	n.d.	97,3	det	det	0,8	n.d.	n.d.	det	det	n.d.
FAD10.295/295.150	8	det	det	det	1,0	det	n.d.	97,3	det	det	det	n.d.	det	det	det	n.d.
FAD10.305/295.58	7	det	det	0,5	0,5	det	n.d.	96,0	1,8	det	det	n.d.	det	det	det	n.d.
FAD11.310/295.379	8	det	det	det	det	det	det	99,1	n.d.	det	det	n.d.	det	det	det	n.d.

1- n.a. indicates the number of analysis made on each sample
2-det indicates that an element has been detected butin amounts lower than 0.5 Wt%
3- n.d. indicates that the element has not been detected

Tab. 6- Composition of the metal artefacts.

except FAD11.310/295.379. Of all the finds, however, only FAD05.0.106 and FAD10.305/295.58 contained suitable amounts of this element with 1.4 Wt per cent As and 1.8 Wt per cent As respectively. From this brief overview, it is clear that all the finds can be qualified as made of unalloyed copper except FAD05.0.106 and FAD10.305/295.58. Numerous laboratory experiments have shown that a copper alloy with 2Wt per cent, as has a hardness that is distinctively higher than an unalloyed copper (Northover 1989; Budd and Ottaway 1991; Lechtman 1996; Junk 2003). Research into the effects of arsenic and nickel on binary copper base alloys (CuAs and CuNi) revealed that amounts as low as 2Wt per cent of these elements will visibly alter the colour of the metal (Mödlinger *et al*. 2017).[20] Therefore, it is very likely that the craftsmen had differentiated between the unalloyed copper and the metals used for FAD05.0.106 and FAD10.305/295.58. We suggest considering these metals respectively as CuAsNi ternary and CuAs binary copper base alloys. One cannot but draw comparison between the composition of the 'prestige' metal finds from the Chalcolithic Southern Levant and that of FAD05.0.106, especially in regards to the high amounts of nickel (see for example Shalev and Northover 1993). Indeed, these 'prestige' goods were made of copper base alloys rich in arsenic, antimony and/or nickel while the basic tools were of unalloyed copper (Shalev 1991; 1994; Shugar and Ghom 2011). It has been demonstrated that the copper ore sources of Faynan could not have naturally produced As, Sb or Ni rich copper base alloys and that the metals used for the 'prestige' objects, or at least some components, were of foreign origin (Hauptmann 2007: 201). It is clear that the presence of FAD05.0.106, a simple lump, in a tomb shows that these alloys had a particular significance even outside of the Southern Levant during the Chalcolithic. Furthermore, this find shows that Tell Fadous-Kfarabida was part of a network of material and technological exchange relating the Southern Levant probably with the northern metallurgical domains such as Anatolia, Iran, or Caucasus, where As, Ni or Sb rich ores are available. Copper or copper base alloy finds from the Eneolithic tombs of Byblos show that metals were available on this part of the Lebanese coast (Artin 2008) and thus suggesting such a network is not far-fetched. What remains to be answered is how did this metal arrive at Tell Fadous-Kfarabida? Was it from the Southern Levant or from the North? Depending on the answer, this site would have a different role in this exchange network. The limited number of samples taken from Early Bronze Age III Tell Fadous-Kfarabida shows a predominance of unalloyed copper or low As binary copper base alloy. If this observation can be generalised to all Early Bronze Age III metal finds of Tell Fadous-Kfarabida, then it might indicate a similarity with the Southern Levant, where unalloyed copper was used for producing tools and weapons whereas the 'prestigious' items such as jewellery were

of gold or silver (Shalev 1994; Genz 2000). In the northern part of the Near East, it seems arsenical copper with amounts of arsenic higher than 2Wt per cent was more readily available (De Ryck, Adriaens and Adams 2005). Indeed arsenical copper with a higher amount of As appears in the Southern Levant only in the subsequent period followed by bronze and leaded bronze (Moorey and Schweizer 1972; Khalil 1984; Philip 1991).

Conclusion

The results from the first sampling campaign of the metal finds of Tell Fadous-Kfarabida offered an interesting insight on the availability and use of different copper and copper base alloys. Even though the number of samples is too low to draw any conclusion, the data opens up interesting perspectives for future research. The presence of a shapeless lump of copper base alloy rich in arsenic and nickel indicates that there might have been similarities between how this metal was perceived at Tell Fadous-Kfarabida and its role as a material used exclusively for making prestigious items in the Southern Levant. This was probably partly linked to its distinctive silvery colour. The availability of such materials at Tell Fadous-Kfarabida shows that it was part of a large exchange network linking the south and north metallurgical domains. However, further research and analysis is required to determine the role of this Lebanese site; was it importing finished products, raw materials, or technologies? Was it a transit point and if yes in which direction? Finally, these first results highlight another possible similarity between Tell Fadous-Kfarabida and the Southern Levant during the Early Bronze Age III regarding the prevalence of unalloyed copper for making tools and other 'common' items. This might be related to the unavailability of alloying components and/or the preference of using gold and silver instead of copper-based alloys in making 'prestige' items. This cultural or economical link with the Southern Levant is far from confirmed and should be consolidated with further research and analysis of a larger corpus including more finds from Tell Fadous-Kfarabida and other sites.

Work on the Faunal Remains from Tell Fadous-Kfarabida

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Introduction

Archaeological research of the Early Bronze Age in the Levant and Mesopotamia has received considerable attention, however, the 'in between' zone, of which Lebanon is part, has only been studied sporadically (Genz 2014b: 290). The settlement of Tell Fadous-Kfarabida offers the opportunity to analyse the developments of socio-political and economic organisation in the Early and Middle Bronze Age coastal region of Lebanon. The material culture and architecture of the Early Bronze Age III indicate the dual nature of the site, as a small yet interconnected community, being second in tier only to the larger Byblos in a hierarchical regional system (Genz *et al*. 2016). The Early Bronze Age material deriving from Tell Fadous-Kfarabida is exceptional, as there is little known regarding the zooarchaeology of the Lebanese coast. We conduct osteomorphological, archaeological, palaeopathological, biogeochemical (stable isotopes), and palaeogenetic research on this material, which gives us a unique opportunity to characterise the socio-economic practices in a unique coastal setting through extended zooarchaeology. Zooarchaeological analysis, focusing on various aspects such as taxonomic diversity, mortality profiles, palaeopathology, mobility, and intra-site body part distribution will reveal the socio-political position of Tell Fadous-Kfarabida within the wider geographic region and reveal whether the settlement was self-subsistent or functioned more as a supply centre to Byblos (Genz *et al*. 2016).

Material and Methods

Zooarchaeological research at Tell Fadous-Kfarabida has been ongoing since 2004. The analysis has been conducted at the site, the American University of Beirut, Groningen Institute of Archaeology of the Groningen University (GIA), Tübingen University, and the Science Museum in Brussels. Isotope analysis is conducted at the Centre for Isotope Research of the University of Groningen, and at the University of Kiel. The zooarchaeological analysis has primarily focused on the identification of mammalian remains to species. In addition to identification, biometric analyses have been conducted based on von Den Driesch (1976). The epiphyseal fusion analysis as well as dental wear stage analysis based on Grant (1982) was undertaken in order to reconstruct the kill off patterns of the various domesticates at the site. Butchery trace analysis was undertaken based on Binford (1981). Zeder and Lapham (2010) and Zeder and Pilaar (2010) were used to differentiate between sheep (*Ovis aries*) and goat (*Capra hircus*) remains. Turtle, bird fish, and mollusc remains have also been analysed. A special palaeopathological study is under way to investigate the unusual traces of disease, war, and injuries observed on several sheep and goat specimens.

A detailed archaeomalacological study with specific attention to molluscan taphonomy was conducted to gain insights into the subsistence economy. The specimens were counted (NISP). Present portions (e.g. apex, wall, column) were also recorded. Minimum Number of Individuals (MNI) based on specific portions were estimated when and as necessary.

To explore the function and the role of *Glycymeris* shell tools in the technological system of Tell Fadous-Kfarabida, an experimental reference collection was created at the Groningen Institute of Archaeology, producing tools from recent *Glycymeris* shells that were used to work various materials (hide, bone, fish, wood). The use-wear traces on the experimental shells were then compared to the use-wear traces on the archaeological shells by means of a metallographic microscope and a Scanning Electron Microscope (SEM).

We also investigate animal husbandry during the Early Bronze Age at Tell Fadous-Kfarabida using light stable isotopic methods. At the moment, we are documenting pig husbandry strategies by measuring stable isotopes of carbon and nitrogen recovered from the bulk collagen in wild boar and domestic pigs – which can be separated by zooarchaeological biometric assessment. In general, carbon and nitrogen data can be used to infer the dietary breadth and ecological conditions. Animals consuming higher amounts of animal protein in their diet tend to display higher $^{15}N/^{14}N$ values than those with a more herbivorous diet. Values of $^{15}N/^{14}N$ also reflect the consumption of plants grown in fertilised soils, which can ultimately reflect foddering strategies. Ratios of $^{13}C/^{12}C$ add a complementary perspective into diet, shedding light on the proportion of C4 to C3 fodder, as well as indications of whether animals spent a significant amount of time feeding under forest canopies. They can also be used to indicate whether marine fish were consumed, a food source that may have been important to coastal pig-keeping strategies in Bronze Age Lebanon. By measuring isotopic data at Tell Fadous-Kfarabida, and comparing them to those from other sites in the Levant and Anatolia, we hope to develop a picture of regional pig husbandry strategies in urban contexts during the Bronze Age.

Results

More than 1,800 specimens have been analysed. The majority of these specimens have been identified as domesticated mammals. The zooarchaeological analysis indicates that sheep (*Ovis aries*) and goat (*Capra hircus*) were the dominant species at the site. The abundance of perinatal sheep and goat specimens (nearly 10 per cent of all sheep and goat specimens), as well as the abundance of senile individuals (*ca* 40 per cent of the aged mandibles), indicate that the Tell Fadous-Kfarabida community was directly involved in husbanding these two species (Genz *et al*. 2016). Furthermore, these data suggest that the animals were kept for wool production, as males, females, and castrates were kept long after they had reached their maximum body size.

Remains of cattle (*Bos taurus*) have also been identified and this species appears to be the third most dominant domesticated species in the assemblages, followed by pig (*Sus domesticus*). Few remains of this latter have, however, been identified. Additionally, a

handful of remains of both horse (*Equus caballus*) and donkey (*Equus asinus*) have been encountered. Dog (*Canis familiaris*) and cat (*Felis catus*) have also been identified, though their remains have been recovered in low quantities.

Deer remains have also been identified, including remains of red deer (*Cervus elaphus*), fallow deer (*Dama dama*), and roe deer (*Capreolus capreolus*). Other wild mammal species include brown hare (*Lepus europaeus*), gazelle (*Gazelle* sp.), wild goat (*Capra aegagrus*), and wild boar (*Sus scrofa*). Remains of several carnivores have also been identified, including brown bear (*Ursus arctos*), red fox (*Vulpes vulpes*), and potentially a first phalanx of a lion (*Panthera leo*).

Remains of marine animals are also abundant at Tell Fadous-Kfarabida. Limpets (*Patella* spp.) and topshells (*Monodonta* spp.) are by far the most common molluscs at the site. These gastropods thrive at high-energy coasts. The abundance of rocky shore dwellers among gastropods (snails) in the settlement's fill and midden layers indicate that the splash zone must have been wide and lined with rock platforms just like it is today. Several molluscs have been identified as dog cockles (*Glycymeris* sp.). A portion of these dog cockles display use-wear traces, suggesting that they have been used as tools (**fig. 37** and **38**).

The majority of the fish remains at Tell Fadous-Kfarabida belong to sea breams (Sparidae) which can be caught from such a coastline (but not exclusively). Rays and skates (Rajiforms and Myliobatifoms) are an interesting feature of the fish bone assemblage and they occur more commonly at Tell Fadous-Kfarabida than in comparable assemblages from the Eastern Mediterranean. Distinguishing between turtle species is difficult, but some of the remains could be ascribed to the loggerhead turtle (*Caretta caretta*).

Discussion and Conclusion

Animal husbandry at Tell Fadous-Kfarabida was oriented towards sheep and goat herding. Cattle were exploited as well, but to a lesser degree. Both domestic pigs and wild boar were consumed. Hunting appears to have contributed to the local economy as well, as evidenced by the presence of various wild species. Fishing and shellfish gathering were very important activities. The presence of turtle remains is exceptional and these animals were likely hunted. Analysis is under way to see which species were exploited, and to what extent turtle exploitation played a role towards the local economy. Vear analysis on dog cockles indicate that they were used for various purposes. This often overlooked tool category appears to have been a valuable addition to the technological system of Tell Fadous-Kfarabida, serving as a locally available raw material for tools. Further research will shed more light on the animal economy of the site.

Fig. 37- A worked Glycymeris shell from Tell Fadous-Kfarabida (FAD10.295/295.197).

Fig. 38- Close-up of the Glycymeris shell (FAD10.295/295.197), displaying wear traces from working soft material.

Bioarchaeological Observations from Tell Fadous-Kfarabida

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Introduction

We report preliminary findings from a small assemblage of human remains recovered at Tell Fadous-Kfarabida to provide comparative data and lay the foundations for future larger-scale studies. Dental non-metric traits display little variation, suggesting relative within-group homogeneity. Isotope analyses indicate a terrestrial diet with insignificant marine input, and a population of largely local provenance.

Beginning in 2017, we were extended an invitation by Professor Hermann Genz (AUB) to conduct some specialised bioarchaeological research on the human remains of Tell Fadous-Kfarabida. The osteological assessment had already been carried out by Dr Sireen El Zaatari and is available in previous reports (Genz *et al*. 2010a; Genz *et al*. 2010b; Genz *et al*. 2018). In this report, we outline the preliminary findings of two bioarchaeological suites of methods: dental morphological traits and stable isotope analyses.

Dental morphological traits, also called dental nonmetric traits, are used to record the appearance of teeth, regarding features such as accessory ridges and cusps, tubercles, styles and deviations in root numbers (Scott and Turner 1988). Dental morphology can provide useful information about identity in both bioarchaeological and forensic contexts, and can be used to assess stress, adaptation, biological distance, evolution, and sociocultural behaviour (Irish 2016; Rathmann *et al*. 2017; Scott *et al*. 2018).

The analysis of carbon, nitrogen, and sulphur stable isotopes is based on the principle that we build our body out of the food we eat and the water we drink, and that our tissues reflect these dietary inputs: that 'we are what we eat' (Ambrose and Krigbaum 2003; Hedges *et al*. 2007; Katzenberg 2007; Schoeninger 2010). Carbon stable isotope ratios of bone and dentin collagen are used to differentiate between the consumption of terrestrial C_3 plants and marine foods in past populations (DeNiro and Epstein 1978; Hoefs 2009; Lee-Thorp, Sealy and van der Merwe 1989). Examining nitrogen stable isotope values ($\delta^{15}N$) in bone collagen allows researchers to understand an organism's trophic level, or where they are in the food web (Bocherens and Drucker 2003; Minagawa and Wada 1984; O'Connell *et al*. 2012; Perkins *et al*. 2014). Marine food webs tend to be more complex with higher trophic levels. Used in conjunction with $\delta^{13}C$ values, $\delta^{15}N$ values of human and animal bone collagen can be used to assess on organisms' reliance on marine and terrestrial resources. Sulphur stable isotope analysis for dietary reconstruction is not as well established as carbon and nitrogen isotope analyses but is emerging as a method for differentiating between terrestrial and marine food sources (Richards, Fuller and Hedges 2001; Richards *et al*. 2003). Marine seaweeds and plankton have extremely uniform $\delta^{34}S$ values consistent with the $\delta^{34}S$ range of sea-salt sulphates. Terrestrial and fresh water plants draw upon sulphur from a variety of sources and will show more variation than marine plants (Peterson, Howarth and Garritt 1985; Richards, Fuller and Hedges 2001).

The use of strontium isotope ($^{87}Sr/^{86}Sr$) analysis as a tool for identifying human and animal mobility and residence among past populations allows insight into large-scale socio-political dynamics by revealing patterns on the level of the individual (Bastos *et al*. 2016; Knudson *et al*. 2014; Madgwick *et al*. 2019; Sołtysiak 2019). The interpretation of movement using strontium isotope analysis rests upon the assumption that the $^{87}Sr/^{86}Sr$ ratios of an individual's body tissues will generally reflect the $^{87}Sr/^{86}Sr$ ratios of the underlying geology in which they lived when these tissues were forming. Erosion of the underlying geological formations is the major contributor to the $^{87}Sr/^{86}Sr$ ratios of the soil, and plants display $^{87}Sr/^{86}Sr$ ratios nearly identical to the soil in which they grow (Evans, Montgomery and Wildman 2009; Evans *et al*. 2010), even though recent research suggests that modern agricultural fertilising practices may have an impact as well (Thomsen and Andreasen 2019).

Oxygen isotope analysis ($\delta^{18}O$) is another common method of examining movement in individuals (Chenery *et al*. 2010; Müldner, Chenery and Eckardt 2011; Prowse *et al*. 2007). The main intake of oxygen atoms into the body is through drinking water (Bryant and Froelich 1995; Longinelli 1984; Luz and Kolodny 1989), and the difference in proportions between ^{18}O and ^{16}O is dependent largely on the location's climate (e.g. mean temperature, altitude) from which the drinking water is sourced (Daux *et al*. 2008).

Materials

For dental morphological variation, all available teeth from the site were recorded. For destructive analyses, owing to the friable and often commingled nature of the burials at Tell Fadous-Kfarabida, care was taken not to sample the same individual twice. Teeth that had to be extracted from a jaw were chosen over loose, disassociated teeth. In the instance of multiple inhumations, such as Context 3109, only cortical bone from the jaw was sampled to ensure that the stable isotope information from the tooth could be paired with information from the bone. Second permanent molars or permanent premolars (first or second) were selected as these teeth, whether mandibular or maxillary, complete crown formation between five and eight years of age (Al Qahtani, Hector and Liversidge 2010). Teeth showing pathology such as carious lesions or excessive wear were avoided. For cortical bone, ~1000 mg of bone showing no pathological changes were sampled.[21]

Methods

Dental traits

Though there are several methods for recording dental variation (Alt 1991; Zoubov 1977), the Arizona dental anthropology system (ASUDAS by Turner, Nichol and Scott 1991) is by far the most widely used. The traits in ASUDAS have been selected because of their durability, easy identification, good repeatability, heritability, and lack of sexual dimorphism (Hanihara 1992; Hubbard, Guatelli-Steinberg and Irish 2015; Irish 1993; Larsen 1997; Scott 1973; Scott and Turner 1997; Turner, Nichol and Scott 1991).

Dental traits were recorded either as present/absent or as a grade from absent to full expression, following the appropriate guidelines (Scott and Irish 2017). Due to the low number of individuals, only descriptive statistics were performed. The expression (**tab. 7**) counts for each trait by tooth (counting the side exhibiting the highest number of observations), enabling other researchers to dichotomise the data according to their own requirements. Traits showed little variation in expression (**fig. 39**), though this could also be a result of the small sample size.

Stable isotope analyses

For stable isotopes from bone, collagen extraction and purification were carried out using a modified Longin method (Brown *et al*. 1988; Longin 1971). At the National Oceanography Centre Southampton (NOCS), carbon and nitrogen stable isotope values were measured simultaneously using an Elementar PYRO Cube Elemental Analyser running in CNS mode and equipped with a thermal conductivity detector interfaced with an Isoprime VisION continuous flow isotope ratio mass spectrometer. All bone samples showed collagen quality indicators of well-preserved collagen for carbon and nitrogen stable isotope analyses. Regarding sulphur stable isotopes, the suggested quality criteria are less established. Samples (**tab. 8**) with per cent S by weight outside of modern mammalian bone are noted.

For $^{87}Sr/^{86}Sr$ analysis of tooth enamel, samples were purified using the ion exchange method presented by Deniel and Pin (2001). Strontium isotope ratios were measured using a ThermoFinnigan Multi-collector ICP Mass Spectrometer (MC-ICP-MS) in the Northern Centre for Isotopic and Elemental Tracing at Durham University. Reproducibility of the standard NBS987 during sample analysis was 0.710252 ± 0.000002 (2 SD, n = 35). All NBS987 values have been normalised to the accepted value of 0.710240.

Oxygen ($\delta^{18}O$) isotope ratios were measured in the carbonate (CO_3) component of tooth enamel following the procedures of Bentley *et al*. (2007). The following

international reference materials were analysed per run: NBS 19 (n = 3), IAEA-CO-1 (n = 3), LSVEC (n = 3). In addition two internal standards: DCS01 (n = 7) and Dobbins (n = 2) were also analysed. All standards yielded an analytical reproducibility better than 0.18 per mil (2 SD) for $\delta^{13}C$ and 0.72 per mil (2 SD) for $\delta^{18}O$. All values have been normalised to the accepted values of -2.40 per milVPDB and -26.70 per milVPDB for $\delta^{18}O$, for IAEA-CO-1 and LSVEC respectively. $\delta^{18}O$ was reported relative to the Vienna Standard Mean Ocean Water (VSMOW) standard for comparison purposes.

Stable Isotopes

Diet

Carbon and nitrogen values show that the people of Tell Fadous-Kfarabida, although living near the coast, were consuming a terrestrial diet with no appreciable marine input (**fig. 40**). Sulphur stable isotopes confirm this (**fig. 41**): although some individuals display higher $\delta^{34}S$ values suggestive of marine input, it is likely the result of sea spray deposition causing the coastal soil to display marine $\delta^{34}S$ values (Nehlich 2015; Vika 2009). $\delta^{13}C$ of the carbonate further supports a diet largely consisting of C_3 terrestrial food with little marine input (Kellner and Schoeninger 2007).

Mobility

Regarding $^{87}Sr/^{86}Sr$ values, five of the Tell Fadous-Kfarabida individuals display values close to each other, ~0.7086 (**fig. 42**). Burial 402 displays a slightly lower value (0.70848) that may suggest non local provenance further inland, possibly towards the Mount Lebanon range. Tell Fadous-Kfarabida sits upon Cretaceous-era sandstone overlain by marine limestones (UNDP 1970). In the absence of local biospheric values, biospheric strontium values from this geological formation have been measured in cedar (*Cedrus* spp.) from Tannourine (**fig. 43**) with a median value of 0.7085, IQR ±0.000395, n = 7 (Rich *et al*. 2016). The Tell Fadous-Kfarabida individuals display values slightly higher than those of inland Tannourine, possibly due to sea spray contributions which would raise $^{87}Sr/^{86}Sr$ values. $\delta^{18}O$ values are homogenous, with only a range of approximately 1 per mil.

Conclusions

Though the available Tell Fadous-Kfarabida human material for bioarchaeological studies is small, the preliminary findings contribute aspects of dental morphology and stable isotope data to build upon in future Lebanese research.

Aknowledgements

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Trait	Tooth	ID	Score					
			0	1	2	3	4	5
Winging	UI1	W_UI1						
Labial curvature	UI1	LC_UI1		4	2			
Palatine torus		PT						
Shoveling	UI1	S_UI1		4				
Shoveling	UI2	S_UI2		1	1			
Shoveling	UC	S_UC		3	1			
Shoveling	LI1	S_LI1	4		1			
Shoveling	LI2	S_LI2	5					
Shoveling	LC	S_LC	3	2				
Double-shoveling	UI1	DS_UI1	4	1				
Double-shoveling	UI2	DS_UI2	1					
Interruption groove	UI1	IG_UI1	3	1				
Interruption groove	UI2	IG_UI2	2					
Tuberculum dentale	UI1	TD_UI1		2	2			
Tuberculum dentale	UI2	TD_UI2	1					
Tuberculum dentale	UC	TD_UC				1	1	
Pegged of reduced incisor	UI2	UI2v	2					
Mesial accessory ridge	UC	MAR_UC	3					
Distal accessory ridge	UC	DAR_UC	1		1			
Distal accessory ridge	LC	DAR_LC						
Premolar accessory ridges	UP1	PAR_UP1			2			
Premolar accessory ridges	UP2	PAR_LP1		1	2			
Distosagittal ridge	UP1	DSR_UP1	2					
Premolar accessory ridges	LP1	PAR_LP2						
Accessory cusps	UP1	AC_UP1	2	1				
Accessory cusps	UP2	AC_UP2						
Metacone size	UM1	M_UM1					3	1
Metacone size	UM2	M_UM2					2	
Metacone size	UM3	M_UM3					1	
Hypocone size	UM1	H_UM1					4	
Hypocone size	UM2	H_UM2			1			
Hypocone size	UM3	H_UM3				1		
Bifurcated hypocone	UM1	BH_UM1	1					
Bifurcated hypocone	UM2	BH_UM2						
Bifurcated hypocone	UM3	BH_UM3	1					
Cusp 5	UM1	C5_UM1	1					
Cusp 5	UM2	C5_UM2						
Cusp 5	UM3	C5_UM3		1				
Marginal ridge tubercles	UM1	MRT		1				
Carabelli cusp	UM1	CC_UM1	1					
Carabelli cusp	UM2	CC_UM2		1				
Carabelli cusp	UM3	CC_UM3		1				
Parastyle	UM1	PA_UM1	2					
Parastyle	UM2	PA_UM2	2					
Parastyle	UM3	PA_UM3	1					
Enamel extensions	UM1	EE_UM1	2					
Enamel extensions	UM2	EE_UM2	1					
Enamel extensions	LM1	EE_LM1						

Enamel extensions	LM2	EE_LM2					
Root number	UP1	RN_UP1		1	3		
Root number	UP2	RN_UP2					
Root number	UM1	RN_UM1				1	
Root number	UM2	RN_UM2				2	
Root number	UM3	RN_UM3				1	
Peg-shaped or reduced molar	UM3	M3V_UM3	1				
Peg-shaped or reduced molar	LM3	M3V_LM3	5				
Odotome	UP1	O_UP1	2				
Odotome	UP2	O_UP2					
Odotome	LP1	O_LP1	3				
Odotome	LP2	O_LP2	2				
Tome's root	LP1	TR_LP1	2				1
Cusp number	LP1	CN_LP1		2	1		
Cusp number	LP2	CN_LP2			2		
Anterior fovea	LM1	AF_LM1			1	1	
Anterior fovea	LM2	AF_LM2				1	
Anterior fovea	LM3	AF_LM3		1			
Mandibular torus		MT	1				
Groove pattern	LM1 (x-pattern)	GPx_LM1	2				
Groove pattern	LM1 (y-pattern)	GPy_LM1		2			
Groove pattern	LM2 (x-pattern)	GPx_LM2					
Groove pattern	LM2 (y-pattern)	GPy_LM2					
Groove pattern	LM3 (x-pattern)	GPx_LM3	1	1			
Groove pattern	LM3 (y-pattern)	GPy_LM3	1	1			
Rocker jaw		RJ	1				
Cusp 5 size	LM1	C5_LM1				3	
Cusp 5 size	LM2	C5_LM2					
Cusp 5 size	LM3	C5_LM3				1	
Cusp 6	LM1	C6_LM1	2				
Cusp 6	LM2	C6_LM2					
Cusp 6	LM3	C6_LM3	1				
Cusp 7	LM1	C7_LM1	1		1		
Cusp 7	LM2	C7_LM2	2				
Cusp 7	LM3	C7_LM3	1				
Deflecting wrinkle	LM1	DW_LM1				2	
C1-C2 crest	LM1	MDTC_LM1	2				
C1-C2 crest	LM2	MDTC_LM2	1				
C1-C2 crest	LM3	MDTC_LM3	2	1			
Protostylid	LM1	PR_LM1	1		1		
Protostylid	LM2	PR_LM2	1		1		
Protostylid	LM3	PR_LM3	1	2			
Root number	LC	RN_LC		4			
Root number	LM1	RN_LM1			3		
Root number	LM2	RN_LM2			1		
Root number	LM3	RN_LM3		1	2		
Torsomolar angle	LM3	TA_LM3	1	1			

Tab. 7- Frequency table for dental nonmetric traits. Scores follow definitions by Scott and Irish (2017). No dental nonmetric trait expressed beyond Score 5.

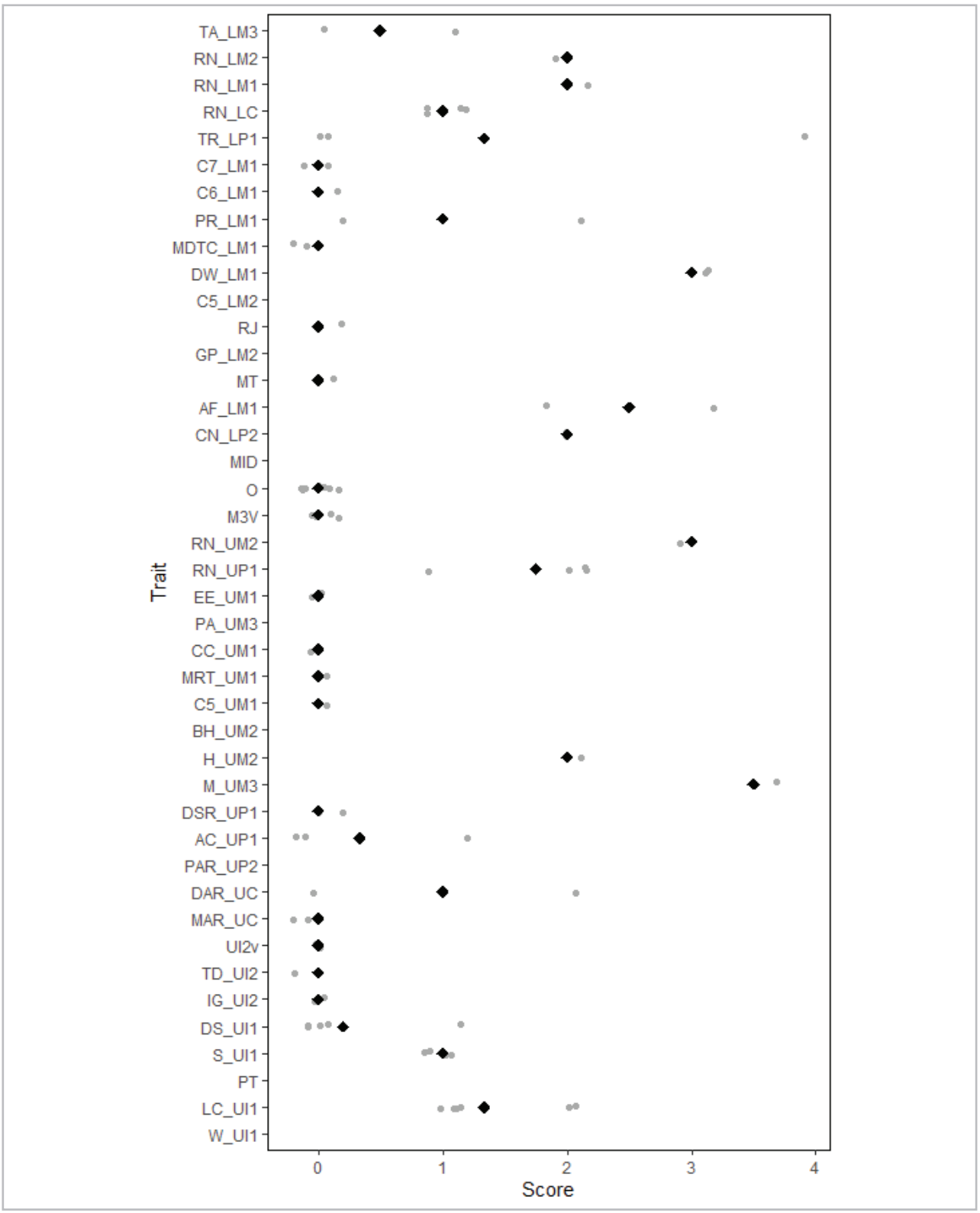

Fig. 39- Plot visualizing dental nonmetric scores by main tooth. Grey circles represent individual values, black diamonds represent mean scores. Abbreviations available in table 1.

Burial	Bone	$\delta^{13}C_{collagen}$	$\delta^{15}N$	$\delta^{34}S$	%C (wt)	%N (wt)	%S (wt)	C:N ratio	Tooth (FDI)	$\delta^{13}C_{carbonate}$	$\delta^{18}O$ (VSMOW)	$^{87}Sr/^{86}Sr$	Sr SE
736	rib	-19.96	8.39	8.36	29.2	10.82	0.63	3.1	44	-12.16	27.7	0.708624	0.000006
402	right rib	-19.63	8.39	---	39.82	14.56	---	3.2	44	-12.32	27.7	0.708488	0.000009
FAD 15.260/320.3110	mandible	-19.63	8.81	13.59	47.24	15.88	0.11	3.5	34	-12.46	27.9	0.708671	0.00001
FAD 15.260/325.3110 Ind 3	mandible	-19.49	8.38	14.71	45.66	15.57	0.08	3.4	45	-12.71	27.2	0.708629	0.000007
FAD 14.260/320.3004	cortical bone	-19.29	8.39	11.09	45.95	15.64	0.11	3.4	47	-13.25	28.2	0.708606	0.00001
637	left rib	-19.79	8.75	7.9	44.05	15.55	0.34	3.3	47	-13.53	27.5	0.70867	0.000009

Tab. 8- Stable isotope results for bone and teeth from Tell Fadous-Kfarabida individuals.

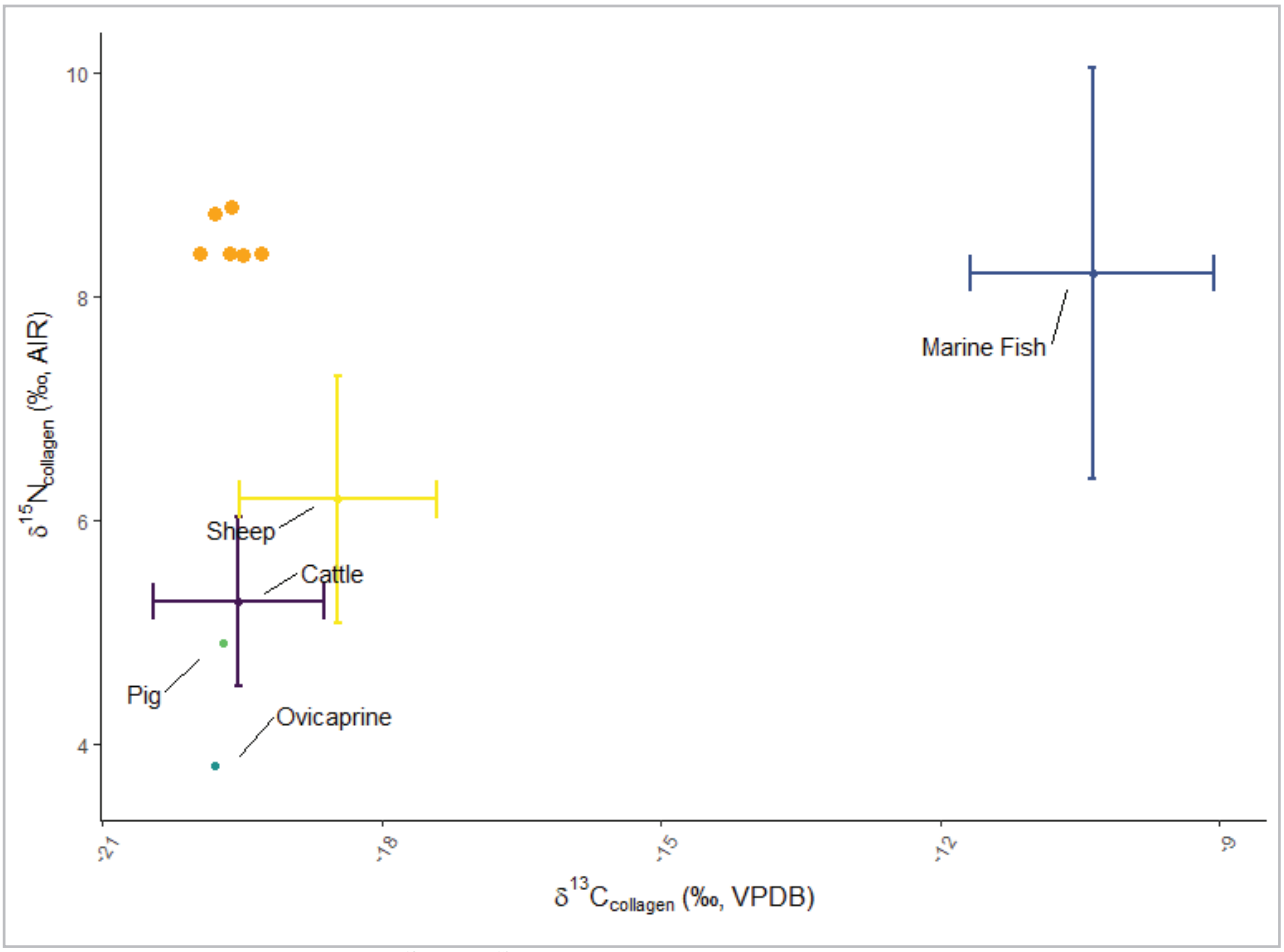

Fig. 40- Tell Fadous-Kfarabida individual $\delta^{13}C$ and $\delta^{15}N$ values from bone collagen, plotted against a Bronze Age Lebanese baseline for comparison (baseline from Schutkowski and Ogden 2011–2012).

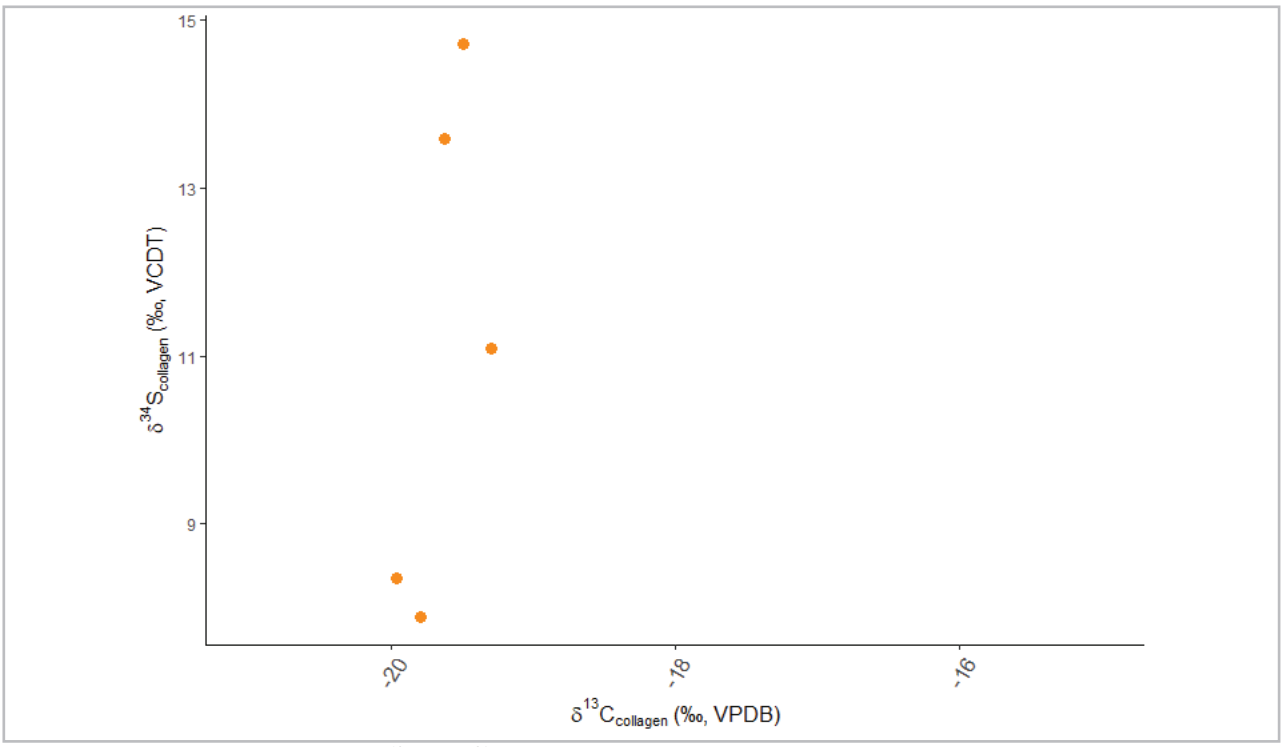

Fig. 41- Tell Fadous-Kfarabida individual $\delta^{13}C$ and $\delta^{34}S$ values from bone collagen.

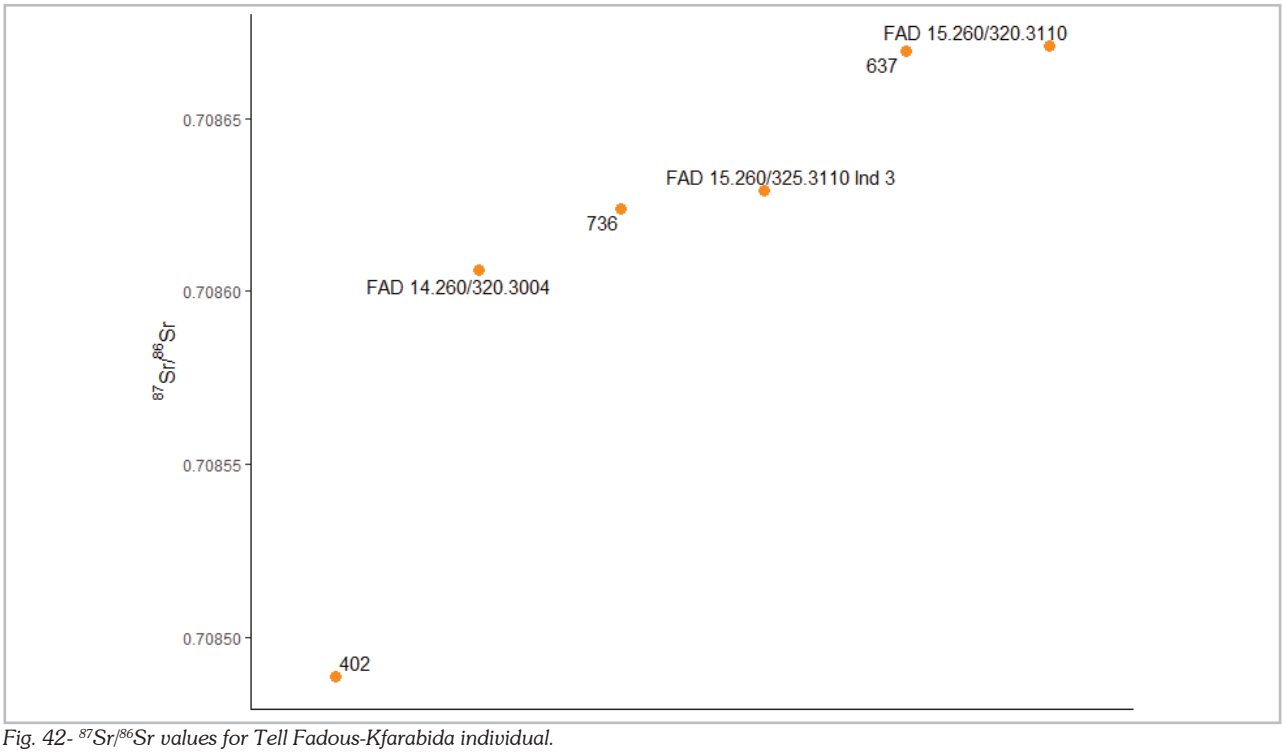

Fig. 42- $^{87}Sr/^{86}Sr$ values for Tell Fadous-Kfarabida individual.

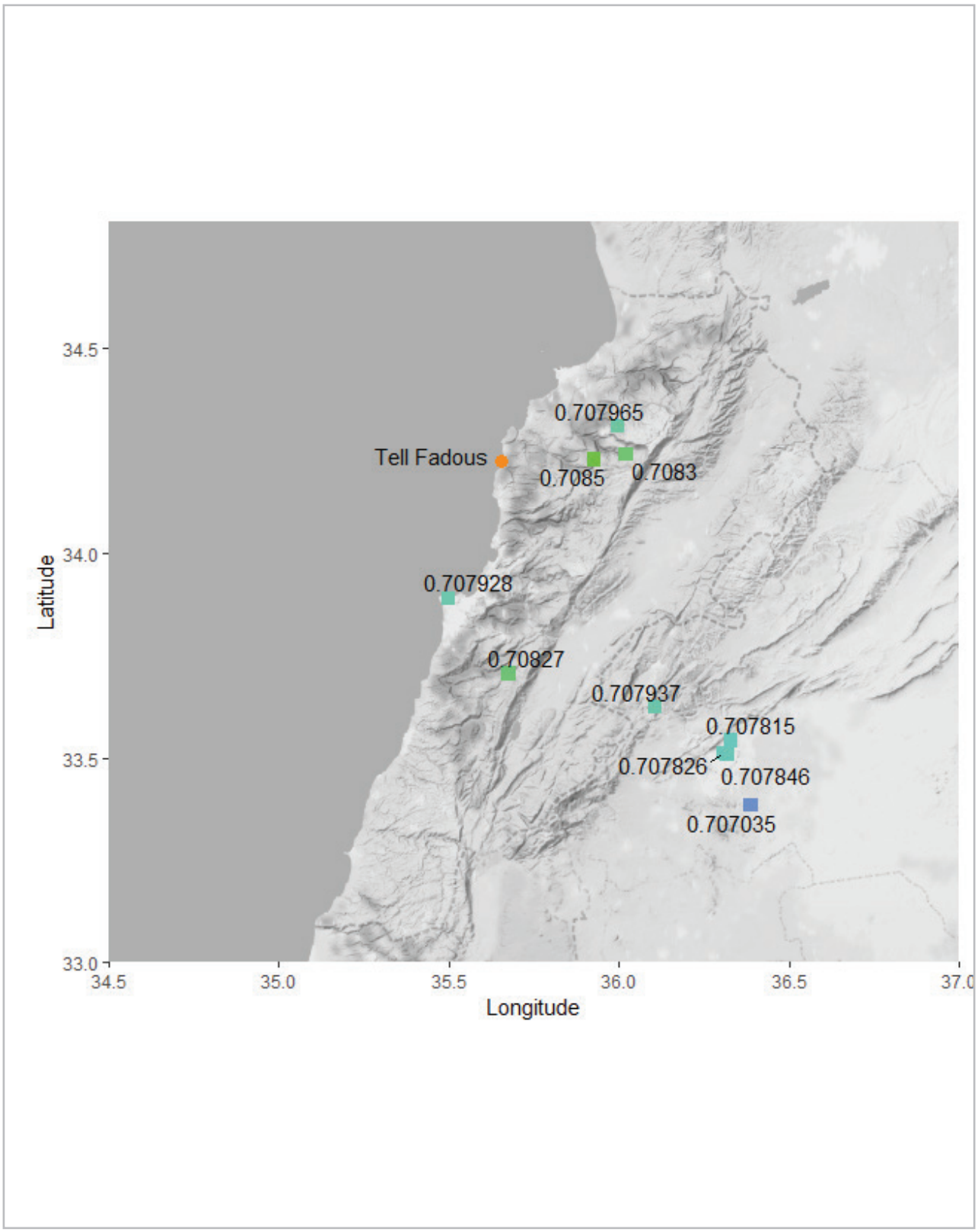

Fig. 43- $^{87}Sr/^{86}Sr$ biospheric values collected from previous studies (Henderson et al. *2009; Rich* et al. *2016).*

General Conclusions

Hermann Genz and Alison Damick

The excavations at Tell Fadous-Kfarabida have greatly enhanced our understanding of the development and layout of early urban settlements on the Lebanese coast.

The work undertaken since 2004 allows a detailed reconstruction of the settlement history of the site (**tab. 9**). The complete sequence is only attested for Area II. As the different excavation areas are not stratigraphically connected, the synchronisation relies mainly on pottery comparisons.

So far little can be said concerning the beginning of the settlement (Phase I), which was established during the early 4th millennium BC. Due to the limited exposure no architecture has been encountered, and the only undisturbed contexts for this phase are represented by two child burials found in the west section in 2005 (Badreshany, Genz and Sader 2005: 28, 29). The pottery (see *supra* contribution by Baldi), as well as the burial customs and the use of stamp seals on pottery vessels (Genz 2009) demonstrate close relations to the settlement of the *Énéolithique récent* at Byblos. Interestingly, the only metal find from this phase, a small copper-based lump from Tomb 67, shows a composition rich in arsenic and nickel. Similar alloys were used in the Chalcolithic of the Southern Levant for the manufacture of prestige items (see *supra* contribution by El Morr).

Phases I and II must have been separated by a hiatus covering at least the second half of the 4th millennium BC. This is borne out by the lack of radiocarbon dates from the second half of the 4th millennium, as well as by the very different pottery traditions of Phases I and II.

During the Early Bronze Age II–III (Phases II–IV) Tell Fadous-Kfarabida developed into a small urban community.

Phase II levels have only been reached in Squares 285/295 (Genz *et al*. 2009) and 310/295 (Genz *et al*. 2018; see *supra* contribution by Wygnanska and Makinson). Due to the limited exposure of Phase II architecture little can be said about the layout of the buildings, but it seems clear that this phase represents the beginning of the urban settlement with larger, multi-room buildings.

The Early Bronze Age III (Phases III–IV) is the main period of occupation. All excavated squares yielded abundant material attributable to Phase III. According to the results in Area I (Genz and Sader 2008a) and in Area IV (see *supra* contribution by Raad and Rutter), the construction of the fortification took place during this phase. Several buildings from Phase III have partly been excavated in Area II. Often no doors or

Phase	Archaeological Period	ARCANE Periodization	Type of Occupation
Phase VI	Middle Bronze Age I/II	-	Pits, burials
Hiatus	Middle Bronze Age I	-	-
Phase V	Early Bronze Age IV	ECL 6	Pits
Hiatus	Early Bronze Age IV	ECL 5	-
Phase IV	Early Bronze Age III	ECL 4	Public buildings
Phase III	Early Bronze Age III	ECL 4	Domestic and public buildings, fortification
Phase II	Early Bronze Age II	ECL 3	Domestic buildings
Hiatus	Early Bronze Age I	ECL 1-2	-
Phase I	Chalcolithic	-	Child burials and stray finds

Tab. 9- Stratigraphic terminology for Tell Fadous-Kfarabida (see Mazzoni and Thalmann, forthcoming for the ARCANE periodisation).

entrances are attested; therefore, these rooms must have been accessed from an upper storey by means of ladders. The buildings were separated by narrow streets. The current picture suggests a planned layout of the settlement with the streets intersecting at right angles. Most buildings clearly represent domestic units, as attested by their layout, installations, and finds, which testify to storage, preparation, and consumption of food. Only Building 4 is different due to its rather monumental size, and most likely represents a public building (see *supra* contribution by Wygnanska and Makinson).

Further evidence of Phase III is found in Area III, where smaller-scale domestic architecture seems to be represented (see *supra* contribution by Woodworth and Mardini), the above-mentioned fortification with a gate in Area IV (see *supra* contribution by Raad and Rutter) and Area V with further evidence for large-scale, presumably public buildings (see *supra* contribution by Wanessian and Alameh). In all these areas, there is no clear indication of Phase IV, but this is presumably due to the extensive bulldozing that occurred in the recent past.

Phase IV represents a major remodelling of the layout of the site. The domestic buildings from Phase III in Area II were abandoned and deliberately filled in. The newly erected Building 3 consists of one large room with interior dimensions of 8 by 6 m (Genz *et al*. 2011; Genz *et al*. 2016). The building can be reconstructed as a large columned hall. The layout of the building as well as its impressive dimensions, but most of all the lack of any indications of domestic activities suggests that it served for administrative or representational purposes. The location of Building 3 above previous domestic dwellings indicates a marked change in land ownership at the site. However, no distinctive breaks are discernible, neither in the pottery typology nor in the building techniques in comparison to Phase III. West of Building 3, separated by a street, another large building (Building 4) is located. Here the continuity to the previous Phase III is much stronger, as it basically represents a rebuilding of the older structure. Due to its large size, Building 4 undoubtedly must have had a public or administrative function as well.

Despite its small size of only 1.5 hectares, the site during Phases III and IV shows evidence of complex socio-economic and socio-political structures, challenging the established rank-size model (Marfoe 1998: 115–128; Thalmann *et al*. 2006: 209–218), which postulates that the importance of sites is reflected by their size. Already in Phase III the presence of possible public buildings, the use and manufacture of cylinder seals and the evidence for weighing (Genz 2011) suggests a stratified society with evidence for administrative elites and sophisticated socio-economic practices. This becomes even clearer in Phase IV with the presence of large buildings of an undoubtedly public nature. Despite its small size, the site has provided a number of objects that fall into the category of prestige objects, such as several elaborately carved cylinder seals, three of them made of hippopotamus ivory (Genz and Ahrens 2021), a fragment of an Egyptian stone vessel (Genz *et al*. 2018: 61, 62), and a number of beads made of non-local materials such as steatite and carnelian (Damick and Woodworth 2015, see *supra* contribution by Wygnanska). Most of these objects originate from the large, most likely public buildings in Area II. Far from being just a small village devoted to agriculture and fishing, the site emerges as a small regional administrative centre most likely connected to Byblos (Genz *et al*. 2016). The large number of cylinder seals discovered in Buildings 3 and 4 seems especially noteworthy. While the precise function of cylinder seals in the Early Bronze Age Levant remains debated (Thalmann 2013), there is strong evidence that they can be counted as prestige items and probably had some administrative or social function. The close similarities of the cylinder seals and seal impressions from Tell Fadous-Kfarabida and Byblos are certainly significant (Genz and Ahrens 2021). If one accepts the idea that the cylinder seal impressions were not merely decorative features, but were used for administrative or social purposes, a close economic and possibly political relationship between the two sites can be suggested. The archaeobotanical results from Phases III and IV are also quite indicative. Rather than representing a mixed economy for subsistence purposes, the evidence points to a focus on surplus production of cash crops, especially emmer wheat and olives. It is quite likely that this surplus was transported to a larger community in the vicinity, most likely Byblos, either for consumption or more likely for trade purposes (Genz *et al*. 2016).

Even if the picture is still rather unclear, also due to the absence of intensive surveys in the coastal plain, the evidence from Tell Fadous-Kfarabida suggests a more complex political and socio-economic organisation of 3rd millennium societies in the Levant than has hitherto been acknowledged. Similar observations of smaller sites containing important buildings or monumental tombs have already been made in the Early Bronze Age of the Euphrates region, leading to a concept of heterarchical structures rather than simple hierarchies based on the size of the settlements.[22] The evidence from Tell Fadous-Kfarabida, however, may still be compatible with a hierarchical organisation, if the interpretation of Fadous-Kfarabida as an administrative sub-centre belonging to the realm of Byblos is accepted. Byblos seems to be the only larger site on the coast between Ras el-Kelb and Ras Chekka. It is highly unlikely that a small site such as Tell Fadous-Kfarabida was politically independent, given its proximity to Byblos and its close cultural ties reflected in the material record. Due to the absence of detailed surveys in the area, it is impossible for the time being to provide ideas about the number of such administrative sub-centres in the region, or the size of the territory controlled by them. Regardless of the different possibilities for interpretation, the results from Tell Fadous-Kfarabida provide tantalising glimpses towards the existence of a far more complex socio-political organisation in the coastal plain of Lebanon during the 3rd millennium BC than previously expected.
Phase IV seems to have ended around 2500 BC (Höflmayer *et al*. 2014), and the subsequent Early Bronze Age IVA seems to be represented by a hiatus.
The Early Bronze Age IVB at Tell Fadous-Kfarabida (Phase V) is mostly attested by pits. As no architectural remains have been encountered so far, the nature of the settlement remains unknown. The Early Bronze Age IV pottery from Tell Fadous-Kfarabida again demonstrates close relations with neighbouring sites such as Tell Arqa and Byblos (see *supra* contribution by D'Andrea), whereas at least occasional contact with more distant locations are attested by the presence of a typical seal impression from western central Syria (Genz and Ahrens 2021, fig. 10b).
The Middle Bronze Age at Tell Fadous-Kfarabida (Phase VI) is again only represented by pits and tombs. Only scanty architectural remains of this period have been encountered up to now, suggesting that the settlement certainly was rather small and should be addressed as a rural site. The pottery shows strong connections to the Southern Levant (see *supra* contribution by Peršin), and the presence of Egyptian ceramic imports in the Middle Bronze Age clearly corroborates this southern connection (see supra contribution by Kopetzky).
No occupation after the Middle Bronze Age is attested until the twentieth century . The reasons for the abandonment of the site remain unclear.

Notes

1- As also confirmed by a radiocarbon date from Tomb 67 of Phase I (Genz *et al*. 2009, p. 82).

2- These bowls, known from every Chalcolithic site all over the Southern Levant, are the most diffused 'type fossil' for this phase. For a review of comparative materials, see Gilead and Goren 1995, note 1.

3- See for instance at Teleilat Ghassul (Lovell 2001, fig. 4.7.9, 4.44.2).

4- See for instance at Abu Hamid (Lovell *et al*. 2007, fig. 11.7; Lovell 2001, fig. 4.28).

5- During the Late Chalcolithic and at the beginning of the Early Bronze, Sidon is quite well integrated in the ceramic panorama of the Southern Levant (Doumet-Serhal 2006, pp. 76–82).

6- The repertoire of Fadous-Kfarabida lacks some features that are widespread in the Golan (as craters, incised wavy lines, fenestrated stands, and vertical plastic applied decorations), while just generic traits, as incised rope patters and punctuated decorations (Epstein 1998, pp. 161, 162) are documented at Fadous-Kfarabida.

7- See for instance the rope-decorated shapes and red-slipped bowls of Tell el-Khazzami (de Contenson 1968).

8- See for instance at Kāmid el-Lōz (Marfoe 1995, fig. 47.9), Saqiet al-Khalli 1 (Badreshany 2013, fig. 3.32.4), Nabʿal-Fāʿūr (Badreshany 2013, fig. 3.32.1) or Byblos (Artin 2009, p. 95, fig. A–D).

9- See at Byblos Dunand 1973, pl. CXCII, CXCIII, CXCVII.6697, 5591, 6700, 6699.

10- The so-called Line-Painted Ware is a specialised production typical of the Palestinian proto-urban phase (Early Bronze I) and very rare in the Central Levant. See at Jericho-Tell es-Sultan (Nigro 2007, fig. 21).

11- See at Tell Qaarassa North, Terminal Chalcolithic (Godon *et al*. 2015, fig. 18.7).

12- See summaries in previous reports: Genz 2010a, pp. 108, 109, fig. 17; Genz 2014, pp. 72, 73, 83, fig. 15, 16; Genz and Sader 2008a, pp. 154, 157, 158; Genz *et al*. 2009, pp. 78, 80, pl. 3; Genz *et al*. 2010, pp. 247, 248, pl. 1; Genz *et al*. 2011, p. 156; Genz *et al*. 2018, pp. 43, 44.

13- For the Northern Levant, see Vacca and D'Andrea 2020, pp. 128, 129, fig. 7.6, tab. 7.1; for the Southern Levant, see Regev *et al*. 2012, pp. 559–561.

14- The complete technological study of the pottery (D'Andrea forthcoming) will appear in the final report.

15- The term *zir* comes from modern water containers made of clay that are still found to store and cool drinking water in Egyptian houses.

16- In Tell el-Dabᶜa in a palace-like building dating to the early 13th dynasty, a pot stand made of stone was found in a bedroom and next to it large fragments of a *zir*. Von Pilgrim suggested large vessels for cooling rooms also for Elephantine, see: von Pilgrim 1996, p. 138.

17- This classification follows the 'Vienna System' which was established in the 1970s for clays used during the Middle Kingdom and Second Intermediate Period in Egypt. See Nordström and Bourriau 1992, pp. 148–190.

18- Other sites such as Byblos might have older and longer occupation but it was poorly excavated and only metal items from sealed contexts such as tombs or hoards and/or with well-defined typological classification can be used for this purpose.

19- The instrument is JEOL JCM-6000 PLUS SEM coupled with a JED-2300 EDS.

20- Increasing the amount of As or Ni in a copper alloy the colour will change from reddish to pinking, yellowish and finally to silver at 7 Wt per cent of arsenic or nickel. At 2Wt per cent As or Ni the copper base alloy would have a rather pinkish colour. But one might expect that an alloy containing 2.5 Wt per cent Ni and 1.4 Wt per cent As would be even more distinguished from copper.

21- Permissions were granted by the Directorate General of Antiquities (DGA) for export and destructive analyses of the selected samples, as well as permissions by Professor Hermann Genz. We thank the DGA, especially Ms Samar Karam for facilitating this research. The samples were photographed before destructive sampling, and the teeth were additionally cast using high-resolution dental moulding material. The moulds are currently curated at Bournemouth University for future microwear studies.

22- Cooper 2006, pp. 58–63. This concept has also been discussed for the Southern Levant, see Philip 2001, pp. 165–168 and Chesson and Philip 2003.

List of References

Allen, S. J. 1998. 'Queen's ware: royal funerary pottery in the Middle Kingdom', in C. J. Eyre (ed.), *Proceedings of the Seventh International Congress of Egyptologists, Cambridge, 3–9 September 1995*, OLA 82, Leuven, pp. 39–48.

Al Qahtani, S. J., Hector, M. P. and Liversidge, H. M. 2010. 'Brief communication: the London atlas of human tooth development and eruption', *American Journal of Physical Anthropology* 142/3, pp. 481–490.

Alt, K. 1991. *Verwandtschaftsanalyse an Skelettmaterial. Methodenentwicklung auf der Basis odontologischer Merkmale*, unpublished Habilitation Thesis, University of Freiburg.

Ambrose, S. H. and Krigbaum, J. 2003. 'Bone chemistry and bioarchaeology', *Journal of Anthropological Archaeology* 22/3, pp. 193–199.

Amiran, R. 1970. *Ancient pottery of the Holy Land: from its beginnings in the Neolithic period to the end of the Iron Age*, Jerusalem.

Amzallag, N. 2009. 'From metallurgy to Bronze Age civilization: the synthetic theory', *American Journal of Archaeology* 113, pp. 497–519.

Arnold, D. 1981. 'Mergeltone (''Wüstentone'') und die Herkunft einer Mergeltonware des Mittleren Reiches aus der Gegend von Memphis', in D. Arnold (ed.), *Studien zur altägyptischen Keramik*, Mainz, pp. 167–191.

Artin, G. 2008. 'Échanges «commerciaux» et «culturels» au Levant durant le IV^e^ millénaire à travers le «prisme» funéraire du site de Byblos', in *Interconnections in the Eastern Mediterranean. Lebanon in the Bronze and Iron Ages. Proceedings of the International Symposium Beirut 2008*, Bulletin d'archéologie et d'architecture libanaises hors-série VI, Beirut, pp. 57–68.

_____ **2009**. *La 'Nécropole énéolithique' de Byblos. Nouvelles interprétations*, BAR International Series 1993, Oxford.

Aston, D. A. 2002. 'Ceramic imports at Tell El-Dab'a during the Middle Bronze II A', in M. Bietak (ed.), *The Middle Bronze Age in the Levant. Proceedings of an international conference on MB IIA ceramic material, Vienna, 24–26 January 2001*, Vienna, pp. 43–88.

Atıcı, A. L. 2005. 'Centralized or decentralized: the mode of pastoral economy at Early Bronze Age Kaman-Kalehöyük', *Anatolian Archaeological Studies* 14, pp.119–128.

Bader, B. 2001. *Tell el-Dab^c^a XIII. Typologie und Chronologie der Mergel C-Ton Keramik. Materialien zum Binnenhandel des Mittleren Reiches und der Zweiten Zwischenzeit*, Vienna.

Bader, B., Forstner-Müller, I., Kopetzky, K. and Doumet-Serhal, C. 2009. 'An Egyptian jar from Sidon in its Egyptian context–some fresh evidence', *Archaeology and History in the Lebanon* 29, pp. 79–83.

Bagh, T. 2002. 'Painted pottery at the beginning of the Middle Bronze Age: Levantine painted ware', in M. Bietak (ed.), *The Middle Bronze Age in the Levant. Proceedings of an international conference on MB IIA ceramic material, Vienna, 24–26 January 2001*, Vienna, pp. 89–101.

_____ **2013**. *Tell el-Dab^c^a XXIII. Levantine painted ware from Egypt and the Levant*, Vienna.

Badreshany, P. K. 2013. *Urbanization in the Levant. An archaeometric approach to understanding the social and economic impact of settlements nucleation in the Biqā' Valley*, Department of Near Eastern Languages and Civilizations, unpublished PhD Dissertation, University of Chicago.

_____ **2016**. 'Lebanon's earliest potting traditions in regional context', *Berytus* 55, pp. 5–42.

Badreshany, P. K., Genz, H. and Sader, H., with contributions by Breuer, P., Çakırlar, C., Deckers, K., Jungklaus, B., Nader, F., Riehl, S., Rokitta, D. and Yanni, S. 2005. 'An Early Bronze Age site on the Lebanese coast. Tell Fadous-Kfarabida 2004 and 2005: final report', *Bulletin d'archéologie et d'architecture Libanaises* 9, pp. 5–115.

Badreshany, P. K. and Genz, H. 2009. 'Pottery production on the northern Lebanese coast during the Early Bronze Age II–III: the petrographic analysis of the ceramics from Tell Fadous-Kfarabida', *Bulletin of the American Schools of Oriental Research* 355, pp. 51–83.

Badreshany, P. K. and Kamlah, J. 2010–2011. 'Middle Bronze Age pottery from Tell el-Burak, Lebanon', *Berytus* 53/54, pp. 81–113.

Baldi, J. S. 2017. 'La région de Byblos de la fin du VI[e] au début du III[e] millénaire: formation d'un réseau territorial', *Syria* 94, pp. 123–155.

Baldi, J. S. and Boustani, M. forthcoming. 'Collections céramiques du musée de la Préhistoire libanaise: une étude technique des manières de faire la poterie au Liban proto-urbain', *Tempora*.

Bastos, M. Q. R., Santos, R. V. M., de Souza, S. M. F., Rodrigues-Carvalho, C., Tykot, R. H., Cook, D. C. and Santos, R. V. 2016. 'Isotopic study of geographic origins and diet of enslaved Africans buried in two Brazilian cemeteries', *Journal of Archaeological Science* 70, pp. 82–90.

Beayno, F., Mattar, C. and Abdul-Nour, H. 2002. 'Mgharet al-Hourriyé (Karussadé, caza de Zgharta). Rapport préliminaire de la fouille 2001', *Bulletin d'archéologie et d'architecture libanaises* 6, pp. 135–178.

Beayno, F. and Mattar, C. 2008. 'Mgharet al-Hourriyé, sépulture collectives de l'âge du Bronze dans une caverne de la Qadisha', in C. Doumet-Serhal, A. Rabate and A. Resek (eds), *A decade of archaeology and history in the Lebanon*, Beirut, pp. 426–447.

Beck, H. C. 1928. 'Classification and nomenclature of beads and pendants', *Archaeologia* 77, pp. 1–76.

Bentley, R. A., Tayles, N., Higham, C., Macpherson, C. and Atkinson, T. C. 2007. 'Shifting gender relations at Khok Phanom Di, Thailand: isotopic evidence from the skeletons', *Current Anthropology* 48/2, pp. 301–314.

Bietak, M. 1991. *Tell el-Dab[c]a V. Ein Friedhofsbezirk der Mittleren Bronzezeitkultur mit Totentempel und Siedlungsschichten*, Vienna.

Binford, L. R. 1981. *Bones. Ancient men and modern myths*, New York.

Bocherens, H. and Drucker, D. 2003. 'Trophic level isotopic enrichment of carbon and nitrogen in bone collagen: case studies from recent and ancient terrestrial ecosystems', *International Journal of Osteoarchaeology* 13 (1/2), pp. 46–53.

Braidwood, R. J. and Braidwood L. 1960. *Excavations in the plain of Antioch*, vol. 1, Oriental Institute Publications 61, Chicago.

Brown, T. A., Nelson, D. E., Vogel, J. S. and Southon, J. R. 1988. 'Improved collagen extraction by modified longin method', *Radiocarbon* 30/2, pp. 171–177.

Bryant, J. D. and Froelich, P. N. 1995. 'A model of oxygen isotope fractionation in body water of large mammals', *Geochimica et Cosmochimica Acta* 59/21, pp. 4523–4537.

Budd, P. and Ottaway, B. S. 1991. 'The properties of arsenical copper alloys: implications for the development of Eneolithic metallurgy', in P. Budd, B. Chapman, C. Jackson, R. Janaway and B. S. Ottaway (eds), *Archaeological science 1989. Proceedings of a conference on the application of scientific techniques to archaeology, Bradford, September 1989*, Oxford, pp.132–142.

Catanzariti, A. 2010–2011. 'Middle Bronze Age ceramic vessels from Kamid el-Loz', *Berytus* 53/54, pp. 47–80.

Chenery, C., Müldner, G., Evans, J., Eckardt, H. and Lewis, M. 2010. 'Strontium and stable isotope evidence for diet and mobility in Roman Gloucester, UK', *Journal of Archaeological Science* 37/1, pp. 150–163.

Chesson, M. S. and Philip, G. 2003. 'Tales of the city? 'Urbanism' in the Early Bronze Age Levant from Mediterranean and Levantine perspectives', *Journal of Mediterranean Archaeology* 16, pp. 3–16.

Cole, D. P. 1984. *Shechem I. The Middle Bronze IIB pottery*, Winona Lake.

Commenge, C., Levy, T. E. and Kansa, E. 2006. 'Gilat's ceramics: cognitive dimensions of pottery production', in T. E. Levy (ed.), *Archaeology, anthropology and cult. The sanctuary at Gilat, Israel*, London, pp. 394–506.

Contenson, H. (de) 1968. 'Rapport préliminaire sur les fouilles de Tell al Khazami en 1967', *Annales archéologiques arabes syriennes* 18, pp. 55–62.

Cooper, L. 2006. *Early urbanism on the Syrian Euphrates*, New York/London.

Courtois, J.-C. 1973. 'Le sanctuaire du dieu au lingot d'Enkomi-Alasia (Chypre) et les lieux de culte contemporains en Méditerranée orientale', *Comptes rendus des séances de l'Académie des inscriptions et belles-lettres*, 117[e] année, N. 2: 223–246. DOI: https://doi.org/10.3406/crai.1973.12872

Czerny, E. 2015. *Tell el-Dab[c]a XXII. "Der Mund der beiden Wege". Die Siedlung und der Tempelbezirk des Mittleren Reiches von Ezbet Ruschdi*, Vienna.

Damick, A. 2019. *Complex ecologies: the micro-evidence for storage landscapes in Early Bronze Age Lebanon*, unpublished PhD Dissertation, Columbia University, New York.

Damick, A. and Woodworth, M. 2015. 'Steatite beads from Tell Fadous-Kfarabida: a case study in Early Bronze Age technology in northern coastal Lebanon', *Journal of Archaeological Science Reports* 3, pp. 603–614.

D'Andrea, M. 2014a. *The Southern Levant in Early Bronze IV. Issues and perspectives in the pottery evidence*, Contributi e materiali di archeologia orientale 17, Rome.

_____ **2014b**. 'La *Black Wheelmade Ware*: originalità e modelli stilistici, tipologici e tecnologici dalla Siria e dal Levante settentrionale in una peculiare produzione dipinta sud–levantina del tardo III millennio a.C', *Rendiconti morali dell'Accademia nazionale dei Lincei* IX, vol. 24, pp. 181–220.

_____ **2017**. 'Note on Early Bronze IV grey hard-textured wares in the Levant', *Studia eblaitica* 3, pp. 172–181.

_____ **2019**. 'The periodization of Early Bronze IV in the Southern Levant: bridging the gap between stratigraphy and absolute chronology', in E. Gallo (ed.), *Conceptualizing urban experiences: Tell es-Sultan and Tall al-Hammām Early Bronze cities across the Jordan. Proceedings of a workshop held in Palermo, G. Whitaker Foundation, Villa Malfitano, 19 June 2017*, Rome La Sapienza Studies on the Archaeology of Palestine & Transjordan 13, Rome, pp. 61–78.

_____ **Forthcoming**. 'The Early Bronze IV pottery', in H. Genz (ed.), *Tell Fadous-Kfarabida II. The Early Bronze Age IV and the Middle Bronze Age*.

Daux, V., Lécuyer, C., Héran, M.-A., Amiot, R., Simon, L., Fourel, F., Martineau, F., Lynnerup, N., Reychler, H. and Escarguel, G. 2008. 'Oxygen isotope fractionation between human phosphate and water revisited', *Journal of Human Evolution* 55/6, pp. 1138–1147.

Deniel, C. and Pin, C. 2001. 'Single-stage method for the simultaneous isolation of lead and strontium from silicate samples for isotopic measurements', *Analytica Chimica Acta* 426/1, pp. 95–103.

De Niro, M. J. and Epstein, S. 1978. 'Influence of diet on the distribution of carbon isotopes in animals', *Geochimica et Cosmochimica Acta* 42/5, pp. 495–506.

De Ryck, I., Adriaens, A. and Adams, F. 2005. 'An overview of Mesopotamian bronze metallurgy during the 3rd millennium BC', *Journal of Cultural Heritage* 6, pp. 261–268.

Douglas, K. 2007. *Die Befestigung der Unterstadt von Hirbet ez-Zeraqon. Deutsch-jordanische Ausgrabungen in Hirbet ez-Zeraqon 1984–1994. Endberichte Band III/1*, Abhandlungen des Deutschen Palästina-Vereins 27/3, Wiesbaden.

Doumet-Serhal, C. 1996. *Les fouilles de Tell el-Ghassil de 1972 à 1974. Étude du matériel,* Bibliothèque archéologique et historique 146, Beirut.

_____ **2003**. 'Sidon – British Museum excavations 1998–2003', *Archaeology and History in the Lebanon* 18, pp. 2–19.

_____ **2004**. 'Twenty Middle Bronze Age burials from the 2001 season of excavation', *Levant* 36/1, pp. 89–154.

_____ **2006**. *The Early Bronze Age in Sidon. 'College site' excavations (1998–2000–2001)*, Bibliothèque archéologique et historique 178, Beirut.

_____ **2008**. 'The British Museum excavation at Sidon: markers for the chronology of the Early and Middle Bronze Age in Lebanon', in M. Bietak and E. Czerny (eds), *The Bronze Age in the Lebanon. Studies on the archaeology and chronology of the Lebanon, Syria and Egypt*, Vienna, pp. 11–44.

Doumet-Serhal, C. and Kopetzky, Y. 2011–2012. 'Sidon and Tell el-Dabᶜa two cities – one story. A highlight on the metal artefacts from the Middle Bronze Age graves' *Archaeology and History in the Lebanon* 34/35, pp. 9–52.

Dunand, M. 1937. *Fouilles de Byblos I, 1926–1932*, tome 1, *Atlas*, Paris.

_____ **1939**. *Fouilles de Byblos I, 1926–1932*, tome 2, *Texte*, Paris.

_____ **1950**. *Fouilles de Byblos II, 1933–1938*, tome 2, *Texte*, Paris.

_____ **1954**. *Fouilles de Byblos II, 1933–1938*, tome 2, *Texte*, Paris.

_____ **1958**. *Fouilles de Byblos II, 1933–1938*, tome 1, *Atlas*, Paris.

_____ **1964**. 'Rapport préliminaire sur les fouilles de Byblos en 1962', *Bulletin du Musée de Beyrouth* 17, pp. 29–35.

_____ **1973**. *Fouilles de Byblos V*, Paris.

Dunham, D. 1967. *Uronarti, Shalfak, Mirgissa. Second cataract forts*, Boston.

El Morr, Z. and Pernot, M. 2011. 'Middle Bronze Age metallurgy in the Levant: evidence from the weapons of Byblos', *Journal of Archaeological Science* 38, pp. 2613–2624.

El Morr, Z., Cattin, F., Bourgarit, D., Lefrais, Y. and Degryse, P. 2013. 'Copper quality and provenance in Middle Bronze Age I Byblos and Tell Arqa (Lebanon)', *Journal of Archaeological Science* 40, pp. 4291–4305.

El Morr, Z. and Mödlinger, M. 2014. 'Middle Bronze Age metal artifacts and metallurgical practices at the sites of Tell Arqa, Mougharet el-Hourryieh, Yanouh and Khariji in Lebanon', *Levant* 46/1, pp. 27–42.

Epstein, C. 1998. *The Chalcolithic culture of the Golan*, Israel Antiquities Authority Reports 4, Jerusalem.

Evans, J. A., Montgomery, J. and Wildman, G. 2009. 'Isotope domain mapping of $^{87}Sr/^{86}Sr$ biosphere variation on the Isle of Skye, Scotland', *Journal of the Geological Society* 166/4, pp. 617–631.

Evans, J. A., Montgomery, J., Wildman, G. and Boulton, N. 2010. 'Spatial variations in biosphere $^{87}Sr/^{86}Sr$ in Britain', *Journal of the Geological Society* 167/1, pp. 1–4.

Garfinkel, Y. 2004. '"Néolithique" and "Énéolithique" Byblos in Southern Levantine context', in E. J. Peltenburg (ed.), *Neolithic revolution. New perspectives on southwest Asia in the light of recent discoveries on Cyprus*, Oxford, pp. 175–188.

Genz, H. 2000. 'The organization of Early Bronze Age metalworking in the Southern Levant', *Paléorient* 26/1, pp. 55–65

_____ **2001**. 'Early Bronze Age potmarks from Khirbat az-Zayraqūn: some aspects concerning their meaning', *Studies in the History and Archaeology of Jordan* 7, pp. 217–228.

_____ **2008**. 'The Middle Bronze Age pottery from Baalbek', in M. van Ess (ed.), *Baalbek/Heliopolis. Results of archaeological and architectural research 2002–2005*, Bulletin d'archéologie et d'architecture libanaises hors-série IV, Beirut, pp. 127–149.

_____ **2009**. 'A stamp seal impression from Tell Fadous-Kfarabida', *Tempora, Annales d'histoire et d'archéologie* 18, pp. 45–51.

_____ **2010a**. 'Recent excavations at Tell Fadous-Kfarabida', *Near Eastern Archaeology* 73 (2/3), pp. 102–113.

_____ **2010b**. 'Reflections on the Early Bronze Age IV in Lebanon', in P. Matthiae, F. Pinnock, L. Nigro and N. Marchetti (eds), *Proceedings of the 6th International Congress on the Archaeology of the ancient Near East, 5–10 May 2008, "Sapienza"–Università di Roma*, vol. 2, *Excavations, surveys and restorations. Reports on recent field archaeology in the Near East*, Wiesbaden, pp. 205–217.

_____ **2010–2011**. 'Middle Bronze Age pottery from Tell Fadous-Kfarabida, Lebanon', *Berytus* 53/54, pp. 115–132.

_____ **2011**. 'Restoring the balance: an Early Bronze Age scale beam from Tell Fadous-Kfarabida, Lebanon', *Antiquity* 85/329, pp. 839–850.

_____ **2014a**. 'Excavations at Tell Fadous-Kfarabida 2004–2011: an Early and Middle Bronze Age site on the Lebanese coast', in F. Höflmayer and R. Eichmann (eds), *Egypt and the Southern Levant in the Early Bronze Age*, Orient-Archäologie 31, Rahden, pp. 69–91.

_____ **2014b**. 'The Northern Levant (Lebanon) during the Early Bronze Age', in M. L. Steiner and A. E. Killebrew (eds), *The Oxford handbook of the archaeology of the Levant: C. 8000–332 BCE*, Oxford, pp. 292–306.

_____ **2015**. 'Beware of environmental determinism: the transition from the Early to the Middle Bronze Age on the Lebanese coast and the 4.2 Ka event', in H. Meller, H. W. Arz, R. Jung and R. Risch (eds), *2200 BC–Ein Klimasturz als Ursache für den Zerfall der Alten Welt?*, Halle, pp. 97–111.

_____ **2016**. 'Simple bone tools from Early Bronze Age Tell Fadous-Kfarabida (Lebanon): a household approach', *Levant* 48/2, pp. 154–166.

_____ **2017**. 'The transition from the third to the second millennium BC in the coastal plain of Lebanon: continuity or break?', in F. Höflmayer (ed), *The late third millennium in the ancient Near East. Chronology, C14, and climate change*, Oriental Institute Seminars 11, Chicago, pp. 73–85.

Genz, H. and Sader, H. 2007. 'Excavations at the Early Bronze Age site of Tell Fadous-Kfarabida: preliminary report on the 2007 season of excavations', *Bulletin d'archéologie et d'architecture libanaises* 11, pp. 7–16.

_____ **2008a**. 'Excavations at Tell Fadous-Kfarabida: preliminary report on the 2008 season of excavations', *Bulletin d'archéologie et d'architecture libanaises* 12, pp. 149–159.

_____ **2008b**. 'Tell Hizzin: digging up new material from an old excavation', *Bulletin d'archéologie et d'architecture libanaises* 12, pp. 183–201.

Genz, H., Çakırlar, C., Damick, A., Jastrzębska, E., Riehl, S., Deckers, K. and Donkin, A. 2009. 'Excavations at Tell Fadous-Kfarabida: preliminary report on the 2009 season of excavations', *Bulletin d'archéologie et d'architecture libanaises* 13, pp. 71–123.

Genz, H., Daniel, R., Damick, A., Ahrens, A., El Zaatari, S., Höflmayer, F., Kutschera, W. and Wild, E. M. 2010a. 'Excavations at Tell Fadous-Kfarabida: preliminary report on the 2010 season of excavations', *Bulletin d'archéologie et d'architecture libanaises* 14, pp. 241–273.

Genz, H., El Zaatari, S., Çakırlar, C., Badreshany, K. and Riehl, S. 2010b. 'A Middle Bronze Age burial from Tell Fadous-Kfarabida, Lebanon', *Egypt and the Levant* 20, pp. 183–206.

Genz, H., Daniel, R., Pustovoytov, K. and Woodworth, M. 2011. 'Excavations at Tell Fadous-Kfarabida: preliminary report on the 2011 season of excavations', *Bulletin d'archéologie et d'architecture libanaises* 15, pp. 151–174.

Genz, H., Riehl, S., Çakırlar, C., Slim, F. and Damick, A. 2016. 'Economic and political organization of Early Bronze Age coastal communities: Tell Fadous-Kfarabida as a case study', *Berytus* 59, pp. 79–120.

Genz, H., Damick, A., Berquist, S., Makinson, M., Wygnanska, Z., Mardini, M., Peršin, M., Raad, N., Alameh, J., Ahrens, A., El Dana, N., Edwards, J. and El Zaatari, S. 2018. 'Excavations at Tell Fadous-Kfarabida: preliminary report on the 2014 and 2015 seasons of excavations', *Bulletin d'archéologie et d'architecture libanaises* 18, pp. 37–78.

Genz, H. and Ahrens, A. 2021. 'Recent Early Bronze Age glyptic finds from Lebanon: the evidence from Tell Fadous-Kfarabida', *Bulletin of the American Schools of Oriental Research* 386, pp. 47–76.

Genz, H., Badreshany, K. and Jean, M. 2021. 'A view from the north. Black wheelmade ware in Lebanon', in W. G. Dever and J. C. Long Jr (eds), *Transitions, urbanism, and collapse in the Early Bronze Age. Essays in honor of Suzanne Richard*, Sheffield, pp. 335–353.

Genz, H., Kopetzky, K., Schwall, C., Börner, M., Rom, J., Haas, F., Stark, M. and Dremel, F. Forthcoming. 'Tell Mirhan and the Chekka region: preliminary report of the survey and first excavation seasons (2016 and 2018)', *Bulletin d'archéologie et d'architecture libanaises*.

Gerstenblith, P. 1983. *The Levant at the beginning of the Middle Bronze Age,* ASOR Dissertation Series 5, Winona Lake.

Gilead, I. and Goren, Y. 1995. 'The pottery assemblages from Grar', in I. Gilead (ed.), *Grar, a Chalcolithic site in the northern Negev*, Beer-Sheva VII, Beer-Sheva, pp. 137–221.

Glatz, C. 2012. 'Bearing the marks of control? Reassessing pot marks in Late Bronze Age Anatolia', *American Journal of Archaeology* 116/1, pp. 5–38.

Godon, M., Baldi, J. S., Ghanem, G., Ibáñez, J. J. and Braemer, F. 2015. 'Qarassa north Tell, southern Syria: the pottery Neolithic and Chalcolithic sequence. A few lights against a dark background', *Paléorient* 41/1, pp. 153–176.

Grant, A. 1982. 'The use of tooth wear as a guide to the age of domestic ungulates', in R. Wilson, C. Grigson and S. Payne (eds), *Ageing and sexing animal bones from archaeological sites*, BAR British series 109, Oxford, pp. 91–108.

Hanihara, T. 1992. 'Dental and cranial affinities among populations of East Asia and the Pacific: the basic populations in East Asia, IV', *American Journal of Physical Anthropology* 88/2, pp. 163–182.

Hassett, B. and Sağlamtimur, H. 2018. 'Radical 'royals'? Burial practices at Başur Höyük and the emergence of early states in Mesopotamia', *Antiquity* 92/363, pp. 640–654.

Hauptmann, A. 2007. *The archaeometallurgy of copper, evidence form Faynan, Jordan*, Berlin.

Hedges, R. E. M., Clement, J. G., Thomas, C. D. L. and O'Connell, T. C. 2007. 'Collagen turnover in the adult femoral mid-shaft: modelled from anthropogenic radiocarbon tracer measurements', *American Journal of Physical Anthropology* 133/2, pp. 808–816.

Henderson, J., Evans, J. and Barkoudah, Y. 2009. 'The roots of provenance: glass, plants and isotopes in the Islamic Middle East', *Antiquity* 83/320, pp. 414–429.

Hirschfeld, N. 2002. 'Marks on pots: patterns of use in the archaeological record at Enkomi', in J. S. Smith (ed.), *Script and seal use on Cyprus in the Bronze and Iron Ages*, Colloquia and Conference Papers 4, Boston, pp. 49–109.

_____ **2011**. 'Potters' marks and potmarks', in V. Karageorghis (ed.), *Enkomi: the excavations of Porphyrios Dikaios 1948–1958. Supplementary catalogue of finds*, Nicosia, pp. 42–58.

_____ **2012**. 'Appendix IV: potmarks', in V. Karageorghis, Y. Violaris and A. Charalambous (eds), *Tombs of the Late Bronze Age in the Limassol area, Cyprus (17th–13th centuries BC)*, Nicosia, pp. 289–299.

Höflmayer, F., Dee, M., Genz, H. and Riehl, S. 2014. 'Radiocarbon evidence for the Early Bronze Age Levant: the site of Tell Fadous-Kfarabida (Lebanon) and the end of the Early Bronze III period', *Radiocarbon* 56/2, pp. 529–542.

Hoefs, J. 2009. *Stable isotope geochemistry*, Berlin.

Hubbard, A. R., Guatelli-Steinberg, D. and Irish, J. D. 2015. 'Do nuclear DNA and dental nonmetric data produce similar reconstructions of regional population history? An example from modern coastal Kenya', *American Journal of Physical Anthropology* 157/2, pp. 295–304.

Irish, J. D. 1993. *Biological affinities of Late Pleistocene through modern African aboriginal populations. The dental evidence*, Arizona State University.

_____ **2016**. 'Assessing dental nonmetric variation among populations', in J. D. Irish and G. R. Scott (eds), *A companion to dental anthropology*, Chichester, pp. 265–286.

Junk, M. 2003. *Material properties of copper alloys containing arsenic, antimony and bismuth, the material of Early Bronze Age ingot torques*, Unpublished Ph.D.-Thesis, Freiberg University of Mining and Technology.

Katzenberg, M. A. 2007. 'Stable isotope analysis: a tool for studying past diet, demography, and life history', in M. A. Katzenberg and S. R. Saunders (eds), *Biological anthropology of the human skeleton*, Hoboken, pp. 411–441.

Kellner, C. M. and Schoeninger, M. J. 2007. 'A simple carbon isotope model for reconstructing prehistoric human diet', *American Journal of Physical Anthropology* 133/4, pp. 1112–1127.

Kennedy, M. A. 2019. 'A new EB IV cultural province in central and southern Syria: the view from Tell Nebi Mend', in M. D'Andrea, M. G. Micale, D. Nadali, S. Pizzimenti and A. Vacca (eds), *Pearls of the past. Studies on Near Eastern art and archaeology in honour of Frances Pinnock*, Marru 8, Münster, pp. 429–448.

Kennedy, M. A., Badreshany, K. and Philip, G. 2018. 'Drinking on the periphery: the Tell Nebi Mend goblets in their regional and archaeometric context', *Levant*, DOI: 10.1080/00758914.2018.

Kenoyer, J. M. 2003. 'Stone beads and pendant making techniques', in J. W. Lankton (ed), *A bead timeline*, vol. 1. *Prehistory to 1200 CE*, Washington DC, pp. 14–19.

Kenoyer, J. M. and Frenez, D. 2018. 'Stone beads in Oman during the third and the second Millennia BCE: new approaches to the study of trade and technology', *BEADS: Journal of the Society of the Bead Researchers* 30, pp. 63–76.

Khalil, L. 1984. 'Metallurgical analyses of some weapons from Tell el-'Ajjul', *Levant* 16, pp. 167–170.

Knudson, K. J., Goldstein, P. S., Dahlstedt, A., Somerville, A. and Schoeninger, M. J. 2014. 'Paleomobility in the Tiwanaku diaspora: biogeochemical analyses at Rio Muerto, Moquegua, Peru', *American Journal of Physical Anthropology* 155/3, pp. 405–421.

Köhler, E. C. and Thalmann, J.-P. 2014. 'Synchronising early Egyptian chronologies and the Northern Levant', in F. Höflmayer and R. Eichmann (eds), *Egypt and the Southern Levant in the Early Bronze Age,* Orient-Archäologie 31, Rahden, pp. 181–206.

Kopetzky, K. 1993. *Datierung der Gräber der Grabungsfläche F/I von Tell el-Dabᶜa anhand der Keramik*, Unpublished M.A. Thesis, University of Vienna.

_____ **2010**. *Tell el-Dabᶜa XX. Die Chronologie der Siedlungskeramik der Zweiten Zwischenzeit aus Tell el-Dabca*, Vienna.

_____ **2010–2011**. 'Egyptian pottery from the Middle Bronze Age in Lebanon', *Berytus* 53/54, pp. 167–179.

_____ **2012**. 'The Egyptian corpus of the Middle Bronze Age layers of Sidon', *Archaeology and History in the Lebanon* 34/35, pp. 163–172.

Larsen, C. S. 1997. *Bioarchaeology: interpreting behaviour from the human skeleton*, New York.

Le Roux, G., Véron, A. and Scholz, C. 2009. 'Metal and Pb isotope analyses on weapons from the Bronze Age in Sidon', *Archaeology and History in the Lebanon* 29, pp. 75–78.

Lechtman, H. 1996. 'Arsenic bronze: dirty copper or chosen alloy? A view from the Americas', *Journal of Field Archaeology* 23, pp. 477–514.

Lee-Thorp, J. A., Sealy, J. C. and van der Merwe, N. J. 1989. 'Stable carbon isotope ratio differences between bone collagen and bone apatite, and their relationship to diet', *Journal of Archaeological Science* 16/6, pp. 585–599.

Lernau, O. 2004. 'Fish remains from the Early Bronze Age Ashqelon, Afridar', *Atiqot* 54, pp. 299–303.

Longin, R. 1971. 'New method of collagen extraction for radiocarbon dating', *Nature* 230/5291, pp. 241, 242.

Longinelli, A. 1984. 'Oxygen isotopes in mammal bone phosphate: a new tool for paleohydrological and paleoclimatological research?', *Geochimica et Cosmochimica Acta* 48/2, pp. 385–390.

Lovell, J. L. 2001. *The Late Neolithic and Chalcolithic periods in the Southern Levant. New data from the site of Teleilat Ghassul, Jordan. Monographs of the Sydney University Teleilat Ghassul Project I*, BAR international series S974, Oxford.

Lovell, J. L., Dollfus, J. and Kafafi, Z. 2007. 'The ceramics of the Late Neolithic and Chalcolithic: Abu Hamid and the burnished tradition', *Paléorient* 33/1, pp. 51–76.

Ludvik, G. 2018. *Hard stone beads and socio-political interaction in the Intermediate Bronze Age Levant, ca. 2500–2000 BCE*, unpublished Ph.-D. Thesis, University of Wisconsin-Madison

Luz, B. and Kolodny, Y. 1989. 'Oxygen isotope variation in bone phosphate', *Applied Geochemistry* 4/3, pp. 317–323.

Madgwick, R., Lamb, A. L., Sloane, H., Nederbragt, A. J., Albarella, U., Pearson, M. P. and Evans, J. A. 2019. 'Multi-isotope analysis reveals that feasts in the Stonehenge environs and across Wessex drew people and animals from throughout Britain', *Science Advances* 5/3, eaau6078.

Mansfeld, G. 1970. 'Ein Bronzezeitliches Steinkammergrab die Rafid im Wadi at–Taym', in R. Hachmann (ed.), *Bericht über die Ergebnisse der Ausgrabungen in Kamid el–Loz (Libanon) in den Jahren 1966 und 1967*, Bonn, pp. 117–128.

Marcus, E. S. 2007. 'Amenemhat and the sea: maritime aspects of the Mit Rahina (Memphis) inscription', *Egypt and the Levant* 17, pp. 137–190.

Marcus, E. S., Porath, S. and Paley, S. M. 2008. 'The Early Middle Bronze Age IIa phases at Tel Ifshar and their external relations', *Egypt and the Levant* 18, pp. 221–244

Marfoe, L. 1995. *Kamid el-Loz 13. The prehistoric and early historic context of the site*, Saarbrücker Beiträge zur Altertumskunde 41, Bonn.

_____ **1998**. *Kamid el-Loz 14. Settlement history of the Biqāᶜ up to the Iron Age*, Saarbrücker Beiträge zur Altertumskunde 53, Bonn.

Mazzoni, S. and Thalmann, J.-P. (eds) Forthcoming. *Associated regional chronologies for the ancient Near East and the Eastern Mediterranean: the Central and Northern Levant*, Turnhout.

Minagawa, M. and Wada, E. 1984. 'Stepwise enrichment of ^{15}N along food chains: further evidence and the relation between $\delta^{15}N$ and animal age', *Geochimica et Cosmochimica Acta* 48/5, pp. 1135–1140.

Mödlinger, M., Kuiper, M. H. G., Braekmans, D. and Berger, D. 2017. 'Quantitative comparisons of the color of CuAs, CuSn, CuNi and CuSb alloys', *Journal of Archaeological Science* 88, pp. 14–23.

Montet, P. 1928. *Byblos et l'Égypte. Quatre campagnes de fouilles 1921–1924*, Bibliothèque archéologique et historique 11, Paris.

Moorey, P. R. S. 1998. *Ancient Mesopotamian materials and industries*, Oxford.

Moorey, P. R. S. and Schweizer, F. 1972. 'Copper and copper alloys in ancient Iraq, Syria and Palestine: some new analyses', *Archaeometry* 14, pp. 177–198.

Müldner, G., Chenery, C. and Eckardt, H. 2011. 'The "headless Romans": multi-isotope investigations of an unusual burial ground from Roman Britain', *Journal of Archaeological Science* 38/2, pp. 280–290.

Nehlich, O. 2015. 'The application of sulphur isotope analyses in archaeological research: a review', *Earth-Science Reviews* 142, pp. 1–17.

Nigro, L. 2002. 'The MB pottery horizon of Tell Mardikh/ancient Ebla in a chronological perspective', in M. Bietak (ed.), *The Middle Bronze Age in the Levant. Proceedings of an international conference on MB IIA ceramic material, Vienna, 24–26 January 2001*, Vienna, pp. 297–328.

_____ **(ed.) 2007**. 'Byblos and Jericho in the Early Bronze Age I. Social dynamics and cultural interaction', *Proceedings of the International Workshop held in Rome on March 6th 2007 by Rome "La Sapienza" University*, Rome "La Sapienza" Studies on the Archaeology of Palestine and Transjordan 4, Rome.

_____ **2012**. 'An EB IIIB (2500–2300 BCE) gemstones necklace from the palace of the copper axes at Khirbet al-Batrawy, Jordan', *Vicino oriente* 16, pp. 227–244.

_____ **2013**. 'Khirbet al-Batrawy: an Early Bronze Age city at the fringes of the desert', *Syria* 90, URL: http://journals.openedition.org/syria/1790 DOI: 10.4000/syria.1790

Nigro, L., Calcagnile, L., Yasin, J., Gallo, E. and Quarta, G. 2019. 'Jericho and the chronology of Palestine in the Early Bronze Age: a radiometric re-assessment', *Radiocarbon* 61/1, pp. 211–241.

Nordstöm, H.-Å. and Bourriau, J. 1992. 'Ceramic technology: clays and fabrics', in D. Arnold and J. Bourriau (eds), *An introduction to Ancient Egyptian pottery, Sonderschriften des Deutschen Archäologischen Instituts Kairo* 17, Mainz, pp. 148–190.

Northover, P. 1989. 'Properties and use of arsenic-copper alloys', in A. Hauptmann, E. Pernicka and G. Wagner (eds), *Old world archaeometallurgy, Proceedings of the International Symposium 'Old World Archaeometallurgy', Heidelberg 1987*, Bochum, pp. 111–118.

O'Connell, T. C., Kneale, C. J., Tasevska, N. and Kuhnle, G. G. C. 2012. 'The diet-body offset in human nitrogen isotopic values: a controlled dietary study', *American Journal of Physical Anthropology* 149/3, pp. 426–434.

Perkins, M. J., McDonald, R. A., van Veen, F. J. F., Kelly, S. D., Rees, G. and Bearhop, S. 2014. 'Application of nitrogen and carbon stable isotopes (δ^{15} and δ^{13} to quantify food chain length and trophic structure', *PLoS ONE* 9/3, e93281.

Peterson, B. J., Howarth, R. W. and Garritt, R. H. 1985. 'Multiple stable isotopes used to trace the flow of organic matter in estuarine food webs', *Science* 227/4692, pp. 1361–1363.

Philip, G. 1991. 'Tin, arsenic, lead: alloying practices in Syria-Palestine around 2000 BC', *Levant* 13, pp. 93–104.

_____ **2001**. 'The Early Bronze I–III Ages', in B. MacDonald, R. Adams and P. Bienkowski (eds), *The archaeology of Jordan*, Levantine Archaeology 1, Sheffield, pp. 163–232.

Pickard, C. and Schoop, U.-D. 2013. 'Characterization of Late Chalcolithic microbeads from Çamlıbel Tarlası, North-Central Anatolia', *Archaeometry* 55/1, pp. 14–32.

Pilgrim, C. von 1996. *Elephantine XVIII. Untersuchungen in der Stadt des Mittleren Reiches und der Zweiten Zwischenzeit*, Archäologische Veröffentlichungen 91, Mainz.

Pritchard, J. B. 1975. *Sarepta. A preliminary report on the Iron Age. Excavations of the University Museum of the University of Pennsylvania 1970–1972*, Philadelphia.

Prowse, T. L., Schwarcz, H. P., Garnsey, P., Knyf, M., Macchiarelli, R. and Bondioli, L. 2007. 'Isotopic evidence for age-related immigration to imperial Rome', *American Journal of Physical Anthropology* 132/4, pp. 510–519.

Rathmann, H., Reyes-Centeno, H., Ghirotto, S., Creanza, N., Hanihara, T. and Harvati, K. 2017. 'Reconstructing human population history from dental phenotypes', *Scientific Reports* 7/1, p. 12495.

Regev, J., de Miroschedji, P., Greenberg, R., Braun, E., Greenhut, Z. and Boaretto, E. 2012. 'Chronology of the Early Bronze Age in the Southern Levant: new analysis for a high chronology', *Radiocarbon* 54 (3/4), pp. 525–566.

Rich, S., Manning, S. W., Degryse, P., Vanhaecke, F. and Van Lerberghe, K. 2016. 'Provenancing East Mediterranean cedar wood with the $^{87}Sr/^{86}Sr$ strontium isotope ratio', *Archaeological and Anthropological Sciences* 8/3, pp. 467–476.

Richards, M. P., Fuller, B. T. and Hedges, R. E. M. 2001. 'Sulphur isotopic variation in ancient bone collagen from Europe: implications for human palaeodiet, residence mobility, and modern pollutant studies', *Earth and Planetary Science Letters* 191/34, pp. 185–190.

Richards, M. P., Fuller, B. T., Sponheimer, M., Robinson, T. and Ayliffe, L. 2003. 'Sulphur isotopes in palaeodietary studies: a review and results from a controlled feeding experiment', *International Journal of Osteoarchaeology* 13 (1/2), pp. 37–45.

Roberts, B. W., Thronton, C. P. and Pigott, V. C. 2009. 'Development of metallurgy in Eurasia', *Antiquity* 83, pp. 1012–1022.

Roux, V. and Thalmann, J,-P. 2016. 'Évolution technologique et morpho-stylistique des assemblages céramiques de Tell Arqa (Liban, 3e millénaire av. J.-C.): stabilité sociologique et changements culturels', *Paléorient* 42/1, pp. 95–121.

Schiestl, R. 2009. *Tell el-Dabᶜa XVIII. Die Palastnekropole von Tell el-Dabca. Die Gräber des Areals F/I der Straten d/2 und d/1*, Vienna.

Schoeninger, M. J. 2010. 'Diet reconstruction and ecology using stable isotope ratios', in C. S. Larsen (ed.), *A companion to biological anthropology*, Malden, pp. 445–464.

Schutkowski, H. and Ogden, A. 2011–2012. 'Sidon of the plain, Sidon of the sea – reflections on Middle Bronze Age diet in the Eastern Mediterranean', *Archaeology and History in the Lebanon* 34/35, pp. 213–225.

Schwartz, G. M. 2017. 'Western Syria and the third- to second millennium BC transition', in F. Höflmayer (ed.), *The late third millennium in the ancient Near East. chronology, C14, and climate change*, Oriental Institute Seminars 11, Chicago, pp. 87–128.

Sconzo, P. 2013. *Tell el-'Abd II. Pottery and potmarks at an early urban settlement of the Middle Euphrates River Valley, Syria. Final reports of the Syrian-German excavations at Tel el-'Abd*, Altertumskunde des Vorderen Orients, Archäologische Studien zur Kultur und Geschichte des Alten Orients 16/2, Münster.

Scott, D. A. 1991. *Metallography and microstructure of ancient and historic metals*, Singapore.

Scott, G. R. 1973. *Dental morphology. A genetic study of American white families and variation in living Southwest Indians*, Arizona State University.

Scott, G. R. and Irish, J. D. 2017. *Human tooth crown and root morphology*, Cambridge.

Scott, G. R. and Turner II, C. G. 1988. 'Dental anthropology', *Annual Review of Anthropology* 17, pp. 99–126.

_____ **1997**. *The anthropology of modern human teeth. Dental morphology and its variation in recent human populations*, Cambridge.

Scott, G. R., Turner II, C. G., Townsend, G. C. and Martinón-Torres, M. 2018. *The anthropology of modern human teeth. Dental morphology and its variation in recent and fossil Homo Sapiens*, Cambridge.

Sebag, D. 2005. 'The Early Bronze Age dwellings in the Southern Levant', *Bulletin du Centre de recherche française à Jérusalem* 16, pp. 222–235.

Seiler, A. 2005. *Tradition und Wandel. Die Keramik als Spiegel der Kulturenentwicklung Thebens in der Zweiten Zwischenzeit*, Sonderschriften des Deutschen Archäologischen Instituts Kairo 32, Mainz.

Shalev, S. 1991. 'Two different copper industries in the Chalcolithic culture of Israel', in J.-P. Mohen and C. Eluere (eds), *Découverte du métal*, Paris, pp. 413–419.

_____ **1994**. 'The change in metal production from the Chalcolithic period to the Early Bronze Age in Israel and Jordan', *Antiquity* 68, pp. 630–637.

Shalev, S. and Northover, P. 1993. 'The Metallurgy of the Nahal Mishmar hoard reconsidered', *Archaeometry* 35/1, pp. 35–47.

Shugar, A. N. and Gohm, C. J. 2011. 'Developmental trends in Chalcolithic copper metallurgy: a radiometric perspective', in J. L. Lovell and Y. M. Rowan (eds), *Culture, chronology and the Chalcolithic*, Levant Supplementary Series 9, Oxford, pp. 133–148.

Siclen III, C. C. van 1996. 'Remarks on the Middle Kingdom palace at Tell Basta', in M. Bietak (ed.), *Haus und Palast im Alten* Ägypten, Vienna, pp. 239–246.

Sołtysiak, A. 2019. 'Strontium and nitrogen isotopic evidence of food import to Tell Ashara–Terqa, a Bronze Age city on the Euphrates, Syria', *International Journal of Osteoarchaeology* 29/1, pp. 127–133.

Spycket, A. 1996. 'Le rôle funéraire des ceintures à anneaux de coquille', in Ö. Tunca and D. Deshelle (eds), *Tablettes et images aux pays de Sumer et d'Akkad. Mélanges offerts à Monsieur H. Linet,* Liège, pp. 141–147.

Stager, L. E. 2002. 'The MB IIA ceramic sequence at Tell Ashkelon and its implications for the "port power" model of trade', in M. Bietak (ed.), *The Middle Bronze Age in the Levant. Proceedings of an international conference on MB IIA ceramic material, Vienna, 24–26 January 2001*, Vienna, pp. 353–362.

Strommenger, E. 1980. *Habuba Kabira: eine Stadt vor 5000 Jahren. Ausgrabungen der Deutschen Orient-Gesellschaft am Euphrat in Habuba Kabira, Syrien*, Mainz.

Thalmann, J.-P. 2006. *Tell Arqa-1. Les niveaux de l'Âge du bronze*, Bibliothèque archéologique et historique 177, Beirut.

_____ **2008**. 'Tell Arqa et Byblos, essai de corrélation', in M. Bietak and E. Czerny (eds), *The Bronze Age in Lebanon. Studies in the archaeology and chronology of Lebanon, Syria and Egypt*, Vienna, pp. 61–78.

_____ **2009**. 'The Early Bronze Age: foreign relations in the light of recent excavations at Tell Arqa', in A.-M. Maïla-Afeiche (ed.), *Interconnections in the Eastern Mediterranean. Lebanon in the Bronze and Iron Ages. Proceedings of the international symposium Beirut 2008*, Bulletin d'archéologie et d'architecture libanaises hors-série VI, Beirut, pp. 15–28.

_____ **2010**. 'Tell Arqa: a prosperous city in the Bronze Age', *Near Eastern Archaeology* 73 (2/3), pp. 86–101.

_____ **2012**. 'Ex Oriente lux: l'invention de la lampe au Proche-Orient', in J. Giraud and G. Gernez (eds), *Aux marges de l'archéologie. Hommage à Serge Cleuziou*, Paris, pp. 175–185.

_____ **2013**. 'Le lion, la chèvre et le poisson. À propos d'une jarre à empreintes de sceaux-cylindres de Tell Arqa (Liban)', *Syria* 90, pp. 255–312.

Thomsen, E. and Andreasen, R. 2019. 'Agricultural lime disturbs natural strontium isotope variations: implications for provenance and migration studies', *Science Advances* 5/3, eaav8083.

Tufnell, O. 1969. 'The pottery from Royal Tombs I–III at Byblos', *Berytus* 18, pp. 5–33.

Turner II, C. G.' Nichol, C. R. and Scott, G. R. 1991. 'Scoring procedures for key morphological traits of the permanent dentition: the Arizona State University dental anthropology system', in M. A. Kelley and C. S. Larsen (eds), *Advances in dental anthropology*, New York, pp. 13–32.

UNDP 1970. *Liban. Étude des eaux souterraines*, New York.

Uziel, J. and Avissar Lewis, R. S. 2013. 'The Tel Nagila Middle Bronze Age homes – studying household activities and identifying children in the archaeological record', *Palestine Exploration Quarterly* 145/4, pp. 268–293.

Vacca, A. and D'Andrea, M. 2020. 'The connections between the Northern and Southern Levant during EB III: re-evaluations and new vistas in the light of new data and higher chronologies', in S. Richard (ed.), *New horizons in the study of the Early Bronze III and Early Bronze IV in the Levant*, University Porte, pp. 120–145.

Vanhecke, M. 2012. *A taphonomic study of the molluscan assemblage of the Early Bronze Age site of Tell Fadous (Lebanon)*, unpublished MA Thesis, Katholieke Universiteit, Leiden.

Véron, A., Le Roux, G., Poirier, A. and Baque, D. 2011–2012. 'Origin of copper used in bronze artefacts from Middle Bronze Age burials in Sidon: a synthesis from lead isotope imprints and chemical analyses', *Archaeology and History in the Lebanon* 34/35, pp. 68–78.

Von Den Driesch, A. 1976. A guide to the measurement of animal bones from archaeological sites, Peabody Museum Bulletin 1, Cambridge, Massachusetts.

Zeder, M. A. and Lapham, H. A. 2010. 'Assessing the reliability of criteria used to identify postcranial bones in

sheep, *ovis*, and goats, *capra*', *Journal of Archaeological Science* 37/11, pp. 2887–2905.

Zeder, M. A. and Pilaar, S. E. 2010. 'Assessing the reliability of criteria used to identify mandibles and mandibular teeth in sheep, *ovis*, and goats, *capra*', *Journal of Archaeological Science* 37/2, pp. 225–242.

Zöldföldi, J. 2011. 'Gemstones at Qatna royal tomb: preliminary report', in P. Pfälzner (ed.), *Interdisziplinäre Studien zur Königsgruft in Qatna*, vol. 1, Wiesbaden, pp. 235–248.

Zoubov, A. A. 1977. 'Odontoglyphics: the laws of variation of the human molar crown microrelief', in A. A Dahlberg and T. M. Graber (eds), *Papers presented at a symposium held on August 30 and 31 at the University of Chicago and submitted to the IXth International Congress of Anthropological and Ethnological Sciences, Chicago 1973*, The Hague, pp. 269–282.