

Storage and Food Control in the 'Amuq from the Late Bronze to the Iron Age: The Archaeological Evidence

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Abstract: Ongoing study of the pottery assemblage and its surrounding context in Area 4 at the site of Alalakh has again brought to light a phenomenon that is considered typical for the Iron Age I Levant: the construction of pits/silo installations in open areas. This phenomenon has been interpreted as a sign of ruralisation or insecure economic conditions, a possible marker for the political instability in the area during the 13th-12th centuries BCE. This article examines the similarities and differences between the examples from the Iron Age I in the 'Amuq and contemporary sites in the Levant, and also considers later similar installations from the Iron Age II. Keeping in mind the functions usually ascribed to these structures, this study also analyses the so-called 'Anatolian' tradition of grain storage in the Late Bronze Age and Early Iron Age in order to address the role of these installations in understanding possible food control strategies and their possible impact in the Levant.

1. Pits, grain storage pits and silos

Pits are one of the most common features in the archaeological records and are very often viewed as a disturbance/destruction of previous archaeological deposits, rather than as the remnants of human activity. Terminology employed in pit and pitting activity varies; here the neutral term 'pit' refers to negative installations of any size that may represent the bottom of a standing installation, an underground feature that does not protrude from the surface level, or an open cavity used to carry out specific activities that may involve fire and water. Once dismissed from their original function and left empty, all pits become 'trash-pits,' the most commonly employed term for defining their function in excavation reports. This article concentrates on the pit complexes in the 'Amuq (Fig. 1) specific to the transitional period from the Late Bronze Age to the Iron Age. Since the focus of this article is food control, i.e. food storage, only installations/buildings created exclusively for storage, namely to host large quantities of food over a long period of time, will be taken into consideration; this study will not analyse storerooms inside other buildings, short- or medium-term storage, nor consequently the ceramic containers related to these spaces.

Underground grain storage pits will be described following the now well-known terminology established by Borowski and common in the Levant (Borowski 1987): 'grain pit' indicates any installation with a capacity of up to 3000 l, considered storage for the average household, while the term 'silo' describes larger features that may pertain to collective consumption (Alonso, Bouby 2017). Both grain pits and silos are underground structures that can reach a depth of 2-3 m and are sealed at the surface level to avoid protrusions, thereby making them inaccessible from the floor.¹ These features are designed

¹ Ilan 2008: 96-97 also suggests that this is a way of hiding the grains from tax collectors and robbers.

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Referee List (DOI 10.36253/fup_referee_list)

FUP Best Practice in Scholarly Publishing (DOI 10.36253/fup_best_practice)

Marina Pucci, *Storage and Food Control in the 'Amuq from the Late Bronze to the Iron Age: The Archaeological Evidence*, © Author(s), CC BY 4.0, DOI 10.36253/979-12-215-0042-4.10, in Clelia Mora, Giulia Torri (edited by), *Administrative Practices and Political Control in Anatolian and Syro-Anatolian Polities in the 2nd and 1st Millennium BCE*, pp. 161-176, 2023, published by Firenze University Press, ISBN 979-12-215-0042-4, DOI 10.36253/979-12-215-0042-4

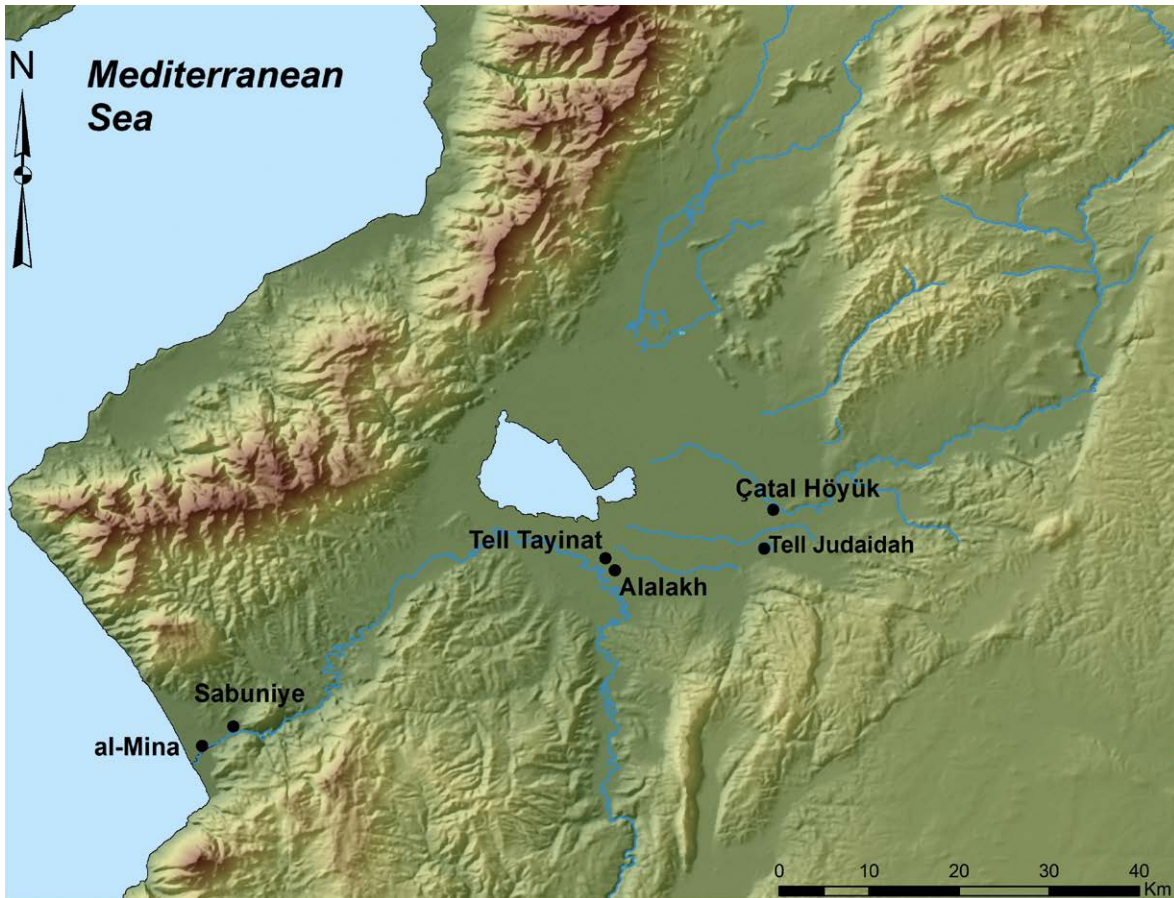


Fig. 1. General map of the 'Amuq with sites mentioned in the text (courtesy of S. Batiuk, CRANE Project).

to house grains and cereals in a sealed space; here the grain continues to transpire until high CO_2 levels prevent pests and the grain becomes dormant and stable (Whittaker *et al.* 2014: 198). Shallower pits, meanwhile, may represent the lower portion of containers that extended above ground, thus suggesting these installations were visible and possibly accessible from the surface. In this case, a mud brick lining visible at the top of the shallower pits indicates the presence of a mud brick structure built above ground level; the reduced width of the opening facilitated its closure. It is unclear how much higher the installation protruded from the ground level since all known examples in Syria are only partially preserved (e.g. the silo complex in Hama Phase H, Fugmann 1958: fig. 116,² which extended a maximum of 40/50 cm above ground). Above ground storage installations such as granaries and storehouses are suited for hosting easily accessible grains and are well known in archaeological and epigraphic sources both in Anatolia and Mesopotamia.³ These specific installations were not, however, identified in the passage from Late Bronze Age to Iron Age.

² Mud brick silos with upper side access are known in Jordan and Egypt (e.g. the 'Silo building complex' in Giza dating to the 18th century BCE).

³ On this topic cf. Adamson 1985: 7-8; Borowski 1987; and more recently Bang 2013: 391-392; Faist *et al.* 2012; Christiansen 2019.

When dealing with storage installations and archaeological remains it is important to consider a couple of *caveats*: as mentioned above, the state of preservation of the installations is poor, and the details of their construction and structural features provided in past publications can vary greatly. In fact, the focus on pits is a fairly recent phenomenon; just in the past twenty years attention has been drawn to the details of pit features in conjunction with analyses of their contents.

Identifying the function of a dismissed pit, i.e. a structure that was backfilled probably after its dismissal, is extremely difficult. Archaeologists have rarely collected samples from these installations (underground structures, silos, pits, fixed *pithoi*), particularly in older excavations; we can therefore only speculate about their specific contents even when their shape, position and lining clearly suggest a storage function, as they could have contained not only grains or other cereals but also fruit and vegetable products, or could have been used in salting meat and manufacturing silage (Reynolds 2011). Some scholars, such as Ilan, 'accept the grain-pit interpretation as the likely one for most, though perhaps not all pits, at all periods' (Ilan 2008: 88), whereas others prefer to rely on a specific analysis (phytoliths) or on the presence of insulating materials (chaff plaster, lime plaster) to infer the grain storage function. Makal (1954: 19-20) reports that in the villages of Anatolia in the 1940s and 1950s a house store 'consisted of wells dug in the ground. What remained over after grounding and selling the grains was put in these store for spring sowing; or if hard times come to be taken out and sold.' The reliability of these installations has also been proven in a recent experiment carried out in Lahav (Currid, Navon 1989), which has demonstrated that cylindrical stone-lined pits, simple pits and ash-lined bell-shaped pits were all excellent vehicles for storing grain.

2. Archaeological evidence in the 'Amuq during the 13th-12th centuries BCE

Extensive excavations on Late Bronze Age and Iron Age levels were carried out at three sites in the 'Amuq valley: Alalakh, Chatal Höyük⁴ and Tell Tayinat⁵. Whereas the village at Chatal Höyük was continuously inhabited from the Late Bronze Age to the Iron Age, Alalakh experienced a progressive and continuous decline during the 13th and 12th centuries BCE before its complete abandonment during Iron Age I. Tell Tayinat instead shows no evidence of occupation during the Late Bronze Age, but a 'new settlement' dating to the Iron Age I was built directly on top of the Early Bronze Age occupation (Harrison 2010). Alalakh and Tayinat, located approximately 3 km apart, both served as the main political centres in the region during the Late Bronze Age and the Iron Age; Chatal H., meanwhile, was a large village conveniently located on the Afrin that lacked a political role in the region.⁶

Pits and extensive pitting activity have been identified at all three sites in Late Bronze Age/Iron Age transitional levels, with slightly different functions and contexts.

At Alalakh the best preserved evidence is located in Area 4, the elevated area in the southern portion of the mound where a saddle had formed in the central part of the elongated mound (Akar 2019: 48). The latest phase of occupation in this area (Level 1) con-

⁴ In this article as well as in all previous publication by the same author the writing "Chatal Höyük" has been preferred to "Çatal Höyük" in order to keep the same writing as in the first publications by Robert Braidwood and to distinguish this site from the prehistoric Çatal Höyük located in the Konya plain.

⁵ This article adapts to the way "Tayinat" has been recently written in Turkish and English academic papers instead of "Ta'yinat", employed in the first publications on the site.

⁶ For the history of excavations at Tayinat and Chatal cf. Pucci 2019: Ch. 1; Harrison 2009; for Alalakh, see Yener 2010: 3-4.

sists of very few structural remains, an external floor and several pits (Fig. 2, top left); these were simple cuts dug into the surface and then filled with various kinds of deposits and materials. It is worth pointing out here that large containers were placed in two of the pits: container AT01474 into pit 64.82.22 and container AT01717 into pit 64.82.12 (Fig. 6-7). The large storage container (AT01474) is a high jar with an ovular body and narrow opening and was found partially sunken into the pit; it has a maximum capacity of 200 kg of wheat and is almost impossible to move even when empty.⁷ Upon rediscovery, the vessel was still closed with a stopper made of unbaked clay (Akar 2019: fig 2.52) and the opening of the vessel was slightly higher than the external surface from which the pit was dug, thereby confirming that the vessel was unmovable and accessible only from the top. The second vessel (AT01717), a large jug with a squat ovoid body and one handle, is a container more suitable for liquids than for cereals and has a capacity of 15 l. Both vessels (Fig. 6-7) found in this phase's primary contexts demonstrate a shape and typology that match vessels found *in situ* in Phase Vb at Tell Afis Area E (Venturi 2020),⁸ that is the last Late Bronze Age phase at the site, dating to 1250-1180 BCE (cf. Venturi 2020: 226). Upon rediscovery the other pits were still filled with ashes (64.94 L8 and L5), or with different groups of artifacts such as metal fragments (64.84 L11) or beads and astragali (64.94 L5). It is difficult to understand whether the objects were discarded in the pits after they were no longer being used for their original purpose, or if the pits were created to store these specific objects for future reuse. No plaster or technical finishing on the internal surface of the pits was observed, and their depth varies greatly: ranging from 1 m to 60 cm when calculating the preserved parts, or 1.40 to 2 m if calculating to the average elevation of the preserved plastered floor (Cx048). Their diameters range from 1.30 m for the smaller ones to 2.80 m for the larger ones. Here it is also difficult to be certain of their function as storage pits; however, the *pithos* inserted into the pit may have in part fulfilled this specific function.

At Chatal Höyük (Fig. 2, bottom left) archaeological evidence belonging to the transitional period from the Late Bronze Age to the Iron Age was identified in two areas (II and V) at opposite sides of the mound. In both areas circular pits were identified: Area II offers a broader excavation extent and a more comprehensive general context, while Area V contains the best-preserved pit. The structural elements of Level II-11 consist of several pebble floors and mud brick silos (Haines 1971: 13-14 and pl. 29c), an unclear mud brick curved wall, and patches of walls. The pebble floor was employed both for paving for the bottom of the silos and for covering their external surfaces. The curved wall, located in the southwest part of the excavated area in N-13, probably belonged to a larger round structure with a pebbled floor, visible above ground level. Haines states, 'whether the pits belonged to this level or originated in the level above is not certain' (1971: 13); however, at least two of the four pits were covered by the pebble paving of the following period, therefore it seems very likely that these pits/silos were used in this level. These pits are characterized by circular cuts into the archaeological deposit with a diameter ranging from 2.5 m to 3m, a mud brick lining, and a depth reaching 1.5 m.⁹ The mud brick superstructure protruded slightly from the floor level and tend-

⁷ Capacity has been calculated with the software Pot Utility (Archane Project) for the vessels. Size and capacity of the pits has been calculated only for the sites where depth and diameter were provided.

⁸ In particular for the jug AT1717.1, cf. Venturi 2020: pl. 43, nos 5 and 7; for jar AT1474, cf. Venturi 2020: pl. 46.

⁹ This measure was calculated thanks to several notes retrieved in the excavation journal from the field and archived at the Oriental Institute Museum.

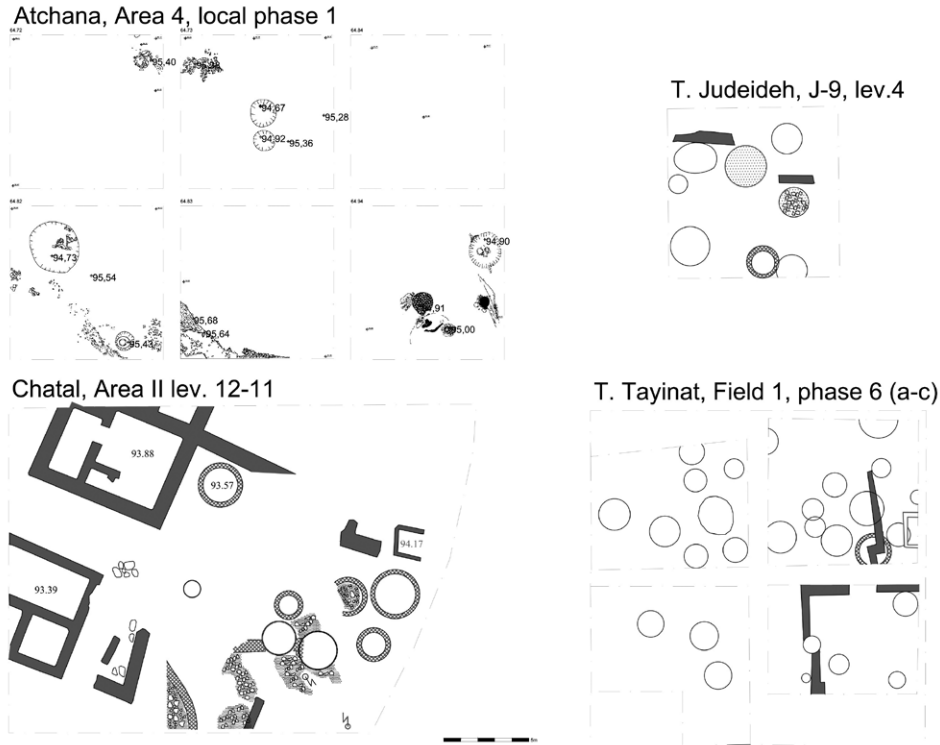
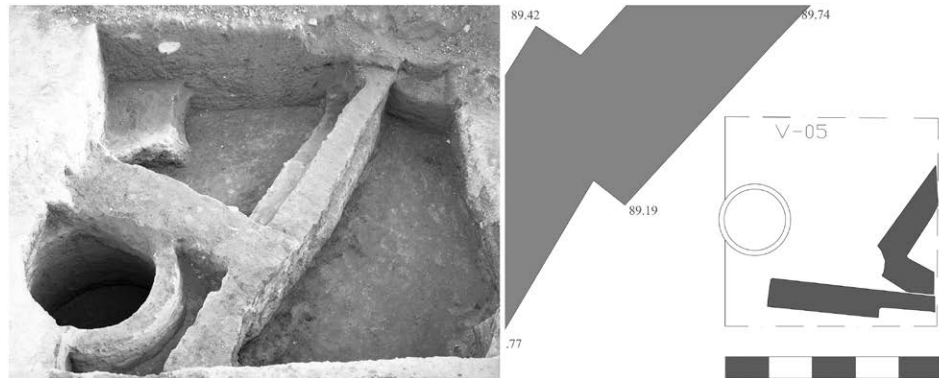


Fig. 2. Late Bronze Age/Iron Age transitional levels in the 'Amuq sites with evidence of grain storage pits. From top left to bottom right: a. Tell Atchana, Area 4 phase 1. Redrawn from Akar 2019: fig. 2.46; b. Tell Judeideh, J-9 from Haines 1971: pl. 65; c. Chatal Höyük Area II, from Pucci 2019; d. Tell Tayinat Field 1, from Welton *et al.* 2019: fig. 3. All scaled to the same dimension.

ed to narrow the opening of the pit, which is clearly visible in the left silo in Fig. 5. The bottom of the silo was occasionally paved with pebbles or, in other examples, with simple clay plaster (the presence of chaff could not be determined). The average volume of these structures ranges from 500 kg to just over one ton of wheat. The architectural use of this area during this level differs greatly from the previous one (II-12): a single large structure with massive walls and storerooms was subsequently replaced by an open pebbled area, again with storage facilities. This macroscopic change probably caused Haines to assign this structural phase to the Iron Age I (Phase N in the 'Amuq sequence): the change in architecture could correspond to a change in cultural phase (from Late Bronze Age to Iron Age), which was generally observed in the material culture already during the excavations. In analysing the material culture of the *loci* from this level, however, it has become clear that the typical marker for local Phase N, i.e. large quantities of painted decorated pottery, was absent in this assemblage. Thus, this level still belongs to the Late Bronze Age (Phase M in the 'Amuq sequence). The *loci* belonging to this period represent three different archaeological contexts; when analysed separately, each pottery assemblage (cf. Pucci 2019: 172-179) provides a general coherent horizon that has been ascribed to the Late Bronze Age II. The pits were mostly filled with debris when the whole area was levelled and rebuilt.

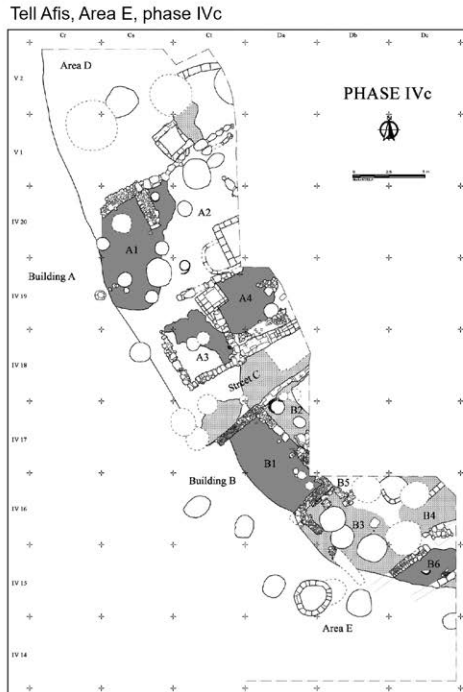
Fig. 3. Chatal Höyük Area V, plan and photo of level 5 with large silo.



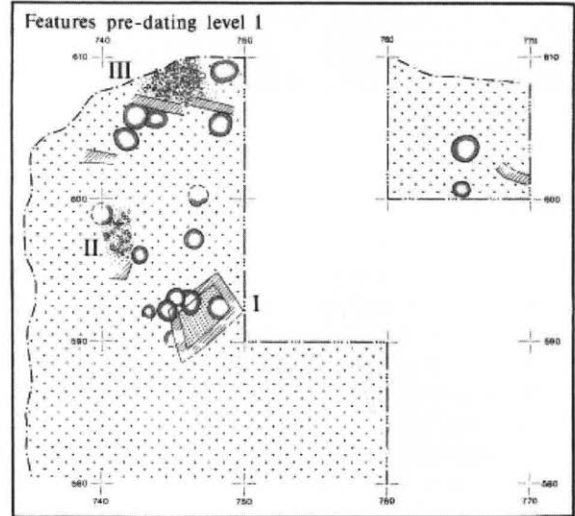
A similar situation is evident in Area V of the same site (Fig. 3), where in the 5 by 5 m square the remains from Level V-5 include two walls and a well-preserved pit with a mud brick lining and lime plaster on its bottom. This installation is preserved to a depth of approximately 2.5 m for a top width of 1.60 m, and the brick lining protrudes approximately 40 cm from the surface. Similar to the examples from Area II, the edges of the pit are approximately 20 cm thick and its volume is approximately 400 kg of wheat. The mud bricks are not always easy to distinguish and the general context of this installation is unclear – even the two walls identified in the same level are fragmentary and their alignment is uncertain. The surface level to which the installation should belong has been identified only adjacent to the pit itself and does not guarantee coexistence with the two walls. The whole pottery assemblage from this level (Pucci 2019: pls 144-146) belongs to the latest phase of the Late Bronze Age (M-Late at Chatal H.), and it is sealed by a floor with an inventory (V-04) ascribed to the end of the 12th century BCE due to the complete vessels found on it. It is therefore contemporary with Level 11 in Area II.

No samples or specific analyses were carried out on the filling of the pits, however when reporting the excavations in Area II, Braidwood writes in the field notes that this area could be interpreted as a ‘sort of a barnyard if these wells are taken to be grain storage pits’ (19th March 1935, field notes). The size and depth of these mud brick-lined pits in both areas is similar and appears to point to a proper underground silo, complete with a mud brick lining to isolate its contents and possibly a mud brick lid. Shape, context, technical features and size all seem to confirm Braidwood’s hypothesis that ascribes them to a grain storage function. Consequently, the ones identified in Area II would point to an open common area employed for storage and situated close to the domestic structures located to the north. Based on the size of the pits, they seem to be a domestic reserve rather than storage for collective use.

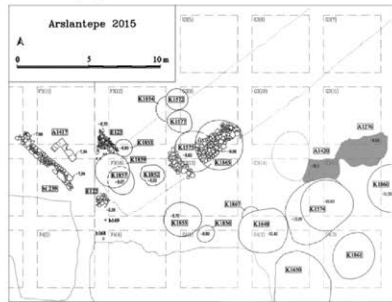
In Area Field 1 on the acropolis at Tell Tayinat (Fig. 2, bottom right) the Canadian team brought to light several phases (FP 6-5) characterized by pitting activities (Welton *et al.* 2019). Uncovered here is a series of large storage silos dug into the remains dating to the 3rd millennium BCE. During Field Phase 6 at least five large circular pits were identified, some of which were constructed with a lining of mud brick (e.g., G4.56:279, 288) almost identical to the ones identified at Chatal H.. Numerous smaller pits are interspersed between the large silos; a few of these contained concentrations of non-perforated, cylindrical clay loom weights and other artifacts associated with textile production, which is similar to the pits at Alalakh with specific groups of finds in them. Diameter sizes of these installations during Phase 6 range from 2 m to



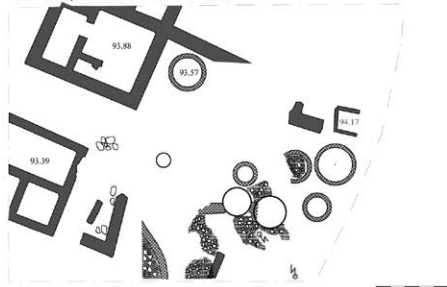
Tille Hoyuk, predating lev. I



Arslantepe, IIIb



Chatal, Area II lev. 12-11



1.5 m for those lined with mud brick (calculated from the plan in Welton *et al.* 2018: fig. 3), and during Phase FPSa they reach 2.6 m. Their depth reaches 1.5 m according to the mud brick layers visible in Welton *et al.* 2019: fig. 4. Sparse mud brick walls were also found in this level in connection to the installations, as if the group of installations were related to some ephemeral domestic structures. Pottery material collected in the silo and in the filling above the surface has led archaeologists to ascribe these phases to the 12th and 11th centuries BCE, (cf. Table 1 in Harrison 2021). Although like in Tayinat the contents of the installations were not preserved, palaeobotanical analyses on these phases (Welton *et al.* 2019: 318) has revealed a large presence of free-threshing wheat and barley, which could point to the type of food stored in the silo.

At both Tayinat and Chatal the silo phase on the mound disappears during the second half of Iron Age I and is replaced by either monumental architecture (Tayinat) or by a dense domestic neighbourhood (Chatal). At Alalakh the site was almost completely abandoned and the pitting activity probably did not last more than one gener-

Fig. 4. Chatal Höyük Area II with silos (compared to Tell Afis, phase IVa (from Venturi 2020: pl. 13); to Arslantepe III (plan from Manuelli *et al.* 2021: fig. 7).



Fig. 5. Mudbrick structure of grain storage pit in Chatal Höyük, Area II.

ation (see Montesanto, Pucci 2019-2020, for the Iron Age presence on the northern part of the acropolis).

The third site excavated by the Oriental Institute, i.e. Tell al Judeidah (Fig. 2, top right), contains little evidence for this specific period; the area is limited to a ten by ten surface, but it is possible to point out the evidence in one specific square of the mound: J-9. Here Level 4 yielded at least one occupation phase with six large pits lined with mud bricks and/or with stones connected to a few sporadic walls (Haines 1971: pl. 52a), a context very similar to the ones in Chatal and Tayinat. However, a precise dating for this level is still a work in progress. Haines ascribed them to Phase O, i.e. Iron Age II-III, however the pottery and materials from these contexts have not yet been analysed.

In general for the Iron Age I the 'Amuq provides a homogenous phenomenon of pitting activity that spans from the end of the Late Bronze Age (Alalakh and Chatal) to the very beginning of the Iron Age (Tell Tayinat), i.e. from the mid-13th to the end of the 12th century BCE or slightly later. Size, technique of the grain storage pits, location and contexts all appear to indicate a homogeneous phenomenon, which sees the use of pits to store grains on a long-term basis (at minimum for the winter season), possibly as a backup in case of drought, or for seeding and fodder. The capacity of the grain-storage pits, all well under 3 tons, points towards a domestic use of these installations and not to a centralised system of collecting food. At Chatal, Tayinat and Judeidah the mud brick lining appears to be a common feature along with its location in an open area inside the mound that was, at least in Chatal, still walled. In terms of chronology, the evidence at Alalakh seems to be the oldest example (second half of the 13th century BCE); this may represent the first phase of the site's decline, which goes hand in hand with the need to store grains inside the settlement rather than near the farms. The presence of a *pithos* (the typical container for medium-term storage) embedded inside a pit may indicate that the *pithos*, usually kept inside the buildings, was now inserted into the pit to hide

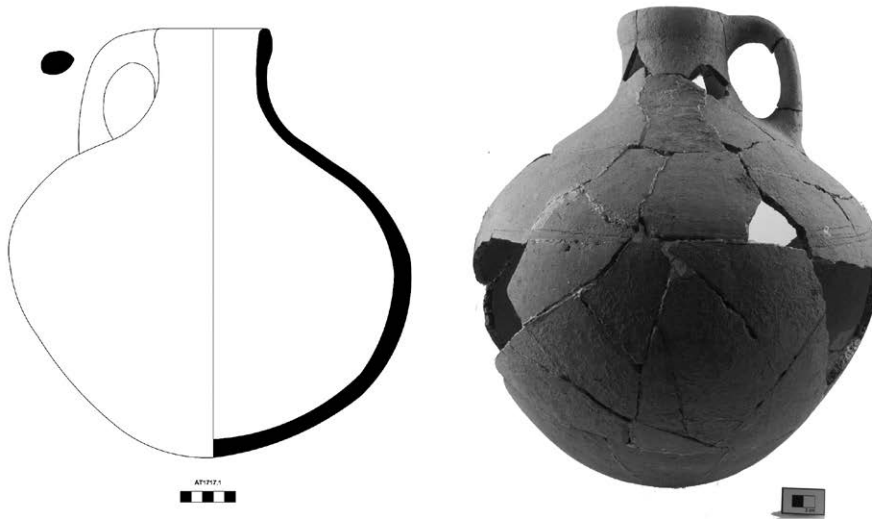


Fig. 6. Alalakh, storage jar (AT1474) found *in situ*, Area 4 (Horowitz 2019: 507, pl. 7.3).

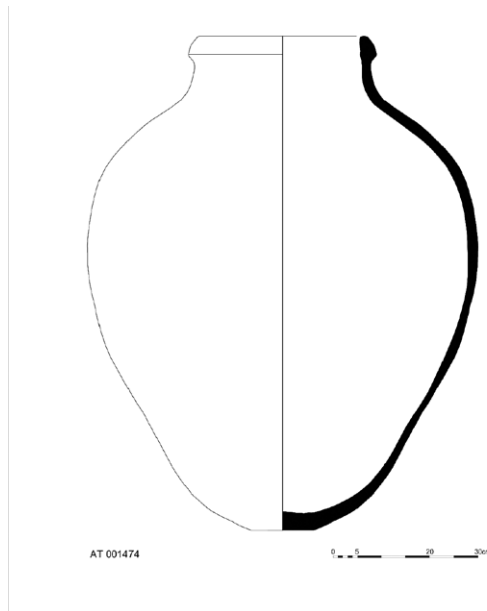


Fig. 7. Alalakh, photo and drawing of *in situ* jug, Area 4, Alalakh AT1717.

or protect it, but it was not yet a proper grain-storage pit like the ones appearing in Tayinat and Chatal a few years later. It remains to be seen whether the other smaller pits containing specific artifacts were intended to be trash disposal pits or, more probably, smaller storage pits for specific artifacts that were used in the open area; in the case of the latter, the metal fragments could be recycled, and the loom weights were ready to be used in portable looms along with other tools for textile work.

According to this reconstruction, all settlements in the 'Amuq would become sparsely occupied with large open common areas employed to carry out domestic activities and the region would be interspersed with small villages based on an economy of subsistence.

When dealing with the passage from the Late Bronze Age to the Iron Age, I have suggested that the presence of grain storage pits inside the settlement already during the second half of the 13th century (Pucci 2020a: 136), together with the ruralisation of the settlement, is a clear indication that the region underwent a period of economic difficulty. The palaeobotanical analyses carried out on the Iron Age I levels at Tell Tayinat appear to support this hypothesis (Welton *et al.* 2019: 319); the comparison between the palaeobotanical samples belonging to Iron Age I in Tell Tayinat (12th-11th centuries BCE) with those from Alalakh Phase IV (14th century BCE) points to a reduction of the agricultural catchment area through the abandonment of arable fields, which were left uncultivated during the 13th-12th centuries BCE. This, together with the now well-known references to abandoned orchards around Alalakh in the letters from the Urtenu archive at Ugarit,¹⁰ confirm a period of agricultural instability in the 'Amuq, particularly in the southern 'Amuq plain. Assuming that the brick-lined pits were grain storage installations intended for long term storage, i.e. they were sealed in autumn and reopened only in spring,¹¹ they cannot be interpreted as the typical 'winter storage' of a household but rather as a 'safety' deposit, a way to face possible difficulties arising from political or climatic instability or to ensure enough seeds were stored for the next season.

This phenomenon of pitting during the transition from Late Bronze Age to Iron Age is well known in the whole eastern Mediterranean area (see Ilan 2008 and Venturi 2015 for a general overview of this phenomenon). Fig. 4 provides a comparison of the examples from the 'Amuq with neighbouring contemporary sites located in different environments; the situation seems very similar both in inner Syria (Tell Afis Levels Va and IV c-a dating from the end of the 13th century to the mid-11th century BCE)¹² and in Anatolia (Tille Höyük Pre-I level dating to the 12th century).¹³ At both sites grain storage pits – lined with mud brick, stone or chaff – were found to have replaced a densely built urban environment; size, location and depth of the features (where available) are very similar to the ones identified in the 'Amuq, mirroring a domestic use of grain pit storage in a sparsely populated settlement and, most likely, in a scarcely centrally administrated site. As demonstrated in the examples from Hama, the knowledge of using grain-storage pits with specific technical features was well rooted in inner Syria, and was a technique employed probably without interruption in the countryside and out-

¹⁰ Letters I-7.2 (for the orchards) and I-7.6 (for plantations) in Lackenbacher *et al.* 2016. Cf. also Pucci 2020b.

¹¹ For grain storage pits to function, the contents must be sealed and not reopened for a long period in order to build the necessary vermin-free atmosphere inside.

¹² Venturi 2020: 21, pl. 91.

¹³ Blaylock 2016: 418 (for the dating) and Blaylock 2009: 121 and fig. 5.11.

side densely populated settlements.¹⁴ The intensification of these features during this period already strongly diminishes during Iron Age I and is replaced at some sites by a different 'communal' storage installation: the silo.

3. Looking ahead: Iron Age II-III storage installations in South-east Anatolia and inner Syria

Castellano (Castellano 2018) clearly illustrates several sites during the Iron Age II and III in Anatolia with large underground silos, which have features in common with the grain-storage pits, such as their stone lining, mud brick lining and plaster, and their location inside the settlement; they greatly differ, however, in dimensions. At Kınık Höyük operation C two large stone-lined and chaff-plastered silos were identified inside the settlement next to the fortification wall of the city, and were in use in from the 10th to 8th centuries BCE before being dismissed for a long period of time. The structures with an elliptical shape, a diameter of approximately 8 m, and a depth of 2.5 m surely belong to the group of large storage installations, i.e. silos. According to Borowski, these structures are intended for use on a communal basis and are no longer related to a single household; they may suggest a centralized organization of agricultural production and field exploitation. The examples from Kınık, in particular, still bear traces of the wooden beams employed to support the roof and to anchor it to the sides, providing a reliable reference for the general dimensions of the silo itself. Similarly, far to the south-east at Tille Höyük large-scale mud brick-, stone- or chaff-lined silos were identified in Levels IV and V (Blaylock 2009: 121, figs 6.29 and 10) and date to the 9th century BCE. This tradition of large-scale storage installations continues up to Level VII (8th century BCE): here the silos are chaff-faced and show burnt traces and ash layers on their interiors (a technique employed to clean the pits of vermin and parasites). Remains of seeds confirm their use as grain storage. The same phenomenon appears at Kilise Tepe (Heffron *et al.* 2017), where in the topmost Iron Age levels several large storage installations, stone-lined with remains of phytoliths, were identified in the central strip (J-L 14) on three surfaces 3-1 dating to the 7th century BCE (Dee *et al.* 2017). P09/55 in particular is a rectangular pit 3.5 m long and 2.5 m deep (35 m³) dug into the surface and most probably employed as a large grain commodity (Heffron *et al.* 2017: plan 25). Aside from several other small silos (such as P07/15), no other architectural remains were found in the same area. Similar large-scale installations were identified at Tell Tayinat: still in Field I but during FP 4, a squared mud brick-lined installation was located in the same area where grain-storage pits had been previously identified; its dimensions are very similar to the Kilise Tepe examples (Welton *et al.* 2019: fig. 10) but it predates them (10th century BCE, cf. Harrison 2021).

The evidence from Arslantepe is less clear: the pits identified in Level IIIb and ascribed to the Iron Age I-II range from simple grain storage pits to a silo. In particular, some of the round and oval pits (such as K1574) that measure 4.5 m long and almost 2 m deep surpass the standard size for household activities. The pit dated to the 11th century BC (Manuelli *et al.* 2021), fig. 7 shows traces of chaff plaster and is connected to an open-air surface that reaches the mound wall; but when compared with the evidence from Late Bronze Age/Iron Age levels at Alalakh, Chatal Höyük and Tille Höyük, the dimensional differences are not striking (Fig. 4), while the absence of a clear lining makes them different from the Anatolian examples. If this evidence is confirmed

¹⁴ Finkelstein relates the use of grain storage pits to the process of sedentarism and nomadism, which does not apply to the Iron Age in Northern Levant.

as a silo, the example from Arslantepe together with that of Kınık would represent the first Iron Age communal silos. Looking further south, a large-scale stone-lined grain silo was identified in the southern Levant at Megiddo Level III; dating to the end of the 8th century BCE, the structure reaches a capacity of 346 tons of grain (Lamon, Shipton 1939) with two internal staircases that reach the bottom. It is difficult to ascertain a direct connection between these large silos and a substantial change in the economic organization of the sites; however, we can postulate that when sites such as Tell Tayinat reached their peak in urban development and relevance, these installations were no longer located on the acropolis and, as Ilan (2008: 99) suggests, were probably replaced by other storage methods that were less arduous, less prone to spoilage, and could be used in more stable political circumstances.

4. Looking Back: the Anatolian tradition and state-controlled storages

The morphology of grain storage installations is said to be linked to cultural, technical and technological factors (Prats 2017), while methods of grain storage are clearly related to agricultural exploitation, as well as environmental and economic factors. The technique of grain pit storage has been known in the eastern Mediterranean since the Neolithic period: its use varies in intensity, but it was probably available and known without interruption. The shape of the pit (cylindrical in the aforementioned examples, or ellipsoidal, spherical, or bell-shaped in some other southern Levantine examples) does not play any role in the examples given above, as we find cylindrical pits during the Iron Age from Anatolia down to the southern Levant. The dimensions of the grain storage facilities, and consequently the food control system that these installations may refer to, is in fact a matter of debate that involves two geographical areas very different in terms of agricultural potential: Anatolia and the Levant (including north-western Syria). Castellano (2018) suggests that the tradition of building underground grain silos might be connected to the Anatolian or Hittite tradition of underground storehouses or silos, which is well documented in the archaeological evidence. As a matter of fact, according to the archaeological evidence in Anatolia, underground structures or silos were definitely in use both in the capital and at Kaman-Kalehöyük already in the Old Hittite period (16th century BC). In Boğazköy the well-known underground silo complex developed from an underground structure with rectangular spaces, which had completely burnt down at the end of the 16th century BCE (Seeher 2008; Seeher 2017: 57-69; Diffey *et al.* 2020), into a series of rounded stone-lined silos located on the Büyükkaya, over a period of time spanning from the 16th to the 14th centuries BCE. The palaeobotanical analyses carried out on the silo-complex have clearly shown that the quantity of stored materials was considerable (7087 tons), but the quality of the stored grains, in an advanced state of processing, was reduced because it included large quantities of weeds; each individual silo collected grains and cereals from a single area, suggesting that each silo was used for a specific group of fields. Their analysis also revealed an agricultural model based on a low input management and the use of traction in the fields, but there was low manuring and almost no hand-weeding. Thus the stored crops included large quantities of weeds and indicated minimal exploitation of the fields. Both the silo-complex and the later single silos in the Hittite capital are considered a necessary facility to overcome the low productivity of the fields, caused by low exploitation and natural environment (Schachner 2009: 11). Significantly in order to survive on the Anatolian plateau, the presence of a communal silo was the only way to guarantee the minimum seed supply for the next season. The appearance of these large silos in the main towns already during the Old Hittite period, such as the large storage

silo RS at Kaman-Kalehöyük Level IIIb (cf. Fairbairn, Omura 2005), mirrors the need of a growing community to overcome its unstable geographic and climatic setting; in other words, just as small villages such as Demirci Höyük built several grain pit storage facilities in the village centre during the third millennium,¹⁵ the larger communities would build larger silos for the whole town during the second millennium BCE.

Staple products are therefore central in organising the political economy in a 'climatically and politically volatile scenario' (van den Hout 2007) and have been studied in relation to the taxation system that primarily aimed at granting sowing seeds (d'Alfonso, Matessi 2021: 136) and in part fulfilled the Hittite Empire's 3 year plan for cultivation. The retrieval of the goods would be carried out by an administrator (AGRIG), keeper of the royal storehouses, that was located not only in the capital but also dispersed in various towns under Hittite domain (Singer 1984; d'Alfonso, Matessi 2021: 136). The creation of new storehouses also in the newly established provinces might have been part of the Hittite imperial policy (Marchetti (ed.) 2020: 267-268) and consequently could be considered part of the more general economic policy of the Hittite Empire. Scholars tend to associate these 'seal houses' with the underground grain storage silos (Klinger 2021: 627-628¹⁶) that have been identified at Boğazköy and elsewhere. These seal houses were not centralised; a few urban centres or Hattuša alone would not have served as selected storage locations, but rather grains were collected in each region or subregion accordingly.¹⁷ Are the large grain silos then a marker for this kind of policy? From an archaeological point of view, only a few observations may be added in this regard. The available archaeological evidence points to the construction of large silos or underground structures inside settlements located in central Anatolia (cf. Castellano 2018: fig. 12) mainly in the 16th century BCE, i.e. well before the Imperial phase of the Hittite Empire. All silos known at this point seem to fall into disuse by the 14th century BC, leaving a gap of approximately three centuries before the first (possible) re-appearance of a silo at Arslantepe. Moreover, during the 14th and 13th centuries BCE silos were identified only in the capital on the Buyukkaya, and these were much smaller than the silo complex of the 16th century (Seeher 2017).¹⁸ Thus, it seems that when the empire was growing and consequently would have been able to collect more surplus, the facilities to host this surplus (if correctly identified as silos), were less numerous than a century earlier. Additionally, no traces of any kind of control or administration (tokens, sealings, stoppers) were ever found in the areas next to the silos (neither in the Late Bronze Age nor in the Iron Age), a practice that it is well known in other communal buildings in Syria from the neolithic period (e.g. Sabi Abyad). On the other hand, following Fairbairn and Omura, the storing technique of the silo is identical to that of the grain storage pit,¹⁹ which exists in the area from the Neo-

¹⁵ Korfmann 1983.

¹⁶ There are some discrepancies with this identification: Fairbairn and Omura (Fairbairn, Omura 2005) identify these installations with the ÉSAG, i.e. traditional pit installation used to store grain (on this topic cf. also Cammarosano 2018: 119). One seal house has been interpreted in the lower palace Area C at Karkemish without any connection to silo or grain storage pits.

¹⁷ Cf. Diffey *et al.* (2020: 1220) suggesting that the Hittite state may have not chosen to centralise crop storage on such a large scale.

¹⁸ The granary at Maşat Höyük is not a storage pit but an above ground storage construction. The granary at Alaca Höyük still needs a comprehensive publication, but in this case it is also an above ground structure.

¹⁹ Only the covering with a wooden frame for the silo may possibly represent a slight technical improvement for large installations. The remains of hollows at the edge of the pit at Kınık as well as vertical beams probably used to support the roof are visible in the RS structures at Kaman-Kalehöyük.

lithic period and is strongly related to the dry farming and low agricultural productivity of Anatolia; these installations cannot be opened during the winter and may have only housed the seeds necessary to guarantee sowing or to face emergency situations. Their change in size, from grain storage pits to silo, took place already before the Old Hittite Period (e.g. Oymağaç)²⁰ and may be related to a growing community, new agricultural organisation, or to a communal based agricultural economy, rather than to an economically centralised reassessment. It is obvious that with the imperial organisation of the tax system these structures also became part of the new administration, but were apparently not implemented or developed.

Returning now to the evidence in the 'Amuq region, there are no archaeological remains to support the idea that the underground silo followed the Hittite political and military expansion as an imperial economic model. The geographical and environmental setting of the plain finds no comparison with the one on the highlands of Anatolia; the absence of silos would imply that there was no need to have 'stored grains' to compensate for volatile agricultural exploitation because the plain had and still has a strong, stable and highly productive agricultural output, and the traditional storage methods for cereals until that period (probably in non-centralised, above ground facilities, possibly also close to the fields) was maintained. It is however true that an AGRIG and a seal house is attested at Karkemish (cf. Marchetti (ed.) 2020: 267-268), demonstrating that this specific administrative system was also employed in conquered areas. The notion that this system is connected specifically to the construction of underground storage silos still needs to be clearly demonstrated.

The reappearance of the silo in Anatolia already during the 10th century BCE (Kınık Höyük, Arslantepe, and later at Kilise Tepe and Tille Höyük) confirms the existence of a local tradition aimed at compensating for local instability. By contrast, the grain storage pits common at the very end of the Late Bronze and Iron Age I and identified at all sites in the 'Amuq have been interpreted by many scholars (Gates 2013) as signs of ruralisation and political instability; they also belong to a tradition well known in Syria from the third millennium BCE (e.g. Hama). As soon as the settlements achieved economic stability and a well-defined urban layout by the end of the Iron Age I, these installations fell into disuse or, at the very least, were no longer built inside the towns.

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²⁰ Two large storage installations were identified at the site. The oldest one, a squared stone lined silo, is dated by Czichon and Yılmaz (2014: 340) to the Early Bronze Age. The second one, a silo with plastered walls, is ascribed by J. Richter (in Czichon *et al.* 2016: 38-39) to the passage from the Middle Bronze to the Late Bronze Age.

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