

THE DAILY GRIND AT TEL DOR: A TROUGH AND BASIN FROM AN IRON AGE I KITCHEN

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Introduction

Tel Dor is an important harbor site located north of Caesarea on Israel's coastal plain. The first round of excavations at the site was conducted during 1980–2000 by Professor Ephraim Stern of the Hebrew University of Jerusalem.¹ Area G, located in approximately the center of the mound, was excavated in 1986–1996 by the University of California at Berkeley under the direction of Professor Andrew Stewart. Excavation of Iron I material in Area G in 1992–1994, under the author's supervision, uncovered an at-least partially roofed Room 9795, belonging to local Phase 9. In the center of Room 9795, clearance revealed the puzzling trough-like installation L.9982 with the attached basin L.18224, which are the subjects of this essay (Fig. 1).²

The stratigraphy of the excavation unit in which the trough is located (square AI32) has been summarized elsewhere (Gilboa, Sharon and Zorn 2004: 35–36, Table 2). Local Phases 10–12 (a copper/bronze metallurgical center of the Late Bronze Age IIB through early Iron Age IA) are superseded by the construction of a large building that undergoes a number of floor raisings and wall additions while retaining its basic character over a period of about two centuries (Phases 9–6, late Iron Age IA to Iron Age IIA; c. 1100–900 BCE according to the conventional chronology). The trough installation belongs only to Phase 9. However, it should be noted that one of the few stone-paved floors in Area G was found adjacent to the trough, and that stone pavements continued to be used in this same room in Phases 7–8, along with a small mud-

plaster installation on the Phase 8 floor. Despite the lack of a trough installation in subsequent phases, the continued use of the stone pavements perhaps suggests some continuity of function in this area.

Trough Room 9795

Room 9795 (measuring c. 5.8 m north–south by 5 m east–west) is bounded on the south by W.9800, on the west by W.18048, and on the north by W.9262; the eastern limit is hidden in the baulk. This room is part of a building of undetermined size extending at least 14 m north–south by 9.5 m east–west. The floor in the western part of the room is partially stone paved (c. #12.90), while other parts are of dirt (c. #12.70); three stones were set into the floor on the east, forming a kind of tripod base. The room was destroyed in a fierce conflagration in which most of the burning was limited to the southern part of the room, with some spillage into Room 18242 to the west and the northern part of R18033 to the south. No evidence of burning was detected in the northern doorway into Room 9928. Fragments of fire-hardened ceiling were found collapsed on the trough and sloping to the west; it is unclear if the roof extended east over the entire room. While some restorable *in-situ* pottery was recovered in the room, much of the ceramic material was scattered about, suggesting breakage before complete destruction of the room. Gilboa has assigned Phase 9 to (late) Iron IA, with a conventional ceramic date of c. 1090–1050 BCE, or c. 975 BCE based on the radiocarbon results from Dor (Gilboa and Sharon 2003: Table 21; Gilboa, Sharon and Zorn 2004: 40, Table 2).

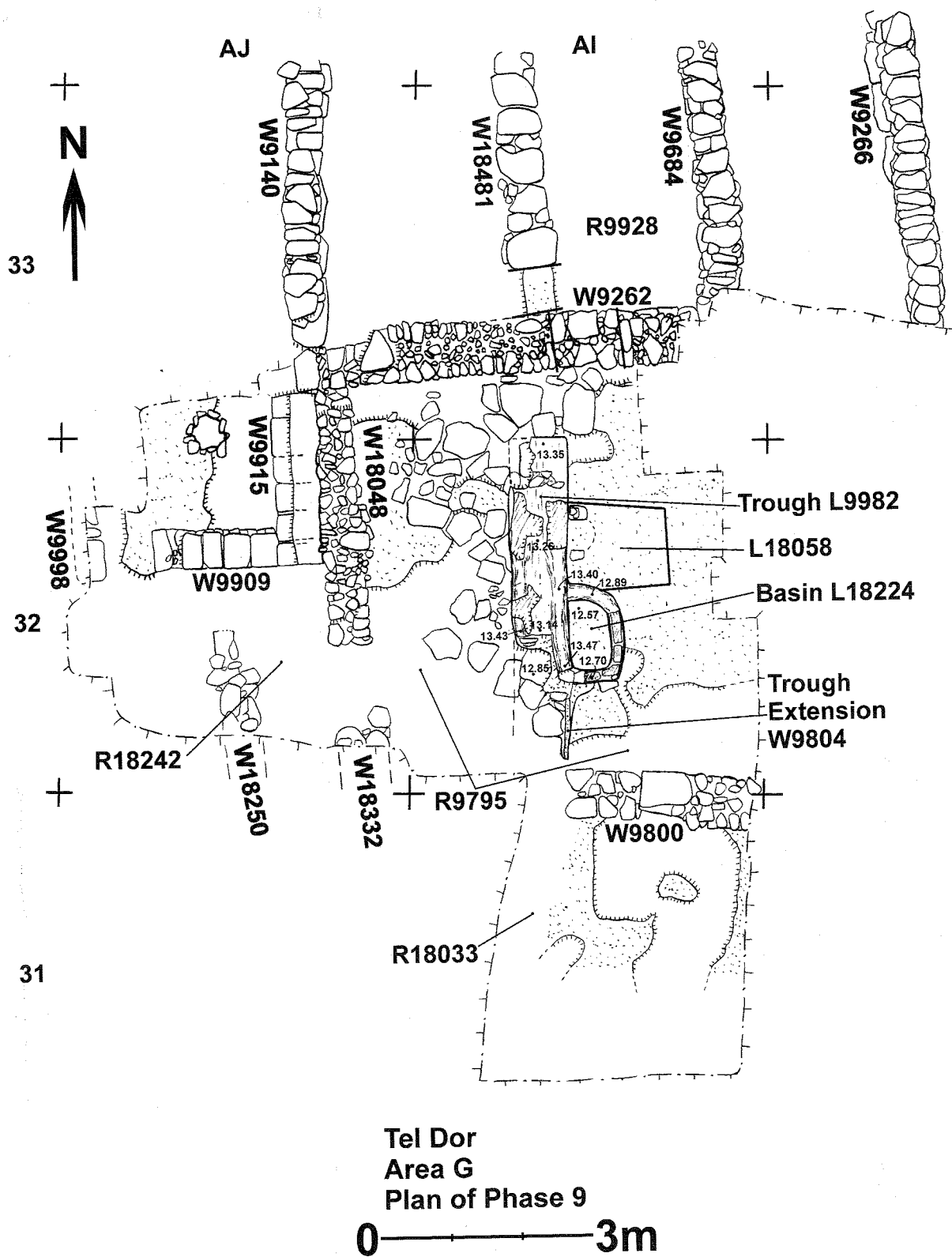


Fig. 1. Tel Dor Area G: Plan of Phase 9 showing general location of trough L.9982

Table 1: Distribution of Sherds in Room 9795

Type	Room 9795 East	Room 9795 West
Bowls	44	22
Kraters	18	4
Cooking Pots	4	0
Jugs	14	8
Pitchers/Flasks	11	1
Jars/Storage Jars	15	8
Pithoi	8	1

Finds from trough room 9795

Table 1 summarizes the data on the pottery recovered from Room 9795. Since the eastern and western areas are roughly the same size, the larger quantity of sherds to the east is significant. The



Fig. 2. Basalt grinding stone and fragments from vicinity of trough and basin

presence of cooking pots and almost twice as many jugs to the east suggests food preparation, while the larger number of storage vessels suggests perhaps that most of the food was also kept in this area.

One complete, basalt upper grinding stone, fragments of three upper or lower grinding stones (or querns), and the major portion of a basalt bowl were found in the vicinity of the trough (Fig. 2).³ Four of these originated in L.18058, in the corner formed by the trough and the basin, while one fragment came from L.18090, just north of the trough.

Description of the trough

Installation 9982 is a trough-like feature preserved to a length of c. 5.2 m, 1 m high and 0.8 m wide, with a central channel c. 0.30 m deep. The top of the northern quarter of the trough was partially removed by the construction of Phase 8 floors, thus it is best preserved in its central section. The trough was constructed in an *ad-hoc* fashion; for example, the northern preserved section was built upon a row of large stones partially sunk into the floor and covered with blackened clay. The rest of the trough structure was made up of pieces of mud brick, smaller stones, and packed clay, over which a thin layer of clay was spread to seal the installation (Figs. 3–7). The end result of this slap-dash construction was a ramshackle installation only recognizable among the general destruction debris of the room as much of its plaster surface had been hardened in the fire that engulfed the room. In the southwestern part of Room 9795, where the fire was apparently less intense, only part of the southeastern wall of the trough (Fig. 7, W.9804) was preserved, and it is possible that the trough extended even farther south into square AI31, where traces of it were perhaps recognized in the western section. However, an extension of the trough to the south would make the relationship with W.9800 problematic. If the trough did extend past W.9800, it would have been at least c. 6 m long.

Description of the basin

A low, semicircular basin, L.18224, c. 1.4 m long by 0.8 m wide on the exterior, was built against the center of the eastern face of the trough and sunk c. 8–10 cm below floor level. The lowest course of the basin wall was composed of mud bricks laid on

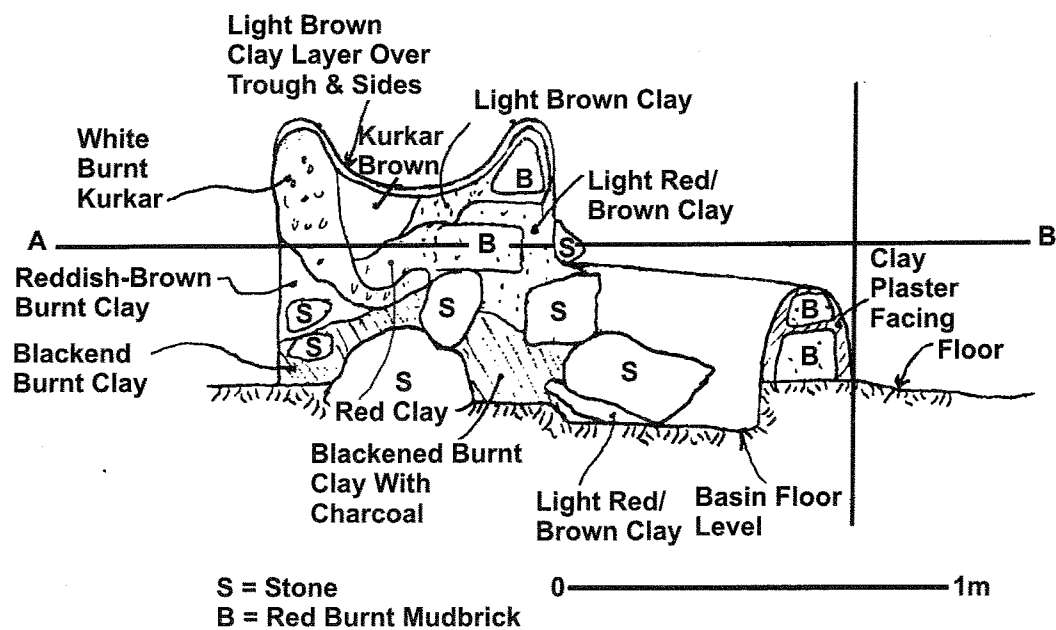


Fig. 3. Section through trough and basin, looking north

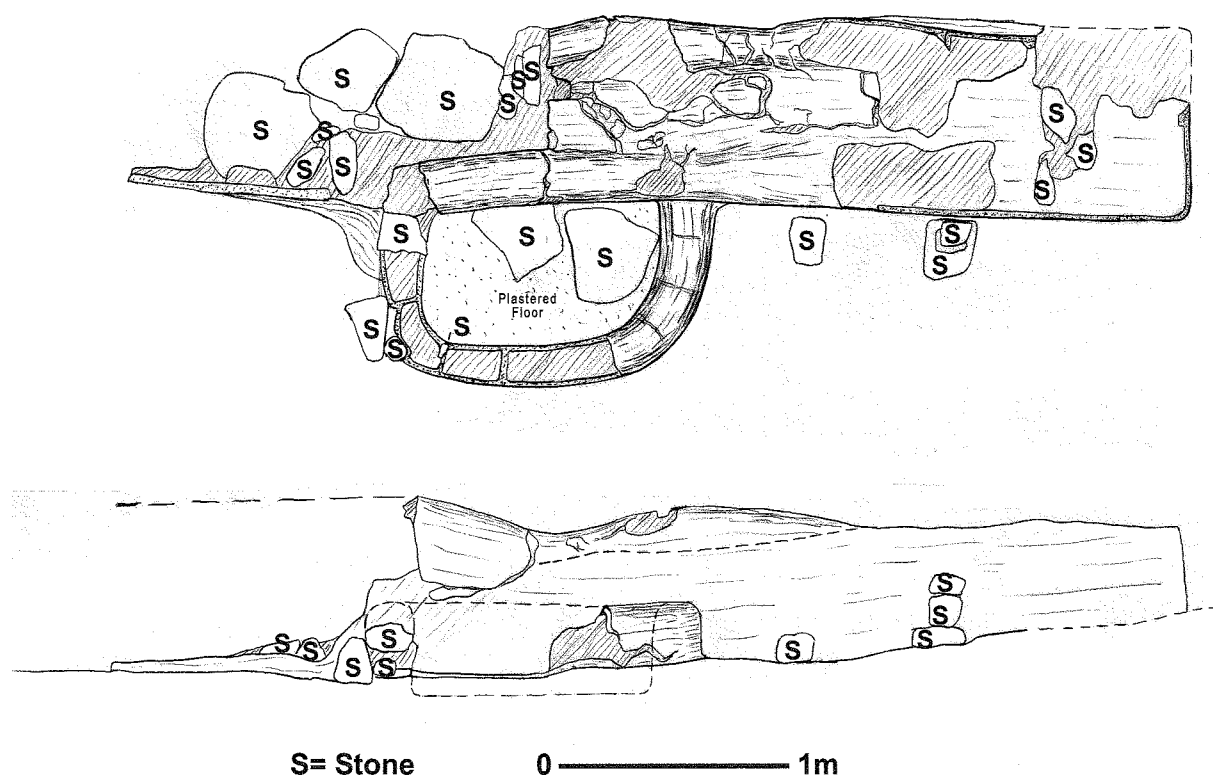


Fig. 4. Plan and elevation of trough and basin

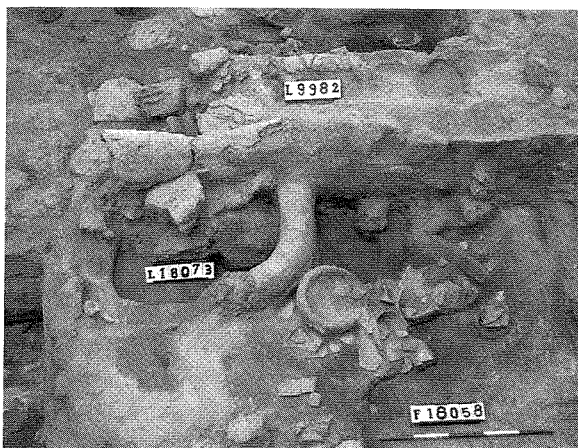


Fig. 5. Close-up of trough and basin during excavation showing in-situ pottery, grinding stone, and basalt bowl

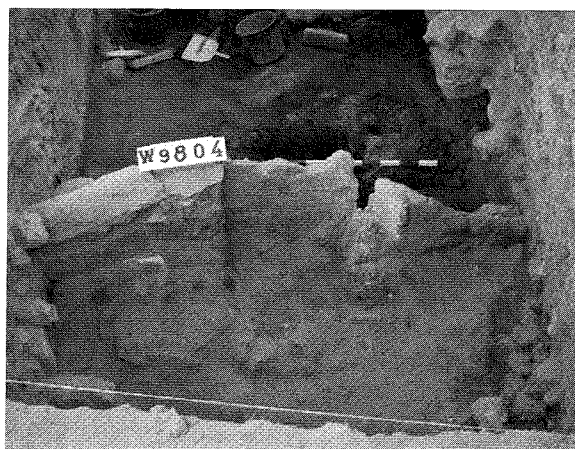


Fig. 7. The poorly preserved southeastern extension of trough L.9982, here labeled W.9804

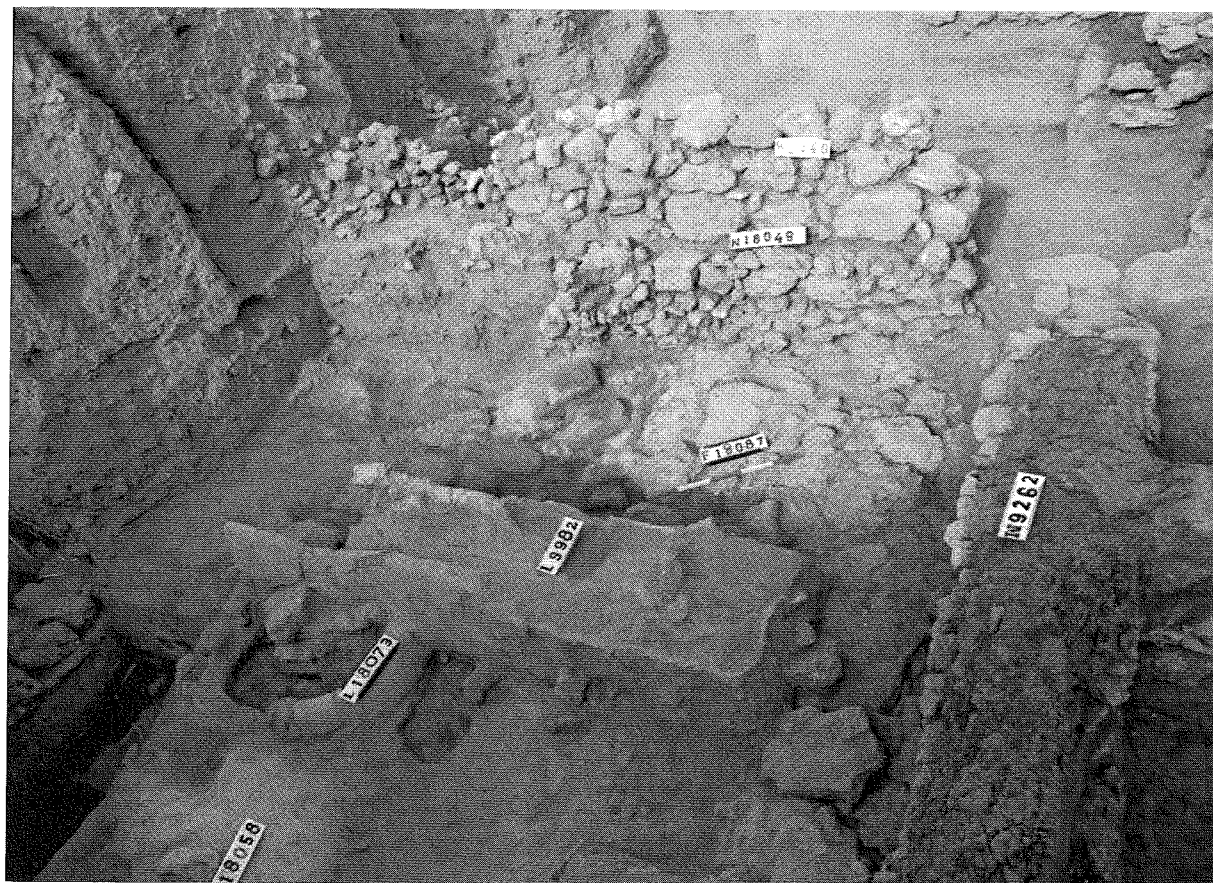


Fig. 6. General view of Room 9795 after excavation showing trough and basin

their long sides, while the narrowing upper course was made of small pieces of mud brick and small stones. This top course was only completely preserved at its northern end, where the basin wall reached c. 0.38 m high. The whole basin was plastered. Fragments of flat stones were found inside the basin sloping down from north to south, and the basalt bowl and complete upper grinding stone were found just outside the basin.

Purpose of the trough and basin

The presence of one basalt grinding stone and three fragments, as well as a basalt bowl, in close association with the trough, indicate that Room 9795 and its associated installations were most likely connected with the processing of cereal grains into foodstuffs. No ovens were found in the excavated portion of Room 9795, though of course they may be located just inside the eastern balk, or in adjacent unexcavated rooms. Based on the available evidence, the room was not likely used for baking. Beer brewing is also unlikely due to the apparent Canaanite disinterest in such beverages. Thus, the installations should be connected with the pre-baking processing of grains, that is, procedures involved in converting grain into flour and then into dough to be baked.⁴ Ethnographic investigations in the Near East and Egypt suggest that the following steps could have been part of that process (depending on whether the grains were free-threshed or hulled): sieving the already winnowed grain, hand cleaning, pounding in a mortar with pestle, a second sieving and hand cleaning, and finally grinding (Hillman 1984: 128–135, 138–139; Samuel 1989: 259–269; 1993: 279–280; 2000: Fig. 22.3). Thus, the question is exactly which steps in this process do the trough and basin represent? The solution can best be arrived at by examining parallels for both the trough and the basin in the realm of grain processing, and then integrating these observations into a single explanatory model.

However, a word of caution is necessary: the parallels available can be problematic. Egyptian reliefs are often conventionalized and typically do not show all the steps in a process, but only those deemed most important. The same is true of models in wood or clay, with the addition of a certain level

of abstraction to the figures and their tools. In addition, food-processing technologies change, and what may have been true in one period may not hold in another. Archaeological material can be improperly excavated and/or poorly documented. These caveats must all be taken into account when evaluating such comparative data in relation to the Dor trough and basin.

Trough Comparanda

First, the use of the trough as a mortar can be immediately ruled out, as mortars are round, narrow and low to the ground, and they must be made of stone or wood in order to withstand the pounding of a pestle. The trough is both too high and made of material unsuitable for pounding. There are, however, parallels to troughs, or raised platforms/benches in general, associated with grain processing from Egypt, through the Levant, and up into Anatolia and Greece. We will examine each of these in turn.

Egyptian parallels

Egypt provides a great deal of data on the manipulation of grain from plowing/sowing, through harvesting/winnowing, milling and conversion into bread or beer. The data come from reliefs, servant statues, and models found in tombs, as well as from actual excavated remains of food-processing installations. There were two basic types of grinding stations: querns placed directly on the floor or on a very low platform, over which a kneeling woman rocked to and fro (see below), and querns raised above the floor over which workers bent, rather than knelt. Over time, the standing installation seems to have gained favor.⁵

Reliefs

Tomb reliefs often provide the fullest documentation of the post-winnowing aspects of rendering grain into flour, although not every relief shows every step. The fullest representations depict workers sieving the winnowed grain, pounding it in mortars, hand picking and/or sieving the kernels, and grinding in a quern.⁶ Reliefs showing workers standing at raised grinding stations include those of the vizier Antefoker from the Middle Kingdom

(Davies 1920: Pls. XI, XIA), and the scribe and physician Nebamun of the New Kingdom (Säve-Söderbergh 1957: Pl. 22, p. 24). In the former, a woman leans, slightly bent at the knees, over a gently sloping table at the lower end of which is an attached basin for catching the flour. The latter relief is more abstract, showing a woman bent over what may be a mud-brick grinding installation (as at Amarna, described below). Both scenes also show work at a mortar, and sieving.

Tomb models

Egyptian tombs have provided many examples of bakery (or bakery and brewery) models, and statues of servants processing grain (Breasted 1948: 23, 37–42; Pls. 24, 36–38a, 39b, 40a?, 40b; Winlock 1955: 28–29, Pls. 22–23, 64–65). Statues are invariably of individual workers at, raised benches that are higher at the end where the worker stands, sloping downward. Sometimes there is a small depression at the end of the bench where flour could collect, but this is not universally depicted, so perhaps flour collected on the floor or in a container not otherwise depicted. In the models, multiple millers stand at what appear to be adjacent but individual benches, which cannot be said to form a single installation, or at double installations (Breasted 1948: Pl. 40b; Garstang 2002: 126–129; Figs. 124–126). Winlock's analysis of the Meket-Re' model presents a good example of the conventionalization of Egyptian depictions (1955: 25–29; Pls. 22–23, 64–65; Kemp 1989: 120–122; Fig. 42). The bakery scene shows mortar and pestle work, grinding (at single, parallel installations), working dough, and baking in ovens, but there is no rendition of the necessary steps of sieving and hand picking.

Excavated bench installations

Many examples of the raised-bench grinding installations depicted in reliefs, statues and models have been excavated in workmen quarters at Tell el-Amarna and Deir el-Medineh.

The examples recovered at Amarna were not initially recognized as grinding installations. Most examples were found in the front rooms of houses, though also in kitchens, constructed against one wall of the building. They were usually described by the excavators as box hearths, c. 0.30–0.40

m high, often divided into two or three compartments, with a very low plastered bin (wall c. 0.10–0.15 m high) attached along the length of the hearth.⁷ Later work at Amarna by Kemp identified these box-shaped installations as quern emplacements. These examples were square boxes built of mud bricks filled with stones and mud brick and topped by a layer of ash, the whole installation covered with gypsum plaster over the ash (el-Saidi and Cornwell 1986: 3, Figs. 1.2, 1.3; el-Saidi 1987: 5, Figs. 1.3, 1.5, 1.6; Bowmann 1995: 17–19, Figs. 1.11, 1.12).⁸ While preserved to a height of c. 0.40 m, it was clear from the impression made by one installation against the adjacent wall that it stood c. 0.35 m higher on the side nearest the wall.⁹

Similar installations were found by Bruyère at Deir el-Medineh. Here they were called kneading troughs, though the presence of grinding stones belies this suggestion (Bruyère 1939: 75–78, Fig. 24; 1953: 96–101, Figs. 28, 30).¹⁰ One example was preserved to 0.60 m at its high end, 0.40 m at its low end, and was 0.70 m wide. Each such installation was attached to one wall of the building, with a small space left for the miller to stand between it and another wall. Each one also had a small attached clay basin running the length of the installation. Such an installation has also been reported from Iron I levels at Beth-Shean (A. Mazar 2003: personal communication, quoted by Tim Fries (2005).

The material from Amarna and Deir el-Medineh indicate that grinding platforms stood, at their highest, c. 0.75 m, and were c. 0.80 m long and wide. The quern rested against the higher end and sloped down to c. 0.40–0.35 m. The flour then collected in a plastered receptacle with a wall typically 0.10 m high that ran the length of the platform. Apparently a single quern was the norm in such domestic settings.

What appears to be a model of two women standing at a similar installation from Cyprus has been interpreted as women kneading cakes, as suggested by the small balls set to each side of the installation (Karageorghis 1987: 16, Pl. I:1). However, if the model represents milling, not kneading, the basin in front of the table-like structure may be for collecting flour.

Levantine parallels

Mud-brick pedestals used as stands for saddle querns have been found at Ebla (Tell Mardikh) in Syria. The earliest examples originate in palace G, c. 2300 BCE, with others from building P4 of EB IV, and the western palace of 1800–1600 BCE.

In palace G, querns on raised platforms were found *in situ* close to the walls of at least three rooms (Dolce 1988: 39, Pl. VIII:1–3; IX:1; Ellis 1993–1997: 401; Matthiae, Pinnock and Matthiae 1995: 106–107, 109; Curtis 2001: 202). Millers would have stood or knelt with their backs to these walls and rocked to and fro facing the center of the room. Some of these platforms have low areas ringed by narrow walls attached to their outer faces, probably to collect the flour. Two of these rooms have depressions in their floors, possibly to hold mortars for pounding the grain. At least one of the rooms had a raised shallow trough.

Public building P4 contained one room with a large number of grinding stones and querns associated with a bench near the eastern wall of Room 5220 (Matthiae 1993: 629–633; Marchetti and Nigro 1995–1996: 14–16, 18, Figs. 1, 3). Against the northern wall was a raised bench with three

partitions against adjoining the wall and a wider surface in front of the partitions. In Room 5021, a raised bench near the northern wall had two *in situ* querns, while three grinding stones were also found in the room. A bench with a raised edge extended outward from the southern wall. Against the southern side of the bench was a plastered area surrounded by a low raised wall.

One room in the Western Palace contained 16 querns *in situ* on a raised bench that ran around three sides of the room, leaving just enough room for the millers to stand or kneel against the wall (Dolce 1988: 43–44, Pl. IX:2–3; Matthiae, Pinnock and Matthiae 1995: 173; Curtis 2001: 202). The flour apparently spilled directly onto the floor. A hole near the center of the long wall was perhaps a receptacle for a mortar.

While low, flour-collection basins were sometimes associated with the Ebla troughs, this was not universal. When such basins are present, they often run nearly the entire length of the platform.

Excavations in 1996 at Tel Chinnereth uncovered trough installation 4155 in Room 4153 of Stratum V (Fig. 8), dated by the excavators to the late eleventh century BCE according to the conventional

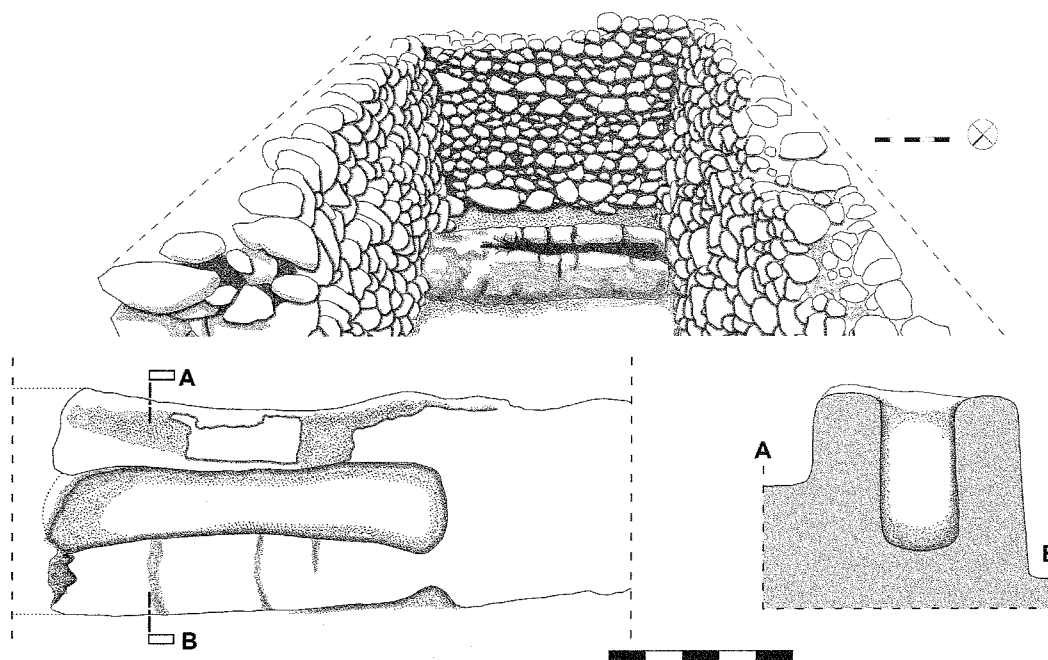


Fig. 8. Trough installation 4155 in Room 4153 of Stratum V at Tel Chinnereth, dated to Iron I. Top: isometric view; bottom: top view and cross section (courtesy of Dr. Stephen Münster)

chronology (Pakkala, Münger and Zangenberg 2004: Fig. 8; S. Münger 2005: personal communication). The trough is built of mud-brick material with an outer lime coating and extends from one wall to the other across the width of the room (about 1.2 m wide and 3.5 m long).¹¹ No basin was found attached to the trough, and moreover, the Chinnereth trough is over 0.75 m deep, much deeper than the Dor installation. So far no theory for its use has been advanced.

Finally, a clay model from Achzib dating to the seventh–sixth centuries BCE should be mentioned (Dayagi-Mendels 2002: 13–15, 150–151, Fig. 7.11), which represents a figure standing at a raised, three-legged basin. In this case, the table-like basin is almost certainly of wood, as a mud-brick tripod would have been too unstable. The figure leans over and manipulates one ovoid lump, while another lump rests at the far end of the basin. There is no evidence for a quern, though this could be due to the level of abstraction in the model. On the other hand, the presence of a second lump suggests that the figure is kneading dough. Similar clay figures standing at tripod tables are known from Cyprus (Karageorghis 1987: 16; Pl. I:2–3), Mycenaean (Blegen 1946–1948: 15, Fig. 1–4), and Archaic Greece (Hutton 1899: xiv, 31, Fig. 3), while kneading at what are probably wooden tables is also depicted in Egyptian reliefs.¹²

Anatolian and Greek parallels

Excavations at Phrygian Gordion revealed buildings dating to the early seventh century that contained platform grinding stations located next to a wall, each comprising from five to eighteen querns (de Vries 1980: 34, 39, Fig. 10). The platforms were wide enough for grain to collect at the far end of each quern during grinding. At Sardis, a Lydian period kitchen area contained a bench installation with two querns (Greenwalt, Cahill, Dedeoğlu and Herrmann 1990: 146, 148, Figs. 9–10). A line of stones partially preserved on the floor around the front of the installation may mark an area in which the flour collected on the floor, as in Egypt.

From Greece come a number of terracottas depicting workers processing grain. An example from Boeotia shows four women standing at a trough while a flutist provides music (Mollard-

Besques 1954: 20, no. B 116, Pl. 15). One interpretation of this scene is that the figures are rubbing lozenge-shaped grinding stones against querns set into the platform. The first and fourth figures, however, have a second lozenge shape before them on their querns. Perhaps what is depicted here is the kneading of dough, and what seem to be grinding stones are actually lumps of dough (Moritz 1958: 31; Sparkes 1962: 133). The Boeotian figures date from about 510 to 470 BCE and most seem to have originated in tombs, paralleling the use of such figures in Egypt (Higgins 1967: 77). Two Argive terracottas of the mid-late sixth century BCE depict more elaborate stages in the production of bread (Kourouniotis 1896: 201–216, Pl. XI:1–2; Amyx 1958: 233–235, 240–241, Pls. 50a–50b). In one grouping of figures are seen a trough with loaves lying unattended, and another trough at which women apparently knead dough. The second grouping shows a woman sifting/sieving grain into a raised basin from a shallow semicircular container.

Basin Comparanda

Querns, either flat or saddle type, set directly on the floor or raised slightly above it, either singly or in groups, are found throughout the ancient Near East and Egypt in virtually all periods from the Natufian-Neolithic onward (Curtis 2001: 64, 67).¹³ Egypt again provides the most abundant parallels, though a few reliefs from the Assyrian empire are a helpful supplement.¹⁴ In most of these examples, the miller, generally female, is shown kneeling on the floor, bent over her quern, grinding stone in hand. Very rarely is any receptacle for the ground flour depicted (Daga's tomb is one of the rare cases where there is an attached basin). Apparently flour was usually allowed to collect in a pile on the floor at the base of the quern.

Excavations at Tel Rehov have yielded four semicircular clay basins found in association with saddle querns in Stratum IV, dated by the excavators on the basis of radiocarbon tests to the mid-ninth century (Ebeling and Rowan 2004: Fig. on p. 114; Fries 2004: 16–17; 2005: 1–3). The best-preserved example is installation 4604 in Area G,¹⁵ described as a quern set in a horseshoe-shaped basin, 1.3 m

long by 0.95 m wide, abutting a mud-brick wall. The basin was constructed mostly of mud bricks, with some stone construction, and plastered over with mud. The northern end was 0.38 m high, the southern 0.25 m. Two querns and a grinding stone were found just outside the installation to the north. The other three installations, 6406 (Fig. 9; 1.25 m×0.90 m), 5456 (1.20 m×0.90 m), and 6453 (size unknown), were of like construction, and also had querns *in situ* in the basins, one end resting against the highest part of the basin and sloping downward. Fries suggests that the basins were used to contain the flour that was ground on the querns.

Querns set in what appear to be mud-brick enclosures are known from several sites in ancient Israel, perhaps the best example being that in Room 3168 at Hazor in Stratum VI of the eighth century. Although the installation is not discussed in the text or shown in the plan of the stratum, it can be seen in Pl. LVI:1, where the quern and part of its mud-brick basin built against the adjacent wall are just visible (Yadin *et al.* 1961). What may be similar installations are found in Room 1002 in Lachish Stratum III, also of the eighth century (Tufnell 1953a: 106; 1953b: Pl. 20.3, Pl. 16.3, Pl. 115). Unfortunately, the text does not describe the construction of these features in sufficient detail, and the photos can at best be said to be suggestive of such an installation. A trapezoidal basin

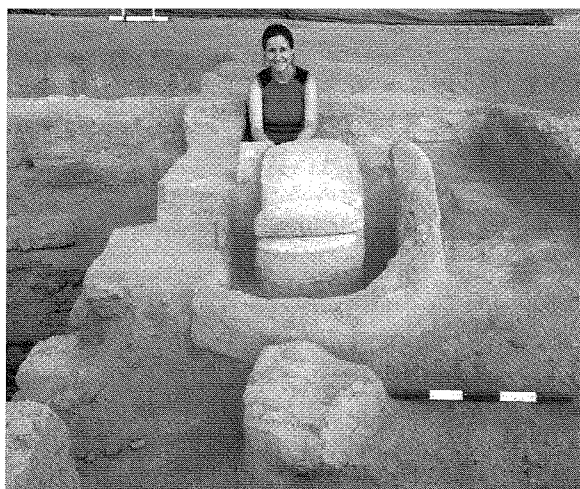


Fig. 9. Grinding installation 6406 in Area C at Tel Rehov (courtesy of Prof. Amihai Mazar)

attached to what may be a long, narrow mudbrick table was found in Room 2111 in the east wing of Building 2081 in Megiddo VA (Loud 1948: Figs. 100 and 388), though it is difficult to be certain because there is only a vague plan, no photograph of the installation, no description in the text, and almost nothing was recorded from the room.¹⁶ A final parallel from Israel comes from Ḥorvat Rosh Zayit in the Galilee (Gal and Alexandre 2000: 23, Figs. II:26, II:28, Plan 5). What may be two stone-lined basins containing querns were found in the post-fort phase of Stratum I, dating to the ninth century BCE.

Conclusions: The Function of the Dor Trough Installation

As the above survey of comparanda demonstrates, there are no exact parallels to the Dor trough-and-basin installation. The Chinnereth trough is deeper than the Dor example and lacks the attached basin. There are raised benches or platforms used as stations for grinding grain, such as those from Ebla, Egypt and Gordion, although the Dor trough bears no trace of indentations for querns; it does not slope down across its width or have a catch basin that runs its length, as in the Egyptian examples; nor is it as wide as the Gordion example. Thus, the trough does not seem a suitable candidate for a grinding station.

While the representations from Egypt and Mesopotamia are suggestive of such installations, the basin-and-quern emplacements from Tel Rehov, and perhaps the other Israelite sites, provide important and solid parallels for the basin at Dor. At both sites the basins are attached to a wall or trough, are about the same size, and were found with basalt bowls, querns and/or grinding stones either *in situ* or close by. Unlike most examples of floor-based querns, those from Dor and Rehov were set in basins, which must have facilitated the collection of the flour. These installations are thus structurally intermediate between the standing installations from Egypt, with their low, attached basins, and most floor querns that lack such basins.¹⁷ It seems that the basin, not the trough, at Dor was used for grinding.

What then of the trough? Since other activities

were closely associated with grain processing, it is likely that one of these tasks took place in the trough. Two possibilities present themselves. Firstly, the trough may have functioned as a station for sieving and/or hand picking the grain.¹⁸ In such a scenario, the grain was presumably spread out over the length of the trough and several workers could then sieve and/or pick through it simultaneously. If grain was cleaned in the trough, it was then likely fed directly to a miller working at the basin. A similar role might be suggested for the various wide benches in palace G and building P4 at Ebla, which were not grinding stations. The second possibility is that the trough was used as a kneading platform.¹⁹ While there are no indentations in the trough to indicate the use of boards as kneading surfaces (as might be suggested by the

Greek and Phoenician terracottas),²⁰ and the earth surface of the trough would not have been suitable for kneading dough, a cloth mat laid in the trough may have allowed for the working of a wet dough. It is, of course, possible that the trough served both tasks, in sequence or simultaneously, with sieving/hand picking going on at one end, while kneading took place at the other end.

Room 9795's role as part of a bakery may also provide a clue to its destruction. With so much grain and flour about, a stray spark from an oven, perhaps in the unexcavated area beneath the eastern balk, could have set off the conflagration.²¹ It may be that the relatively limited fiery destruction that engulfed Room 9795 and parts of adjacent rooms was the result of a simple kitchen fire, rather than an enemy attack.

Notes

- 1 In 1985, I arrived at Tel Dor as a wet-behind-the-ears square supervisor. Over the years I became area supervisor for Area G, then the director of the Cornell University team in Area G. While I concluded my part in the excavations in 1999, I am still involved in the preparation of the report of Area G. Thus, I have had the opportunity to benefit from Professor Stern's advice and support over much of my own archaeological career. It is with great pleasure that I present to him this essay on one of the more enigmatic features excavated at Tel Dor. All illustrations, unless otherwise indicated, are courtesy of the Tel Dor Excavations and are reproduced here with their permission.
- 2 This article owes much to the contributions of scholars in many different fields. My colleagues on the Tel Dor excavations, Dr. Ayelet Gilboa and Orna Nagar-Hillman, provided me with data on the pottery and grinding stones (respectively) found in the trough room. Talia Goldman and Sveta Matskevich provided assistance with illustrations, excavation records, and databases. Professor Andrew Stewart provided me with a photograph of the Boeotian terracotta and bibliographic guidance on the Greek material. Dr. Stefan Münzer shared pre-publication information on the Tel Chinnereth trough, as did Tim Fries and Professor Amihai Mazar for the Tel Rehov installations. I gratefully acknowledge their permission to cite this material here. Tim had hunted up many of the Levantine parallels (Beth-Shean, Hazor, Lachish, H. Rosh Zayit) as part of his work, and graciously shared his efforts with me, saving me much time. My special thanks to Dr. Delwen Samuel for her assistance with the Egyptian grain-processing material and her willingness to mull over the nature of the Dor trough in numerous emails over the course of two years. I thank Professors Ephraim Stern and Andrew Stewart for permission to utilize the Area G material in this article.
- 3 I am indebted to Orna Nagar-Hillman and Monique Pisani, who are working on the analysis of the ground-stone tools from Tel Dor, for pre-publication information concerning the trough room grinding stones.
- 4 Grinding stones can be used for purposes other than simply grinding grain, though grains would have been the main staple. The pottery finds may indicate that other types of food were processed here, and the possibility that Room 9795 was a more general-purpose kitchen should be kept in mind (D. Samuel 2005: personal communication).
- 5 Tooley 1955: 28–29 notes that most kneeling grinding figures are found through the end of the First Intermediate period, with standing querns more common afterwards.
- 6 Perhaps the most complete depiction of the entire process comes from the mastaba of Kaemrehu at Sakkara from the end of the Fifth Dynasty, c. 2325 BCE (Mogensen 1921: 34–36, Figs. 31, 33; Saleh and Sourouzain 1987: Pl. 59). Other useful scenes are found in the Tomb of Daga (Davies 1913: 35, Pl. XXXVIII), the Tomb of Antefoker (Davies 1920: 15, Pl. XI), the Tomb of Sešemnefer (Junker 1953: 158–162, Pl. XVIII, Fig. 64) and the Tomb of Nebamun (SäveSöderbergh 1957: 24, Pl. XXII). In ancient Egyptian representations,

- workers shown sieving and pounding hulled grains are actually processing spikelets. The kernels were not crushed in the mortar; rather, the spikelets were broken up to release the grain. The grain was separated from the chaff by a second winnowing, sieving and another round of hand picking. Finally, the whole grain was ground in the quern. Mortars were only necessary for grinding hulled cereals such as emmer, einkorn or barley; the processing of naked or free-threshing grains (e.g., durum and bread wheat) did not require grinding in a mortar (D. Samuel 1995: personal communication; Samuel 2000: 541, Fig. 22.3).
- 7 See, for example, the descriptions of front halls in Peet and Woolley 1923: 76–82, Fig. 11. They were defined as hearths because their interiors were partially filled with ashes, and sometimes adjacent wall surfaces were blackened (Peet 1921: 178, Pl. XXVII:2; Peet and Woolley 1923: 61, 78).
 - 8 For reconstructions of such grinding stations, see Samuel 1989: Figs. 12.6, 12.11, 12.12.
 - 9 This higher extension of one of the two installation walls may be seen in el-Saidi and Cornwell 1986: Fig. 1.3, and Peet 1921: Pl. XXVII:2; the latter also showing the sloping surface into which the querns were set.
 - 10 Bruyère misinterpreted the reliefs, statues, and models of which he was aware, as depicting kneading, rather than grinding.
 - 11 I am indebted to Dr. Stefan Münzer and the Tel Chinnereth/Tell el-'Oreimeh Excavations for permission to use the pre-publication drawings in Fig. 8. The top drawing was prepared by Christa Lennert in 2004, and the bottom two drawings were prepared by Axel Mauer in 2005.
 - 12 Egyptian reliefs and models often depict dough kneading on surfaces raised only slightly off the floor, much like floor quern emplacements. Reliefs that depict standing kneaders show them at legged tables, again suggesting wooden furniture, as in the Tomb of Nefer-hotep (Davies 1933: 38; Pl. XLV), and the Tomb of enAmūn (Davies 1930: 51, Pl. LVIII). The tripod models are reminiscent of the three stones found set into the floor in the eastern part of Room 9795. Could they have functioned as a base for a low kneading table?
 - 13 Floor-based querns, like those on benches at Ebla (above), could also be used in large numbers on a more industrial scale serving the needs of a large establishment. For example, one room in the pre-Akkadian level at Tell Brak produced twelve querns and grinding stones, and this was not the only area or period to produce such groupings at Tell Brak (Oates, Oates and McDonald 2001: 266).
 - 14 Grinding while kneeling at a floor quern is represented in many Egyptian servant statues (Borchardt 1911–1936: Pls. 24.110; 25.114–115; 49.237; 52.243; 54.252; 58.329; 83.494; 85.500; 86.504; Breasted 1948: 17–25, 38–39, Pls. 15–21, 23, 25d, 34a, 38b; Tooley 1955: 28, Ills. 19–20), and tomb reliefs (Davies 1913: Pl. XXXVIII [Tomb of Daga]; Junker 1953: Pl. XVIII, Fig. 64; Mogensen 1921: Figs. 31, 33), as well as Mesopotamian reliefs (Ellis 1993–1997: 402; Curtis 2001: 203). Servant statues also represent sieving, while kneeling or squatting, and kneeling figures forming loaves on a table set flat upon the ground (Breasted 1948: 25–27, Pls. 25a–c, 26a, 26b, 26d, 27). The reliefs cited above often show sieving as well.
 - 15 I am indebted to Professor Amihai Mazar for permission to reproduce here the pre-publication photograph from the Tel Rehov excavations.
 - 16 My thanks to Dr. Ilan Sharon of the Institute of Archaeology at the Hebrew University for bringing this possibility to my attention.
 - 17 Sparkes (1962: 134, Pl. VIII.1) illustrates an early fifth-century Boeotian figure apparently bending over a low, square, box-like installation in which there is a smaller raised surface, and is apparently using a grinding stone. The ground flour probably collected in the large box in which the smaller surface was set. This is analogous to the Dor and Rehov basins.
 - 18 Could the small basalt bowl have been used for preliminary grinding of hulled cereals, such as was more typically done in deeper mortars?
 - 19 On the difficulty of identifying kneading troughs in the archaeological record, see Meyers 2007: 71.
 - 20 Note that the Boeotian trough installation seems to contain rectangular surfaces, perhaps wooden or stone, on which the workers knead their dough; they are not kneading directly on the table/trough surface. The level of abstraction in the other Greek models makes it impossible to differentiate between grinding or kneading.
 - 21 Based on the presence of ash material within the grinding stations found in Egypt, it has been suggested that such installations may have been subjected to occasional low-level burnings as a way of controlling insects, ashes being a natural desiccant (el-Saidi 1987: 5–6; Samuel 2000: 561; R. Miller "Appendix: Ash as an Insecticide," 14–16 in el-Saidi 1987). Could such an effort to eradicate pests have gotten out of control at Dor?

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