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A Second-Temple Period Chalk Quarry and Vessel-Production Cave Complex on Mount Scopus, Jerusalem

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From the latter half of the first century BCE, an increased observance of Jewish purity laws is evidenced in Judea, focusing on Jerusalem and the Temple. This is further attested by the flourishing chalk-vessel industry, producing vessels for storage and table use, which according to Halakha did not contract impurity. This article is the final report of the chalk-quarry and vessel-production cave complex uncovered on the eastern slope of Mount Scopus, dated by pottery and coins to the first century CE, including a reconstruction of the technology for producing chalk vessels and quantification of vessel types. A few pottery vessels dating to the period between the revolts (70–132 CE) may indicate that chalk vessels continued to be produced in the cave after the First Jewish Revolt. Also included in this report are adjacent quarries, a winepress, water installations and tombs.

Keywords: Jewish, Halakha, purity, chalk vessel industry, workshop, quarry, technology, quantification

Introduction

Archaeological excavations carried out in 1999–2000 on the eastern slope of Mount Scopus, below the Augusta Victoria Hospital, prior to the construction of a new road from Jerusalem to the Jordan Valley via Ma'ale Adummim (Figs. 1, 2),[2] revealed a late Second

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[2] The preliminary excavation (Permit No. A-3082; map ref. 22390–415/63300–315) was carried out in July–August 1999 and was followed by a salvage excavation (Permit Nos. A-3114, A-3174) carried out in October 1999–April 2000. The excavations, funded by the Moriah Company Ltd., were conducted on behalf of the Israel Antiquities Authority, under the direction of Jon Seligman, the late David Amit, and Irena Zilberbod, with the assistance of Vered Barzel (area supervision), Vadim Essman and Vjaceslav Pirski (surveying), Tsila Sagiv and Mariana Slazberger (field photography), Yehoshua Dray (metal detection), Amos Frumkin and Ze'ev Levy (geology), Débora Sandhaus (pottery processing) and Donald T. Aruel (numismatics). The coins were cleaned in the metal laboratories headed by Ella Altmark; the finds were drawn by Irina Lidsky and photographed by Clara Amit, all of the IAA. We acknowledge the help of D. Merhav, N. Proderantz and T. Dkaidak of the Yoram Gadish Company and S. Carmel of the Barashi Company, and we are grateful to Yehoshua (Yeshu) Dray, whose technical aptitude contributed to understanding the lathing techniques employed to manufacture the chalk vessels. I would like to thank Yardenna Alexandre for the thoughtful editing and true interest in the article.

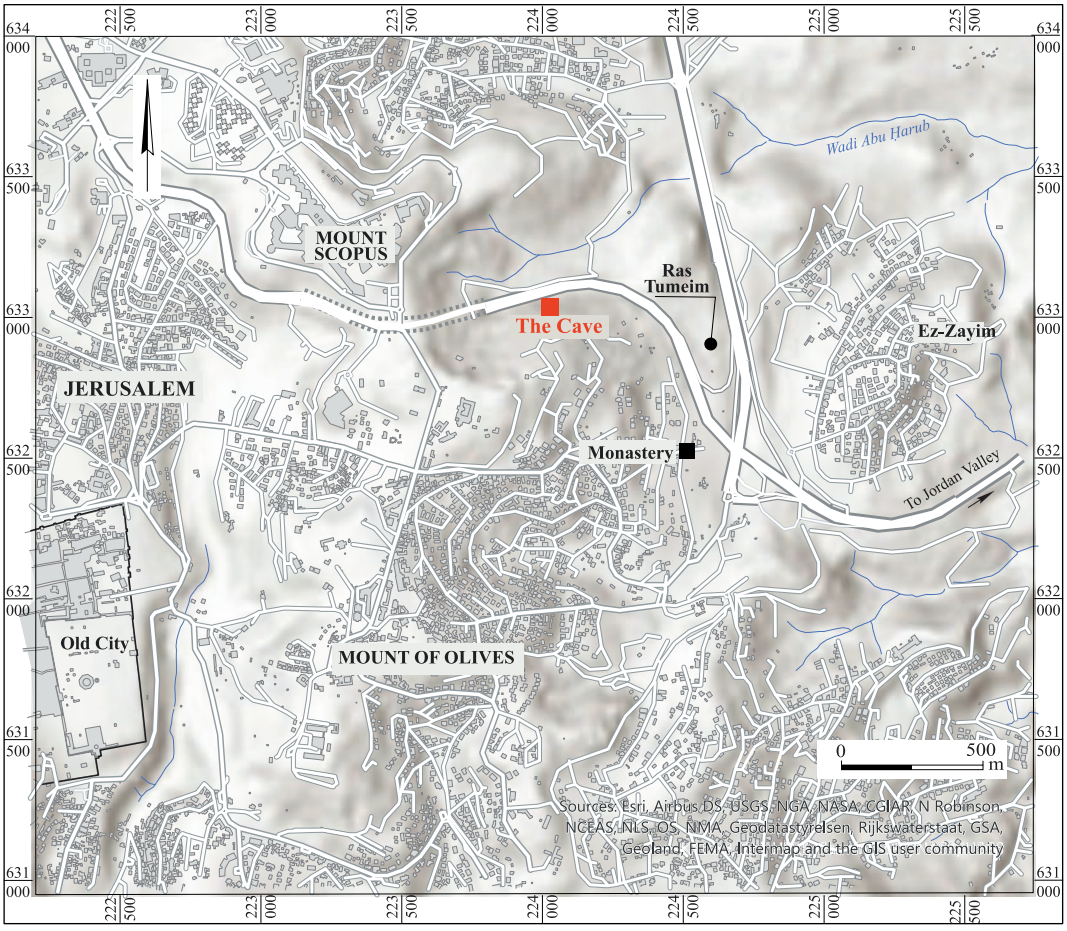


Fig. 1. Location map.

Temple period chalk-vessel production cave. Also uncovered were installations from different periods and the remains of a monastery designated 'the Monastery of Theodorus and Cyriakos'. Preliminary reports and articles concerning the excavations have previously been published (Amit, Seligman and Zilberbod 2000; 2001; 2003; 2008a; 2008b; Stone et al. 2011). This is the final report of the chalk quarry and vessel-production cave complex, as well as the adjacent quarries, winepress, water installations and tombs; the final report on the monastery will be published separately.

Geographical Background

The eastern slope of Mount Scopus flanks the southwestern bank of Wadi Abu-Ḥarub, a tributary of Naḥal Og (Wadi Mukhliq) that drains eastward to the Dead Sea. Mount Scopus is characterized by the Menuḥa Formation of the Mount Scopus Group of Senonian chalk, the geological layer suitable for the quarrying and production of chalk vessels (see Frumkin and Lewy, this volume). The very shallow rendzina soils, and the much lower precipitation on the eastern slopes facing the Judean Desert than in Jerusalem, created a relatively dry

Fig. 2. Aerial view of the excavation, looking north.

landscape of low spiny burnet shrubs (*Sarcopoterium spinosum*) with few trees. Seasonal agriculture was practiced along the Wadi Abu-Ḥarub valley floor, and the slopes probably served the seminomadic Judean Desert pastoralists. In the absence of perennial water sources, water was collected in pools and cisterns that have been located at various nearby sites, and specifically in two huge cisterns located across the valley at Ras Tumeim (Zissu and Kloner 2009).

Previous Research and Identification of the Site

In contrast to the many religious and archaeological sites on the western slope and ridge of Mount Scopus and the Mount of Olives, the eastern slope attracted surprisingly little attention. The Ras Tumeim hill opposite the excavated monastery, has been identified with the biblical site of Baḥurim (בַּחֻרִים), mentioned in the context of David's activities around Jerusalem, where Paltiel, son of Laish of Gallim followed Michal after she was returned to David by Avner (2 Samuel 3:16), and where David hid when escaping from Absalom to the Judean Desert (2 Samuel 16:5; 17:18). Scholars have located Baḥurim between Gallim and 'En Rogel, east of the Mount of Olives ridge, on the road to Jericho (Voigt 1925; Alt

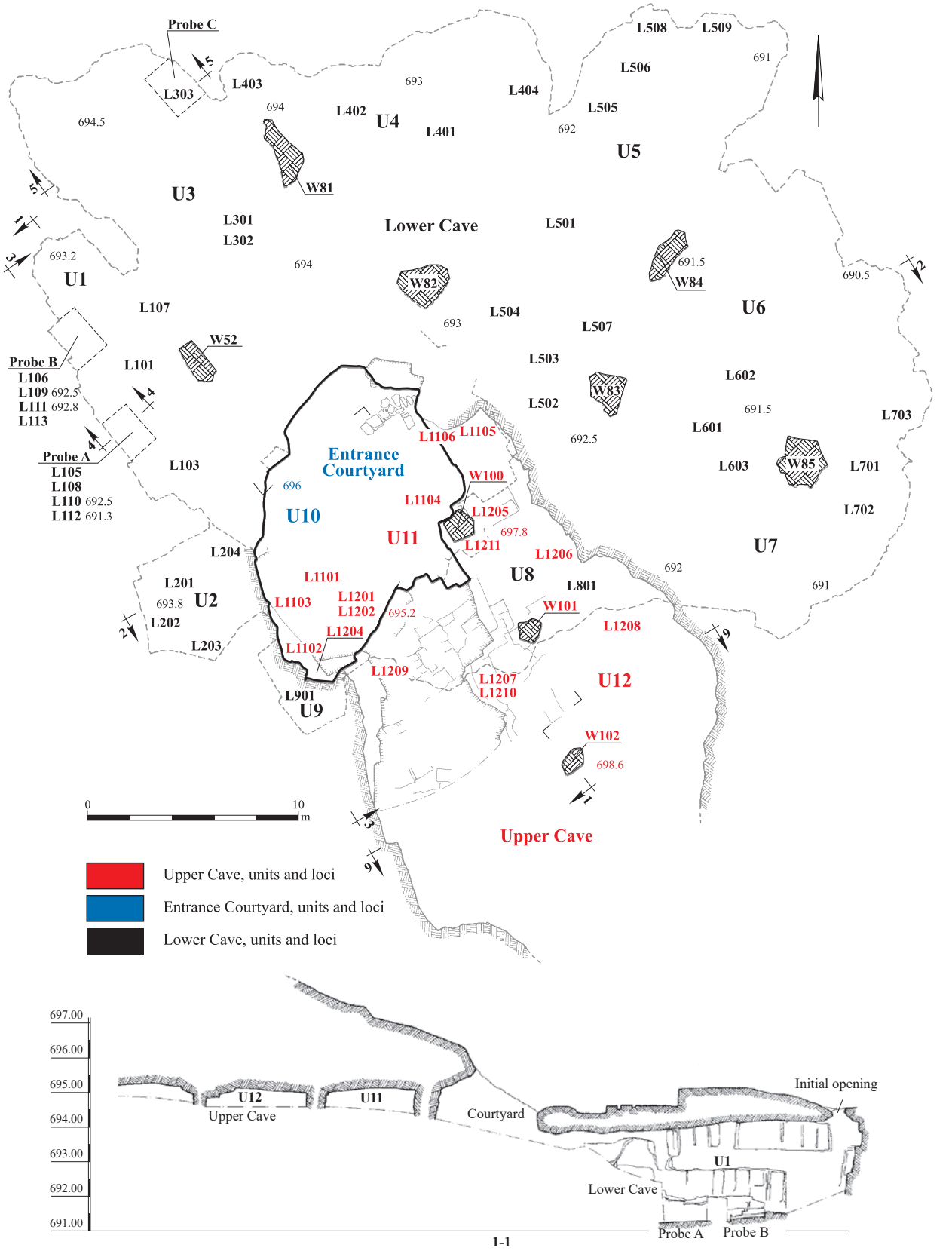
1926:30–33; Elliger 1935:49–50; Abel 1938:260). A place named Baorin appears in the late sixth-century CE Piacenza Pilgrim's itinerary from Jericho to Jerusalem via the Mount of Olives, and thence to the tomb of Lazarus at Bethany (Antonini Placentini, Itinerarium, ch.16. Geyer 1898:170; Wilkinson 2002:138). Baorin lay east of Jerusalem, aligning with the general location of Ras Tumeim, and the route from the Mount of Olives to Jericho is well-documented (Voigt 1925:68–69; Beauvery 1957:72–79). The identification of biblical Baḥurim at Ras Tumeim is further supported by Iron Age pottery sherds retrieved in surveys. In the Byzantine period, the name Baorin may have shifted to include the adjacent monastery cited by the Piacenza Pilgrim.

Archaeological surveys recorded only a few sites in this area, including sporadic Iron Age II and Early Roman period sherds on Ras Tumeim (Abel 1938:260; Kloner 2001:127, 99*, Site 310), and a few Herodian-period burial caves near the Augusta Victoria Hospital (Kloner 2001:150–151; 117*–118*, Sites 364–368). Several additional sites were discovered in the course of development works: a columbarium on the eastern slope of Ras Tumeim (Mazor 1984; 1996); structures, burial caves and rock-cut installations at Ras Sheikh 'Anbar (Kloner 2001:127, 99*, Site 307); a large *kokhim* burial cave just above the chalk vessel cave (Gath 1976; Kloner 2001:146, 114*, Site 353; Kloner and Zissu 2007:185–186, Cave 2–19) and a dwelling cave. In 2007, quarries, tombs, terraces, winepresses, columbaria and other features were identified in an IAA development survey of the surrounding area (Eirikh-Rose 2007).

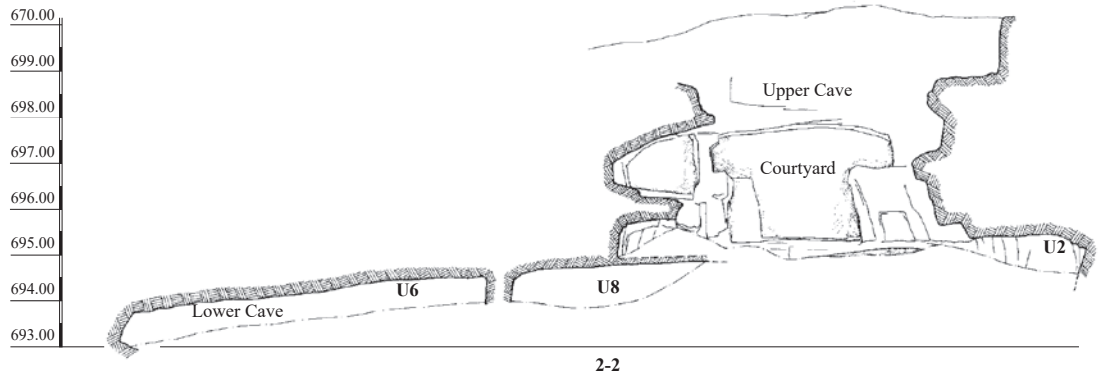
Two huge cisterns were recorded on the southwestern slope of Ras Tumeim (Voigt 1925:70, Figs. 1, 2). Zissu and Kloner measured one cistern (5.3 × 24.0 m, depth at least 6.8 m, capacity at least 850 cu m), as the other cistern was full of earth; based on the plaster and on the similarity to contemporary cisterns in the Hasmonean royal desert fortresses, they dated the cisterns to the Hasmonean–Herodian period, suggesting that they may have belonged to a royal fortress on the hill, whose stone walls were subsequently dismantled and reused in the construction of the adjacent monastery (Zissu and Kloner 2009:99–112). We propose that the cisterns may originally have been part of the late Second Temple period road system, supplying water for travelers and their livestock, just as the monastery's huge pools and cisterns provided for the pilgrims and travelers along the Jerusalem–Jericho road in the Byzantine and Early Islamic periods.

The Chalk Quarry and Vessel-Production Cave Complex

The cave complex, located on the northern slope of a promontory extending east of the Mount Scopus and Mount of Olive ridges (map ref. 22411/63308), was discovered when a bulldozer working under archaeological supervision penetrated the ceiling of the lower cave (initial opening marked on Plan 1: Section 1–1). A slight widening of the opening enabled access with a rope ladder, exposing a manmade cave containing thousands of chalk-vessel fragments (Fig. 3). The preliminary inspection revealed that the cave was a chalk quarry and workshop for the production of chalk vessels that were common at many late Second



Plan 1. The chalk-vessel production cave, plan an sections.



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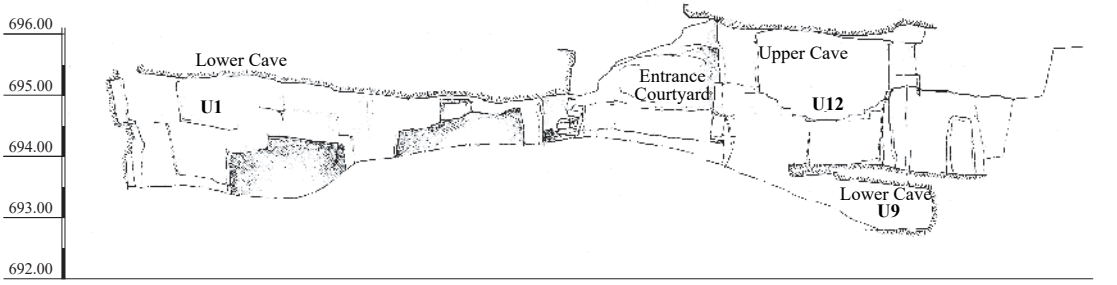

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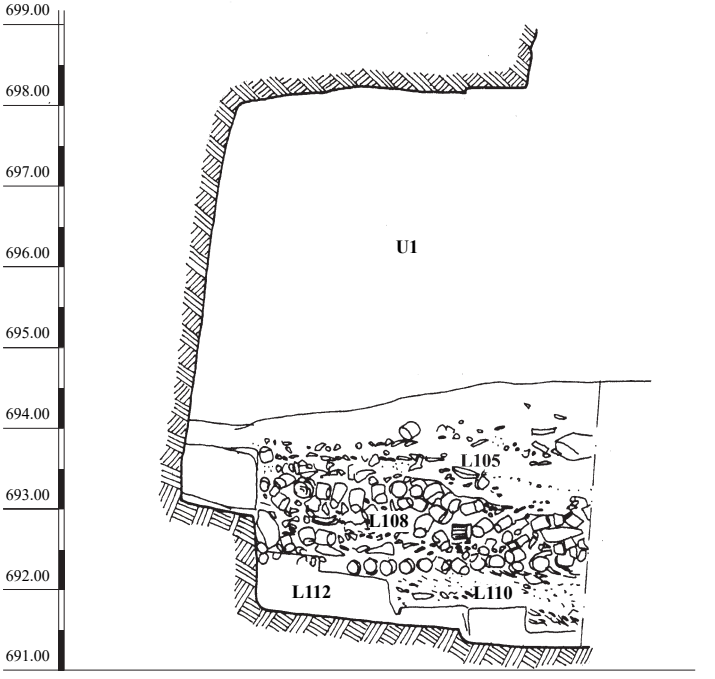

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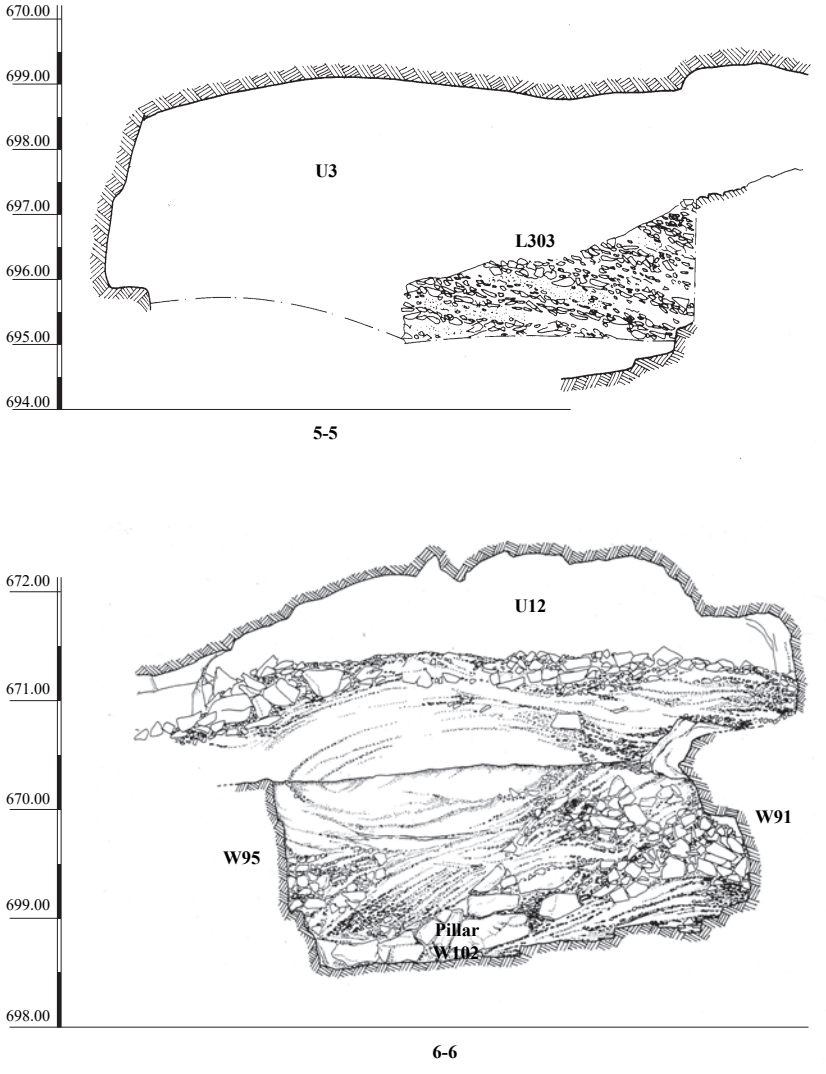
Plan 1. (cont.).



Plan 1. (cont.).

Temple period sites. The archaeological excavation exposed the cave complex, comprising a rock-hewn open-air entrance courtyard that led into two large subterranean caves, a lower cave and an upper cave (Fig. 4). The courtyard was revealed when a blockage of sloping fill observed in the interior of the lower cave was partially cleared (see Fig. 13). A very deep fill layer (depth c. 5 m) was then removed mechanically from above, exposing the ovoid-shaped open courtyard (c. 8 × 13 m), whose bedrock floor lay 5 m below ground level. Originally, when the cave complex functioned, the courtyard was accessed from ground level by descending its roughly stepped quarried sides.

Fig. 3. Initial opening in the roof of the lower cave (U1), looking northwest.

Fig. 4. Entrance courtyard (U10) and upper cave (U11, U12), looking southeast.

The Lower Cave

The lower cave was hewn on the northern side of the entrance courtyard, first at a slight downward angle, and then on a horizontal plane, the quarriers cutting and advancing from the courtyard to the north, east and west, and creating a large fan-shaped area, whose radius increased as the quarrying progressed (max. distance from courtyard 30 m; cave area c. 1000 sq m; Plan 1: Sections 1–1, 2–2, 3–3). The ceiling adjacent to the courtyard was up to 5 m high, its height decreasing toward the cave's outer perimeter (min. height 2 m). Due to the immense space, the softness of the stone and the natural cracks in the bedrock, rock pillars were retained at regular intervals to support the ceiling, forming nine definable areas, designated Units 1–9 to facilitate the description (Plan 1:U1–U9).

Rectangular blocks quarried from the walls, floor and ceiling of the cave left a network of characteristic grooves and ridges on all the lower cave's surfaces, and marks where iron wedges had been inserted (Fig. 5; see *The Quarrying Techniques*, below). The quarrying produced large quantities of chips that piled up inside the cave, sometimes reaching the ceiling, whilst narrow paths left between the piles enabled access to all areas of the cave (Figs. 6, 7). To illuminate the dark cave, flat stones were inserted into small horizontal notches cut in the walls, forming ledges, many still extant, on which oil lamps were placed (Figs. 8, 9). Telltale soot marks were visible on the ceiling above the ledges, and at many

Fig. 5. Lower cave, Unit 1, quarried blocks and chalk-vessel production debris, looking west.

Fig. 6. Chalk-chip piles in the southern part of Unit 3, looking south.

Fig. 7. Chalk-chip piles and paths in Unit 5 between
Pillars W83 and W84, looking southeast; note Unit 4 in back.

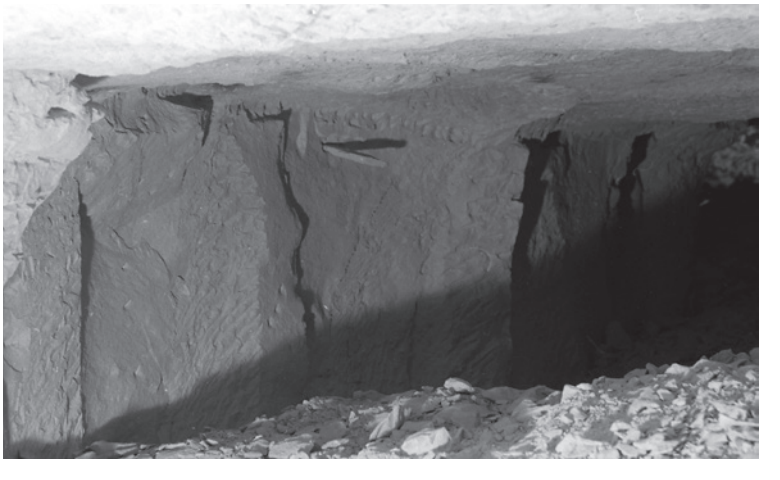


Fig. 8. Stone ledge wedged in a notch.

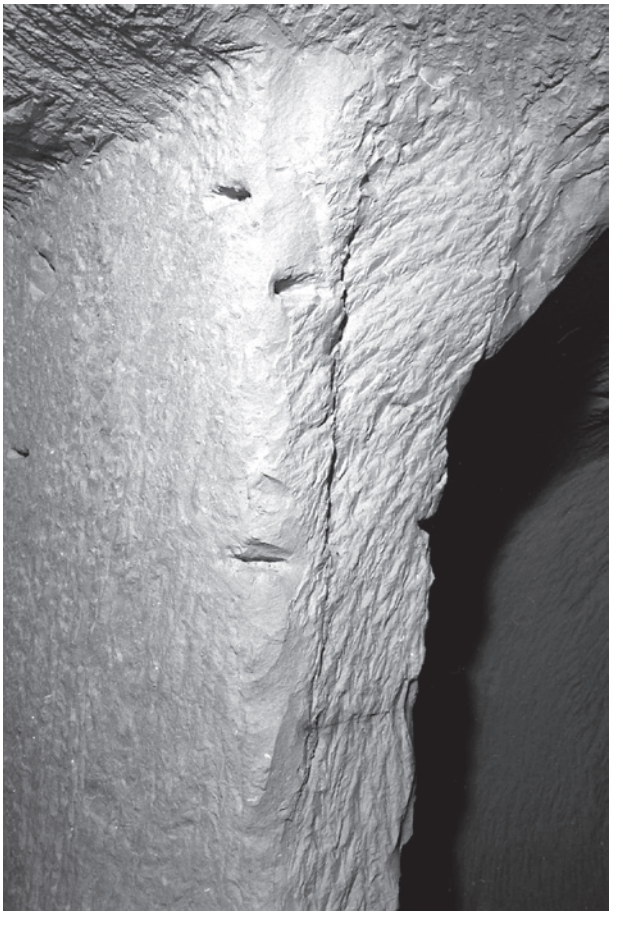


Fig. 9. Notches for stone ledges in Unit 4.

other spots where the ledges had subsequently been cut away as the cave was gradually enlarged (Fig. 10).

In the course of the excavation, a few accumulations in Units 1–9 were cleared, yielding chalk artifacts and other finds (for list of finds according to units and loci, see Appendix 1). Three small probes (Probes A–C) were cut through the chalk debris piles in Units 1 and 3 (Plan 1).

Unit 1 (3–4 × 16 m; max. height 5 m) was the entrance from the courtyard into the lower cave. All the surfaces exhibited channels and quarry tool marks running in different directions. Along the northern wall, the channels reflected the removal of large stone blocks on two levels (Figs. 3, 11). The eastern chisel-marked wall had two openings separated by a rock pillar (W52; 0.6 × 2.0 m) and the wall surface was discolored with brown iron-oxide stains, probably left by the iron wedges used to remove the blocks (Fig. 12). Debris piles from the quarrying and the vessel production, as well as from the partial collapse of the ceiling, covered the floor and the southwestern cave perimeter, also blocking the access to the entrance courtyard (Figs. 13, 14).

Fig. 10. Stone ledge wedged in a notch, with soot marks on ceiling.

Fig. 11. Unit 1, two-level quarrying, looking northwest; note opening into Unit 3 on right.

Fig. 12. Unit 1, western wall and Pillar W52 with brown stains from stone cutting, looking east.

Fig. 13. Unit 1, blocked passage to entrance courtyard, looking southeast; note access to Unit 2 on right.

Fig. 14. Unit 1, debris piles and discarded cores and chalk vessels, looking southwest.

Two probes were excavated along the Unit 1 cave wall to examine the over one-meter-high piles. Probe A (3 × 2 m, depth 1.2 m), located near the entrance courtyard, cut through several layers, the top layer containing chalk-vessel cores, wasters and chips (L105; Plan 1: Section 4–4; Fig. 15). Beneath it, a thick layer of fine chalk dust (L108; thickness 0.7 m) yielded a huge quantity (62 full plastic crates!) of stone cores and wasters discarded from the lathe production of vessels that must have been carried out here. Below this layer, fine chalk soil lenses containing a few finds (L110) overlay bedrock (L112). In Probe B (2.0 × 2.3 m, depth 0.75 m), located close to the northern end of Unit 1, the surface layer (L106) and the underlying light-colored layer (L109) also contained many discarded cores and wasters (Fig. 16).

Unit 2 was a small area (c. 6.0 × 7.5 m) adjacent to the opening leading from the courtyard into the lower cave. It was revealed and accessed from the southwestern corner of Unit 1 after the debris pile had been cleared. The debris in Unit 2 included large quantities of chalk-vessel cores and wasters (L201; Figs. 17, 18).

Unit 3, accessed from Unit 1, was one of the six areas (Units 3–8) that comprised the main expanse of the cave. The rectangular area between Pillar 52 on the west and Pillars 81 and 82 on the east (c. 8 × 24 m; Fig. 19) was filled with chips and dust layers halfway up to the ceiling, with only a very few chalk-vessel cores or wasters, mostly concentrated near Unit 1. Quarrying channels of stone blocks cut from the bedrock floor were visible,

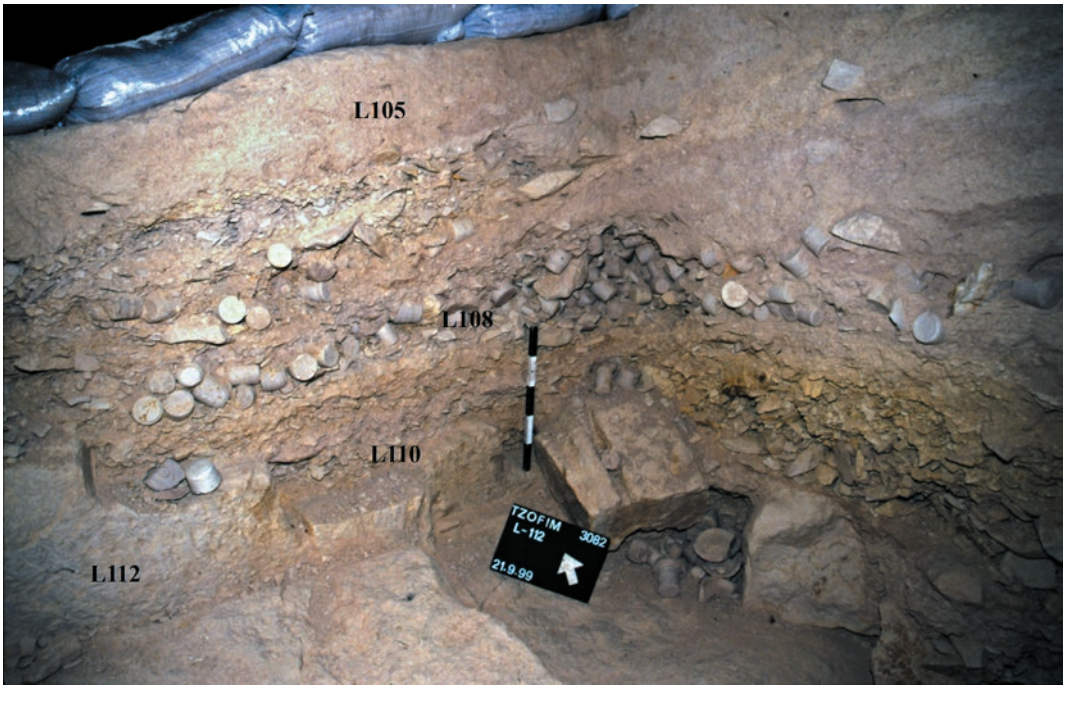


Fig. 15. Until 1, Probe A, layers of discarded cores, wasters and chips on bedrock, looking north.

Fig. 16. Until 1, Probe B, discarded cores and wasters, looking east.

Fig. 17. Unit 2, chalk-vessel debris on floor, looking southwest.

Fig. 18. Unit 2, chalk vessel debris on floor.

Fig. 19. Unit 3, chiseled block-cutting marks on the walls and ceiling.

and chiseled block-cutting markings could be seen on the walls and the ceiling (Fig. 19); Pillar 82 had a gouged-out ledge for a lamp close to the ceiling. A small probe (Probe C; c. 3 × 2 m) dug through a pile down to the bedrock floor (L303; Plan 1: Section 5–5), yielded some iron pieces that were identified as parts of lathes and a chisel (see Fig. 54:5). A coin, dating to the third year of the First Jewish Revolt was found in L302 (see Ariel, below: Coin No. 3).

Unit 4 was a triangular-shaped area between the cave perimeter and Pillar 82 (c. 11 × 12 m). A few chalk cores were retrieved here together with some pottery sherds, and a large hand-carved chalk mug in an initial stage of manufacture was found close to Pillar 82. Ledge niches were gouged high up on the cave walls, the largest (9 × 15 cm) protruding from the wall. Soot stains were visible on the ceiling at regular intervals, especially in the northeastern corner, and lamp sherds were retrieved near the niches in L404; some iron pieces were found in L402.

Unit 5 was a large rectangular area between the cave perimeter and Pillars 82, 83 and 84 (c. 8 × 22 m; Fig. 20); there were ledge niches on the pillars and walls (Fig. 21), and soot stains on the ceiling. In the southern part of the unit, chalk-chip piles filled the space up to 0.5 m below the ceiling, with intervening paths enabling access to the cave interior. Chalk blocks, cores and unfinished vessels in various stages of production were found on some piles (Fig. 22); a hand-carved mug in an initial stage of production, a few pottery sherds and

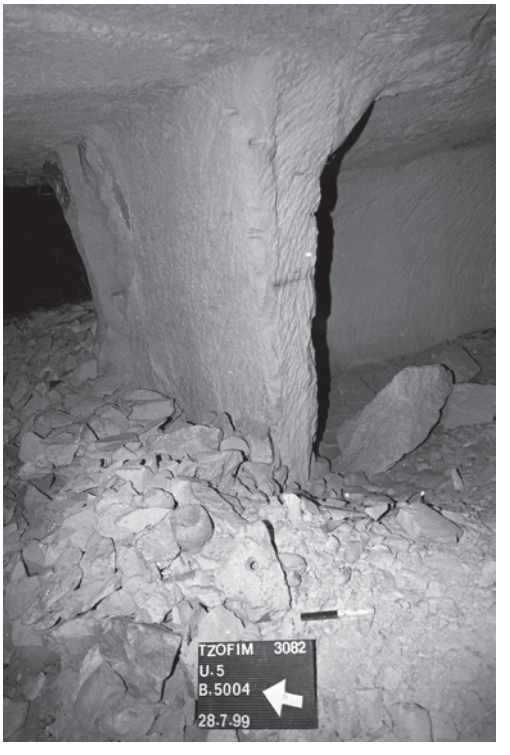


Fig. 20. Unit 5, debris on floor next to Pillar W84, looking southeast.

Fig. 21. Unit 5, lamp ledges along cave wall, looking south.

some iron pieces, including an adze, a wedge and a feather (see Fig. 30:1–3) were retrieved here, as well as a coin dated to third year of the First Jewish Revolt (see Ariel, below: Coin No. 4).

Unit 6 was delimited by the cave perimeter and Pillars 83, 84 and 85 (c. 10 × 14 m). There were ledge niches on the walls, a few lamp sherds (L602, B6002; not illustrated), and the space was filled with chalk chips almost up to the ceiling. A few cores and a mug lay next to the path (L603) adjacent to Pillar 85, and an iron adze piece was found here. Unit 7 was the southeastern end of the cave, between the cave perimeter, Pillar 85 and Unit 8 (8 × 14 m). Removal marks of stone blocks and some ledge niches were clearly visible here. Two unfinished hand-carved bowls, basins and a few cores lay close to the eastern cave wall (Fig. 23), and a few lamp fragments and metal pieces, including an iron feather (see Fig. 30:5) were also found here.

Unit 8, located in the southern part of the cave, underlay the upper cave (Plan 1: Section 2–2). This long narrow unit (5 × 13 m) was full of chalk chip piles with intervening paths; a few cores, as well as some pottery sherds and iron pieces, including a feather (see Fig. 30:4), lined the paths (L801). Unit 9, a small chamber, accessed from the entrance courtyard (Plan 1: Section 3–3), exhibited a karstic crack cutting through the corner close to the ceiling, and contained chalk-vessel cores.

Fig. 22. Unit 5, unfinished chalk vessels, including mugs, on floor.

Fig. 23. Unit 7, broken chalk bowls and basins.

The Upper Cave

The upper cave was hewn on the southeastern side of the courtyard at a higher level on the hillslope. The upper cave's floor slightly overhung the courtyard and partly overlay Unit 8 of the lower cave (Plan 1: Section 1–1; Fig. 4). The upper cave was smaller (17 × 24 m, c. 500 sq m), and it had three bedrock pillars (W100, W101, W102) supporting the ceiling and defining two main units (Units 11, 12). In the excavation, a large quantity of soil fill (depth c. 2.5 m) was removed from the front area of the cave, leaving a vertical section (Plan 1: Section 6–6). Pottery sherds concentrated around the ashy remains of hearths provided evidence of cooking activities, probably carried out by the laborers. The pottery predominantly dated to the first century CE (see Sandhaus, this volume; see *Discussion*, below).

In Unit 11, irregular bedrock stone steps formed by the quarrying led into the cave (Fig. 24). On Pillar 100, there were a few incised Greek letters, ON and IN, and between them a delicate charcoal drawing of acanthus leaves (Figs. 25, 26), similar to incised designs on contemporary stone ossuaries; the inscriptions were not deciphered. Unit 12, the inner unit, was only partially excavated between the pillars and along the cave wall, yielding two coins, one from 54 CE and the other from the second year of the First Jewish Revolt (see Ariel, below: Coin Nos. 1, 2). A few pottery vessels found on a stone ledge on the western side of the cave (L1204) were forms dated to the early second century CE (see Sandhaus, this volume; see *Discussion*, below).

Fig. 24. Unit 11, irregular bedrock steps and Pillar W100.

Fig. 25. Unit 11, Pillar 100, incised inscription and charcoal drawing of acanthus leaves.

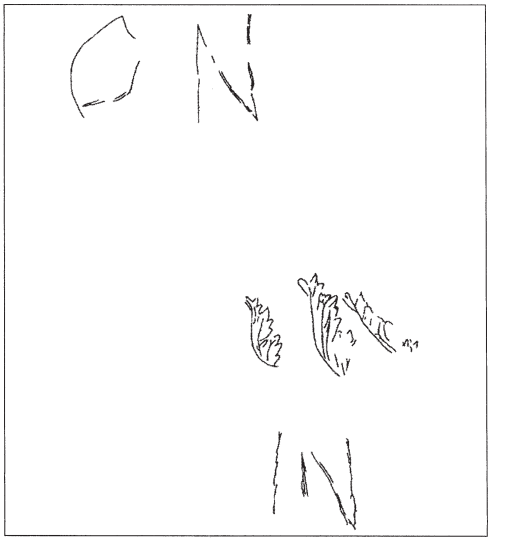


Fig. 26. Unit 11, Pillar 100, drawing of inscription and acanthus leaves.

The upper cave contained far fewer chalk vessel cores and wasters than the lower one, possibly because it was closer to the surface and thus more susceptible to disturbances, but more probably because the chalk vessel production was mainly concentrated in the lower cave. The hearths with the pottery sherds suggest that the upper cave may have served as a service or cooking area for the workers.

THE CHALK QUARRY

Quarrying was carried out on all the surfaces in the caves: floor, walls and ceiling. Rectangular chalk blocks, with average dimensions of 1.5 × 0.7 × 0.7 m were cut out of bedrock and then, into smaller blocks and chiseled down to a size suitable for the fabrication of the vessels.

The blocks were quarried from bedrock in stages. First, severance channels defining the edges of the block were cut to the required depth using an adze. The narrow channels on three sides of the block were cut perpendicular to the stone surface, while on the

Fig. 27. Two blocks, each with three perpendicular severance channels and a single angled channel to the back of the block.

Fig. 28. Four wedge-marks driven behind the block along the edge of the severance channel.

fourth side—always a long vertical side—the channel was cut at an angle to the back of the block (Fig. 27). Next, a few iron wedges, or 'plugs', were placed at the back of the angled channel at fixed intervals. Each wedge was set between one or two rectangular pieces of iron, called 'feathers' or 'shims', that served to guide the wedge at the correct angle behind the stone block. The wedges were driven behind the blocks with a hammer, one by one, until a fissure was created, causing the block to separate from the bedrock. The quarrying left an imprinted network of channels on all the cave surfaces, and in many instances, the impression marks of the wedges were visible in the angled channels, with extant iron particles that rusted over time, leaving reddish-brown stains on the white rock (Figs. 28, 29). A complete iron adze with a flat hammer point at one end and a blade at the other, and a central round handle hole, was retrieved from Unit 5 (Fig. 30:1). A complete wedge, with a flat back and a blade at the front, was also found together with a feather, next to a quarried face in Unit 5 (Fig. 30:2, 3). Pieces of wedges and feathers were retrieved from several other localities in the cave (e.g., Fig. 30:4, 5; three of the eleven feathers are illustrated). Once the first layer of blocks was removed, the second layer did

Fig. 29. Close-up of rusted stained marks left by the iron wedge.

Fig. 30 ▸

No.	Artifact	Locus	Basket	Measurements (mm)	Parallels
1	Adze	505	5005	Length 19 max. width 5.5 hole diam. 1.7 hole length 3.5	Ḥorbat ʻOvesh (Aviam and Getzov 1998: Fig. 14:1–3) Shemuel Ha-Navi (Sion et al. 2011:45) Sanhedriyya (Bar-Nathan 2008: Fig. 5)
2	Wedge	507	5008/1	Length 9.4 width 1.6	Ḥizma (Magen 2002: Fig. 2.63: 2) Sanhedriyya (Jotham-Rothschild 1952: Fig. 1) Ketef Hinnom (Barkay 1995:11) Shuʻafaṭ (Zilberbod 2014: Figs. 21–23) Shemuel Ha-Navi (Sion et al. 2011:43–44)
3	Feather	507	5008/2	5 × 4 max. thickness 0.8	Shuʻafaṭ (Zilberbod 2014: Figs. 21–23) Shemuel Ha-Navi (Sion et al. 2011:43–44)
4	Feather	801	8007	4 × 4 max. thickness 0.4	As No. 3
5	Feather	701	7005	4.0 × 3.5 max. thickness 0.8	As No. 3

not require an angled channel on the fourth face, as the space left after the removal of the first block enabled the wedge and feathers to be positioned. The technique of cutting the angled channel along the long vertical edge to remove the chalk blocks differed from that employed at other ancient limestone quarries, where a triangular channel was usually cut horizontally below the stone (Safrai and Sasson 2001:20–21, 26).

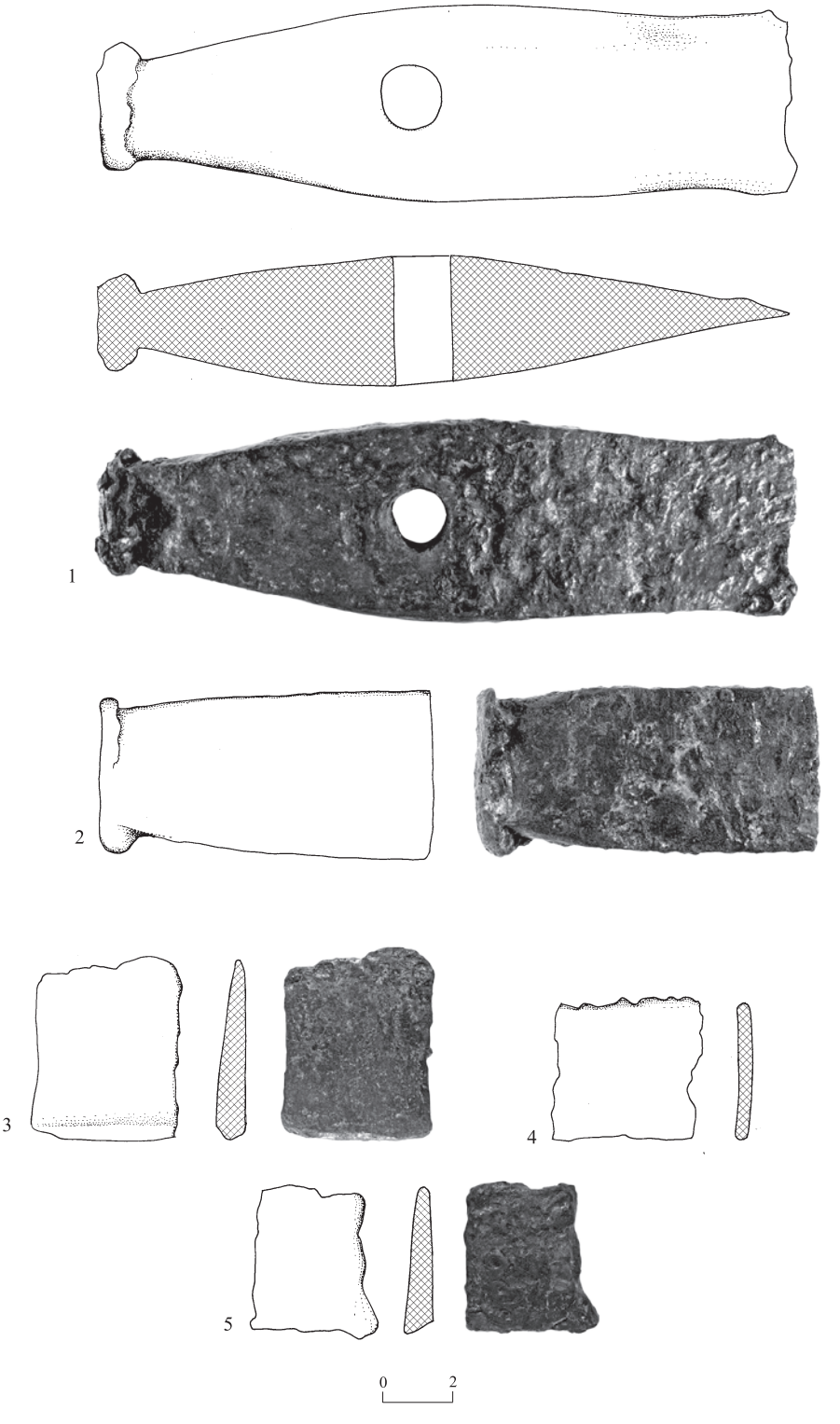


Fig. 30. Iron quarrying tools: adze (1), wedge (2), feathers (3–5).

Quarrying has been documented at many sites in the ancient world. Although quarrying in the Mediterranean area has received detailed attention (Forbes 1963:162–177; Koželj 1988), the research in Israel is limited to a single monograph dedicated to the technology of ancient quarrying in Israel (Safrai and Sasson 2001). Many limestone quarries have been excavated in the Jerusalem area, for example, northern Jerusalem (Sasson, Sion and Barda 2011; Sion et al. 2011:39), Ketef Hinnom (Avner and Zelinger 2015:28*–29*), Ṣalaḥ ed-Din St. (Avni and Adawi 2015:59–61) and Arnona (Edrey 2017). Most of these are open-air quarries, exploiting geological layers on the surface.

The Mount Scopus quarry is an underground cave quarry, similar to a few other quarries in the Jerusalem area, including Ḥizma, 5 km northeast of Jerusalem (Magen 2002:5–17), Zedekiah Cave beneath the Old City (Zelinger 2007), and several caves in the Judean foothills (Ben-Arieh 1959; 1959–1960; Kloner and Tepper 1987:23–29; Kloner 2003:4). In these quarries, a specific geological layer underlying a less suitable layer was quarried, or a man-made cave was created for this specific purpose (Safrai and Sasson 2001:7).

Similar iron wedges and feathers have been published from other sites in the Jerusalem area, for example, at Ḥizma (Magen 2002:61, Fig. 2.63:2, misidentified there as chisels), in the Sanhedriyya caves (Jotham-Rothschild 1952:26, 31–32, Fig. 1), at Ketef Hinnom (Barkay 1995:11), in the Second Temple period quarry at Ramat Shelomo (Zilberbod 2014: Figs. 21–23, two wedges and nine feathers) and at Shemuel Ha-Navi (Sion et al. 2011:43–44). Wedges and feathers were also used in quarries in the Mediterranean area and beyond (Singer, Holmyard and Hall 1954:477–478; Koželj 1988:6–7. Pls. 8, 9; Schwandner 1991:218; Safrai and Sasson 2001:24–26).

The Chalk-Vessel Workshop

Huge piles of debitage, and thousands of wasters—discarded chalk vessels damaged in the course of production—were retrieved from the caves, predominantly in the areas near the entrance courtyard (Units 1, 2, 9 and 11), whereas only very few wasters were found in the darker innermost areas. It seems that the covered, yet better illuminated areas of the caves were exploited for the production of the vessels.

Thousands of chalk cylinders and broken vessel pieces were retrieved in Probes A and B that cut through the piles in Unit 1, representing only a small sample of the huge quantities extant in the cave. The cylinders were the discarded cores removed from the vessels during the lathe-turning (see below), amassing to create huge waster piles, thus providing evidence for the production of tens of thousands of vessels. The waste was not removed from the cave during the production process, rather the lathes were moved on when the debris piles became unmanageable. No complete, finished vessels were found in the caves, as these had been taken away, presumably for sale in the Jerusalem markets and the environs.

Typology

The workshop contained wasters of many different types of vessels that broke during the production process (Fig. 31). The assemblage probably comprised relatively large quantities of the more delicate vessels, and fewer heavier ones that were less likely to break during production.

Previous studies have established typologies for the Early Roman chalk vessel assemblages, based either on finished vessels found in consumption contexts, such as in the City of David (Cahill 1992) and in the excavations south of the Temple Mount (Magen 2002:63–115), or on the finds from the production workshop at Ḥizma (Gibson 1983; Magen 2002:18–51). Since the Mount Scopus vessels mostly conform to the typological categories defined at these sites (albeit with some overlap in the different classifications), these types are listed in the text, and the types with specific parallels are cited in the tables accompanying the illustrated vessels.

The vessel types are initially classified according to the production technique, either lathe-turned or hand-carved, and further subdivided according to size and form. David Amit proposed blurring the distinction between lathe-turned and hand-carved vessels, when mugs with a hand-carved exterior and a lathe-removed interior were discovered at the ʻEnot Amitai production workshop, near Reina in Lower Galilee (Amit 2010:56–58). Although mixed-technique mugs were first observed at Khirbat el-Muraq in Judea (Damati 1977:107–108; Gibson 2003:295), such vessels were mostly found in Galilee (Gal 1991; Amit 2010; Reed 2009:298–299; Adler 2019:9–12); only a single mixed-technique mug was found in the Mount Scopus cave (see Figs. 36:6; 42:7). Amit suggested that the mixed technique may

Fig. 31. A selection of chalk-vessel production waste.

have become common after the Mount Scopus workshop was abandoned (Amit 2010:57–58), but recent finds at Shu‘afaṭ and in Galilee suggest that this technological difference may be regional rather than chronological (Adler 2019:10–12).

The discovery of unfinished fragments of chalk ossuaries in the cave is noteworthy, as this is the first evidence of a manufacturing site of these funerary items (see below).

Lathe-Turned Vessels

Mass-produced chalk vessels were manufactured on lathes, producing simple vessels without handles and usually with little decoration. The lathe striations are clearly visible on all the vessels, and as the vessels are wasters, many still have rough unfinished edges, including parts of the still-attached central core. Hillel Geva proposed that small lathe-turned vessels were first manufactured in the first century CE, as these vessels were not found in Areas E and J in the Jerusalem Jewish Quarter excavations that dated to the second half of the first century BCE (Geva 2006a:221; 2006b:196–197). However, a single, lathe-turned hemispherical bowl was since found at Jericho in a late first-century BCE context (Bar-Nathan and Gärtner 2013:208, 214). The Mount Scopus assemblage, including many small lathe-turned vessels, is dated by associated pottery to the first century CE (see below), compatible with Geva’s proposal without discounting an earlier typological development.

Bowls (Fig. 32)
Shallow Bowls with Straight Walls (Fig. 32:1–5).— The small shallow bowls or saucers (diam. 12–23 cm, depth 3.5–6.0 cm) have a flat base (Fig. 32:1–4), or a low disc base (Fig. 32:5). The bases are finished on the lathe, or sometimes hand-finished with an adze (Fig. 32:3), the walls are either straight or taper outward on the interior, and the rims are usually simple, some having a very thin rim. All the vessels retrieved broke prior to finishing. Complete finished vessels are known from settlement sites, such as the City of David (Cahill 1992: Fig. 15:12–22). It has been suggested that this bowl type emulates ceramic forms, specifically Terra Sigillata and Eastern Sigillata vessels (Magen 2002:66; Cahill 1992:202).
Types: Ḥizma: I.1.Ai.Form 1 (Magen 2002:22, Fig. 2.4:2–10); Temple Mount: I.1.A.iii. Form 1 (Magen 2002:66, Fig. 3.5:1–7); City of David: 1.a.i.F (Cahill 1992:201–202).

Shallow Bowls with Sloping Walls (Figs. 32:6–11).— These bowls are similar to the previous group in form and size, the only difference being the outward slope of their walls. Some bowls have external everted rims like ceramic forms (Fig. 33:9–11). Cahill classifies bowls with straight and sloping walls as a single group. Following Magen, we consider that the two groups are separate but related forms.
Types: Ḥizma: I.1.A.i.Form 2 (Magen 2002:22, Fig. 2.6:1–8); Temple Mount: I.1.A.iii.Form 2 (Magen 2002:68, Fig. 3.5:8, 9); City of David: 1.a.i.F (Cahill 1992:201–202).

Deep Open Bowl (Fig. 32:12).— This deep bowl has outward-sloping walls, rounding down to the base, and a plain rim. Finished bowls have a low disc base and possibly an everted and internally grooved rim.
Types: Ḥizma: I.1.A.ii.Form 2 (Magen 2002:22, 24, Fig. 2.8:6, 7); Temple Mount: I.1.A.iii. Form 3 (Magen 2002:68–69, Fig. 3.5:10); City of David: 1.a.i.E (Cahill 1992:201).

Hemispherical Bowl (Fig. 32:13).— A deep hemispherical bowl (max. diam. 19 cm, height 10 cm) with rounded incurved walls and a simple rim is a common type. Finished bowls

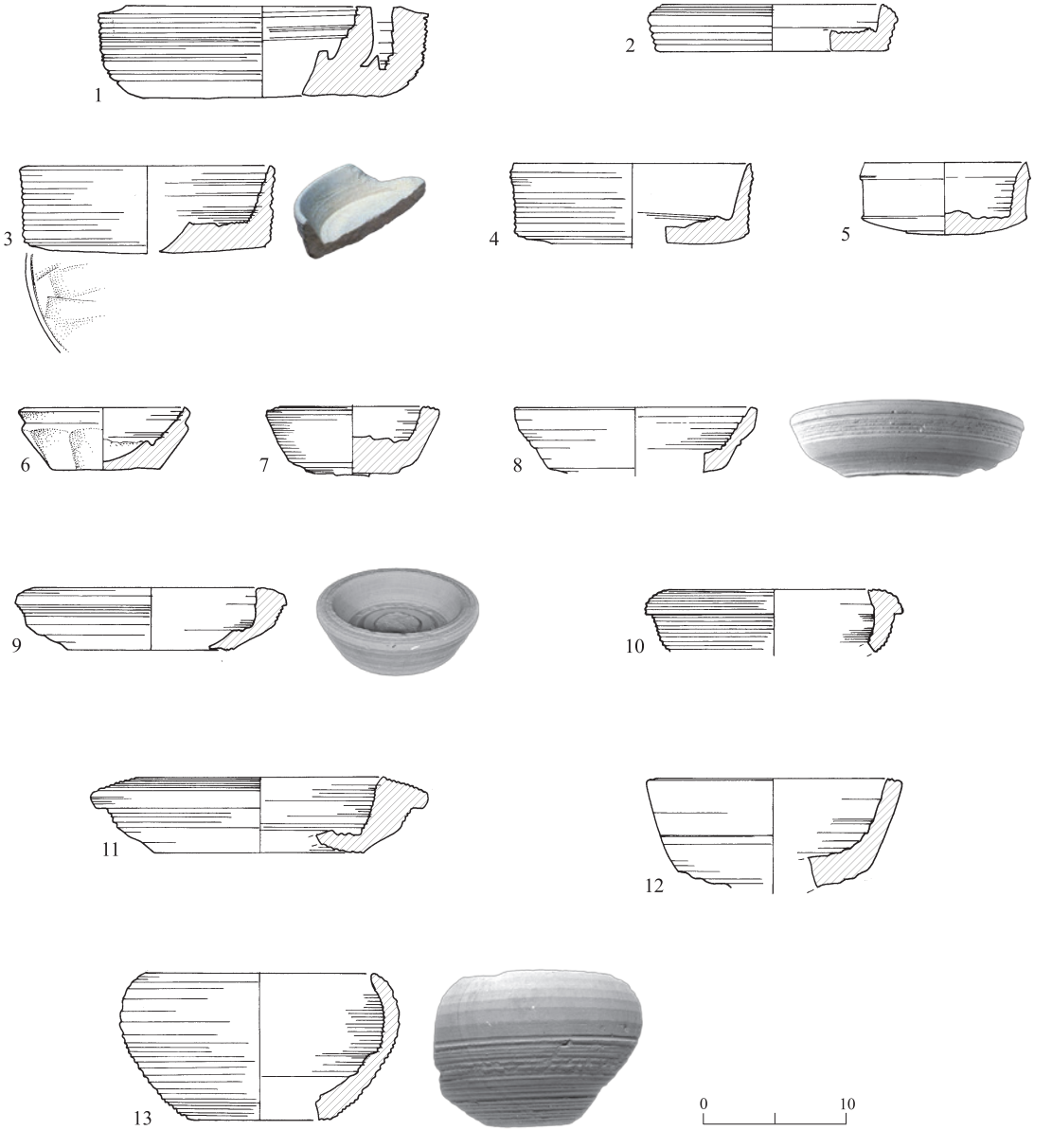


Fig. 32. Lathe-turned chalk bowls.

◂ **Fig. 32**

No.	Vessel Type	Unit	Locus	Basket	Parallels		
					Ḥizma (Magen 2002)	Temple Mount (Magen 2002)	City of David (Cahill 1992)
1	Shallow with straight walls	U2	201	2001	I.1.A.i, Fig. 2.4:1		
2	Shallow with straight walls	U2	201	2001	I.1.A.i.Form 1, Fig. 2.4:10	I.1.A.iii.Form 1	1.a.i.F, Fig. 15:16
3	Shallow with straight walls	U2	201	2001	I.1.A.i.Form , Fig. 2.4:4	I.1.A.iii.Form 1, Fig. 3.5:5	1.a.i.F, Fig. 15:12
4	Shallow with straight walls	U2	201	2001	As No. 3	As No. 3	As No. 3
5	Shallow with straight walls	U2	201	2001	I.1.A.i.Form 1	I.1.A.iii.Form 1	1.a.i.B, Fig. 15:2
6	Shallow with sloping walls	U1	105	1020	I.1.A.i.Form 2		
7	Shallow with sloping walls	U12	1205	12048	I.1.A.i.Form 2, Fig. 2.6:2		
8	Shallow with sloping walls	U2	201	2001	I.1.A.i.Form 2, Fig. 2.6:7	I.1.A.iii.Form 2, Fig. 3.5:8	1.a.i.F, Fig. 15:12
9	Shallow with sloping walls	U1	108	1083	I.1.A.i.Form 2, Fig. 2.6:4, 7		
10	Shallow with sloping walls	U2	201	2001	I.1.A.i.Form 2		
11	Shallow with sloping walls	U1	108	1022	I.1.A.i.Form 2		
12	Deep open	U2	201	2001	I.1.A.ii.Form 2, Fig. 2.8:7	Fig. 3.11.1	1.a.i.E, Fig. 15:7, 8
13	Hemispherical	U1	108	1074	I.1.A.iii, Fig. 2.11:4		1.a.i.I, Fig. 16:6

have a shallow disc base. This form may be based on similarly shaped ceramic or wooden bowls (Cahill 1992:203).
Types: Ḥizma: I.1.A.iii (Magen 2002:24, Fig. 2.11:1–7); Temple Mount: I.1.A.vi (Magen 2002:69–71, Fig. 3.13:1–3); City of David: 1.a.i.I (Cahill 1992:202–203).

Cups and Goblets (Fig. 33)
Straight-Walled Cups (Figs. 33:1–6).— The cups (diam. 7–8 cm, height 8–11 cm) have deep interiors, straight walls rounding down to a small flat, or low narrow disc base, and a plain or tapered rim. A vessel with a still-attached internal core illustrates the production procedure using the lathe, or possibly an attempt to produce a second bowl from the same core (Fig. 33:1). Finished vessels often have decorative ribbing mid-wall and are highly polished.

Types: Ḥizma: I.1.B (Magen 2002:24, Fig. 2.14:1–9); Temple Mount: I.1.B (Magen 2002:70–71, Fig. 3.13:4–6); City of David: 1.a.i.J (Cahill 1992:203, Fig. 16:7).

Sloping-Walled Cup (Figs. 33:7).— A cup with straight outward-sloping walls and a plain rim. Finished vessels have a grooved external rim. Magen and Cahill define these vessels as bowls, but the vessel's relatively small diameter (11 cm) suggests that it is a cup.
Types: Temple Mount: I.1.A.iii.Form 3 (Magen 2002:68, Fig. 3.5:9); City of David: 1.a.i.H (Cahill 1992:202).

Hemispherical Cups (Figs. 33:8–11).— These cups (max. diam. 11 cm, rim diam. 8 cm) are smaller versions of the hemispherical bowls, with simple rims, some having an external groove (Fig. 33:9), and low disc bases, either wide or narrow. Magen and Cahill group these cups with the hemispherical bowls, but their small size makes their use as bowls unlikely.
Types: Ḥizma: I.1.A.iii (Magen 2002:24); Temple Mount: I.1.A.vi (Magen 2002:69–71); City of David: 1.a.i.I (Cahill 1992:202–203).

Deep Cup with Profiled Rim (Fig. 33:12).—A highly polished cup with straight walls and a sculpted profiled rim undercut by a concave depression. Magen includes this type in the general cup types.
Types: Ḥizma: I.1.B (Magen 2002:24, Fig. 2.14:4); City of David: 1.a.i.K (Cahill 1992:203).

Shallow Bowl-Like Goblets (Figs. 33:13, 14).— Shallow hemispherical bowl-like goblets (diam. 12–16 cm) with highly polished walls, profiled rims and carinated decoration. One goblet has an outset square profiled rim with a few deep ridges (Fig. 33:13); the other has a carinated rim decorated with two ridges (Fig. 33:14). This group exhibits much variation in the decoration, the vessels from the City of David displaying distinctly decorative ribbing on the rim. Magen groups the shallow and the deep goblets together.
Types: Ḥizma: I.1.C (Magen 2002:24, Fig. 2.17:1–6); City of David: 1.a.i.D (Cahill 1992:201).

Deep Goblets (Fig. 33:15, 16).— The complete goblets have a stemmed base, but all the vessels in the cave lacked the base. The deep cup of the goblet (depth up to 11 cm) has an externally profiled rim with multiple incised ridges. The decoration below the rim varies, including additional ridges and grooves and an external ridged waist on the lower third of the cup. The very smooth, straight walls curve down below the waist ridge to form a hemispherical base. Complete goblets including the bases are rare, with an example from the Jewish Quarter excavations (Avigad 1983:182, Photo 209.2). The shape of these goblets recalls ceramic forms (Magen 2002:72), or possibly glass goblets.
Types: Ḥizma: I.1.C (Magen 2002:24, Fig. 2.17:1–6); Temple Mount: I.1.A.vi (Magen 2002:71–72, Fig. 3.15:1–3); City of David: 1.a.ii (Cahill 1992:204).

Fig. 33. Lathe-turned chalk cups and goblets.

◂ **Fig. 33**

No.	Vessel Type	Unit	Locus	Basket	Parallels		
					Ḥizma (Magen 2002)	Temple Mount (Magen 2002)	City of David (Cahill 1992)
1	Straight-walled cup	U1	102	1032	I.1.B, Fig. 2.14:1	I.1.B	1.a.i.J
2	Straight-walled cup	U2	201	2001	I.1.B	I.1.B, Fig. 3.13:4, 5	1.a.i.J, Fig. 16:16
3	Straight-walled cup	U2	201	2001	I.1.B, Fig. 2.14:2	I.1.B	1.a.i.J
4	Straight-walled cup	U2	201	2001	As No. 3	I.1.B	1.a.i.J, Fig. 16:7
5	Straight-walled cup	U2	201	2001	I.1.B		
6	Straight-walled cup	U2	201	2001	I.1.B	I.1.B	1.a.i.J
7	Sloping-walled cup	U2	201	2001/5		I.1.A.iii.Form 3, Fig. 3.5:9	1.a.i.H, Fig. 16:1
8	Hemispherical cup	U1	105	1023/1	I.1.A.iii	I.1.A.vi, Fig. 3.13:2, 3	1.a.i.I, Fig. 16:2
9	Hemispherical cup	U2	201	2001	I.1.A.iii, Fig. 2.11:2	I.1.A.vi, Fig. 3.13:2	1.a.i.I, Fig. 16:2
10	Hemispherical cup	U2	201	2001	I.1.A.iii	I.1.A.vi, Fig. 3.13:3	1.a.i.I, Fig. 16:2
11	Hemispherical cup	U2	201	2001	I.1.A.iii, Fig. 2.11:4	I.1.A.vi	1.a.i.I
12	Deep cup with profiled rim	U2	201	2001	I.1.B, Fig. 2.14:4		1.a.i.K, Fig. 16:17–19
13	Shallow bowl-like goblet	U2	201	2001	I.1.C		1.a.i.D, Fig. 15:5
14	Shallow bowl-like goblet	U2	201	2001/7	I.1.C		
15	Deep goblet	U1	108	1068	I.1.C, Fig. 2.17:1	I.1.C, Fig. 3.15:1	1.a.ii, Fig. 16:20, 21
16	Deep goblet	U2	201	2001/6	I.1.C, Fig. 2.17:5	I.1.C, Fig. 3.15:1	1.a.ii, Fig. 16:20, 21

Stoppers (Fig. 34).— Stoppers have round flat disc tops, with an incised groove, and a tapered conical plunger. One stopper has a narrow disc top and a long projectile-like plunger (Fig. 34:1), and the other has a wide disc top and a short, tapered plunger (Fig. 34:2). The stoppers were used as plugs or lids for narrow-necked bottles and other vessels, the groove probably used to attach a cord to secure the stopper to the vessel. As chalk vessels with narrow necks fitting these stoppers are not known, it seems that the stoppers were not made for stone vessels but were probably used to plug pottery jars, bottles and jugs. Magen and Cahill subdivide this type according to shape. Interestingly, Reich (2003:8.3:8, 9) and Geva (2010:172) illustrate the stoppers upside-down, suggesting that the plug is a handle.

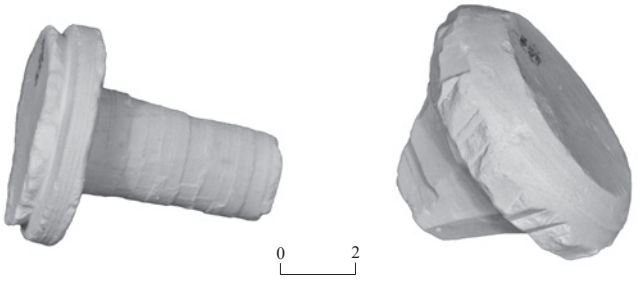


Fig. 34. Stoppers.

No.	Unit	Locus	Basket	Parallels		
				Ḥizma (Magen 2002)	Temple Mount (Magen 2002)	City of David (Cahill 1992)
1	U1	108	1039	I.1.E	I.1.G.Form 2, Fig. 3.25:9	1.a.iii.A (Fig. 17:1)
2	U1	108	1032	I.1.E, Fig. 2.19:8	I.1.G.Form 1, Fig. 3.25:8	1.a.iii.C, Fig. 17:3

Types: Ḥizma: I.1.E (Magen 2002:24, Fig. 2.19:7, 8); Temple Mount: I.1.G.Form 2 (Magen 2002:76–77, Fig. 3.25:8–11); City of David: 1.a.iii (Cahill 1992:204–205).

Cores (Figs. 35–39).— Thousands of chalk cores discarded from small lathe-turned vessels composed the mass of the assemblage (Fig. 35). The vessel interior was cut from the top with the lathe blade, forming channels around the central block, which was then detached by snapping it out of the vessel base. The detachment of the core would often cause the vessel to break, thus accounting for the many wasters. The cores were usually cylindrical or conical, with striations caused by the blade on the stone, and the break was visible on the core base. Consequently, almost every discarded core represents a vessel that was supplied by the Mount Scopus cave for sale and use in Jerusalem and the vicinity.

Magen (2002:32–33) proposed a sub-typology for the vessel cores, even suggesting specific vessel types based on the cores. However, without a detailed understanding of the manufacturing process, defining vessel types based on specific core types remains speculative. Nonetheless, the cores collected in the excavation were counted, following Magen's typology: Form 1, cylindrical cores tapering toward the bottom (Figs. 36:1; 37); Form 2, cylindrical cores possibly from mugs (Fig. 36:2); Form 3, flattened conic cores (Figs. 36:3; 38); Form 4, various core shapes showing the pivot point attached to the lathe (Figs. 36:4; 39); Form 5, cores broken during lathing but still attached to the vessel base (Fig. 36:5); and Form 6, a single mug core showing the combined use of lathe-turning on the interior and hand-carving on the exterior (Fig. 36:6).

Types: Ḥizma: I.1.G.Forms 1–4, and I.1.H (Magen 2002:32–33, Fig. 2.24; 2.28a; Temple Mount: I.1.H (Magen 2002:77–78, Fig. 3.29); City of David: 1.a.vi.B (Cahill 1992:206–207).

Fig. 35. Chalk cores from various vessels.

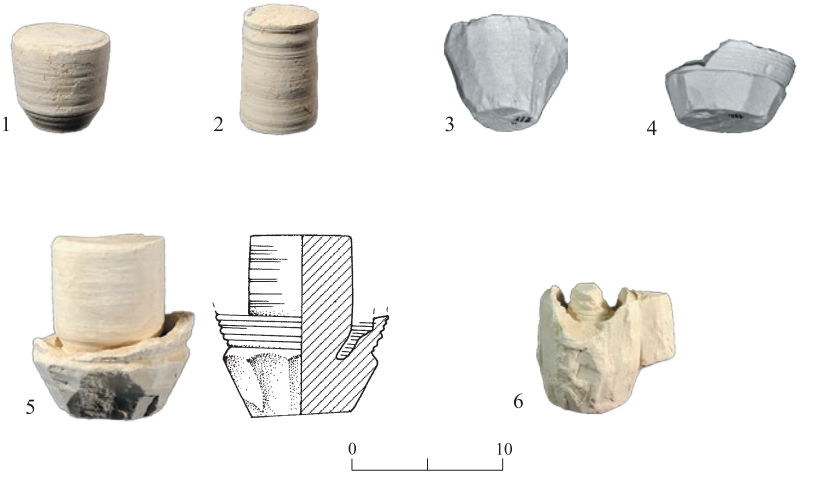


Fig. 36. Chalk cores, Forms 1–6.

No.	Description	Parallels		
		Ḥizma (Magen 2002)	Temple Mount (Magen 2002)	City of David (Cahill 1992)
1	Form 1, cylindrical core	I.1.G.Form 1, Fig. 2.24:1, 2	I.1.H	1.a.vi.B, Fig. 17:22
2	Form 2, small cylindrical core	I.1.G.Form 2	I.1.H	1.a.vi.B
3	Form 3, flattened conic core	I.1.G.Form 3, Fig. 2.24:8–11	I.1.H	1.a.vi.B
4	Form 4, core with lathe pivot point	I.1.G.Form 4, Fig. 2.24:12–15	I.1.H	1.a.vi.B
5	Form 5, core still attached to vessel	I.1.G.Form 1, Fig. 2.24:3		
6	Form 6, mixed-technique core	I1.H, Fig. 2.28:a, b		

Fig. 37. Form 1, cylindrical cores tapering toward the bottom.

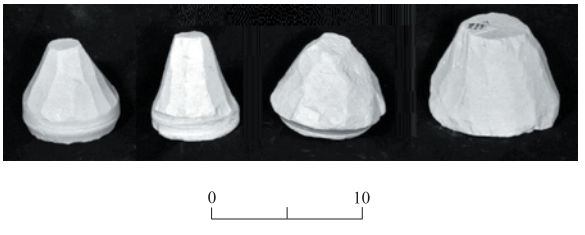


Fig. 38. Form 3, flattened conic cores.

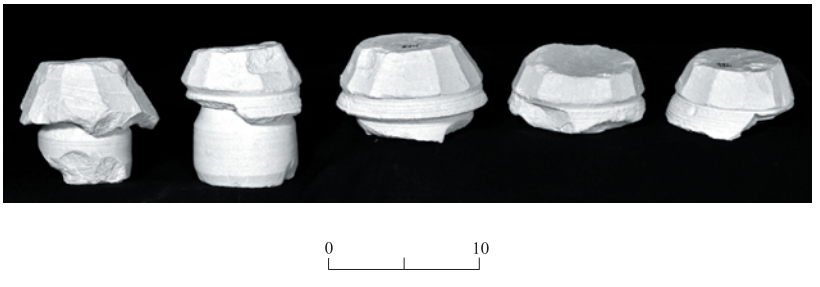


Fig. 39. Form 4, various core shapes showing the pivot point attached to the lathe.

Large Lathe-Turned Vessels (Fig. 40)

Kraters (Fig. 40:1–4).— Large lathe-turned kraters, modeled after *calyx* kraters (Magen 2002:88) are a *fossile directeur* of the late Second Temple period. Magen (2002:80–90) identified three variations, of which only the barrel shape (Form 1) is represented in the Mount Scopus assemblage. The kraters have wide sculpted rims (diam. 35–45 cm) with a variety of incised ridges and grooves forming a triangular profile just below the exterior

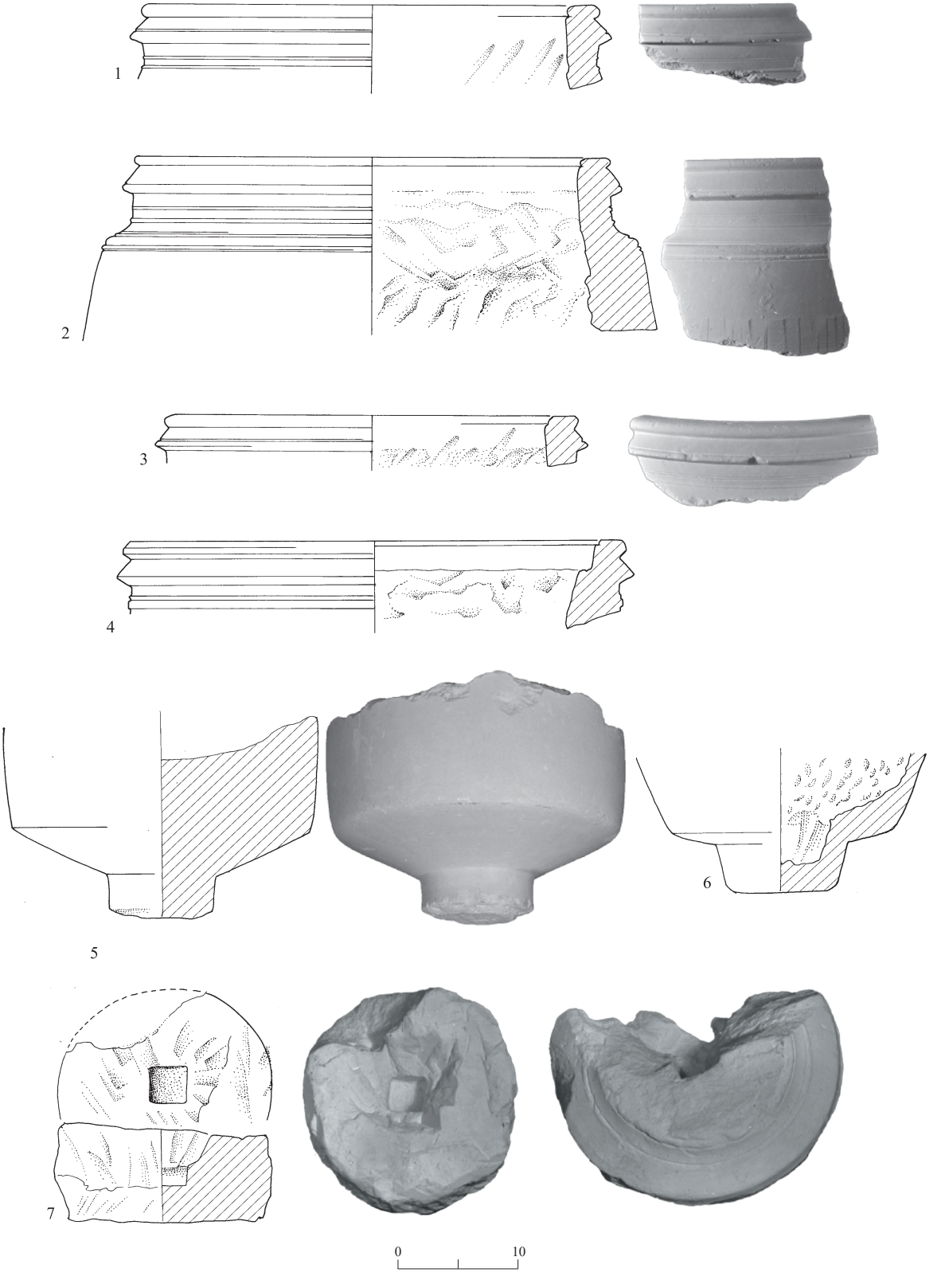


Fig. 40. Large lathe-turned vessels.

◂ **Fig. 40**

No.	Vessel Type	Unit	Locus	Basket	Parallels		
					Ḥizma (Magen 2002)	Temple Mount (Magen 2002)	City of David (Cahill 1992)
1	Krater	U1	105	1020/2	I.2.B, Fig. 2.31:1	I.2.B.i.Form 1, Fig. 3.34:2, 4	1.b.i, Fig. 18:3
2	Krater	U1	105	1020/1	As No. 1	As No. 1	As No. 1
3	Krater	U1	105	1028	As No. 1	As No. 1	As No. 1
4	Krater	U1	108	1032/2	As No. 1	As No. 1	As No. 1
5	Holemouth jar base					I.2.C, Fig. 3.51:1, 2	
6	Holemouth jar base					As No. 5	
7	Large vessel base with lathe socket				I.2.A, Figs. 2.29, 2.30		

rim. A hand-carved strip on the exterior wall of one krater (Fig. 40:2) was left for handles, while another vessel (Fig. 40:4) has an internal ledge for a lid. It is noteworthy that while the external face was cut on the lathe, the interior was hand-cut leaving clear chisel markings inside the vessels. The rims and walls of complete finished vessels are often decorated with fluted patterns, and there are a series of ridges and grooves below the rim and above the distinct body carination. The rest of the body is smooth and barrel-shaped, and the vessel is set on a high trumpet base, again decorated with incised lines.

The kraters are important for the dating and function of the late Second Temple period layers excavated south of the Temple Mount (Magen 2002:63–115) and in the Jewish Quarter (Avigad 1983:127–129, 174–183; Geva 2006a:222–223; 2010; 2014). These vessels have been extensively discussed in the literature and have often been misidentified as *qalal*, a large stone container mentioned in the rabbinic sources (Mishnah, *Parah* 3:3; Brand 1953:496–498; Avigad 1983:174–175; Magen 2002:141–144; Adler 2011:210–212). Suggestions concerning the function of these vessels have also been widely discussed, including as covered containers for ritually pure water or wine (Rahmani 1974:68), as prescribed in the Mishnah (*Yadaim* 1:2; *Kelim* 10:1, and as implied in the New Testament, in the water-to-wine miracle at Cana (John 2:6).
Types: Ḥizma: I.2.B (Magen 2002:38–39); Temple Mount: I.2.B.i.Form 1 (Magen 2002:80–90, Fig. 3.34; 3.38; 3.44); City of David: 1.b.i (Cahill 1992:207–209).

Holemouth Jars (Fig. 40:5, 6).— Two bases of rare holemouth jars were found, the complete vessels having a biconical shape with a narrow knob-like base requiring a stand to stabilize the vessel. A few vessels were retrieved from the Jewish Quarter Burnt House (Geva 2010:169, Fig. 5.9) and Qalandiya (Magen 2004:94, Pl. 12:10).
Types: Temple Mount: I.2.C (Magen 2002:90, Fig. 3.51:1, 2).

Bases (Fig. 40:7).— Two round chiseled bases with a central square socket to attach them to the lathe were retrieved. Similar bases of large lathe-turned vessels were found at Ḥizma. *Types*: Ḥizma: I.2.A (Magen 2002:38, Figs. 2.29; 2.30).

Hand-Carved Vessels

Several vessel types were hand-carved using a chisel or adze, these tools leaving distinctive rectangular-cut facets on the vessel surface. Some vessels were subsequently polished to remove the striations left by the chiseling, but all the Mount Scopus vessels still clearly displayed the marks.

Mugs (Figs. 41; 42:1–7).— The *fossile directeur* hand-carved mug-like containers were often mistakenly designated 'measuring cups,' following a proposal by Ben-David (1969) to identify them with cups used to measure the Mishnaic *log* (*Menaḥoth* 9:2). A metrological study of complete mugs from Masada and other sites has since shown that their volume varies greatly from c. 20 to 1000 ml (Reich 2007).

The mugs were cut from a single stone block into a cylindrical shape with neat chisel-cut facets all around the vessel from top to bottom, forming a beer-mug shape, with walls narrowing to the top, forming a simple rim (Fig. 41). The mugs presented here are 8–16 cm high, and their rim diameter ranges from 7–12 cm. The mugs have one (Fig. 42:1–5, 7) or two (Fig. 42:6) vertical rectangular handles; the finished handles are usually pierced. The hand-chiseled working on the interior is clearly visible. One mug exhibits a mixed technique, hand-carved on the exterior, with a lathe-worked core (Fig. 42:7; see also 36:6). These mugs are ubiquitous in all Early Roman settlements in the Jerusalem area, and in Jewish settlements in other areas of the country.

Fig. 41. Hand-carved mugs.

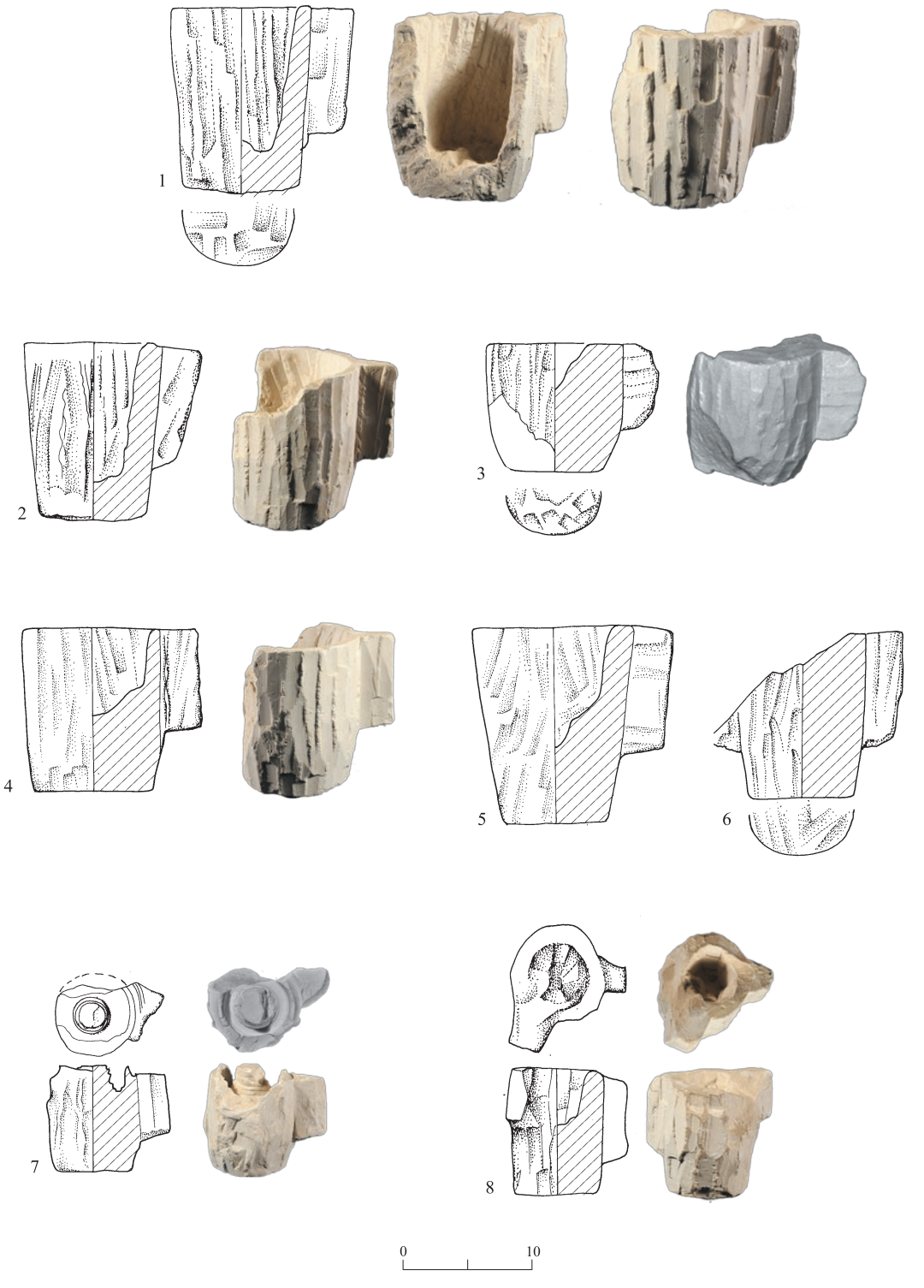


Fig. 42. Hand-carved mugs (1–7) and pitcher (8).

◂ **Fig. 42**

No.	Vessel Type	Parallels		
		Ḥizma (Magen 2002)	Temple Mount (Magen 2002)	City of David (Cahill 1992)
1	Mug	II.A.Form 1, Fig. 2.33:1	II.A, Fig. 3.60	2.a.i.A.1, Fig. 20:3
2	Mug	As No. 1	As No. 1	As No. 1
3	Mug	II.A.Form 1, Fig. 2.33:4	As No. 1	As No. 1
4	Mug	As No. 1	As No. 1	As No. 1
5	Mug	As No. 1	As No. 1	As No. 1
6	Mug, two handles	II.A.Form 1	II.A	2.a.i.A.1
7	Mug, mixed technique (see also Fig. 36:6)	II.A.Form 1, Fig. 2.33:3, 5	As No. 1	2.a.i.A.2, Fig. 20:2
8	Pitcher	II.A.Form 1, Fig. 2.34	II.A	2.a.i.B, Fig. 20:6

Types: Ḥizma: IIA.Form 1 (Magen 2002:40, Fig. 2.33); Temple Mount: II.A (Magen 2002: 97–99, Fig. 3.60:1, 2); City of David: 2.a.i.A.1 with one handle, 2.a.i.A.2 with two handles (Cahill 1992:210).

Pitcher (Fig. 42:8).— Pitchers are similar to mugs, differing only in the spout attached to the rim. Although unfinished, the pitchers retrieved from the cave were recognized by the rough extension of a side-piece for a spout, larger than needed for a handle, and located at a right-angle clockwise of the handle.
Types: Ḥizma: II.A.Form 1 (Magen 2002:40, Fig. 2.34); Temple Mount: II.A (Magen 2002:97–99, Fig. 3.60:3, 4); City of David: 2.a.i.B (Cahill 1992:210–211).

Large Hand-Carved Bowls
Globular Bowl (Fig. 43:1).— A unique, hand-carved globular bowl (Unit 1; L108, B1032/5; waist diam. 25 cm, rim diam. 18 cm) has thick walls (3 cm) curving into an everted shelf rim and two ledge handles cut above the waist. The exterior surface is smoothed with a hand-carved band at the height of the handles. No parallels for this beautiful vessel are known, although it resembles lathe-turned holemouth jars found at Qalandiya and Jerusalem (Magen 2002:93, Figs. 3.51; 3.53). Based on these parallels, the hand-carved band was simply the area unworked to allow the manufacture of protruding handles.

Bowls and Basins (Figs. 43:2–5; 44).— The large hand-carved bowls and basins have thick walls, plain rims, flat bases and two ledge handles located on the rim exterior. There are two sub-forms, one with gently curved walls (Fig. 43:2–4) and the other with straightish walls (Figs. 43:5; 44). The rim diameter of the vessels varies greatly from 16 to 34 cm.

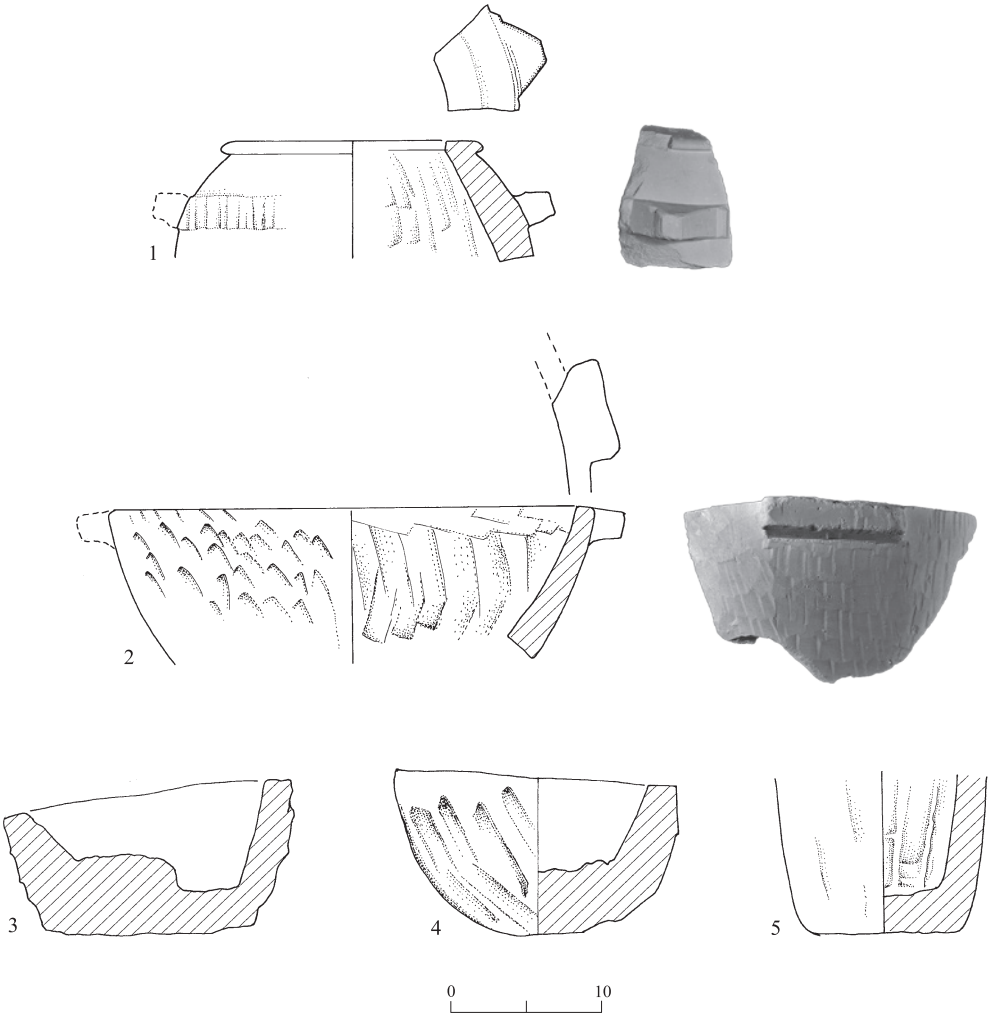


Fig. 43. Large hand-carved bowls.

No.	Vessel Type	Parallels		
		Ḥizma (Magen 2002)	Temple Mount (Magen 2002)	City of David (Cahill 1992)
1	Globular bowl			
2	Large bowl	II.B.i.Form 1	II.B.Form, Fig. 3.60:6	2.a.ii.A.2
3	Large bowl	As No. 2	As No. 2	As No. 2
4	Large bowl	As No. 2	As No. 2	As No. 2
5	Large bowl	As No. 2	As No. 2	As No. 2

Fig. 44. Large hand-carved bowls (1–4) and basins (5, 6).

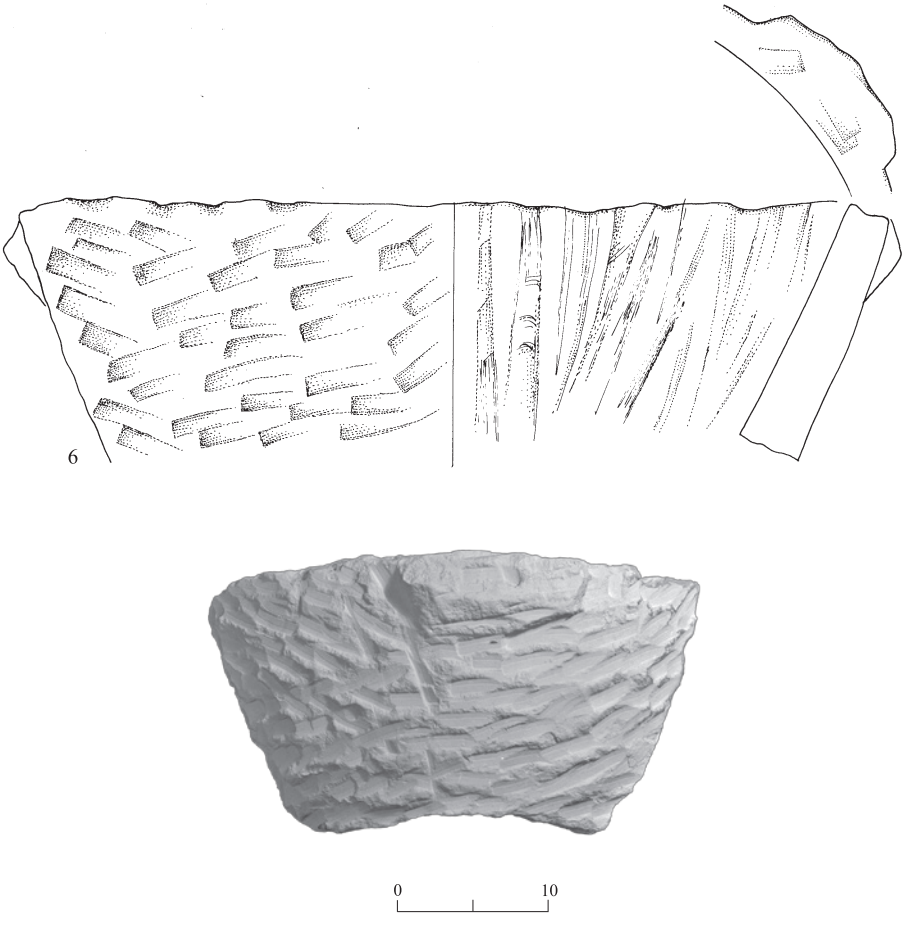


Fig. 44. (cont.).

No.	Vessel Type	Parallels		
		Ḥizma Type (Magen 2002)	Temple Mount (Magen 2002)	City of David (Cahill 1992)
1	Bowl	II.B.i.Form 1	II.B.Form 1	2.a.ii.A.2, Fig. 20:8
2	Bowl	II.B.i.Form 1, Fig. 2.40:3	II.B.Form 1 (Fig. 3.60:8)	
3	Bowl	II.B.i.Form 1	II.B.Form 1	2.a.ii.A.2
4	Bowl	II.B.i.Form 1	II.B.Form 1	
5	Basin	II.B.i.Form 3, Fig. 2.44:1		
6	Basin			

Fig. 45. Lids placed on large bowls.

Types: Ḥizma: II.B.i.Form 1 (Magen 2002:46, Fig. 2.40:1–6); Temple Mount: II.B.Form I (Magen 2002:100, Fig. 3.60:6); City of David: 2.a.ii.A.2 (Cahill 1992:212).

Lids (Figs. 45; 46:1, 2).— The unfinished, broken lids illustrated were flat and circular and were produced from rough chisel-cut discs (diam. 18–19 cm) with a knob handle on top. Relatively rare complete lids have pierced rectangular handles.
Types: Ḥizma: I.1.D (Magen 2002:24, Fig. 2.19:2); Temple Mount: I.1.F.Form 3 (Magen 2002:76, Fig. 3.25:5, 6); City of David: 2.a.iii.B (Cahill 1992:213).

Volume-Measuring Devices (Fig. 46:3, 4).— These rather strange artifacts have an almost square base attached to a tapered conical foot. One example was discarded prior to the removal of the interior (Fig. 46:3), while the other was gouged out (Fig. 46:4). Initially identified as lids for large vessels, later excavations at Yafo defined these items as volume-measuring devices (Amit and Adler 2018:545–546, Fig. 14.5:75). Complete examples were found at other sites, notably in the Jewish Quarter Burnt House (Geva 2010:178, Pl. 15.14:2) and at nearby Shu‘afaṭ (Reich, Amit and Bar-Nathan 2014:63).

Bases with Lathe Sockets (Fig. 46:5, 6).— These chalk blocks, with a square socket, were cut for attachment to iron lathe pivots (see *Technological Aspects*, below).

Box (Fig. 46:7).— A box fragment.

Ossuaries and Ossuary Lids (Fig. 47).— Chalk ossuaries for the secondary burial of bones of the deceased were common in late Second Temple period tombs (Rahmani 1994:21–24; Magen 2002:125–136; Kloner and Zissu 2007:120), but their specific production sites were not known. In the comprehensive corpus of stone ossuaries, Rahmani (1994:3) suggested that the ossuaries came from the quarries at Ḥizma and Abu Dis/Beit Sajur, but ossuary

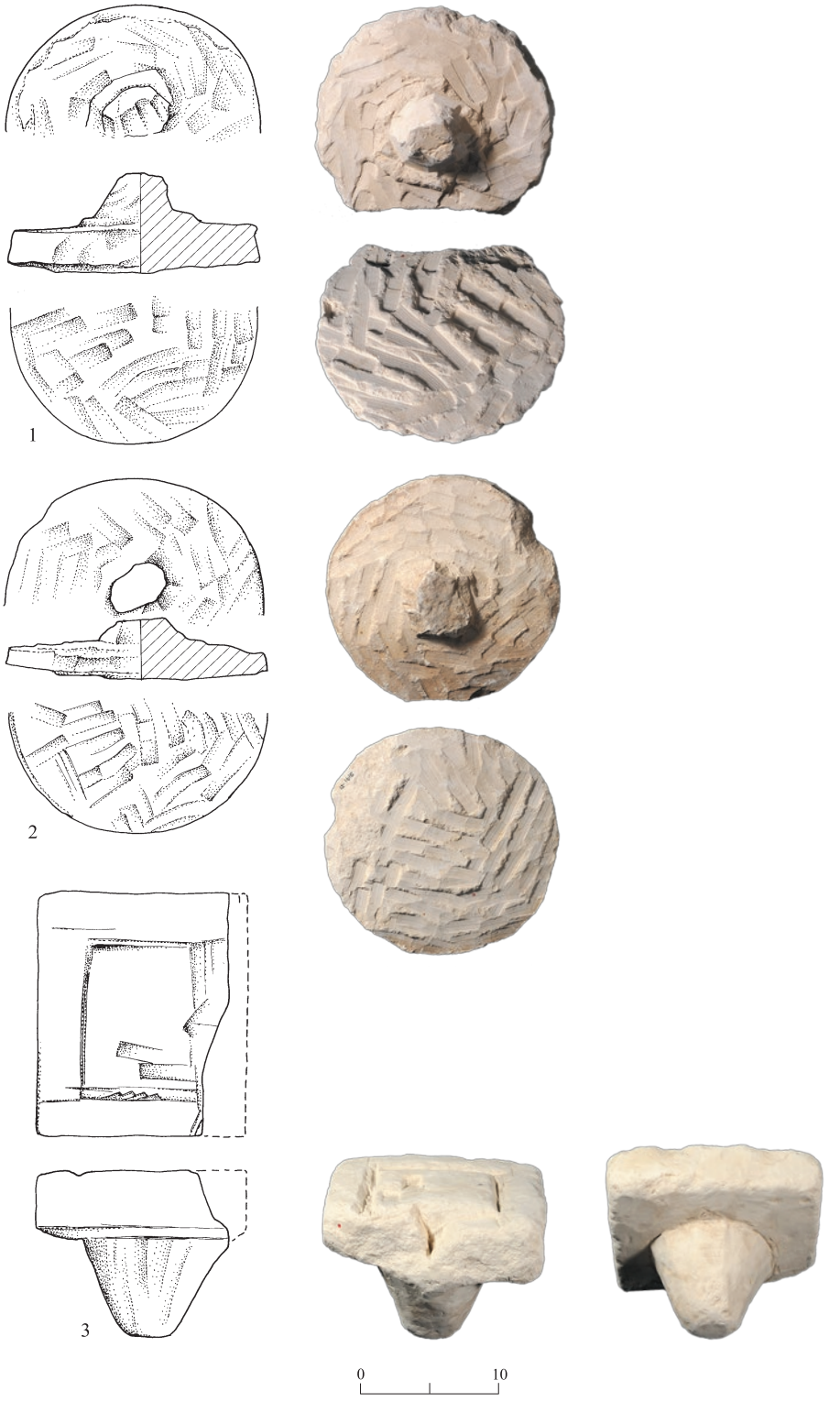


Fig. 46. Lids (1, 2), volume-measuring devices (3, 4), lathe bases (5, 6) and box? (7).

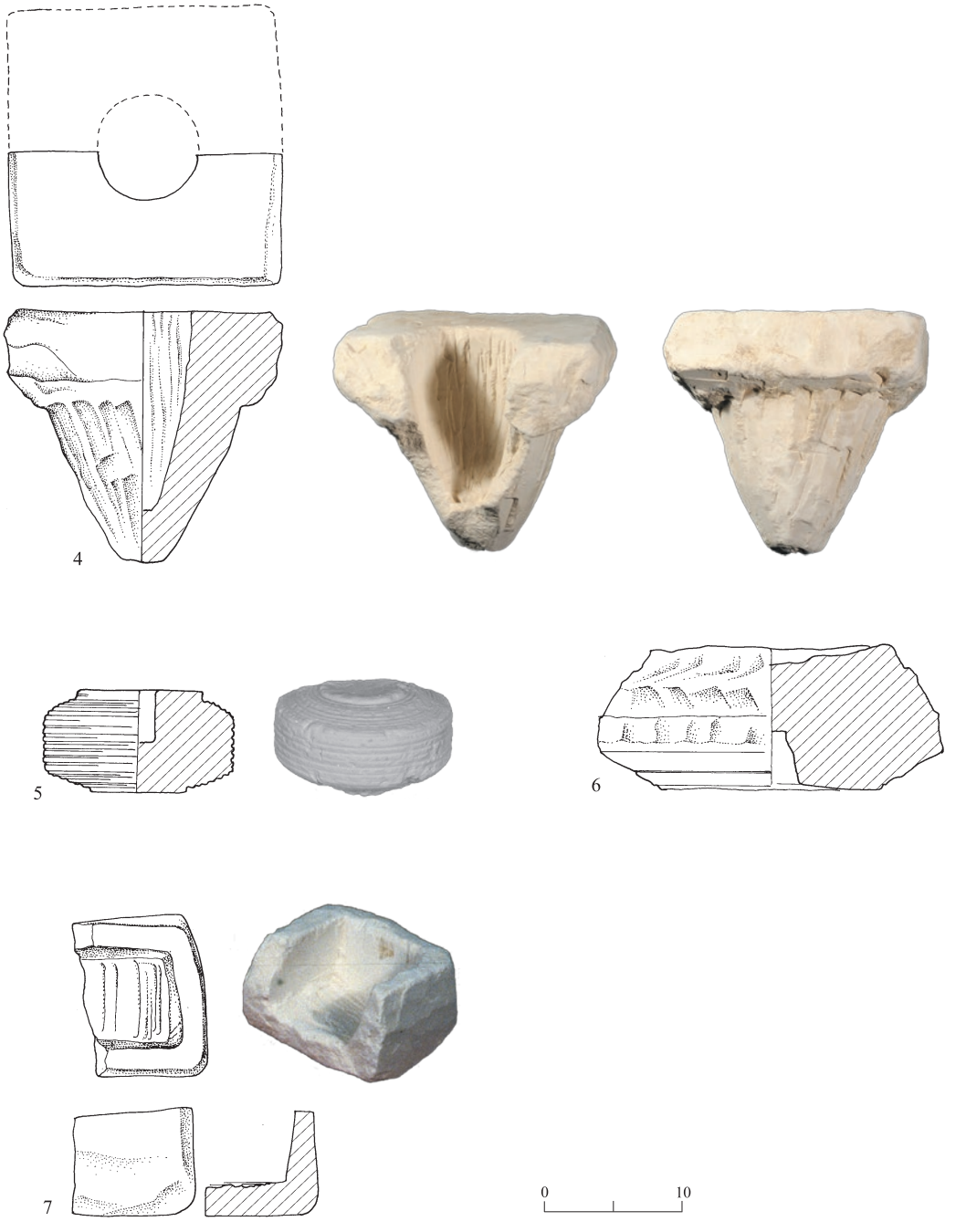


Fig. 46. (cont.).

◂ **Fig. 46**

No.	Vessel Type	Unit	Locus	Basket	Parallels		
					Ḥizma (Magen 2002)	Temple Mount (Magen 2002)	City of David (Cahill 1992)
1	Lid				I.1.D, Fig. 2.19:2	I.1.F.Form 3, Fig. 3.25:6	1.a.iv
2	Lid				As No. 1	As No. 1	As No. 1
3	Volume-measuring device						
4	Volume-measuring device						
5	Lathe block with socket	U2	202	2002			
6	Lathe block with socket						
7	Box?	U2	204	2004/1			

Fig. 47 ▸

No.	Unit	Locus	Basket
1	U12	1207	12055
2	U12	1207	12055
3			
4			
5			
6	U1	105	1023
7	U12		
8	U12	120	1201/1
9	U12		

wasters were not found in these assemblages (Magen 2002:133). The find of some blocks of the same dimensions as ossuaries at Jebel Mukabbar (Rahmani 1969), Tel el-Ful (Gibson 1996:18*) and Ḥizma (Magen 2002:133), was proffered as evidence for the ossuary industry. Rahmani (1994:3) proposed that ossuaries were manufactured at the chalk quarries, as the tool marks on the ossuary bases were similar to those on unfinished chalk vessels at these sites. Broken ossuaries pieces were uncovered for the first time in the Mount Scopus cave, indicating that ossuaries were produced at the same site as the vessels. Moreover, the lighter weight of a finished ossuary, rather than of an unworked stone block, would favor production at the quarry.

Broken unfinished ossuary lids are illustrated. Whilst various lid types are found in the tombs, these lids are of the flat and vaulted types (Rahmani 1994:4–6) that were either placed on the box or slid into a shelf insert for sealing. Rahmani (1994:7–11) and Magen (2002:133–135) provide detailed discussions on the techniques of ossuary production.

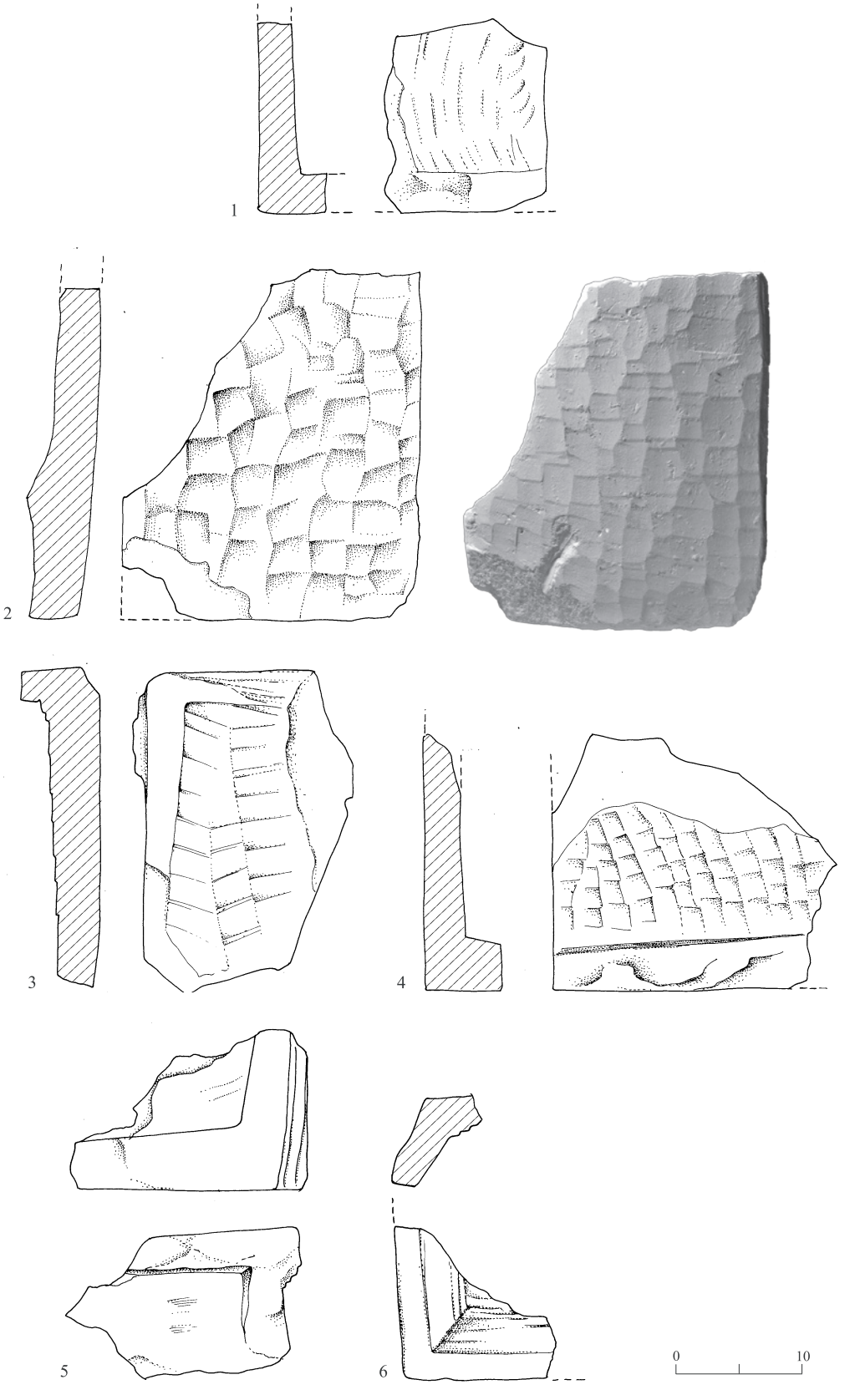


Fig. 47. Ossuary lids.

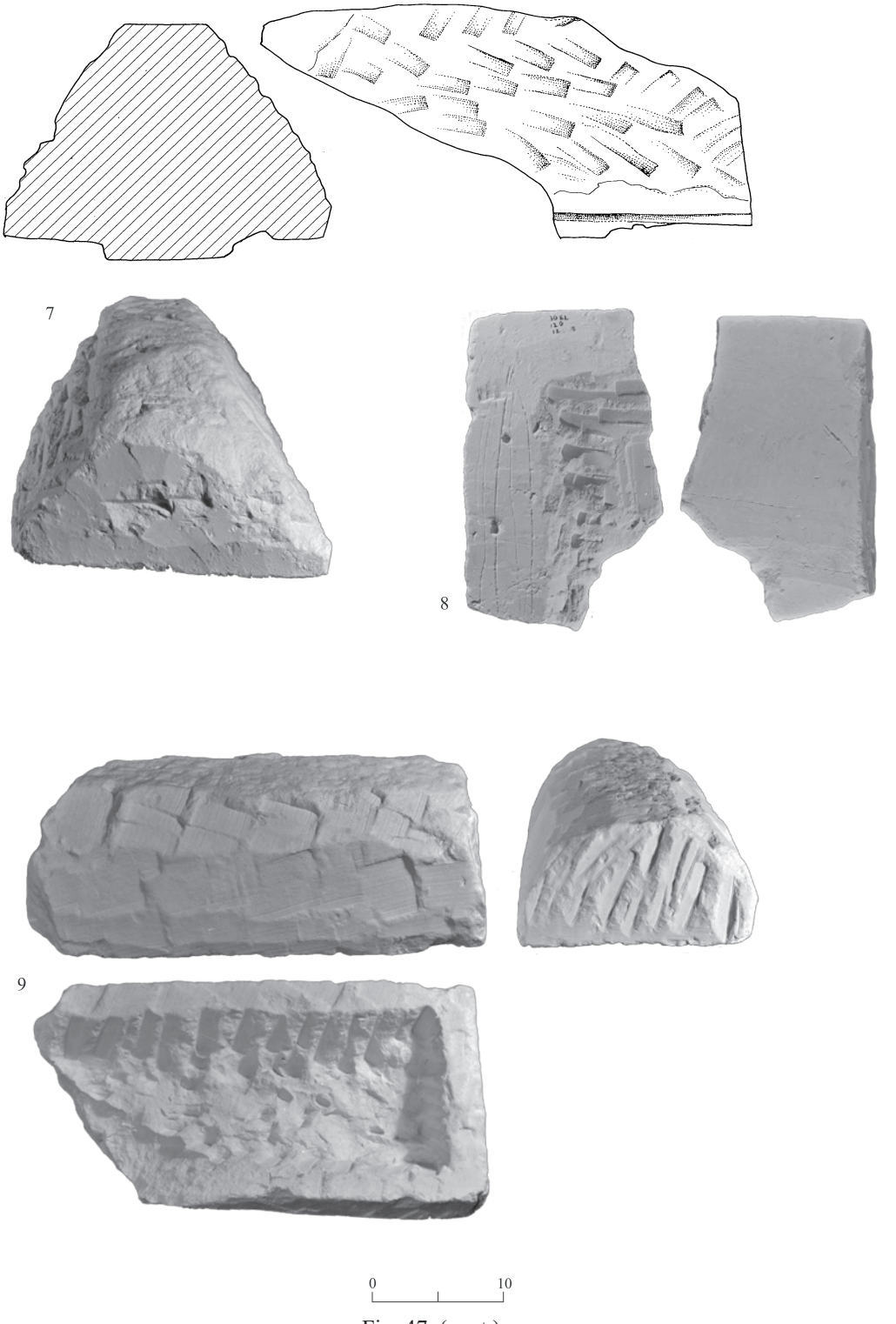


Fig. 47. (cont.).

Quantitative Analysis

Quantitative analysis has been a major component of pottery reports for decades, its importance clearly appreciated for the understanding of phasing, typological development, geographical distribution and functionality. Chalk vessels, appearing in smaller quantities and at fewer sites, have rarely been afforded similar treatment. However, the large number—literally thousands—of chalk vessels retrieved from the Mount Scopus cave lends itself well to a statistical analysis. Statistical analyses of the chalk vessels were conducted at Gamla in the Golan (Gibson 2003:305; 2016:76–79), Nabratein in Galilee (Reed 2003:394–395), the Jerusalem Tyropoeon Valley (Giv'ati Parking Lot excavation; Zilberstein and Nissim Ben Efraim 2013:213, 225–288) and the Jerusalem City of David city dump (Gadot and Adler 2016). The City of David study specifically aimed at comparing the relative frequency of different types, the ratio of chalk vessels to pottery vessels, and understanding the way that Halakha, the Jewish law, related to the frequency of use of pottery and chalk vessels (Gadot and Adler 2016:205). The statistical quantification of the finds from the Mount Scopus cave sheds light on the differences between a production site and consumption sites, specifically in Jerusalem and Gamla.

Regarding number-crunching, the caveats applicable to pottery quantification also apply here. A simple count of sherds or fragments can be misrepresentative, varying widely due to differences in collection procedures (Gadot and Adler 2016:210, n. 18), counting systems, breakage and reuse. These limitations apply specifically when comparing results from different sites. At Gamla (Gibson 2003:305; 2016:76–79), Nabratein (Reed 2003:394–395) and the Tyropoeon Valley (Zilberstein and Nissim Ben Efraim 2013:213, 225–288), all the diagnostic fragments were counted, whereas at the Jerusalem city dump (Gadot and Adler 2016:210), all the fragments were counted. In the Mount Scopus cave, a simple count of the diagnostic fragments was employed, as well as a quantification of the fragments using the Estimated Vessel Equivalent system (EVE) described by Orton, whereby the percentage of the diagnostic rim is measured and classified typologically, and the sum of these percentages is entered into a chart of the resulting vessel equivalents (Orton 1980:165–167; Orton, Tyers and Vince 1993:166–173). The EVE method enabled the assessment of the prevalence of specific types and the rarity of others, allowing for the higher levels of breakage of the more delicate vessels, but due to the limitations of the method (Garrigós and Fernández 2017:30–42), a simple diagnostic rim count was also employed, giving expression to all the chalk-vessel types. In addition, since this is a production site, the cores, almost all complete, were also counted with a simple count. Some hand-carved vessel types, including stoppers, lids, bowls and basins, that were found in very small numbers, were clustered together.

The data, showing the type-distribution in the Mount Scopus cave, and comparing it with the quantified data from the other sites, is presented in two tables (Tables 1, 2) and four graphs (Figs. 48–51). The Mount Scopus sample comprises 7106 chalk artifacts, the largest assemblage ever assessed quantitatively.

Table 1. Quantities and Percentages of Mount Scopus Chalk Vessel Types (N =7106)

Manufacturing Technique	Chalk Vessel Type	Ḥizma Type (Magen 2002)	Temple Mount Type (Magen 2002)	City of David Type (Cahill 1992)	N	% Total Including Cores	% Total Without Cores	EVE Total Without Cores	EVE % Without Cores
Small Lathe	Shallow bowl, straight sides	I.1.A.i. Form 1	I.1.A.iii. Form 1	1.a.i.F	278	3.91	19.21	46.250	14.00
	Shallow bowl, sloping sides	I.1.A.i. Form 2	I.1.A.iii. Form 2		188	2.64	12.99	24.375	7.38
	Deep bowl	I.1.A.ii. Form 2	I.1.A.iii. Form 3	1.a.i.E	43	0.60	2.97	6.875	2.08
	Hemispherical bowl	I.1.A.iii	I.1.A.vi	1.a.i.I	638	8.87	44.09	107.250	32.39
	Bowls, other								
	Bowls, total				*1147*	*16.14*	*79.26*	*184.750*	*55.96*
	Cup, straight sides	I.1.B	I.1.B	1.a.i.J	3	0.04	0.21	22.875	6.93
	Cup, sloped side		I.1.A.iii. Form 3	1.a.i.H	57	0.80	3.94	0.375	0.11
	Cup, hemispherical	I.1.A.iii	I.1.A.vi	1.a.i.I	75	1.05	5.18	8.625	2.61
	Cups, total				*135*	*1.89*	*9.32*	*31.875*	*9.65*
	Shallow goblet	I.1.C	I.1.C	1.a.i.D	4	0.05	0.27	0.25	0.07
	Deep goblet			1.a.ii	45	0.63	3.11	7.875	2.38
	Goblets, total				*49*	*0.69*	*3.39*	*8.125*	*2.46*
	Stopper, short	I.1.E	I.1.G. Form 1	1.a.iii.D/E	25	0.35	1.73	25.000	7.57
	Stopper, long		I.1.G. Form 2	1.a.iii.A					
	Stoppers, total				*25*	*0.35*	*1.73*	*25.000*	*7.57*
	Lids				15	0.21	1.07	2.375	0.72
	Total Small Lathe				*1371*	*19.28*	*94.77*	*252.125*	*76.36*
Large Lathe	Krater	I.2.B	I.2.B.i. Form 1	1.b.i	24	0.34	1.66	24.000	7.27
	Total Large Lathe				*24*	*0.34*	*1.66*	*24.000*	*7.27*
Hand-Carved	Mugs	II.A Form 1	II.A	2.a.i.A.1/2	30	0.42	2.07	30.000	9.09
	Pitcher			2.a.i.B	7	0.10	0.48	7.000	2.12
	Stoppers								
	Lids								
	Other				17	0.24	1.17	17.000	5.15
	Total Hand-Carved				*54*	*0.75*	*3.73*	*54.000*	*16.36*

Table 1. (cont.)

Manufacturing Technique	Chalk Vessel Type	Ḥizma Type (Magen 2002)	Temple Mount Type (Magen 2002)	City of David Type (Cahill 1992)	N	% Total Including Cores	% Total Without Cores	EVE Total Without Cores	EVE % Without Cores
Cores	Cylindrical	I.1.G. Form 1	I.1.H	I.a.vi.B	4101	57.70			
	Small cylindrical	I.1.G. Form 2			1135	15.97			
	Conic	I.1.G. Form 3			27	0.38			
	With pivot marks	I.1.G. Form 4			163	2.29			
	With attached broken vessels				206	2.90			
	Total Cores				*5634*	*79.30*			
Ossuary pieces					25	0.35			
Total Artifacts					*7106*				
Total without cores					*1447*			*330.125*	

The extremely large number of cores (5634), representing over 79% of all the vessels, emphasizes strikingly the function of the site as a workshop for the production of chalk vessels, specifically for small lathe-turned bowls, cups and goblets (Figs. 48, 49). A comparison of the 5634 Mount Scopus cores and over 3000 Ḥizma cores (Magen 2002:32), totaling almost 9000 cores, to the negligible total of 24 cores found in the three consumption sites in the City of David—seven cores (1%) from the Jerusalem city dump (Gadot and Adler 2016:211), 16 cores (7%) from the Tyropoeon Valley (Zilberstein and Nissim Ben Efraim 2013:222), and one core from Shiloh's City of David excavations (Cahill 1992:213)—makes it evident that the chalk vessels were probably fabricated exclusively at the quarry sites. The assertion that the presence of a few cores provides evidence for chalk vessel production inside the city (Magen 2002:2, 77; Gibson 2003:289, 291), later reiterated by Gadot and Adler, based on seven cores and thirteen debitage pieces in the city dump (Gadot and Adler 2016:209), is not convincing. Cahill (1992:219) cautioned against identifying a site with a few cores as a production center. Indeed, the few cores and the debitage probably arrived together with the

Table 2. Comparative Quantities of Chalk-Vessel Types and Groups at Mount Scopus, the Jerusalem City Dump[i], the Tyropoeon valley[ii] and Gamla[iii]

Type and Groups	Mount Scopus					Jerusalem City Dump		Tyropoeon Valley		Gamla	
	N	%	% without cores	EVE without cores	% EVE	N	%	N	%	N	%
Hemispherical bowls	638	8.87	44.09	107.250	32.39	190	19	5	2		
Bowls	1147	16.14	79.26	184.750	55.96	461	46	23	10	110	22.60
Cup, straight sides	3	0.04	0.21	22.875	6.93	84	8	4	2		
Cups	135	1.89	9.32	31.875	9.65	84	8	4	2		
Goblets	49	0.69	3.39	8.125	2.46	13	1			13	2.70
Stoppers	25	0.35	1.73	25.000	7.57	10	1				
Lids	15	0.21	1.07	2.375	0.72	8	1				
Small lathe, total	*1371*	*19.28*	*94.77*	*252.125*	*76.36*	*493*	*49*	*26*	*12*	*166*	*34.10*
Krater	24	0.34	1.66	24.000	7.27	53	5	99	44		
Large lathe, total	*24*	*0.34*	*1.66*	*24.000*	*7.27*	*61*	*6*	*117*	*52*		
Mugs	30	0.42	2.07	30.000	9.09	364	36	52	23	234	48.10
Hand carved, total	*54*	*0.75*	*3.73*	*54.000*	*16.36*	*407*	*41*	*64*	*29*	*321*	*65.90*
Cores	5634	79.30				7	1	16	7	3	
Total artifacts	*7106*	*100.00*	*100.00*	*330.125*	*100.00*	*1003*	*100*	*223*	*100*	*487*	*100.00*

[i] Gadot and Adler 2016
[ii] Zilberstein and Nissim Ben Efraim 2013
[iii] Gibson 2016

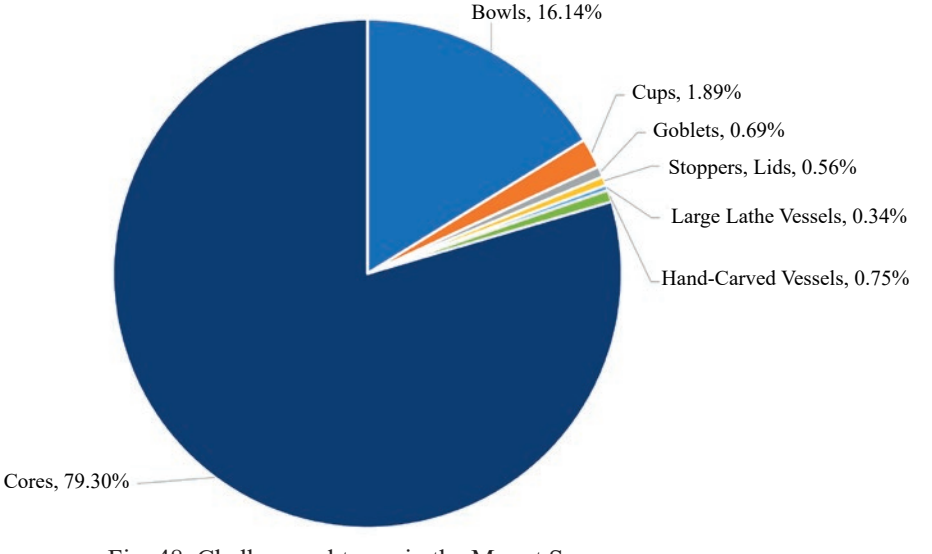


Fig. 48. Chalk-vessel types in the Mount Scopus cave.

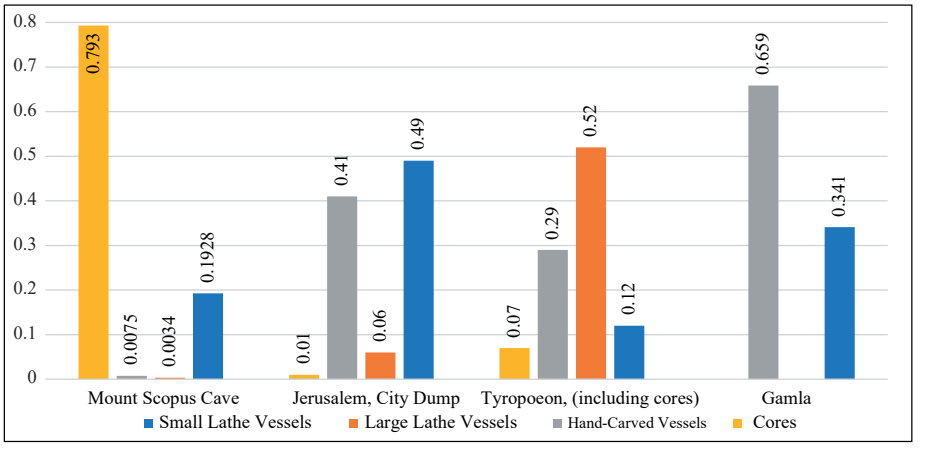


Fig. 49. Chalk vessel types in Mount Scopus cave, Jerusalem city dump, Tyropoeon Valley and Gamla.

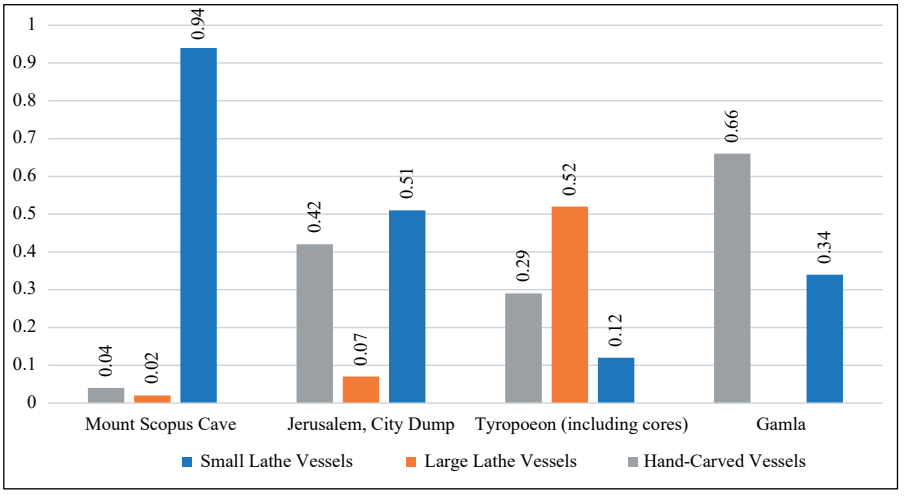


Fig. 50. Chalk vessel types without cores in Mount Scopus cave, Jerusalem city dump, Tyropoeon Valley and Gamla.

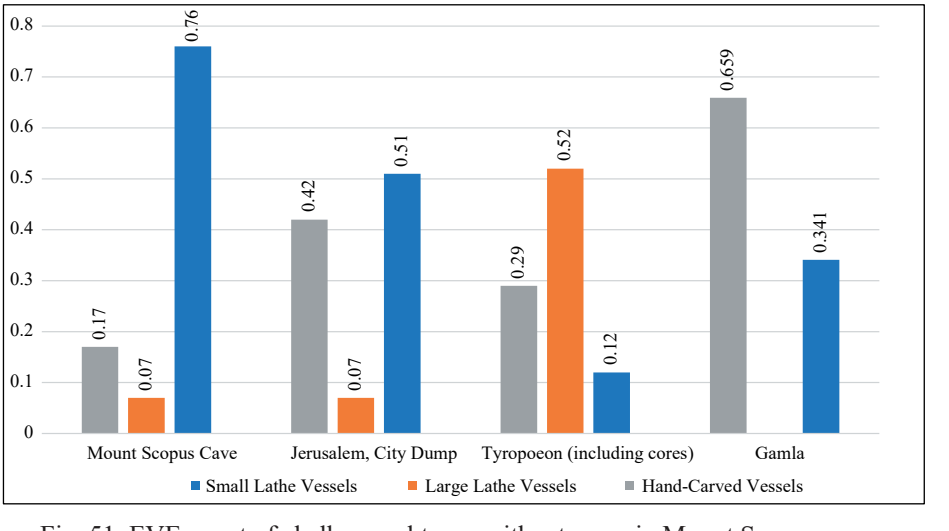


Fig. 51. EVE count of chalk-vessel types without cores in Mount Scopus cave, Jerusalem City dump, Tyropoeon Valley and Gamla.

finished vessels from the Ḥizma and Mount Scopus workshops. Amit (2010:56) noted the economic and ecological advantages of manufacturing vessels at the quarry site, reducing transportation costs and leaving the waste and dust at the production site.

To compare the quantities of the chalk vessel types at Mount Scopus with the vessel types found at the consumption sites in Jerusalem and Gamla (Gibson 2016), we detracted the 5634 cores from the assemblage, leaving 1472 vessel fragments (Fig. 50). In addition, the comparison of the simple count of the broken vessel fragments with the EVE weighted results, showed that the simple count over-represented some vessel types (Fig. 51). According to the simple count, almost 95% of the vessels were small lathe-turned vessels, but this number dropped to 76% when the count was EVE weighted, as smaller vessels break more easily and into smaller fragments during production. Most of these vessels (79%/56% EVE) were bowls of various types, the most common being hemispherical bowls (44%/33% EVE). These figures align well with the percentages of small lathe-turned vessels in the Jerusalem dump (49%), but differ significantly from the Tyropoeon Valley (12%) and the Gamla (34%) assemblages. The Mount Scopus small lathe-turned vessels also included many shallow bowls with straight (19%/14% EVE) and sloping walls (13%/7% EVE) and deep bowls (3%/2% EVE). Various cups (9%/10% EVE) and goblets (3%/3% EVE) also appeared in significant numbers, a comparison to the other sites precluded by the different typological classifications.

The large lathe-turned vessels (24) and the hand-carved vessels (54) appear in relatively small numbers at Mount Scopus. Large lathe-turned vessels, including kraters, represent less than 2% of the vessel fragments, or 7% EVE, the difference explained by the lower breakage rate and larger fragments of the heavier vessels. The small percentage matches the data from the Jerusalem city dump, and the few kraters from the Galilee (Reed 2003:392–401) and Gamla (Gibson 2016:77), where these vessels are considered luxury items. However, it differs significantly from the Tyropoeon Valley, where kraters comprised 44% and other large lathe-turned vessels comprised 12% of the assemblage, and probably also from the Jewish Quarter, where kraters are one of the most common forms in the chalk vessel assemblage (Geva 2006a:222; 2010:167–169). Geva (2010:155), and Gadot and Adler (2016:213), attributed the prevalence of kraters in Jerusalem residential sites, as opposed to their small representation in the dump, to a low breakage rate as these large vessels were rarely moved.

Hand-carved vessels, mostly mugs, comprised only 3.7%/16.4% EVE of the Mount Scopus assemblage, as opposed to 41% at the Jerusalem dump, 29% in the Tyropoeon Valley, and 66% at Gamla. Geva (2010:164) indeed observed that mugs are the most common chalk vessel in late Second Temple period Jerusalem. The explanation for this huge discrepancy may be found in the two production sites. At the Ḥizma workshop, the hand-carved vessels, mainly mugs, dominate the chalk vessel assemblage (Magen 2002:19, 40), whereas at the Mount Scopus cave workshop, the small lathe-turned vessels dominate. As Magen noted, it aspires that there was specialization in these two production sites, the Mount Scopus cave focusing on the production of lathe-turned vessels, and the Ḥizma site on hand-carved ones (Magen 2002:2).

Furthermore, the small number of ossuary fragments (25) retrieved from the Mount Scopus cave raises the possibility that there was an, as yet undiscovered, site specializing in the production of ossuaries.

Technological Aspects

The production methods of the chalk vessels have been discussed in detail (Magen 1976; 2002:116–131; Mutz 1978; Cahill 1992:219–225; Gibson 2003:294–300; 2016:59–61; Amit, Seligman and Zilberbod 2008a:325–330). The finds from the Mount Scopus excavation shed further light on the technological aspects of the chalk vessel production.

It was proposed that the chalk blocks were soaked in water to soften them before carving (Magen 2002:117, 122; Gibson 2003:294), necessitating an adjacent water source. As no cistern was found at the Ḥizma quarry, Magen suggested that the stone was damp from water seepage. High humidity was also noted in the Mount Scopus cave, and this may well also have been a factor for manufacturing the vessels at the quarry sites.

The tools used in chalk vessel production were probably mostly adopted from wood carving (Magen 2002:116; Gibson 2003:294), and the kit would have included lathes, chisels with different edges and angles, gouges, scalpels and drills. Tooling with different instruments is evident on the vessels, and iron tools were found at Ḥizma (Magen 2002:61, Fig. 2.63) and in the Mount Scopus cave.

The two main production techniques were hand-carving and lathe-turning. The simpler hand-carving technique involved carving vessels from stone blocks with a chisel and carving tools to form a variety of vessels, characterized by thick crude walls and vertical shaved facets on the exterior, and by a chipped interior. The most common hand-carved vessels were the mugs (Fig. 52). A single example of a hand-carved mug, whose interior was removed with a lathe, was found in the Mount Scopus caves (see Fig. 42:7), whereas the mixed-technique was common in the Galilee (Gal 1991; Amit 2010:56–58; Reed 2009:298–299; Adler 2019:9–12). The hand-carving technique continued in use after the introduction of the lathe.

The more advanced, lathe-turning technique was used to produce most of the Mount Scopus vessels, as evidenced in the thousands of discarded cores in the production areas. The fine vessels were fabricated with small lathes, and the kraters and large vessels, with large lathes. Reconstructions of the lathes and the lathe-technology, based on wasters and on anthropological analogies in traditional stone-vessel workshops in Bethlehem and elsewhere, have been proposed (Magen 1976; 2002:116–131; Gibson 2003:295–300).

The production of the large vessels required a large complex-fixed lathe apparatus (Fig. 53). Some iron items uncovered in the excavation, including two sets of long spikes with right-angle bent flanges and pyramidal pivot blocks (Fig. 54:1–4), probably belonged to the large-vessel lathe. The lathe support spikes had a right-angled flange, and were tapered and sharpened at both ends (long arm length c. 17 cm, flange length c. 5.5 cm; max. width 2.3 cm). We propose that the long arm (4) was fixed in a wooden block (2, 3) and the rounded

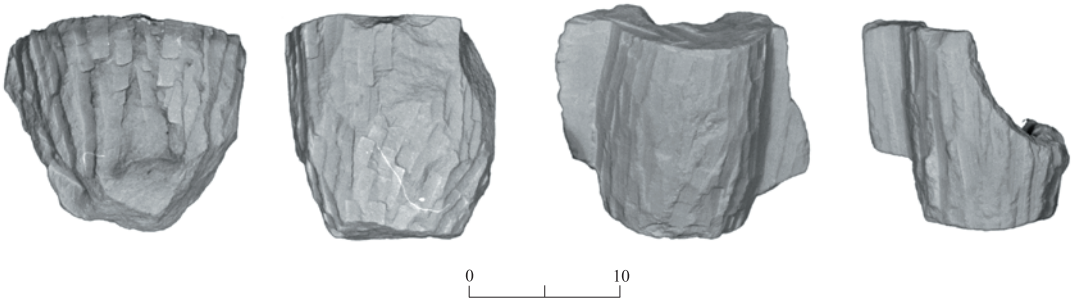


Fig. 52. A series of hand-carved mugs in various stages of production.

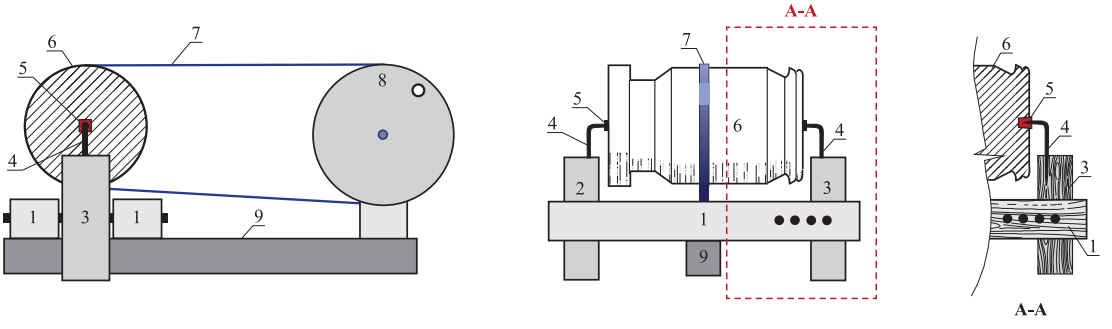


Fig. 53. Reconstruction of a lathe for large vessels (numbers explained in the text).

Fig. 54 ▸

No.	Artifact	Locus	Basket	Measurements (cm)
1	Spike	303	3004/3	Long arm length 15.5, right-angled flange length 6
2	Pivot block	303	3004/1	Length 3.5, pivot socket diam. 1 cm, depth 0.6
3	Spike	303	3004/5	Long arm length 18.5, right-angled flange length 5.5
4	Pivot block	303	3004/2	Length 3.5, pivot socket diam. 1.1, depth 0.7
5	Chisel with flat blade	303	3004/4	Length 18.5

point at the end of the flange was the axis to fit in a square socket (0.7 × 0.7 cm, socket depth 1.5 cm) cut in the wide flaring base of the pivot block. According to this reconstruction, the lathe frame was constructed of wooden beams in the shape of three sides of a square (Nos. 1, 2, 3), whose base and vertical sides would have been fixed permanently, while the upper side was adapted to the height of the vessel. The spike's long arm (4) would have been fixed to the two vertical beams (2, 3) with the two short arms facing each other. The chalk block (6) was crudely carved to form a rough cylinder, and it was then placed horizontally in the

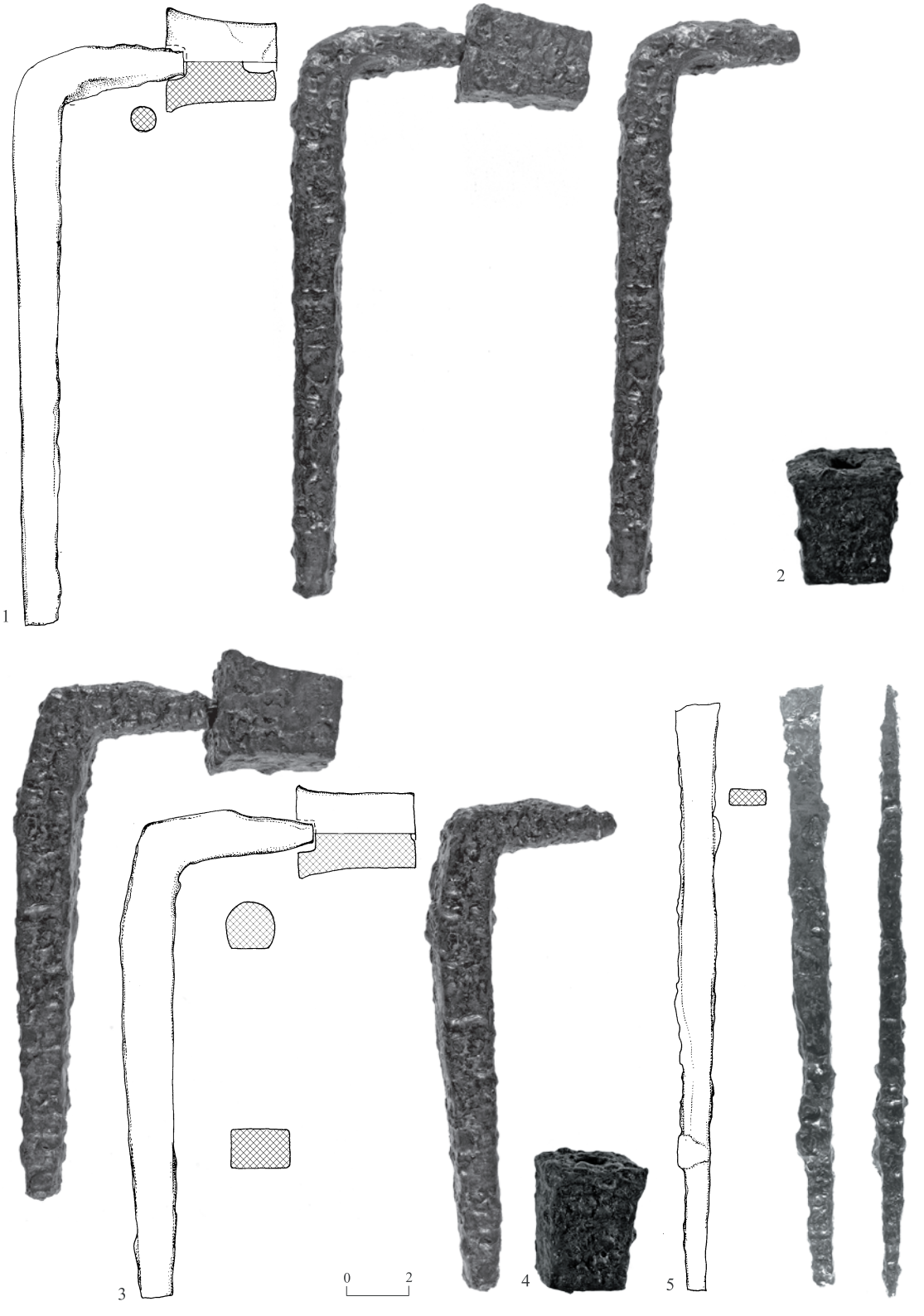


Fig. 54. Iron lathe support spikes (1, 3) and pivot blocks (2, 4), and lathe chisel (5).

space between the two short arms that was adapted to the required size, and it was fixed by setting the pyramidal pivotal block (5) into sockets cut into the chalk vessel's base (Fig. 55). Chalk bases with a trapezoidal socket (Figs. 40:7; 46:5, 6; 56) matching the pyramidal pivotal blocks were found among the wasters in the production areas. The chalk block was shaped into a vessel with a blade, while it was turned using a drive-belt (7) that was turned by a flywheel (8) attached to the other side of the lathe. Magen noted chalk vessels with similar sockets at Ḥizma, but he suggested that a wooden spike was set in the socket and that the chalk core twisted around it (2002:38–39, 130). An iron carving tool or chisel (Fig. 54:5), found together with the lathe pieces, was used to form the vessels. Once the external face of the vessel was shaped, the vessel was removed from the lathe, and the interior was cut and polished using hand tools.

We suggest that the chalk vessel was fixed horizontally in the lathe, as it is unlikely that the metal spikes could have held the heavy block in a vertical position. Previous proposals

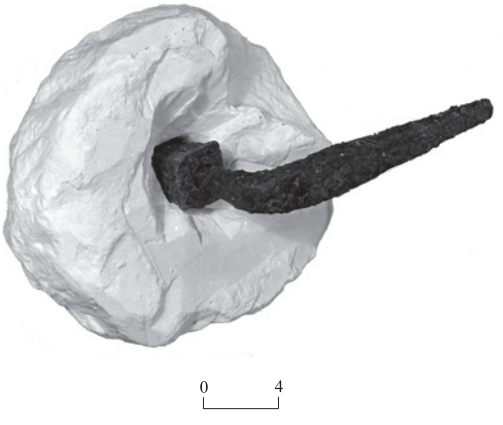


Fig. 55. The lathe support spike and pivot block inserted into the socket of a large chalk vessel base.

Fig. 56. Sockets cut in the bases of large lathe-turned vessels (see Fig. 40:7).

set the vessel block in a vertical position on a revolving stone tournette (Mutz 1978; Magen 2002:131; Gibson 2003:299–300). It is possible that both systems could have functioned contemporaneously.

The small vessels were formed on a small portable lathe, probably powered with a bow or a small flywheel, or both (Fig. 57). The chalk block was set horizontally and fixed with a spindle to the lathe on one side. The form of the spindle, and the system used to fix the vessel in the lathe can be reconstructed based on contact marks visible on discarded vessels. Firstly, prior to attachment, the base of the chalk block was shaped to form a cut-off cone (Fig. 58). We suggest that the cone block (10) was clamped into the spindle using three finger-like arms (11), cut in a round wooden fixing block, these fingers flexible enough to allow the core to be set between them and then be closed using an external fastening ring (12). When the lathing was finished, the ring would have been pushed back and the vessel released from the lathe. Magen proposed an alternative fastening system utilizing bitumen to glue the stone core to a wooden axis attached to the lathe (2002:127–128), but the absence of bitumen remains in the production caves at Mount Scopus and Ḥizma makes

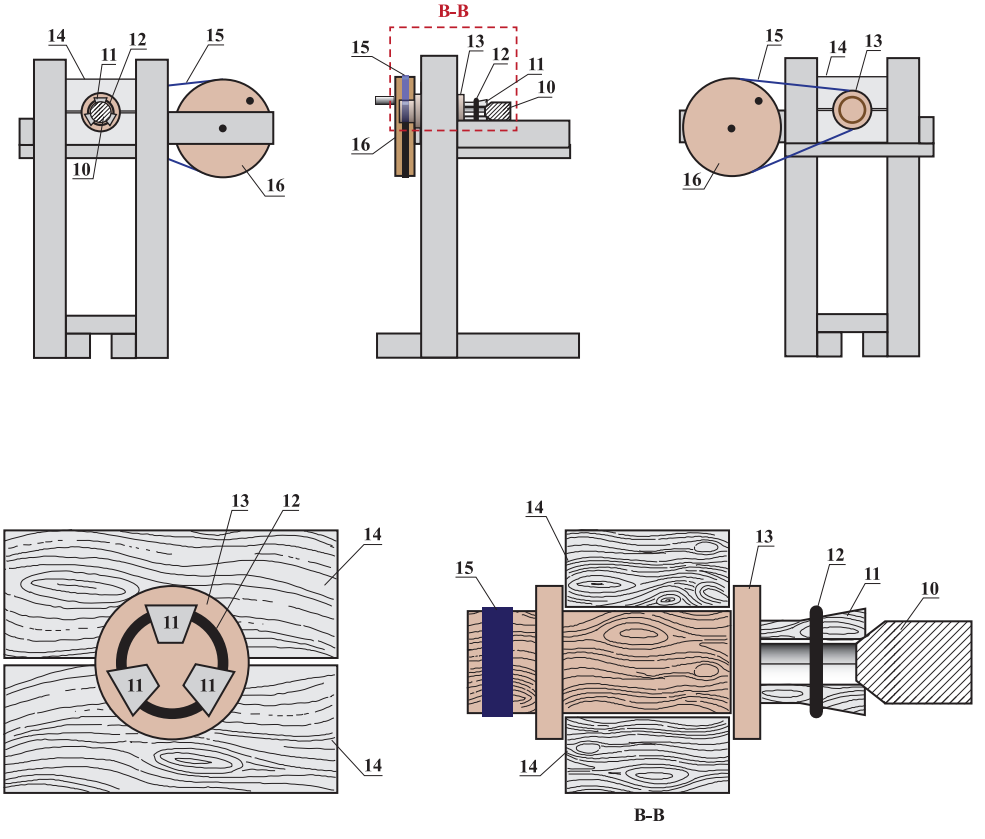


Fig. 57. Reconstruction of lathe for small chalk vessels, including detail of the attachment mechanism used to fix the chalk cores to the lathe (numbers explained in the text).

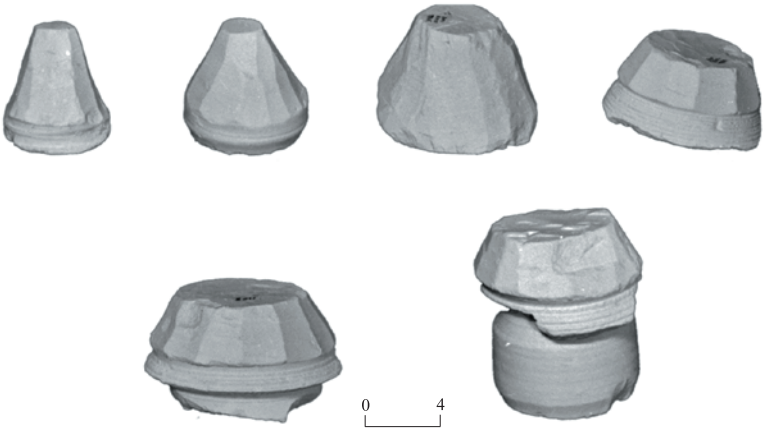


Fig. 58.Various cores cut into shape to attach them to the lathe.

Fig. 59. Striations and detachment marks showing the lathe-working of the chalk vessels.

Fig. 60. Continuous evenly spaced striations on cores showing the lathe-working of the chalk vessels.

this proposal unlikely. Gibson (2003:295–299; 2016:60, Fig. 9.4) suggested a similar set-up with a lathe set in a wooden frame held together by a cross beam, the stone block held on one side by a clamp and on the other side, by a central spike. The spindle would have been attached to the end of a round shaft (13), set horizontally in a fixed wooden frame (14). The shaft was turned on its axis with a drive-belt (15) spun with a flywheel (16) that was also attached to the frame. This method of generating circular motion was known in the Roman period, and we consider this reconstruction preferable to the usual explanation whereby the shaft was spun using a bow wrapped around the spindle clamp (Magen 2002:128–129, Fig. 4.24; Gibson 2003:295, Fig. 8; 2016:60, Fig. 9.5). Support for this proposal can be found in the continuous and consistent striations on the vessel surfaces (Figs. 59; 60), that could only have been created using a constant circular motion, a movement that the back-and-forth path of the bow could not provide.

The spinning chalk block would have been shaped into a vessel with chisels and knives, drawn across the surface of the vessel to the required form and dimensions. The interior was shaped with a hooked knife, that could undercut the stone central core, until it could disconnect from the base, be snapped out and discarded. This was probably the most delicate stage of the production, and many vessels probably broke when the interior core was removed (Fig. 61). Sometimes the artisan could produce a smaller vessel from the same block, as evidenced by many wasters.

Fig. 61. Broken vessels: (a) cup core showing cutting on the interior to release the central section to form a goblet; (b) flat bowl showing cutting of core to produce flat bowls and the detachment of a central portion of stone; (c) core with a carved base to attach it to the lathe and multiple sections remaining after the removal of vessels; (d) core cut for the removal of flat vessels.

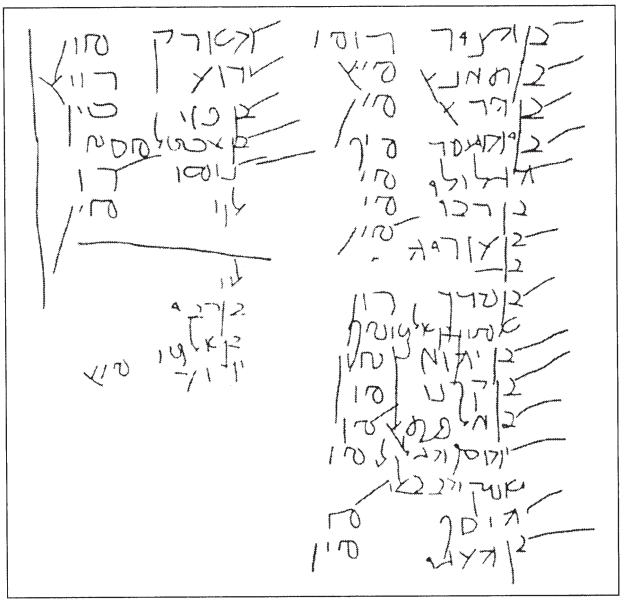


Fig. 62. Inscription from Beth Phage listing workers of an ossuary workshop (after Milik 1971: Fig. 1, Pl. II).

Specialist masons and highly skilled artisans were no doubt employed in the chalk quarrying and vessel production, and the trained artisans must have been paid more than simple workers. This recalls an inscription (Fig. 62) found in 1910, in a tomb at Bethphage, only 1.5 km away (Milik 1971). The inscription, now in the Louvre Museum in Paris, displays a list of 23 names and pseudonyms scratched on an ossuary lid. Next to the names, such as Ben Ḥazir, Ben Azaria, Yehoseph, Hasharaq and Haglili, are registered small amounts of money, for instance ר1, מ2ף. The letter ר denoting a quarter *sela‘*, equaling a *dinar* or *drachma*; מ representing a *ma‘ah* or a sixth of a *dinar* (an *obol*), and ף designating a *peleg*, which is half a *ma‘ah*. It was suggested that this inscription is a roster of workers in an ossuary workshop with their daily wages, the salaries reflecting the different levels of skill (Rahmani 1994:7–8). It is possible that the Mount Scopus chalk vessel and ossuary workshop is the workplace of these artisans; the flat lid of an ossuary found in a tomb on Mount Scopus is even marked with its price of 1 *sela‘* (*drachma*) and 4 *ma‘ot* (*obol*) (Rahmani 1994:10, 221, No. 696). A similar inscription was found on an ossuary lid from the City of David (Eshel and Szanton 2023).

OTHER FINDS IN THE CAVE

In addition to the chalk artifacts, other finds were retrieved from the cave, such as metal items, pottery sherds and coins. Two Roman-period glass fragments were found in Unit 12 (not illustrated).

Metal Artifacts

Many iron pieces were found in the lower and upper caves (Units 3, 4, 5, 6, 7, 8, 12), especially in Units 5 and 12 (see Appendix 1). Several pieces were identified as quarrying tools, including adzes, wedges and feathers, and other pieces were parts of lathes. The metal items are illustrated, and their functions are discussed in the sections on the quarrying techniques and the chalk vessel production technology (see above, Figs. 30; 57).

Pottery

Pottery sherds were found sporadically throughout the caves. There were several small concentrations of pottery in the upper cave, specifically in areas around the ashy remains of hearths, possibly providing evidence of cooking by the workers (see Appendix 1; see Sandhaus, this volume). The pottery assemblage included casseroles or open cooking pots, cooking pots with characteristic triangular rims, storage jars with a ridge at the base of the neck, juglets with a cup-shaped rim and knife-pared lamps, pottery forms that are characteristic of the Herodian and Early Roman period, dated within the first century CE. The presence in the caves of the cooking pot with a flattened rim, a storage jar with a squared grooved rim and two discus lamps (Sandhaus, this volume: Figs. 1:13; 2:8; 3:5, 6) reflects on some activity in the cave in the period between the First Jewish Revolt and the Bar Kokhba Revolt (70–135 CE).

Coins

Donald T. Ariel

Four copper-alloy coins were recovered from the site. A coin of Procurator Antonius Felix (54 CE) was found in the upper cave(Unit 12). Three coins dated to the First Jewish Revolt, one from Year 2 (67–68 CE) and two from Year 3 (68–69 CE) were retrieved, two in the lower cave (Units 3 and 5) and one in the upper cave (Unit 12).

1. Reg. No. 12066, L1206. IAA 95602.
Procurator under Claudius, Jerusalem, 54 CE.
Obv.: [NEPW] KΛA[Y KAICAP] Two oblong shields and two spears crossed.
Rev.: Palm tree; above: [BPIT]; in fields: L–IΔ/K–AI
Æ, ↑, 2.59 g, 17 mm.
TJC:259, No. 340.

2. Reg. No. 12015, L1203. IAA 95603.
First Jewish Revolt, Jerusalem, 67/8 CE.
Obv.: שתים–שנת Amphora.
Rev.: חרת ציון Vine leaf.
Æ, ↑, 2.96 g, 19 mm.
TJC:241, No. 196.

3. Reg. No. 3002, L302. IAA 95600.
First Jewish Revolt, Jerusalem, 68/9 CE.
Obv.: שנת שלוש Amphora with lid.
Rev.: ח[רות צ]יון Vine leaf.
Æ, ↑, 2.60 g, 20 mm.
TJC:242, No. 204.

4. Reg. No. 5006, L506. IAA 95601.
First Jewish Revolt, Jerusalem, 68/9 CE.
Obv.: שנת [ש]לוש Amphora with lid.
Rev.: חרות ציון Vine leaf.
Æ, ↑, 2.70 g, 17 mm.
TJC:242, No. 204.

Dating of the Chalk Quarry and Vessel Production Cave

The earliest of the four coins retrieved in the cave dates from the mid-first century CE, and the three other coins are First Jewish Revolt coins (67–69 CE), providing a *terminus post quem* of 69 CE for the chalk vessel production in the cave. The activity in the chalk quarry and vessel production workshop may be dated by the chronological range of the pottery

that was found throughout the caves. Most of the pottery assemblage is dated to the first century CE (see Sandhaus, this volume), whilst a few pottery vessels, mostly from L1204 in the upper cave, date to the period between the First Jewish Revolt (67–70 CE) and the Bar Kokhba Revolt (132–135 CE). The presence of this later pottery raises the issue whether the chalk vessel production cave continued to function after the First Jewish Revolt. Many chalk vessels found at Shu'afaṭ, a Jewish site settled until the mid-second century CE (Sklar-Parnes, Rapuano and Bar-Nathan. 2004:39*; Bar-Nathan and Sklar-Parnes 2007:63; Adler 2017b:118–121), have clearly indicated that the chalk vessels did continue in use in the Jerusalem area after 70 CE.

The production in the Mount Scopus cave thus aligns within the chronological range proposed for the use of the chalk vessels in the Jerusalem area, with the main activity down to the First Jewish Revolt, and some possible continued activity until the Bar Kokhba Revolt.

Discussion: The Mount Scopus Cave in Context

The period from the Hasmonean Dynasty (the latter half of the second century BCE) onward was characterized by the increased observance of purity laws in Judea, focusing on Jerusalem and the Temple. From the latter half of the first century BCE onward, the chalk vessel industry flourished in areas of Jewish population, producing chalk vessels for storage and table use, a phenomenon that is understood as the result of increased observance of Jewish ritual practice concerning purity and impurity that formulated in the Halakha at this time (Deines 1993; Magen 2002:138–47; Amit and Adler 2010:122–124; 2011:170–182; 2016; Miller 2015:153–183). Since foodstuffs and liquids specifically contracted impurity, regulations regarding vessels that were not susceptible to contamination, including stone vessels, were defined in halakhic discussions in the Mishnah, Tosefta, exegetical literature and the Talmud.

Yigael Yadin was the first to associate the chalk vessels discovered at Masada with the halakhic sources (1966:146, 154). The numerous chalk vessels since found at many contemporary sites in Judea and Galilee, together with Jewish coins and ritual baths (*miqwa'ot*), provided clear evidence for the ethnic definition of Jewish settlements (Zissu 2001:14–16, 234–243; Magen 2002:162; Aviam 2007:119). The chalk vessels have been discovered in Herodian and Early Roman period settlements in Jerusalem (Magen 2002:148–151), including the Jewish Quarter (Avigad 1983:174–183; Reich 2003:266–268; Geva 2006a; 2010; 2014; Gordon 2012); the excavations south of the Temple Mount (Magen 2002:63–115); the City of David (Cahill 1992; Gadot and Adler 2016); Tyropoeon Valley (Zilberstein and Nissim Ben Efraim 2013); Golden Gate (Reich and Shukron 1998); and in the surrounding area (Bar-Nathan and Gärtner 2013). The vessels have also been found in many contemporary sites in Judea, Transjordan, Galilee and Golan (Magen 2002:148–162; Gibson 2003:300–301; 2016:49, n. 5).

Whilst the discovery of chalk vessel production and consumption sites, associated chronologically and functionally with Jewish populations, led most researchers to identify the written sources with the archaeological finds, some scholars raised doubts and objections to the identification of the chalk vessels with the vessels required for the maintenance of ritual purity described in the written sources (Cahill 1992:233; Miller 2003; Gibson 2003:304; 2016:78).

In addition to the Mount Scopus cave, the quarries and production sites in the environs of Jerusalem include the caves near the village of Ḥizma (Gibson 1983; Magen 1994; 2002:5–62), and the quarrying and vessel production sites at Jebel Mukkabbir (Raḥmani 1969) and Tell el-Ful (Gibson 1996:18*; 2003:289). Quarries have been uncovered in Galilee at Reina (Gal 1991; Adler 2019:10–12) and ʻEnot Amitai, both near Nazareth (Amit 2010:50–52; Adler 2019:9–10). Gibson cites other production sites at Abu Dis, Bethany and Beit Saḥur, although additional information is missing (2003:306, n. 31).

Chronologically, the chalk vessels are common in settlement layers in Judea dated between the second half of the first century BCE (Magen 2002:162; Geva 2006a:219) and the Bar Kokhba Revolt in 132–135 CE (Cahill 1992:233; Magen 2002:162; Gibson 2003:302; Sklar-Parnes et. al. 2004:39*; Amit 2010:55; Amit and Adler 2010; Adler 2017a). Amit and Adler proposed that the chalk vessels may have continued in limited use in Jewish settlements in the Galilee down to the fourth century CE (Amit 2010:54–55; Amit and Adler 2010:139–142; Adler 2017a:275–277).

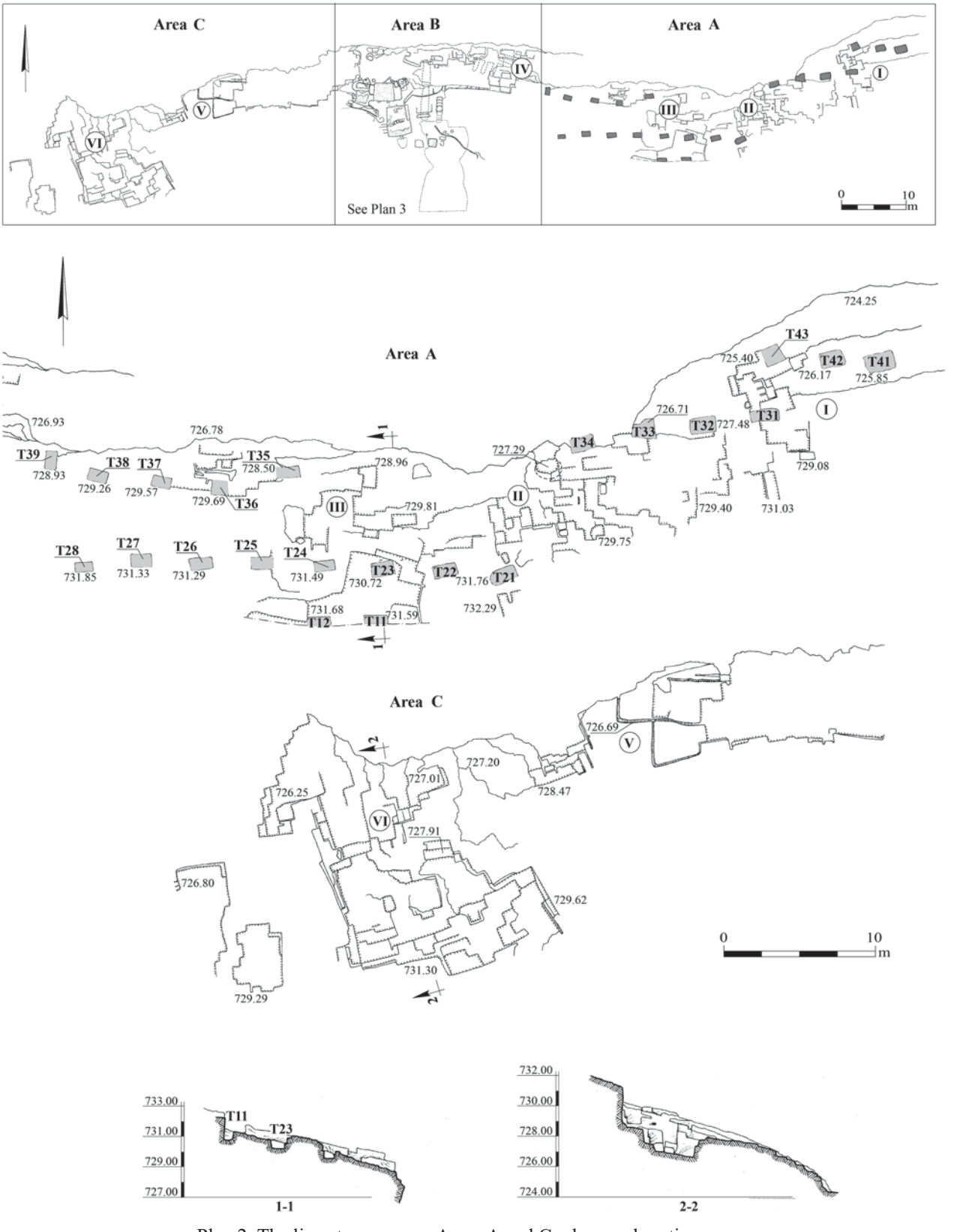
The Limestone Quarry and Installations

An ancient limestone quarry was exposed on the southern slope of Wadi Abu Ḥarub, just above the entrance to the chalk-vessel production cave (c. 700 m asl; see Fig. 2). The remains of earlier installations, including a winepress, water installations and graves were found within the area of the quarry, some cut and damaged by it. Two years after the main excavation was completed, development works stabilizing the slope below the chalk quarry and above the new road, exposed a burial cave and a tunnel hewn into the bedrock; a short salvage excavation documented these remains (see below).

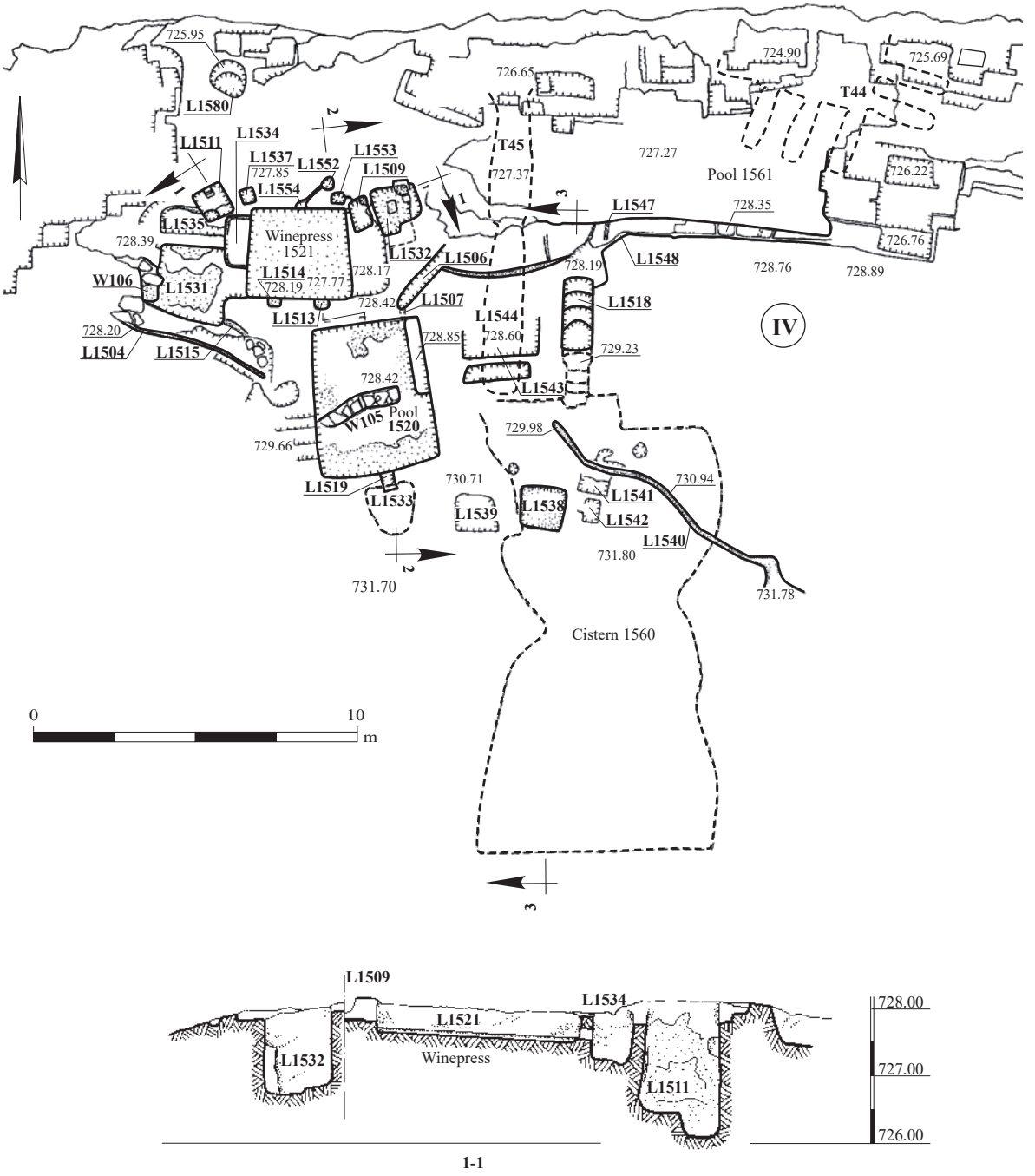
Limestone Quarry (Plans 2; 3)

A long narrow quarry extended along a continuous area on the slope (20 × 150 m; Fig. 63). Six segments (Segments I–VI) were defined by their quarrying depth or by other features. Segments I–III (Area A) and V–VI (Area C) are illustrated in Plan 2, while Segment IV (Area B) is illustrated in Plan 3.

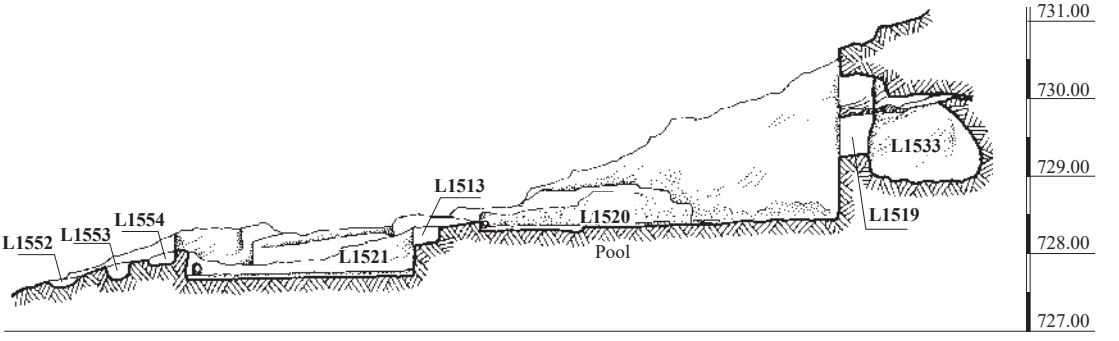
In Segment I (c. 60 sq m; depth of quarried channels 0.4–1.2 m), two quarried levels were distinguished in the deeper parts, based on the different directions of the arched grooves left by the quarrymen's picks (Fig. 64). In Segment II (c. 130 sq m; depth of quarried channels 0.3–0.4 m, max. width 0.1 m), the imprints extant after the removal of the stones indicated that the quarried stone blocks were relatively small. In Segment III (c. 240 sq m;



Plan 2. The limestone quarry, Areas A and C, plans and sections.



Plan 3. The limestone quarry, Area B, with winepress and water installations, plan and sections.



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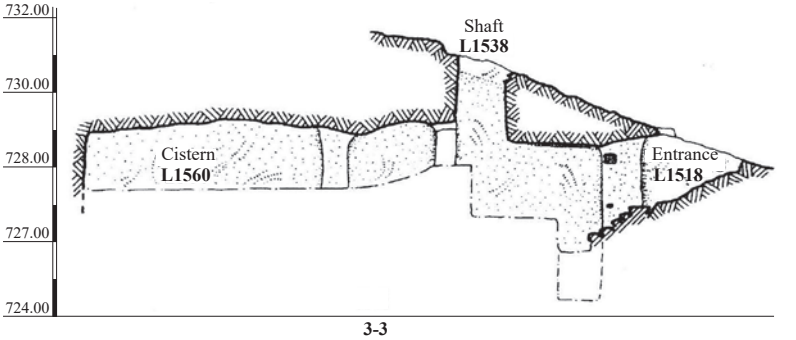


3-3

Fig. 63. Aerial view of quarry; the entrance into the chalk-vessel cave is on top right.

depth of quarried channels 0.4 m), the quarried stones were relatively long, including a particularly long, narrow trench (length 2.5 m, width 0.1–0.15 m). There was an unquarried area between Sections III and IV (length c. 13 m).

In Segment IV (c. 200 sq m; depth c. 2 m), there were four quarried levels. The winepress and the water installations were hewn in this area (Plan 3; see below). Segment V (c. 200 sq m; Plan 2) was extensively damaged prior to the excavation; at its western edge, a network

of channels with a trapezoid rounded profile (max. width 0.17 m), were probably channels collecting runoff from the hillside into the bell-shaped cistern exposed in a section of the road. In Segment VI (c. 500 sq m; max. depth 3 m), six quarrying levels were observed, with evidence for the cutting of various long and small blocks (Fig. 65).

Fig. 64. Quarry Segment I, with cist grave T41 in foreground, looking west.

Fig. 65. Quarry Segment VI, looking north.

Ancient quarrying technology has been discussed in detail (Forbes 1963:162–177; Koželj 1988; Ward-Perkins 1992; Safrai and Sasson 2001). The quarry on the eastern slope of Mount Scopus joins a growing list of ancient quarries exposed to the north and northeast of Jerusalem (Sasson, Sion and Barda 2011; Sion, Sasson, Zilberbod and Rapuano 2011:39), many of which have been dated to the Second Temple period by associated finds or stratigraphical considerations. Whilst no associated finds dated the quarry, the proximity to the Byzantine monastery may hint that the quarried stones were hewn for its construction.

Winepress (Plan 3)

The winepress uncovered in Area B Segment IV was partially cut and damaged by the quarry (Fig. 66). The treading floor (L1521; 2.8 × 3.0 m) was hewn into the slope to form a horizontal surface; its bedrock walls were preserved to a height of 0.35–0.50 m. On the southern bedrock wall, two square niches with a rounded profile (L1513, L1514; width c. 0.4 m, depth c. 0.3 m) were hewn 1.1 m apart and c. 0.3 m above the floor. The original height of the wall and the niches is unknown due to later quarrying, but the niches probably anchored press beams that were used to secondarily press the crushed grapes. Similar niches are characteristic of Iron Age II winepresses in and around Jerusalem (see below). The treading floor was coated with a thick layer of brown plaster with mica inclusions (thickness 5.5 cm) that also survived in patches on the walls.

Fig. 66. Winepress treading floor (L1521), looking northeast.

Fig. 67. Winepress settling pit (L1509) and collecting vat (L1532), looking north.

An oval duct (0.16 × 0.10 m) in the corner of the treading floor led the must into a settling vat with a sump and plaster patches on the walls (L1509; 0.55 × 0.85 m, depth 0.65 m, floor c. 0.3 m below duct; Plan 3: Section 1–1; Fig. 67). Another duct led through a partition wall, damaged by the later quarrying, into the collecting vat. The collecting vat had a trapezoidal section (L1532; top width 1.0 m, floor width 1.2 m; length eastern side 1.6–1.9 m, length western side 1.7–2.0 m, depth 1.6 m), and a sump. The northern part of the collecting vat was open, its southern part covered by a bedrock overhang. Three low hewn steps and a jutting-out curved bracket (0.25 × 0.15 m) near the corner probably enabled access to collect the must and clean the vat. Fine white plaster (thickness 2.0–2.5 cm) was extant on most of the vat surfaces.

A secondary floor (L1531; c. 2 × 2 m), separated from the treading floor by a damaged bedrock partition, had a c. 10 cm thick earth and small-stone fill leveling layer covered by a fairly well-preserved c. 5 cm thick plaster layer. A wall (W106), with a single course of roughly hewn fieldstones, filled in a natural hollow in the rock on its western side, and the hollow deepened to the south, a crack extending down the slope draining water from above the winepress westwards in a drainage channel (L1504).

A square pit (L1511; 1 × 1 m, depth 1.2 m), next to a small rock-hewn compartment (L1537), at the northwestern corner of the treading floor, was unfinished and exhibited a karstic cavity that must have been exposed during the quarrying. This pit may originally have been planned to be the winepress vat, but the exposure of the cavity would have invalidated it, and it remained unfinished.

Pottery from the Winepress Area (Fig. 68).— A small assemblage of Iron Age II pottery was found in the winepress complex area, retrieved from above the treading floor (L1521), the

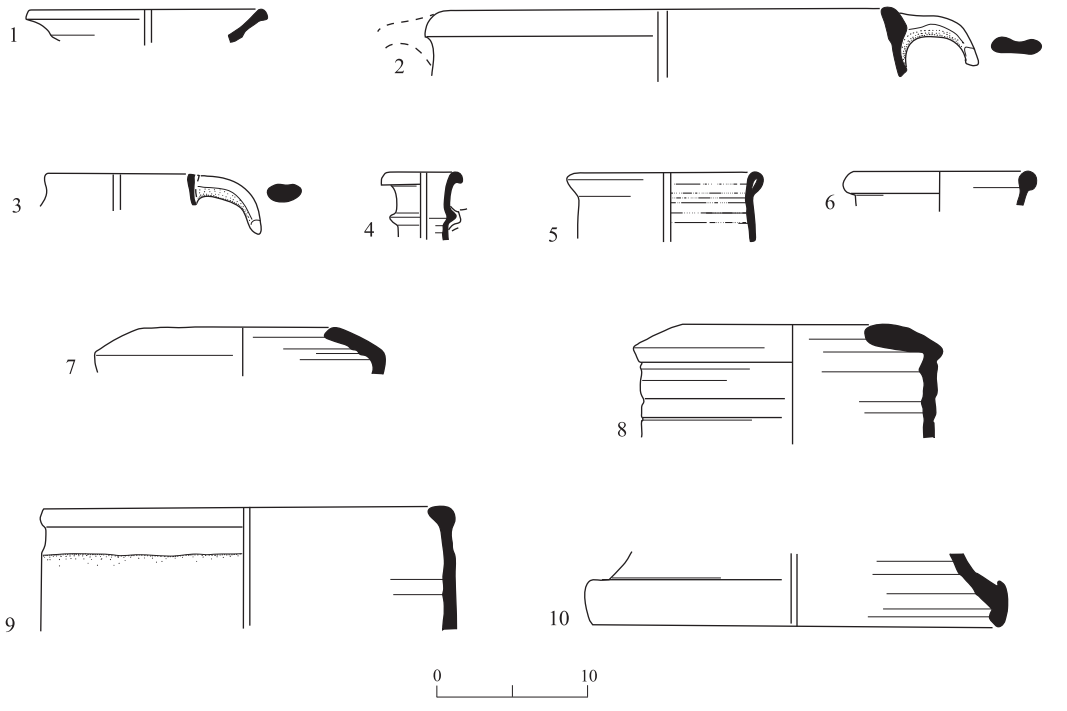


Fig. 68. Iron Age II pottery from winepress area.

No.	Vessel	Locus	Basket	Description	Parallels
1	Bowl	1511	15022/4	Reddish brown	De Groot and Bernick-Greenberg 2012:60–61, Fig. 4.1:14–16, Type B6b
2	Krater	1531	15021/1	Reddish brown, white inclusions	De Groot and Bernick Greenberg 2012:62, Fig. 4.2:1, 2, Type B8a
3	Cooking pot	1521	15021/2	Reddish brown, white inclusions	De Groot and Bernick Greenberg 2012:71, Fig. 4.3:13, 14, Type CCP3b
4	Decanter	1511	15022/5	Brown, red wash	De Groot and Bernick Greenberg 2012:75, Fig. 4.4:6–9, Type Dk1
5	Bottle?	1524	15017	Reddish brown, white inclusions	De Groot and Bernick Greenberg 2012:81–82, Fig. 4.5:6, 7, Type J10
6	Bottle?	1523	15016/1	Reddish brown, white inclusions	As No. 5
7	Holemouth jar	1532	15024	Reddish brown, white, brown and gray inclusions, gray core	De Groot and Bernick Greenberg 2012:84–85, Fig. 4.6:4, Type Hm4
8	Holemouth jar	1511	15022/3	Reddish brown, gray core	De Groot and Bernick Greenberg 2012:82–84, Fig. 4.6:3, Type Hm3
9	Jar	1511	15023/2	Reddish brown, few white inclusions, gray core	
10	Stand	1511	15022/1	Reddish brown, light brown wash, few white inclusions, gray core	De Groot and Bernick Greenberg 2012:94–95, Fig. 4.10:1, Type St1

collecting vat (L1532), the square pit (L1511), the secondary floor (L1531) and the adjacent area. The pottery included vessels characteristic of the final phase of Iron IIB, similar to assemblages in Strata 12–10 in the City of David Area E, dated down to 586 BCE (De Groot and Bernick-Greenberg 2012:57–198). No later pottery from the Roman and Byzantine periods was found. However, since the pottery came from above the floors, its association with the winepress is not unequivocal.

Water Installations

The water installations in Area B Segment IV included a southern pool, an eastern pool and a large underground cistern.

Southern Pool (Plan 3).— South of the winepress, a rectangular installation with rock-hewn sides and a leveled floor was cut into the steep slope (L1520; 3.5 × 4.5 m; max. height of walls 2.2 m; Plan 3: Section 2–2; Fig. 69). The northern parts of the walls were probably stone-built, as indicated by the stepped rock-cut side of the western wall. A bedrock projection (width 0.45 m, height 0.5 m) along the eastern wall of the pool was probably the remains of steps. The installation, whose floor and sides were covered with partially extant white plaster, was probably a water pool or reservoir that collected runoff from the hillside.

In the northeastern corner, a hewn funnel-shaped duct (L1507; length 0.3 m), wider on the interior, drained the pool, and was probably furnished with a plug. The duct led into a

Fig. 69. Southern pool (L1520).

channel (L1506; length 1.8 m, width 0.4 m) that was mostly destroyed by the later quarrying, leaving a narrow west–east, U-shaped depression (L1544; length c. 4 m, width 0.15 m, depth 0.1 m). The drainage channel may have originally extended to the southwestern corner of the eastern pool (see below), which would have received the overflow from the southern pool, if the pools functioned as a single system. The southern pool and the winepress may be contemporary, and are attributed to Iron II, the water possibly intended for the workers and for operating the winepress.

It seems that the walls of the pool were dismantled when the area was exploited as a quarry, and a vertical rectangular opening (L1519; 0.4 × 0.6 m, 0.8 m above the pool floor) leading into a rock-hewn, small round compartment (L1533; 1.4 × 1.5 m), was cut on its southern side. The compartment floor was 0.3 m lower than the opening, and its vaulted ceiling had a vertical crack that was also visible on the exterior; the compartment may have served for storage. A late fieldstone wall (W105; length 2.5 m, width 0.5 m) was built above the pool floor.

Eastern Pool (Plan 3).— Part of the southern rock-hewn side and the southeastern corner of a long pool (L1561; extant length c. 9 m, max. height 1.3 m) were extant, the rest destroyed by the later quarrying. It seems that Channel 1506 conveyed water from Pool 1520 to the southwestern corner of Pool 1561 (reconstructed length c. 11 m). Above the pool, a parallel narrow channel (L1548; length c. 6.0 m, width 0.15 m, height 0.3–0.7 m) drained runoff from the hillside westward into a large underground cistern (see below).

Cistern (Plan 3).— A rock-hewn underground cistern (L1560) was discovered to the east of the southern pool. The large cistern, with an hourglass-shaped plan (length 14 m, width 4.1–7.3 m), had vertical walls and a flat ceiling, and was full of accumulated silt layers up to 1.5 m below the ceiling (Fig. 70). Part of the cistern was excavated to a depth of 4 m without reaching the floor; the walls were coated with six or seven layers of plaster (thickness 5 cm).

The cistern entrance was a rock-hewn stepped corridor (L1518; length 3.7 m, width 0.8 m) that led from the lower part of the slope into the middle of the northern wall (Plan 3: Section 3–3; Fig. 71). At the junction of the corridor and the cistern, the corridor slightly narrowed, creating doorjambs (width 1 m, inward protrusion 0.1 m). Steps of various-sized irregular-shaped stone slabs set on the corridor floor lay between the doorjambs. Next to the bottom stair, a triangular-shaped shelf on the east, left during the quarrying, probably assisted descent into the cistern during the hewing or for maintenance. In front of the entrance, an irregular-shaped sump on the surface may have prevented debris from flowing with the water into the cistern. The water from Channel 1548 flowed into the cistern through the corridor.

A square shaft (L1538; height c. 2 m) for drawing water was cut c. 3 m south of the entrance, next to the cistern's western wall. A rock-cut channel (L1540; width 0.25 m, max. depth 0.4 m, exposed length 8 m), cut between the shaft and the entrance, also drained runoff from the steep slope via the corridor into the cistern. On the slope, two staggered level hewn

Fig. 70. Cistern (L1560) facing the entrance, looking north.

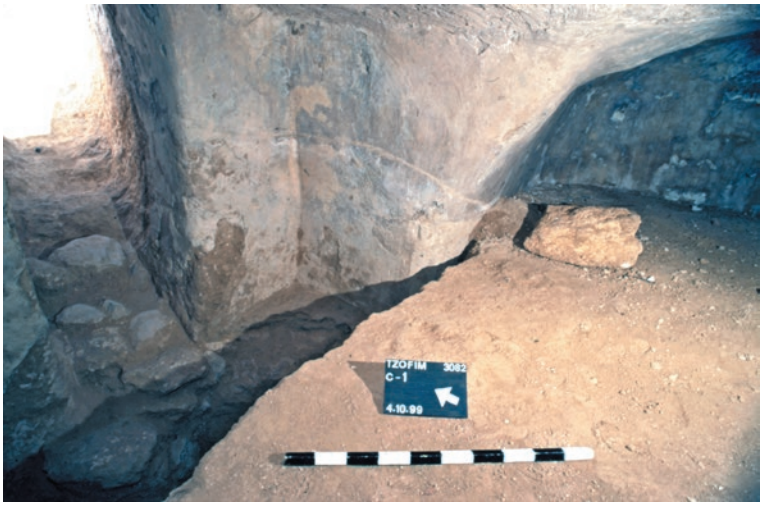


Fig. 71. Plastered cistern interior (L1560), with stepped entrance (L1518) on left, looking northeast.

rectangular surfaces (L1543) may have facilitated movement between the southern pool and the entrance corridor.

Graves

Cist Graves (Plan 2).— Twenty-two rectangular rock-hewn pits (width c. 0.9 m, length c. 1.5 m), uncovered in Segments I, II and III, were identified as cist graves, although no bones or other finds confirmed this identification (Table 3). The graves, placed c. 2.5 m apart, were arranged in four lines along the same east–west oriented longitudinal axis, with 3.0–4.0 m between the lines (Plan 2: Section 1–1); only the westernmost grave (T39) was cut on a south–north axis. Some graves were completely erased by the later quarrying, while others were damaged. Additional graves may have lain along the southern, highest line on the slope, beyond the excavation area.

Table 3. Cist Graves

Grave No.	Quarry Segment	Line	Length (m)	Width (m)	Depth (m)	Comment
T11	III	1	1.5			Partially excavated
T12	III	1	1.5		0.6	
T21	II	2	1.7	0.9		
T22	II	2	1.5	0.8	0.3	Excavated
T23	III	2	1.5	0.9	0.5	Excavated
T24	III	2	1.4	0.7	1.2	Excavated
T25	III	2	1.3	0.8		
T26	III	2	1.5	0.8		
T27	III	2	1.4	0.8		
T28	III	2	1.2	0.6		
T31	I	3	1.8	0.8		
T32	II	3	1.7	1.0		
T33	II	3	1.5	1.3		
T34	II	3	1.6	1.0		
T35	III	3	1.5	0.8		
T36	III	3	1.2	0.9		
T37	III	3	1.4	0.9		
T38	III	3	1.3	0.8	1.7	Excavated
T39	III	3	1.3	0.7	1.85	Excavated
T41	I	4	2.0	1.2		Excavated
T42	I	4	1.6	1.0		
T43	I	4	1.3	1.2		

Burial Cave T44 (Plan 4).— A damaged burial cave (height c. 1 m) with loculi (*kokhim*) was exposed on the slope below Segment IV (Fig. 72; for location see Plan 3). Three arches (length c. 1.8 m, width c. 0.6 m, height 0.55–0.75 m) were cut along the extant southern wall, two *kokhim* (length 1.8 m, width c. 0.55 m, height 0.75 m) on the eastern wall (extant length 1.4 m), and a single, partially preserved *kokh* (length 1.2 m, width c. 0.5 m, preserved height 0.2 m) on the western wall. The cave floor was hewn with a shallow step, and the floor sloped down slightly from west to east (Plan 4: Section 1–1).

Assuming a symmetrical plan, there was probably a third *kokh* on the eastern side and three *kokhim* on the western side, and the entrance would have been in the middle of the northern wall closest to the surface. The cave would thus comprise a main room (3.5 × 3.0 m) and nine *kokhim* divided equally on three sides. No datable finds were discovered due to the massive damage by the mechanical works, but the *kokhim* and the plan are typical of Second Temple period Jewish burial caves (Kloner and Zissu 2007:61). A *kokhim* burial cave excavated in 1976, c. 0.5 km to the south, contained ossuaries and other artifacts dated to the first and early second centuries CE (Gath 1976; Rahmani 1994: Ossuary Nos. 623, 625–628, 666–668; Kloner and Zissu 2007:185–186, Cave 2-19).

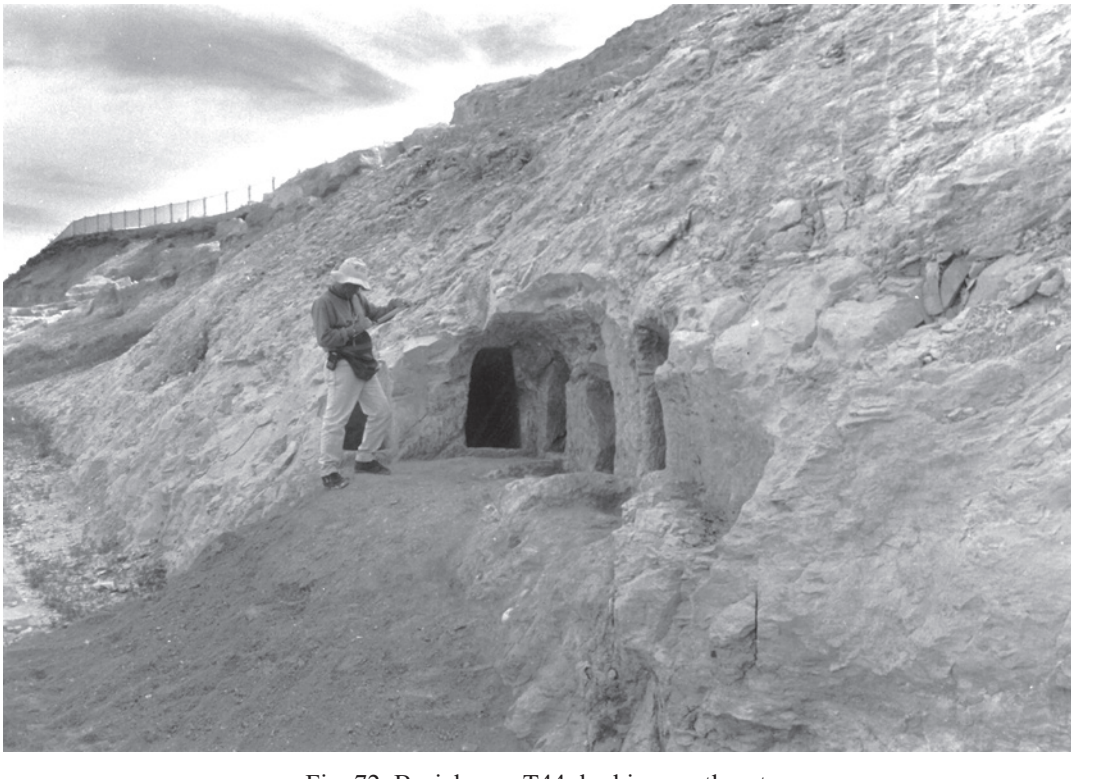
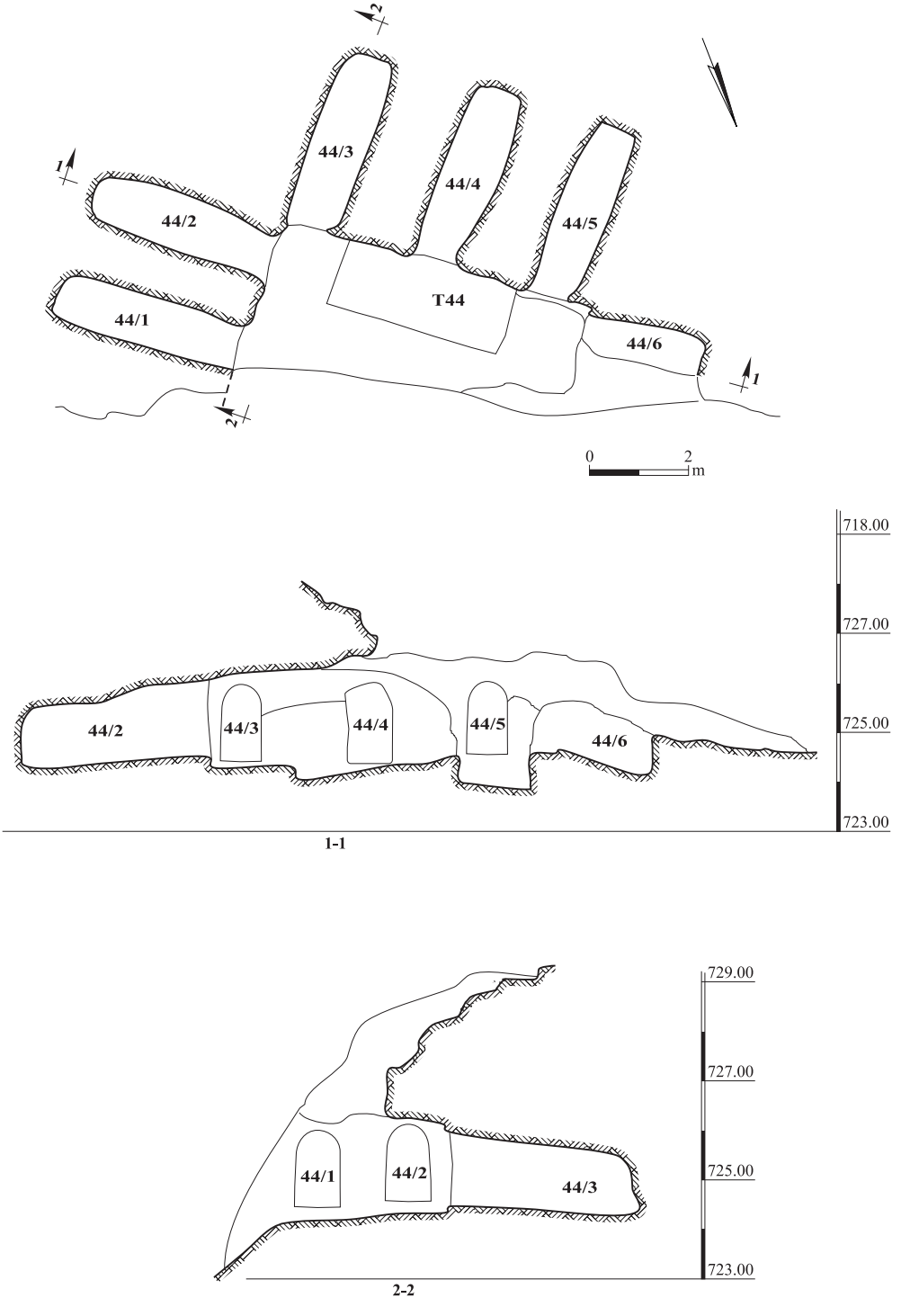
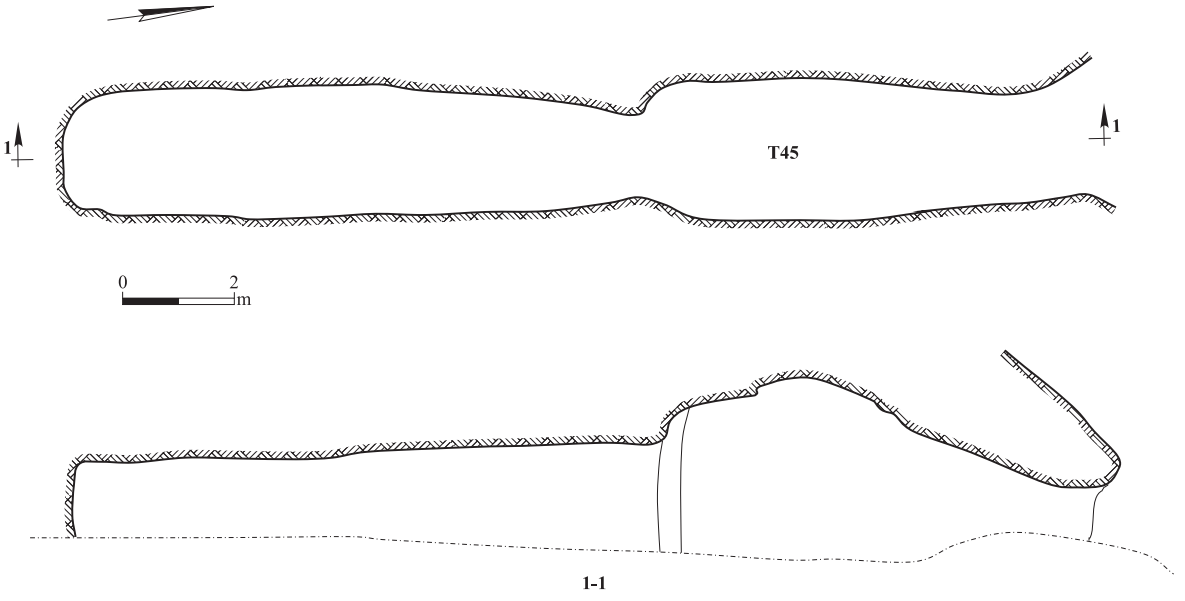


Fig. 72. Burial cave T44, looking southeast.



Plan 4. Burial cave T44, plan and sections.



Plan 5. Tunnel T45, plan and section 1–1.

Tunnel T45 (Plan 5)

An opening into a tunnel in Area B Segment IV, c. 6.5 m west of Burial Cave T44, was accessed and documented, but not excavated (for location, see Plan 3). The straight tunnel was hewn in the bedrock along a north–south axis (T45; length c. 10 m, width 1.0–1.2 m). The rock walls at the tunnel ends had rounded corners, and there was a narrow section at the center, possibly indicating two quarrying phases. The tunnel contained an accumulated dirt layer (height c. 1.0 m, higher near the entrance due to ceiling collapse). No finds hinted to the tunnel's function or dating, and since there was no interior chamber, the installation may not have been completed.

Discussion and Dating of the Limestone Quarry and Installations

The installations were attributed to three different periods. The winepress complex, the southern pool and possibly the eastern pool, were attributed to Iron II. Although rock-cut installations are difficult to date, the two niches on the southern wall of the winepress treading floor point to a characteristic Iron II period technology. Niches for anchoring beams used to press the grapes after they have been primarily crushed on the treading floor have been identified at several sites. Simple Iron II olive presses with a small niche to anchor the pressing beam were first identified by David Eitam in Samaria (1979:146–149). Pressing the fruit with a beam anchored in a niche on the back wall of the installation was a technological feature of both wine and olive presses. Similar and probably contemporary installations, used for wine and/or olive oil, have been identified in the Jerusalem agricultural hinterland at Beit Ṣafafa (Feig 2003:198–201, 224, Plan 4, Fig. 8), el-Burj (De Groot and Weinberger-Stern 2013:97), Khirbat er-Ras (Gibson and Edelstein 1985:147–149), Reches

Soreq (Weiss and Zissu 2009:327, dated there to the Hellenistic period), en-Nabi Danyal (Amit and Yezerski 2001:192–193) and Wadi el-Joz in Jerusalem (Lavi 2011). The Iron Age dating attributed to the winepress is supported by the Iron IIB pottery sherds (seventh to sixth centuries BCE) retrieved above the winepress floors.

The *kokhim* burial cave, the cist graves, the cistern, and possibly the eastern pool, perhaps also with continued use of the southern pool, were attributed to the Early Roman period. The cist graves were hewn and prepared, but the cemetery may possibly never have functioned; the graves may post-date the Herodian–Early Roman chalk vessel production cave, but this cannot be determined. The adjacent agricultural terraces may have continued in use from earlier periods. A contemporary burial cave lies to the south-southwest (Gath 1976; Kloner and Zissu 2007:185–186, Cave 2-19).

The limestone quarries damaged and therefore postdated the other installations. They may date to the Late Roman to Byzantine periods, and they may have been exploited for the construction of the nearby Byzantine monastery, located to the southeast.

Appendix 1. Mount Scopus Cave Units, Loci and Finds in Baskets

Unit	Locus	Locus above	Locus below	Description	Finds in baskets
Unit 1	101	101	102, 105	Surface layer close to courtyard	Chalk: 1006 Pottery: 1001, 1008
	102	101	106	Probe B, surface layer	Chalk: 1002, 1005
	103	101		Area in southeastern corner of unit	Chalk: 1003, 1007
	104	101		Area in southeastern corner of unit	Chalk: 1004
	105	101	108, 110	Probe A, discard pile near to entrance	Chalk: 1009, 1012, 1014, 1015, 1017, 1019, 1020, 1023 Pottery: 1018
	106	102	109	Probe B, vessels collected below surface layer	Chalk: 1010, 1016, 1021, 1029, 1049, 1057, 1060, 1063, 1082, 1102, 1105, 1107, 1108, 1109 Pottery: 1022, 1059
	107			Passage between Units 1 and 2	Chalk: 1011, 1024 Pottery: 1013
	108	105	112	Probe A, light colored fine chalk dust layer	Chalk: 1031, 1032, 1033, 1035, 1036, 1037, 1038, 1039, 1042, 1043, 1044, 1045, 1046, 1047, 1052, 1053, 1055, 1056, 1061, 1062, 1065, 1066, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1083, 1084, 1085, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1103, 1104, 1106, 1025, 1026, 1027, 1028, 1030 Pottery: 1034, 1054, 1086

APPENDIX 1. (cont.).

Unit	Locus	Locus above	Locus below	Description	Finds in baskets
Unit 1	109	106	111, 113	Probe B, light colored chalk layer containing a few vessels	Chalk: 1040 Pottery: 1041, 1058 Lamp: 1048
	110	105		Probe A, light colored chalk layer containing a few vessels	Chalk: 1050, 1051, 1064, 1067
	111	109		Probe B, bedrock	
	112	108		Probe A, bedrock	
	113	109		Probe B, bedrock	
Unit 2	201			Northern part of unit	Chalk: 2001
	202			Western part of unit	Chalk: 2002
	203			Southeastern corner of unit	Chalk: 2003
	204			Central part of unit	Chalk: 2004 Pottery: 2005
Unit 3	301			Surface collection in unit	Chalk: 3006 Iron: 3008
	302			Collection of finds from debris pile	Chalk: 3003 Lamp: 3001 Coin: 3002
	303			Probe C, collection of cores close to northeastern part of unit	Chalk: 3007 Pottery: 3010, 3012 Iron: 3004, 3005, 3011
Unit 4	401			Surface collection in unit	Iron: 4001 (adze piece?)
	402			Collection from debris pile in northern part	Iron: 4002, 4003, 4004, 4005 (adze or chisel piece)
	403			Collection from debris pile in northwestern corner	Iron: 4006
	404			Collection from debris pile close to W59	Pottery: 4008 Lamp: 4007
Unit 5	501			Collection of cores from surface in unit	Chalk: 5001, 5014
	502			Collection from debris pile next to W83	Chalk: 5002, 5015, 5016 Pottery: 5017 Iron: 5007.
	503			Collection from path beside pile L502	Iron: 5003, 5009
	504			Collection from debris pile close to opening	Chalk: 5004, 5018 Pottery: 5019
	505			Collection from debris pile close to W59	Iron: 5005 (adze), 5010 (adze or chisel piece)

Appendix 1. (cont.).

Unit	Locus	Locus above	Locus below	Description	Finds in baskets
Unit 5	506			Collection from debris pile close to W59	Iron: 5011 Coin: 5006.
	507			Collection from debris north of W83	Iron: 5008 (wedge, feather)
	508			Collection from debris pile close to W60	Iron: 5012
	509			Collection from debris pile close to W60 and W61	Iron: 5013
Unit 6	601			Surface collection in unit	Iron: 6001 - pieces of lathe
	602			Collection from debris east of W83	Lamp: 6002
	603			Collection from debris in centre of unit	Chalk: 6005, 6007 Pottery: 6006, 6008 Lamp: 6003, 6009 Iron: 6004
Unit 7	701			Surface collection in unit	Chalk: 7001 Lamp: 7003, 7004, 7010 Iron: 7002, 7005 (feather), 7006 (wedge piece), 7011
	702			Collection from debris in south of unit	Lamp: 7007 Iron: 7009
	703			Collection beside W68	Iron: 7008
Unit 8	801			Surface collection in unit	Chalk: 8003 Pottery: 8004 Iron: 8001, 8007 (feather)
Unit 9	901			Surface collection in unit	Chalk: 9003 Pottery: 9001 Iron: 9002
Unit 10				Entrance courtyard	
Unit 11	1101		1102 –1108	Surface collection in unit	Chalk: 11001, 11040
	1102	1101		Clearance of topsoil on western side above bedrock step	Chalk: 11002, 11003, 11004, 11039, 11043
	1103	1101		Clearance of topsoil on western side above bedrock step	Chalk: 11005, 11006, 11007, 11008, 11041, 11042 Pottery: 11044, 11044, 11055
	1104	1101		Clearance of topsoil on central part of unit above bedrock step	Chalk: 11045, 11046, 11047, 11048, 11049, 11050 Pottery: 11051

APPENDIX 1. (cont.).

Unit	Locus	Locus above	Locus below	Description	Finds in baskets
Unit 11	1105	1101		Clearance of topsoil in eastern part of unit, close to the entrance courtyard	Chalk: 11052
	1106	1101		Clearance of topsoil close to the entrance courtyard	Pottery: 11053
	1107	1101		Clearance of topsoil	Pottery: 11054
	1108	1101		Clearance of topsoil	Chalk: 11056
Unit 12	1201		1202 – 1209	Surface collection in unit	Chalk: 12001
	1202	1201		Clearance of topsoil in western part of unit	Chalk: 12002, 12004, 12005, 12006, 12007, 12008, 12009, 12010, 12021, 12022, 12023, 12024, 12046, 12060 Pottery: 12003, 12017, 12059
	1203	1201	1211	Topsoil beside W100	Chalk: 12034 Pottery: 12013, 12016 (cooking pot), 12035 Iron: 12011 Coin: 12015 Glass: 12012
	1204	1201		Clearance of topsoil close to W90 down to quarried bedrock	Pottery: 12014 (cooking pot), 12032 Lamp: 12047 Iron: 12033
	1205	1201		Clearance of topsoil between W100 and W90 down to bedrock	Chalk: 12018, 12019, 12020, 12026, 12928, 12029, 12039, 12042, 12048, 12053 Pottery: 12027, 12031, 12041, 12043 Lamp: 12030
	1206	1201		Clearance of topsoil between W100, W101 and W97 down to bedrock	Chalk: 12040, 12063, 12064, 12065 Pottery: 12041, 12044, 12054 Iron: 12062 Coin: 12066
	1207	1201	1210	Clearance of topsoil between W101, W102 and W91 down to bedrock	Chalk: 12037, 12030, 12055, 12056 Pottery: 12052 Charcoal: 12045
	1208	1201		Clearance of topsoil between W101, W102 and W95 down to bedrock	Chalk: 12051
	1209	1201		Clearance of topsoil west of W101 down to bedrock	Pottery: 12036 Lamp: 12049, 12057 Glass: 12050
	1210	1207		Bedrock surface	Pottery: 12058
	1211	1203		Bedrock surface	Pottery: 12061 (juglet)

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