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Excavations at Or ʻAqiva (North)

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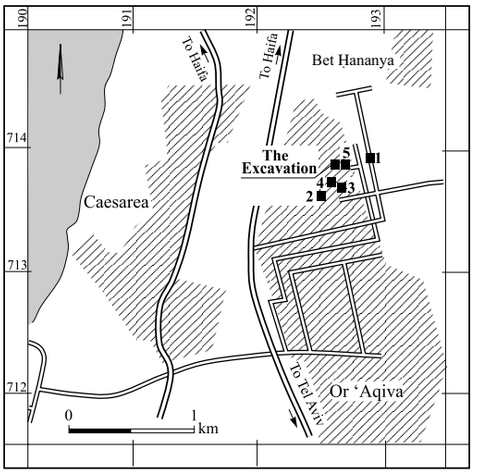
Introduction

Salvage excavations were conducted at Or ʻAqiva (North) from November 1995 through March 1996 (Fig. 1). The site (c. 0.1 hectare; map ref. NIG 1920–32/7131–42, OIG 420–32/2131–42) is situated on the sand dunes north of Naḥal Ḥadera, approximately 2 km northeast of Caesarea, 16 m above sea level. The excavation was carried out prior to industrial development and included an archaeological survey of the surrounding area and soundings conducted with mechanical equipment at a number of nearby sites. The surveyed area extends east of Highway No. 2, north of Or ʻAqiva and west of the Or ʻAqiva industrial zone.



1 Ne'eman1995
2 ʻAd, this volume
3 Peilstöcker 2006
4 Nagorski 2003
5 Hussein 2004

Fig. 1. Location map of the excavation and previous excavations at the site.

Geomorphology. The immediate vicinity surrounding the site is covered with recently deposited sand, which overlays clay deposits, *ḥamra* and older sand dunes. These cover an ancient, eroded *kurkar* ridge with many peaks protruding through the dunes. Clay deposits filling the depressions in the *kurkar* ridge cause seasonal swamps. *Ḥamra* quarrying during the 1950s and 1960s caused severe damage to archaeological sites; in some instances only scattered pottery sherds attest to their existence.

The vegetation covering the area, consisting primarily of *Pistacia Palaestina*, carob and mastic trees, is typical of sand dunes along the coastal plain and is directly associated with the Mediterranean flora on the adjacent Carmel Range, while less varied. In the opinion of some researchers, the natural flora of the country, as seen today, also reflects the botanical landscape in the region in earlier times (Zohary 1944: 95–98; Wiesel 1986).

North of the sand dunes (beyond the limits of the excavation and survey, where the *kurkar* ridge is c. 2 m higher), are remains of *kurkar* quarries that serviced nearby Caesarea. Similar quarries are also found along the Jisr ez-Zarqa Ridge, northwest of the surveyed area.

East of the surveyed area is a low gully filled with clay sediment. A small brook flowing north through the gully drains the rainwater into the Naḥal Tanninim basin and the Kebara swamps. Blockage of such drainage conduits in antiquity led to the creation of seasonal swamps, rendering the area unfit for any agricultural activity and the gully unsuitable for passage. This cut off the dune area in the west from the

ḥamra hills to the east (where Binyamina is situated today).

Previous Excavations. A paved road, partially excavated (Ne'eman 1996), crossed the gully and connected Caesarea with the *ḥamra* hills near Shuni-Mayumas. It was built of large stones and included bridges and conduits for draining swamp water. The excavated section of the road dates to the Byzantine and Early Islamic periods. However, in light of the Roman-dated remains discovered along the road as it approached Caesarea, e.g., several sarcophagi (Peilstöcker 1999), it is most likely that in the Roman period, the road followed the same course or stretched nearby.

Additionally, several small sites were excavated and concentrations of Roman and Byzantine pottery were found during the survey of the sand dune area north of Or 'Aqiva. Some were found at the top of the *kurkar* hills and dunes and others, near the deposits of clay sediments in the swamps. The sites include a small building, located c. 170 m north of the excavations here discussed, and dated by the excavator to the Byzantine period (Nagorski 2003); and a Roman mausoleum, c. 200 m farther north (Alla Nagorski, pers. comm.).

THE EXCAVATION

Thirty squares were opened on the top of a hill rising over the center of the sand dune area and excavated down to the ancient sand dune. Protruding from the surface of the hill, above the ancient sand dune, were a number of building stones and many sherds dating from the Hellenistic period (Phase III; Fig. 2:1, 2). On a small knoll on the northern part of the site, a Roman-period limekiln was exposed (Phase II; Fig. 2:3), and on the eastern side of the hilltop, a Byzantine-period winepress was unearthed (Phase I; Fig. 2:4). Surface remains dating to the Mamluk or Ottoman period were recovered as well.

PHASE III: BUILDINGS FROM THE HELLENISTIC PERIOD

The color of the ancient sand dune ranges from orange to dark yellow and is very different from the bright yellow of the recent sand dune that covers the entire site (Fig. 3). The walls of Phase III (Plan 1) were built on the natural sandy soil of the ancient dune. Seven wall segments constructed of small, *kurkar* fieldstones were

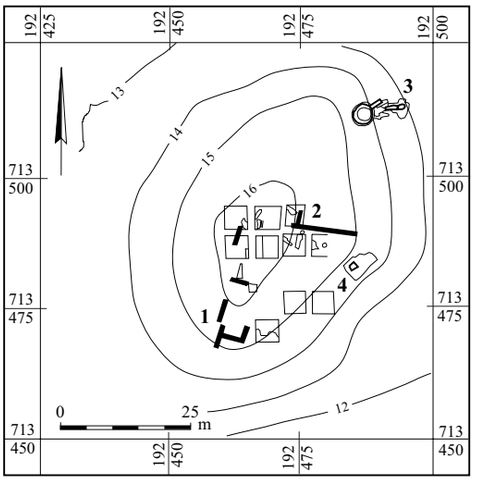
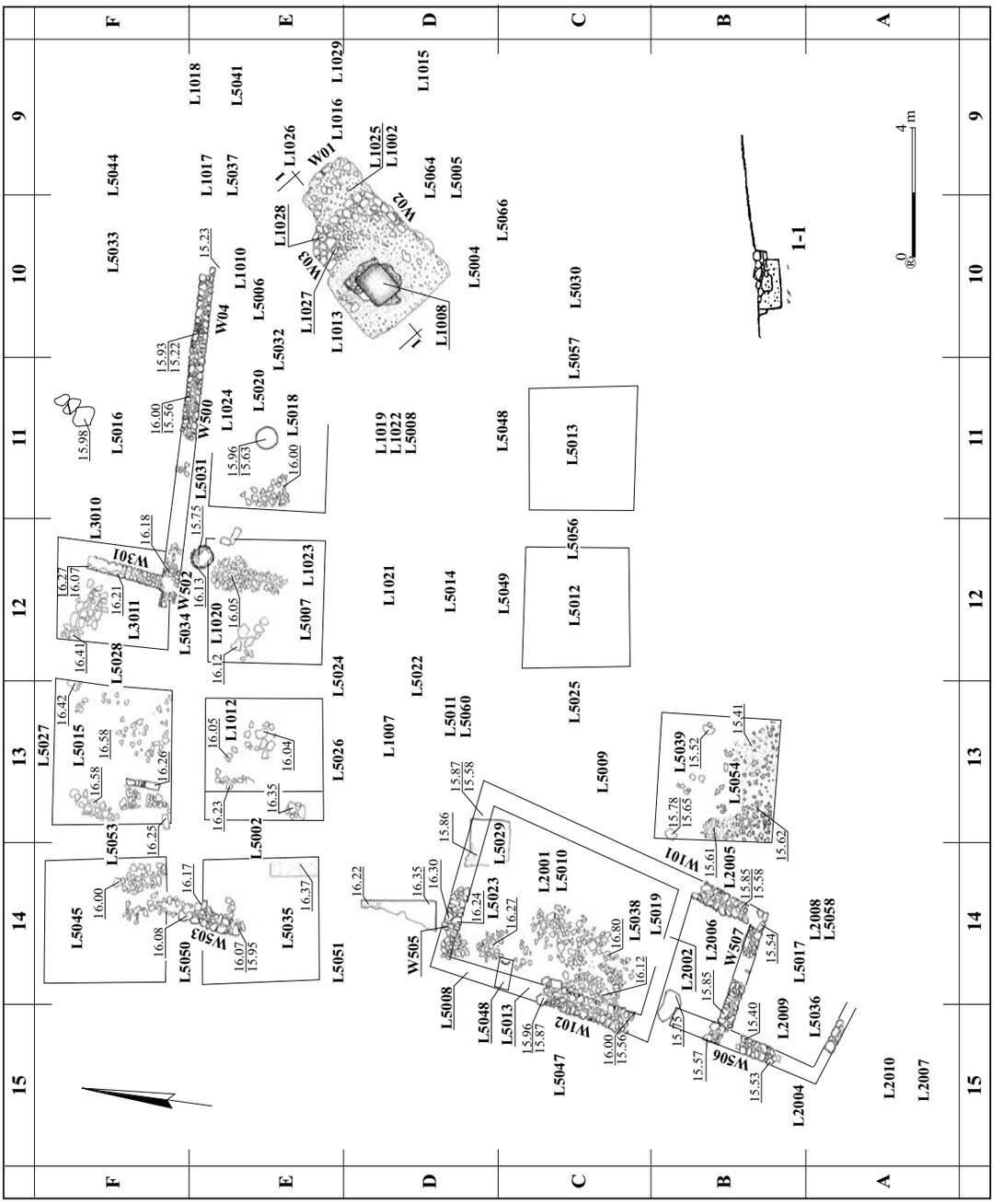


Fig. 2. Site map.

Fig. 3. Section showing the recent sand dune (dark gray) above the remains of the Hellenistic settlement; the ancient dune exposed beneath them is seen at the bottom of the photograph.



Plan 1. The remains of Phases III and I, plan and section.

exposed, as well as several *ṭabuns* and floor segments made of fieldstones. The architectural remains were so badly preserved that neither a wall nor a floor could be fully excavated, yet two structures may be reconstructed: one on the northern part of the excavated area, the other on its southwestern end.

The Northern Building (Sqs E–F/10–12). Of the northern building only two walls survived: W500 and its continuation W502, running east–west, and W301 running north–south. They were set on the sand dune with no foundation trenches. Wall 500, made of fieldstones without plaster, stood three courses high, suggesting that these courses were a foundation originally located below ground level. Another part of W502 was found 5 m to the west, where it was joined by the southern end of W301. Both consisted of two foundation courses of fieldstones with leveled tops, presumably in preparation for the placement of a mudbrick superstructure.

It seems that the interior of the building lay to the north of W500 and W502 (L5016, L5033). Two *ṭabuns* and several paving stones were found *in situ* south of the building (L5018). The northeastern part of the building had probably eroded away down the slope.

The Southwestern Building (Sqs A–D/13–15). The southwestern building consists of two rooms. The northern room is delineated by W505, W102, W507 and W101. The eastern portion of the building was very partially preserved, and can only be reconstructed based on the outlines of W101 and W505. The eastern part of W505 did not survive, save a few mudbricks (L5029).

Paving stones found *in situ* within the northern room (L5010) suggest that the interior was paved. Since W102 and W506 do not follow the same course, it is suggested that the space south of L5010 (L2006) was separated from it by a wall. The southern, smaller room (L5017) was delineated by W508, W506 and W507. These walls were badly damaged and eroded. Their upper surface, where preserved, was leveled in preparation for the placement of mudbricks.

A surface, which was paved with sherds and stones mixed with numerous shells (L5054), was exposed east of W101. This surface was probably part of a courtyard in front of the southwestern building, which faced eastward. A hoard of coins, dated 222–187 BCE (Bijovsky, this volume) was found north of L5054.

Reconstruction. From the remains described above, it is plausible to reconstruct two buildings on the top of the hill, each consisting of several rooms. There may have been a third building, situated to the west of the northern building, as numerous stones were discovered in that area, which was generally void of stones.

The buildings faced a central courtyard that was situated south of the northern building and east of the southwestern building. The northern and western parts of the courtyard, next to the two buildings, were paved with sherds and stones, whereas the other parts of the courtyard lay on the steep southeastern slope, leading off to the south and east.

The sections in this area of the excavation could not assist in determining whether the slope had been there during the Hellenistic period, prior to the construction in Phase III, or was the result of soil erosion following the abandonment of the site. Several jars and cooking pots, as well as vast quantities of gray ash, were discovered on the slope.

The entire area, both between the walls and above them, was covered with black and dark brown clayey soil; this soil probably represents detritus of the mudbricks that topped the stone foundations. In several places the mortar lines of mudbricks were observed, as well as collapsed walls lying in the clayey soil. Although no corners were found *in situ*, it is plausible that the buildings' cornerstones were made of hewn *kurkar* blocks, as suggested by the many hewn *kurkar* stones uncovered in the kiln (see below), constructed after the abandonment of the Phase III buildings.

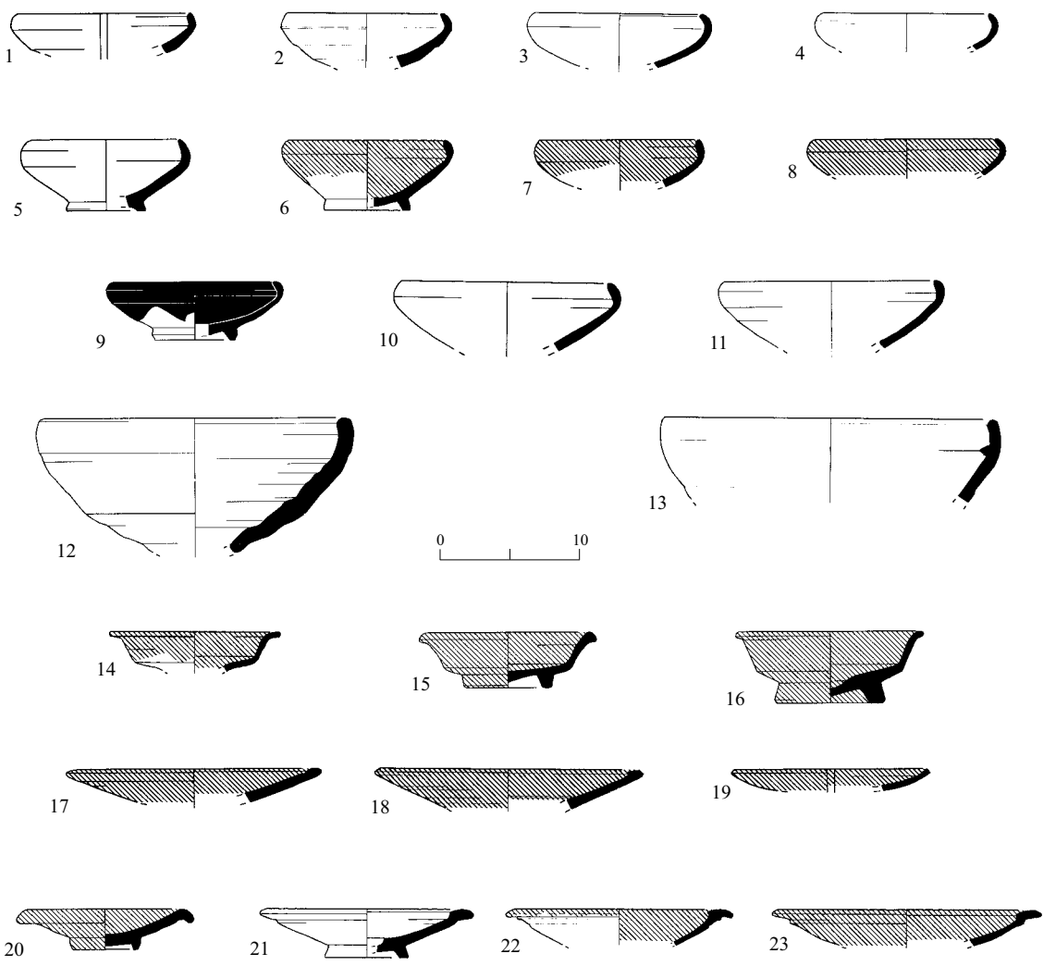


Fig. 4. Hellenistic pottery.

No.	Locus	Reg. No.
1	5067	50307/6
2	5067	50307/02
3	5062	50253/04
4	5062	50253/03
5	5037	50098/02
6	5067	50359/01
7	5067	50359/03
8	5005	50005/05
9	5067	50345
10	1012	10113/3
11	1012	10113
12	5065	50289

No.	Locus	Reg. No.
13	5005	50268/02
14	5049	50161/02
15	1020	10075
16	5067	50332/01
17	3001	30001/5
18	5067	50400/02
19	1019	10068/7
20	5009	50386
21	5065	50330/01
22	5067	50307/01
23	5012	50100/01

The Finds

Pottery

Several hundred ceramic finds were scattered throughout the built area of the site. The poorly preserved architectural remains made it impossible to define significantly 'clean' loci. Consequently, the pottery presented in Figs. 4–8 represents a large variety of domestic vessels (comprising about 90% of the rims), found in all loci of Phase III. Vessel fragments found outside the area of construction are not presented here.

Pottery assemblages resembling the Or 'Aqiva ceramic finds are known from Hellenistic levels at several sites in Israel. The following report makes use of the one from Dor (Guz-Zilberstein 1995) and employs its terminology and typological divisions. The material from Dor was chosen for the following reasons: (1) Dor is geographically very close to the Or 'Aqiva site; (2) The Hellenistic pottery from Dor is competently published; (3) Parallels from other sites are included in the framework of the ceramic discussion in the Dor report and therefore, need not be repeated here.

Incurved Rim Bowls (Fig. 4:1–13; Dor Type BL 8a–c).— This is the most common bowl type found at the site. Most of the bowls are crafted from bright yellow clay; some have a red and brown mottled slip (Fig. 4:6–8), while one has a black slip (Fig. 4:9). Others are made of sandy brown clay and do not bear a slip (Fig. 4:1–5). Bowls resembling a larger version of Dor Type BL 8b (Fig. 4:12, 13) are made of sandy orange clay with no slip. At Dor, bowls of Type 8a–c appeared in loci dated from the second half of the fourth century to the beginning of the second century BCE (Guz-Zilberstein 1995:290, Fig. 6.1:1–24).

Outcurved Carinated Bowls (Fig. 4:14–16; Dor Type BL 7).— The bowls are made of pink or dark orange clay and treated with a slip ranging in color from dark red to dark brown or black. These bowls occur with a large variety of rims and variations at the point of carination. Bowls 4–16 correspond to the later variation, dated at Dor to the second century BCE (Guz-Zilberstein 1995: Fig. 6.2:14–19).

Flat Infolded Rim Bowls (Fig. 4:17–19; Dor Type BL 5a).— Very few bowls of this type were found.[3] They are made of bright yellow or orange clay, which is similar in fabric to the fish-plate group (Fig. 4:20–23; see below). These bowls are treated with a dark red slip (Guz-Zilberstein 1995: Fig 6.4:1–9).

Bowls with a flat infolded rim appeared during the late third century BCE and continued into the early first century BCE (Guz-Zilberstein 1995:293). They usually occur in two variations: one with a flat base, the other with a depression in the base.

Outturned Rim Bowls in Fish-Plate Tradition (Fig. 4:20–23; Dor Type BL 5b).— The clay is yellow or orange, and red slipped. Two different bases were produced, with (Fig. 4:21) or without (Fig. 4:20) a depression. The bowls appear as early as the late fourth and early third centuries BCE and are very common during the second century BCE (Guz-Zilberstein 1995:293, Fig. 6.4:10–19).

Fish-Plate Bowl (Fig. 5:1; Dor Type BL 4).— The clay is bright yellow or orange and is treated with either a bright or dark red slip. These bowls have a wide variety of rims, and the depression at the center of the bowl floor varies in both diameter and depth (Guz-Zilberstein 1995: Fig. 6.3:12–21). The central depression of Fig. 5:1 is surrounded by a raised ring, a feature characteristic of the second century BCE (Guz-Zilberstein 1995:291–292).

Eastern Sigillata Plate (Fig. 5:2).— The interior of this Eastern Sigillata base fragment, is decorated with rouletting. The type corresponds to Samaria Form 1, generally dated from 180 BCE to 50 CE. At Dor, the type was found in

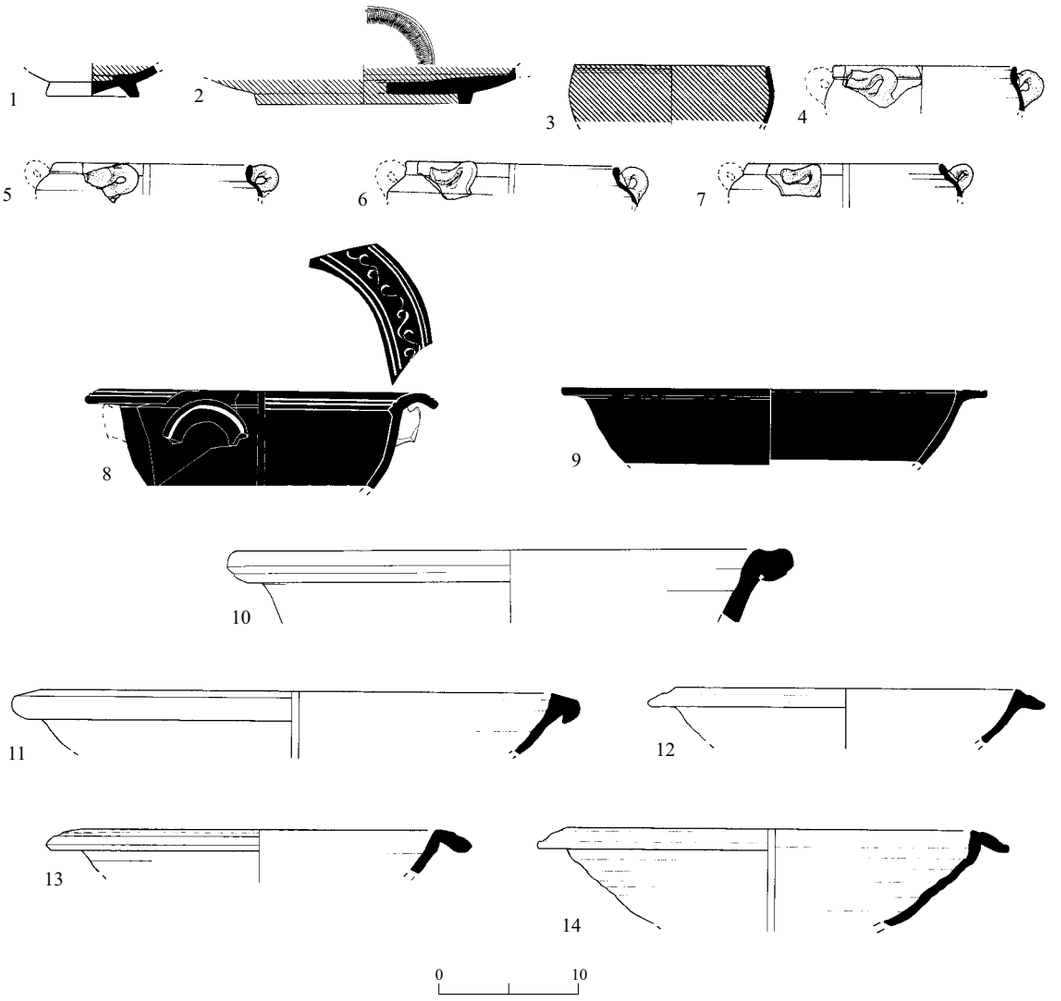


Fig. 5. Hellenistic pottery.

No.	Type	Locus	Reg. No.
1	Bowl	5064	50293/01
2	Plate	1007	10035/1
3	Skyphos	5065	50330/6
4	Bowl	1015	10073/4
5	Bowl	5039	50252/01
6	Bowl	5054	50317/06
7	Bowl	5004	50040

No.	Type	Locus	Reg. No.
8	Krater	5009	50018
9	Krater	5030	50224/01
10	Krater	5056	50212/02
11	Krater	1009	10036/2
12	Mortarium	5041	50145/01
13	Mortarium	5030	50247
14	Mortarium	1019	10068/11

phases dated from the last quarter of the first century BCE to 60 CE (Rosenthal-Heginbottom 1995:234, Fig. 5.6:5).

Skyphos (Fig. 5:3).— A deep cup made of dark orange clay, red slipped and burnished. At Dor, it was dated from the late fourth to the second centuries BCE (Guz-Zilberstein 1995:294, Fig. 6.6:8).

Bowls with Pinched Handles (Fig. 5:4–7; Dor Type BL 10A).— The clay of such bowls is well levigated and occurs in shades of bright or dark orange with a red or dark brown slip. At Dor, they were frequently found in phases dated to the second century BCE and occasionally in loci dated from 125 BCE to 60/63 CE (Guz-Zilberstein 1995:294, Fig. 6.7:1–4).

Krater Made in West Slope Technique (Fig. 5:8).— A fragment of a black-glazed open vessel. Only one parallel was found for the vessel type (Rosenthal-Heginbottom 1995: Fig. 5.11:2); its decoration has several additional parallels (Rosenthal-Heginbottom 1995: Figs. 5.9:11, 12; 5.10:1, 2).

Large Open Krater (Fig. 5:9).— A rim sherd of a black-slipped krater. The vessel resembles the shape of Dor Type KR 9, found there in levels dated to the third and second centuries BCE (Guz-Zilberstein 1995:297, Fig. 6.16a).

Deep Kraters (Fig. 5:10, 11; Dor Type KR5).— Two small rim sherds of this type were found. They are made from sandy, dark grayish orange clay without a slip. We do not know if these kraters had handles, nor are we able to ascertain their exact shape (Guz-Zilberstein 1995:296, Fig. 6.11:5–7, Photo 6.12). This type of krater was common in the second century BCE and continued to appear during the first century BCE.

In addition, a severely worn fragment (not illustrated) found at the site was made of very gritty, yellow clay and possibly slipped (cf. Guz-Zilberstein 1995: Fig. 6.11:7).

Mortaria (Fig. 5:12–14).— Fragments made of sandy, gray clay. There is no exact parallel to these fragments from Dor. Similar vessels assigned to a local northern production were found at Tel Anafa, dated to 250–125 BCE (Berlin 1997: Pl. 39: PW361, PW362).

Cooking Pots (Fig. 6:1–5).— These sherds belong to the globular cooking-pot family. A grooved rim sherd (Fig. 6:1), made of gray coarse ware, belongs to a globular cooking pot with a high rim, commonly discovered in contexts dating from the last quarter of the second century to the first century BCE; variations developed in the Early Roman period. At Tel Anafa, vessels corresponding to this type were found in contexts dated mostly to 125–110 BCE (Berlin 1997:89, Pl. 24: PW197–PW200), and at Tel Iẓṭaba (Nysa-Scythopolis), in contexts associated with the destruction in 107 BCE (Sandhaus, forthcoming).

Two sherds (Fig. 6:2, 3) of a cooking pot with a trianglular-sectioned rim correspond to Dor Type CP 3. The clay is sandy and very dark brown with an orange core. At Dor, they were found in contexts dating from the second half of the fourth century to the second century BCE (Guz-Zilberstein 1995:299, Fig. 6.18:10, 11; Fig. 6.18:4).

Several sherds (Fig. 6:4, 5) of cooking pots of the Dor Type CP 4 are made from sandy, dark orange clay with an orange core. The sides of the vessel are extremely thin and terminate in a bow-like rim. The type seems to imitate a Greek prototype. They occur at Dor in levels of the third and second centuries BCE and continue into the first century BCE (Guz-Zilberstein 1995: Fig. 6.19:12, 13).

Casseroles (Fig. 6:6, 7; Dor Type CP 5).— The vessels have an outfolded rim and an inner groove to accommodate a lid. The clay is sandy and dark orange with an orange core. At Dor, they occur infrequently in levels of the late fourth and third centuries BCE, but are common in levels dated to the second century BCE (Guz-Zilberstein 1995:299, Fig. 6.20:9, 10).

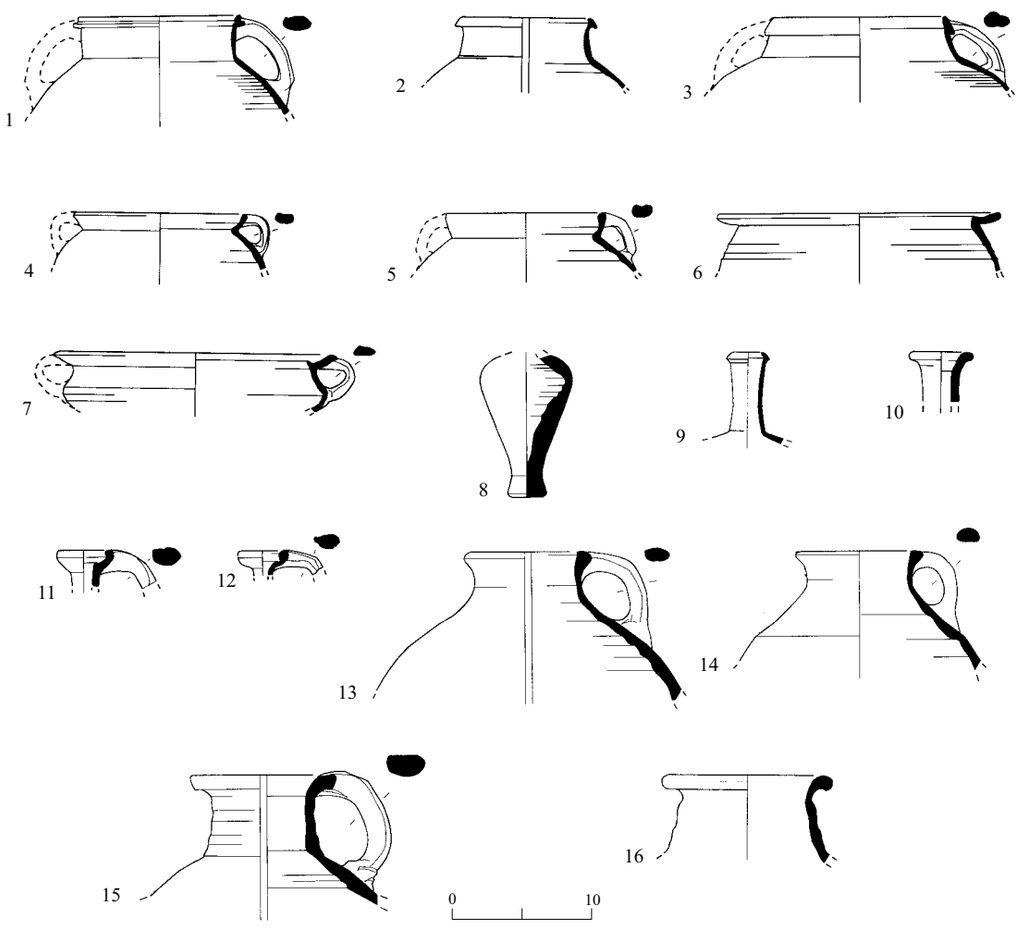


Fig. 6. Hellenistic pottery.

No.	Type	Locus	Reg. No.
1	Cooking pot	5067	50319
2	Cooking pot	1015	10077/3
3	Cooking pot	5005	50246/01
4	Cooking pot	1015	10121/2
5	Cooking pot	5030	50247/01
6	Casserole	5062	50253/02
7	Casserole	5030	50214/01
8	*Unguentarium*	5060	50367

No.	Type	Locus	Reg. No.
9	*Unguentarium*	5039	50241
10	Flask	5005	50237/2
11	Juglet	1024	10125/6
12	Juglet	5048	50205/08
13	Globular jug	5067	50319
14	Globular jug	1021	10076/28
15	Jug	5061	50239/01
16	Table amphora	5061	50239/02

Unguentaria (Fig. 6:8, 9; Dor Type UN 2).—These small plain *unguentaria* are represented by a thick-walled body (Fig. 5:8) and a thinner rim and neck fragment (Fig. 5:9), both made of orange clay with no inclusions. Type UN 2b (Fig. 6:8) first appeared at the end of the fourth century BCE and was especially popular during the third century until the mid-second century

BCE. Later, in the second half of the second century BCE, the finer Type UN 2c (Fig. 6:9) became dominant (Guz-Zilberstein 1995:305, Fig. 6.26:9–22).

Flask (Fig. 6:10; Dor Type FL).— A small sherd of a slightly everted rim, made of well-levigated orange clay. Few examples were uncovered at Dor, most of them in levels of the third century BCE, but also in assemblages of the second century BCE (Guz-Zilberstein 1995:310, Fig. 6.34:1, 2).

Juglets (Fig. 6:11, 12).— Two small sherds of juglets with a cup rim and a handle attached to it. The juglets are made of yellow to bright orange clay with red and white inclusions. No exact parallels were found, yet variations of the cup rim are known from the second century BCE onward.

Globular Jugs (Fig. 6:13, 14; Dor Type JG 11).— Storage jugs with a folded rim. This type was widespread throughout the region and was recorded at sites dated from the late fifth to the second centuries BCE (Guz-Zilberstein 1995:308–309, Fig. 6.30:1–6).

Jug with Outflared Rim (Fig. 6:15).— The jug is a variant of plain undecorated jugs of the Hellenistic period. Similar vessels were recorded at Dor (Guz-Zilberstein 1995: Fig. 6.31:5–6).

Table Amphora (Fig. 6:16; Dor Type JG 7).— Sherd of a table amphora with a wide neck and an outflared rim. Based on its appearance at Dor, the type is dated to the Early Hellenistic period (the second century BCE; Guz-Zilberstein 1995:309, Fig. 6.32:4).

Angular Shoulder Ridged Jars (Fig. 7:1–3; Dor Type JR 3).— The clay is bright orange with a sandy texture and an orange core (Fig. 7:1, 2) or bright brown with a brown core (Fig. 7:3). These jars derived from the local tradition of the Persian period. At Dor this type was found in contexts dated from the late fourth to the third centuries BCE, with an isolated occurrence in the second century BCE (Guz-Zilberstein 1995:312, Fig. 6.38:1, 2, 5).

Bag-Shaped Jars (Fig. 7:4–7; Dor Type Jar 1a).— Jars made of sandy orange clay with an orange core. At Dor, two variations of these jars were uncovered in all phases of the Hellenistic period (Guz-Zilberstein 1995:311, Fig. 6:35).

Amphorae (Fig. 7:8–10).— Three fragments of Hellenistic amphorae are presented: a rim sherd (Fig. 7:8) made of pink clay devoid of inclusions, presumably imported from Chios; a base (Fig. 7:9) made of bright pink to orange clay with a bright orange core and no inclusions— it belongs to a Knidian amphora and dates to the second century BCE (Empereur and Tuna 1989:281–284, Fig. 8:l); a base fragment (Fig. 6:10) broken at the bottom.

Lamps (Fig. 8).— The lamps in Fig. 8:1–4 are round-shouldered, wheel-turned, locally produced, and made of pink to orange clay. They resemble lamps from Dor, dated from the mid-fourth to the second centuries BCE (for a detailed description, see Rosenthal-Heginbottom 1995:235, Type 6, Figs. 5.13:10; 5.14:1, 6).

Fig. 7 ▸

No.	Type	Locus	Reg. No.
1	Jar	5009	50302/01
2	Jar	5043	50312/01
3	Jar	5069	50350/02
4	Jar	5004	50280
5	Jar	5004	50274
6	Jar	5055	50201/02
7	Jar	5004	50017/01
8	Amphora	1007	10017/1
9	Amphora	1009	10038
10	Amphora	5005	50246

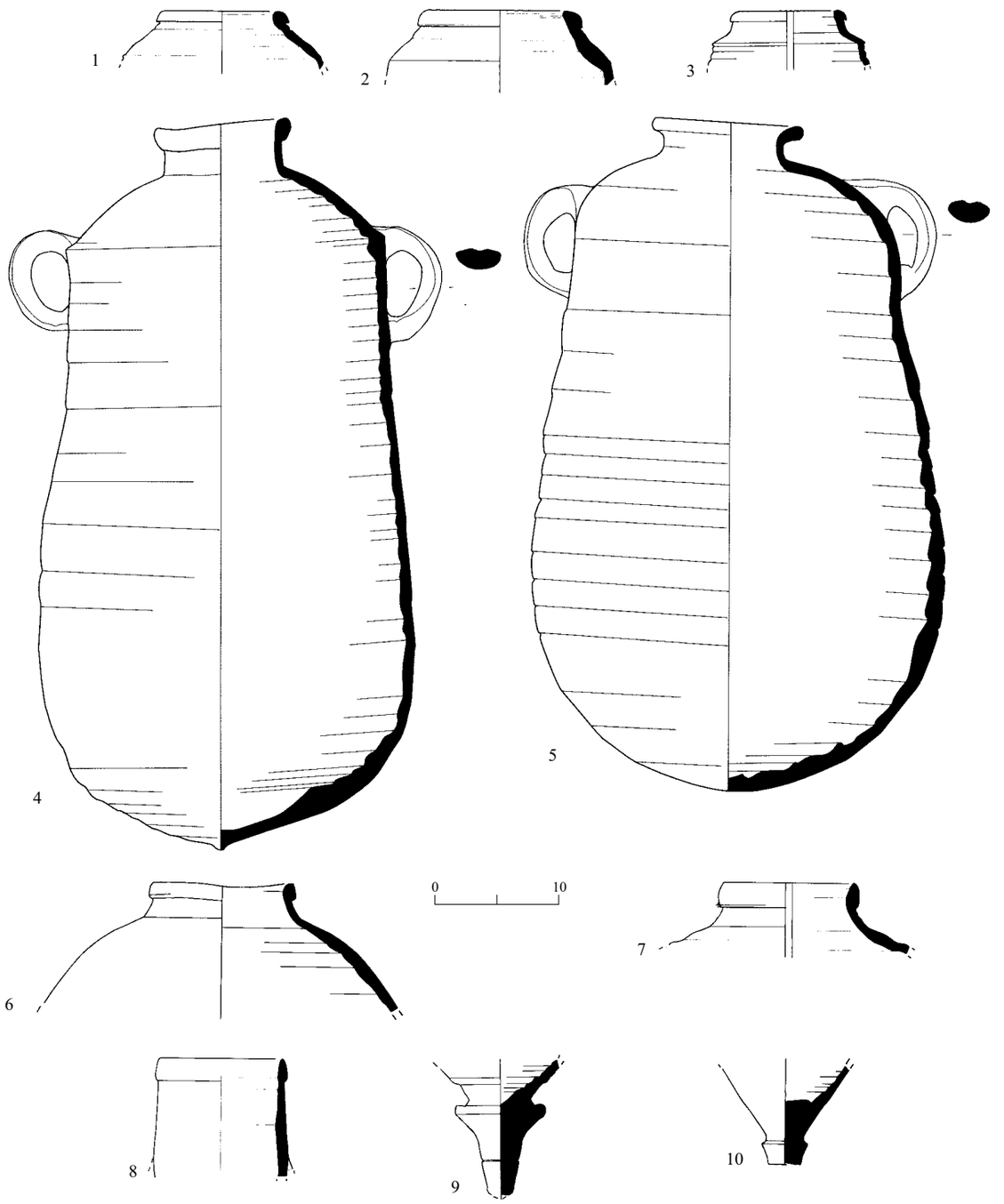


Fig. 7. Hellenistic pottery.

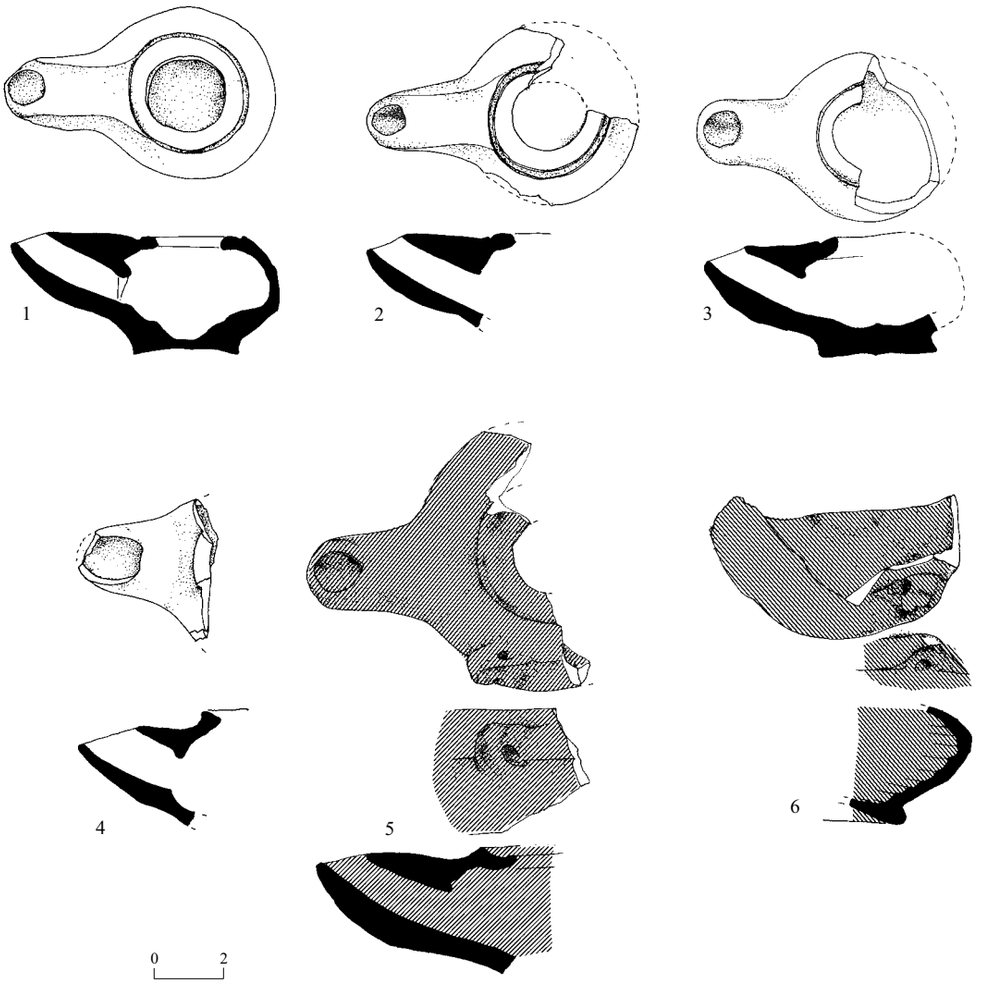


Fig. 8. Hellenistic pottery lamps.

No	Locus	Reg. No.
1	5030	50231/1
2	5059	50208/01
3	5004	50110

No	Locus	Reg. No.
4	5066	50334
5	5043	50291
6	5043	50405

Two wheel-turned lamps (Fig. 8:5, 6) have a conical, lentil-shaped body, a broad rim, a prominent pierced side-lug and a raised base. They are made of light brown clay and have a gray-black glaze. These lamps are local imitations of Attic lamps. They correspond to Dor Type 10, dated to 200–150/50 BCE (Rosenthal-Heginbottom 1995:236–237, Fig. 5.15:7).

Metal Objects

Several objects (Fig. 9) made of iron, copper or bronze and lead, were collected within and around the buildings of Phase III, and were therefore attributed to the Hellenistic period.

Awl Point (Fig. 9:1).— One end is pointed; the other, dull and bent, was inserted into a handle.

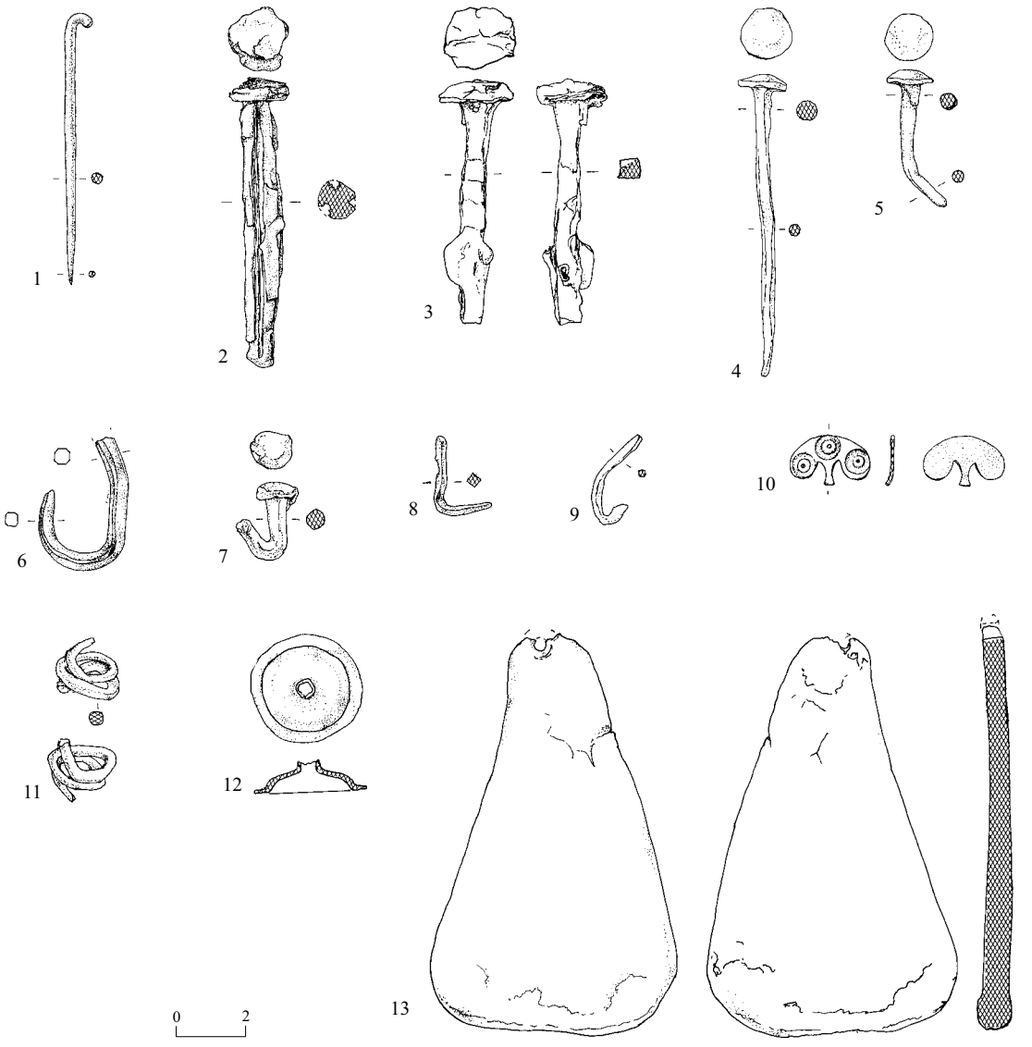


Fig. 9. Hellenistic metal objects.

No.	Type	Metal	Locus	Reg. No.
1	Awl	Copper	5067	50401
2	Nail	Iron	5013	50258
3	Nail	Iron	5054	50397
4	Nail	Bronze/copper	5036	50366
5	Nail	Bronze/copper	5039	50139
6	Nail	Bronze/copper	1027	10092
7	Nail	Bronze/copper	2008	20032
8	Nail	Bronze/copper	1002	10014
9	Nail	Bronze/copper	1010	10054
10	Uniden-tified	Copper	1009	10051
11	Coil	Copper	1023	10091
12	Disc	Bronze/copper	5054	50200
13	Weight	Lead	2006	20030

Iron Nails (Fig. 9:2, 3).— The nails have a rounded domed head. Nail No. 2 has a round cross-section, while No. 3 has a quadrangle cross-section. The nails from Or ʻAqiva cannot be dated, and their ascription to the Hellenistic period is based on stratigraphic considerations; nevertheless, the nails may have been related to the Roman-period kiln or the Byzantine-period winepress and remained in the area.

Similar nails were recovered in numerous assemblages dating from the Persian period onward, e.g., at Tiberias (Amitai-Preiss 2004:184–185, Fig. 11.4:5, and see further parallels therein). Iron nails of this type were also unearthed in Roman-period funerary contexts involving the use of wooden coffins (Avigad 1967:126; 1976:135; Mazar 1973:128; Hachilili and Killebrew 1999:67). It is certainly possible the nails were used to secure a wooden coffin that was interred in the extensive burial field located in the vicinity of the site, which included marble and *kurkar* coffins as well.

Bronze/Copper Nails (Fig. 9:4–9).— The nails are thinner and finer than the ones made of iron; Nos. 8 and 9 are even smaller than the rest. The bronze nails have a rounded domed head and a round cross-section, except for No. 8, with a quadrangle cross-section. Their small dimensions indicate they served to reinforce smaller and finer objects than the large thick iron nails.

Butterfly-Shaped Copper Object (Fig. 9:10).— The delicate shape and the decoration of three sets of concentric circles may indicate that it adorned a piece of jewelry, or was a small decorated object. No parallels were found.

Copper Coil (Fig. 9:11).— Copper coils and wires were discovered in various excavations. They may have been twisted around cloth and wood, rather than used as jewelry.

Bronze/Copper Disc (Fig. 9:12).— The disc is concave and perforated at its center. Based on the dimensions of the depression in the disc, it was used together with nails and may have ensured that the head of the nail did not penetrate the material it was hammered into. Similar discs were used in this manner in various periods.

Lead Weight (Fig. 9:13).— This triangular object was cast in a mold. Its upper perforated part was broken and damaged. No parallels were found.

Coins

A hoard of coins was uncovered in L5009, east of the southwestern building; isolated coins were discovered elsewhere (see Bijovsky, this volume).

Faunal Remains

Moshe Sadeh

The faunal remains were recovered from 18 baskets assigned to Phase III, dated to the Hellenistic period. The preponderance of cattle bones (about 75%), particularly lower jaws and scapula bones, is noteworthy (Table 1). The radius left proximal indicates that the minimum number of cattle is 2. Only one individual (7.69%) of each of the other species—sheep/goat, donkey, pig and domestic fowl—was recorded.

It seems that the settlement relied on cattle raising. Since there is little data on this issue for the Hellenistic period, it might be instructive to compare the finds to those from the preceding Persian-period levels at Tel Mikhal (Tel Michal), where the minimum head of cattle reaches about 61% of the total amount of livestock, and cattle bones make up more than 70% of the total number of animal bones.

The faunal remains of the Hellenistic period from Or ʻAqiva reflect an economy based on cattle and other species of mammals, as well as domesticated fowl. Cattle raising was probably the primary branch of animal husbandry at Or ʻAqiva, as it was at Tel Mikhal. This indicates that the settlement had a permanent source of

Table 1. Breakdown of Animal Bones of the Hellenistic Period at Or ʻAqiva

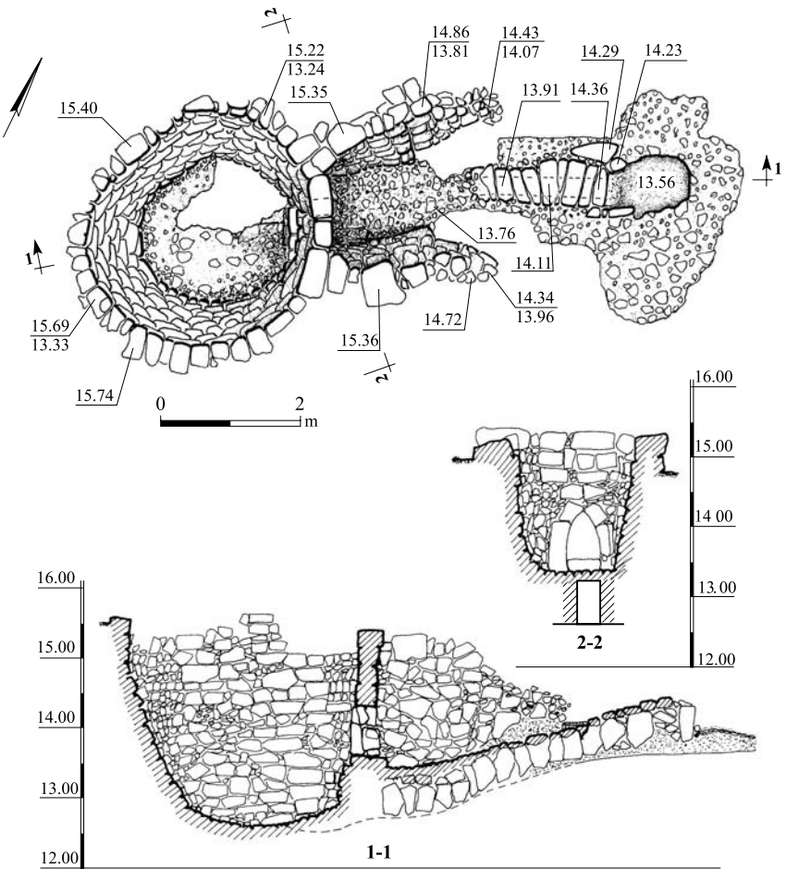
Species / Bones	Cattle *(Bos Taurus)*	Sheep/Goat *(Ovis Aries/ Capra Hircus)*	Donkey *(Equus Asinus)*	Pig *(Sus Scrofa)*	Domestic Fowl *(Gallus Domestica)*	Total
Cranium	1	1				2
Mandibula Right	9					10
Left	1					
Molar	7	1				8
Pre Molar	3					3
Scapula	7					7
Humerus	1					1
Radius	3		1			4
Ulna	1		1			2
Metacarpus			1			1
Pelvis	4	1				5
Femur	1					1
Tibia	1	1			1	3
Metatarsus	1		1			2
Metapod	10	9		2	2	23
Astragalus	3			1		4
Costa	26	5				31
Phalanx 1	5					5
Phalanx 2	1					1
V. Axis	1					1
V. Thoracic	1					1
V. Lumbar	1					1
V. Coccys		2				2
Total	*88*	*20*	*4*	*3*	*3*	*118*
%	*74.58*	*16.95*	*3.39*	*2.59*	*2.59*	*100*

water that provided for the substantial needs of the herd.

PHASE II: A LIMEKILN OF THE ROMAN PERIOD

After the Hellenistic settlement was abandoned, a limekiln of the Roman period was constructed on the northeastern edge of the excavated area (Plan 2; Fig. 10). Its dating was based on sherds typical of the Roman period, uncovered within the roof debris (see Fig. 13), and on a radiocarbon dating of charcoal, possibly blown away from the kiln (see below, Segal and Carmi). The kiln included three components: a firing chamber, an outer chamber and a draft channel (this nomenclature follows Sasson 1990:60–61).

The Firing Chamber (Fig. 11). The chamber (diam. 3.5 m, depth. c. 4 m), situated in the western part of the kiln, was used for burning stones into lime. Its construction probably utilized dressed *kurkar* stones dismantled from buildings of Phase III. Its walls—of stones held in place by clayey soil—were built within a pit; the stones were fired red due to extreme heat



Plan 2. Plan and section of the limekiln (Phase II).

Fig. 10. Limekiln, looking west.

within the chamber. Several repairs were made in the walls, as during the firing process some of the stones in the heated chamber were damaged and replaced with new ones. Two courses of stones slanting inward toward the center of the pit were exposed along the western side of the firing chamber, suggesting that the upper portion of the chamber was domed, resembling the limekiln at Masada (Sasson 1990:131).

The firing chamber was filled with dressed stones that were not arranged in any particular order, nor did they appear to have been intended for firing; they must have originally formed part of the upper portion of the chamber's walls and dome. Additionally, several limestone blocks were discovered arranged in a semi-

Fig. 11. The limekiln's firing chamber, looking south. Note the pieces of limestone at the bottom of the firing chamber and the air-intake draft channel. The outer chamber is on the left.

circle along the interior wall at the bottom of the firing chamber; their purpose is unclear.

The Outer Chamber (see Fig. 10). The western wall (1.3 m long) of the outer chamber is situated along the eastern wall of the firing chamber. A triangular opening (c. 0.6 m wide, 0.8 m high, c. 1.5 m above the floor) in the eastern end (c. 2 m long) of the outer chamber connected the two chambers. The lower part of the opening was built of a large stone threshold in secondary use; the upper portion was constructed of two large stones. Its floor was paved with lime and chalk and descended slightly to the west, toward the firing chamber.

The Draft Channel (Fig. 12). The sides and top of the air-intake draft channel (c. 0.3 × 0.6 m, c. 0.3 m high) were constructed of flat *kurkar* slabs, whereas the lower part was built beneath the outer chamber floor. Located on the natural slope to the east of the outer chamber was a thick lime surface (diam. c. 2 m), with the external opening (0.5 × 0.6 m) of the air-intake draft channel at its center.

Fig. 12. The air-intake draft channel beneath the firing chamber, looking west. Note the opening between the firing chamber and the outer chamber.

The location beneath the outer chamber of both the draft channel and its opening served to facilitate access to the slabs covering the draft channel. The air-intake opening was situated on the slope to the east and the channel terminated in the west at the bottom of the firing chamber.

Reconstruction of the Kiln and Its Operation. The firing chamber in this type of kiln was constructed underground. The stones intended for firing were piled up above it in a dome and sealed with layers of sand and stones (Cohen 1973; Spanier 1985). The fuel was introduced into the firing chamber ('hearth chamber'; according to Cohen 1973) from the outer chamber via the channel opening. The ventilation opening was located above ground level, opposite the opening (Sasson 1990:128).

The Or 'Aqiva kiln differs from those presented by Cohen, Spanier or Sasson in various aspects:

1. The opening from the outer chamber is connected to the lower third of the firing chamber, whereas in the other kilns it is connected to the bottom of the firing chamber.
2. The air-intake draft channel is situated below the opening and not opposite it (Sasson 1990:66).
3. The limestones intended for burning were arranged on the bottom of the kiln and not in the upper portion of the firing chamber (Sasson 1990: Fig. 51).
4. The opening of the Or 'Aqiva kiln faces east, although the prevailing winds are westerly (see Sasson 1990:100).

The upper part of the firing chamber did not survive and its plan is uncertain; therefore, our reconstruction of the kiln firing process is tentative.[6] Judging from the collapsed stones in the firing chamber, its walls were originally substantially higher than the preserved portion. The manner in which the upper part of the firing chamber was built cannot be confidently reconstructed, nor whether the dome was sealed or had an opening on top.

The following stages are an attempt to reconstruct the firing process in the kiln based on the elements exposed in the excavation:

1. The stones intended for firing were arranged in a dome-like fashion in the upper part of the firing chamber and were covered with sand and stones to maintain the temperature within the kiln and minimize costs expended on fuel.
2. Fuel was inserted into the space between the dome and the bottom of the firing chamber via the opening connecting the outer chamber and the firing chamber.
3. The opening between the firing chamber and the outer chamber was sealed. (No signs of sealing were found.)
4. After igniting the fuel, the temperature in the firing chamber increased. The heat and the smoke exited the kiln through the stone and sand covering. A low-pressure area was created within the kiln, drawing air inward via the air-intake draft channel. The amount of air entering the channel was regulated by increasing or decreasing the size of the draft opening into the channel, thereby controlling the flame and the temperature inside the kiln.

Discussion. The location and circumstances of the large kiln excavated at the site raise some difficulties. The large kiln is situated on a non-forested sand-dune area, which could not provide a fuel source. Hence, the question of a fuel source arises.

The presence of dressed limestone blocks in a kiln that is situated on a *kurkar* ridge is puzzling. No limestone blocks whatsoever were found among the remains of Phase III of the Hellenistic period, nor at the nearby city of Caesarea. Consequently, it may be assumed that these stones were brought to the kiln from the Carmel Range. Yet, it would have been much more practical to build the kiln in an area containing indigenous limestone (Sasson 1990:15), rather than transporting this cargo a long distance to be fired in a kiln situated on an out-of-the-way *kurkar* ridge.

The limestone and *kurkar* uncovered at the bottom of the firing chamber indicate that a mixture of these two types of stones was burnt in the kiln. It may be suggested that as the firing of *kurkar* probably produced very low-quality material, limestone was added to improve the quality of the product. This may be the reason for building the kiln at this location, taking advantage of the building stones at the site. Moreover, it may also be proposed that Roman-period marble sarcophagi, such as the ones discovered in the area, were the material burnt in the kiln. In both cases, the kiln was abandoned when the material had all been burnt.

The Finds

Pottery

Very few sherds were unearthed from Phase II, attributed to the Roman period. While dismantling the limekiln for preservation, a cooking pot and *saqiya* vessels were recovered from the kiln, all dating to the fourth century CE, confirming the date suggested here for the kiln (Peilstöcker 2006: Fig. 6).

Jars (Fig. 13).— Two fragments of bag-shaped storage jars with a thin ring rim. The neck is convex and slightly grooved, with a ridge that forms a collar at the bottom of the neck. The upper part of the body is slightly curved and grooved in steps.

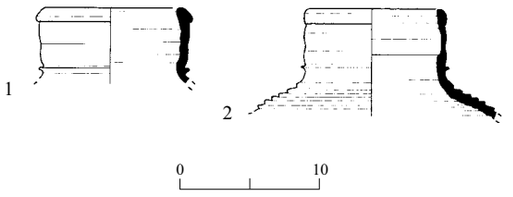


Fig. 13. Roman pottery.

No.	Type	Locus	Reg. No.
1	Bag-shaped storage jar	5005	50216/02
2	Bag-shaped storage jar	1009	10029/9

According to Fernandez's typological division, jars of this type first appeared in the first century CE (Fernandez 1983:180–181, 229), but Landgraf and Adan-Bayewitz believe they are not the late type of bag-shaped jars (Landgraf 1980:69–70, Fig. 22:6; Adan-Bayewitz 1986: Fig. 1:4–7). Parallels for this type of jar were found in assemblages from the second–fourth centuries CE, e.g., at Naḥal Ḥever, where Aharoni (1961: Fig. 7:16, 20) dated them to the first–second centuries CE; Lajjun Fortress (Parker 1987: Fig. 109:155), where they are dated to 363–502 CE; Jalame (Johnson 1988:Fig. 7–51: No. 782) and Shiqmona (Elgavish 1977: Pl. 19:154), where they are dated to the first–third centuries CE; Caesarea (Blakely 1987:68, Fig. 22:61); Neapolis Hippodrome (Magen 2005: Fig. 32:13), where they are dated exclusively to the fourth century CE; Magdala (Loffreda 1976: Figs. 1:8; 3:23; 8:23); the Roman-period site at ʻEin ez-Zeituna (Glick 2006: Fig. 10:1, 5), and at other sites in northern Israel (Fernandez 1983:180–181, 229 T1.2[2a]; 185–186, T1.8, 187, T1.9).

Radiocarbon Dating of Charcoal

Dror Segal and Israel Carmi

In March 1997, a deteriorated organic sample of charcoal from L1021 was submitted for analysis in the radiocarbon dating laboratory at the Weizman Institute of Science, Reḥovot. In keeping with current practice, the samples were pre-treated with acid and alkali, then oxidized to carbon dioxide, reduced to lithium carbide, hydrolized to acetylene and measured (Table 2).

Despite the deteriorated state of the sample, the achieved results are extremely credible. The sample clearly dates to the Roman period, specifically to the second half of the first century CE or the first half of the second century CE. It is perhaps contemporary with the limekiln excavated nearby.

Table 2. Radiocarbon Dates

Sample No.	$\Delta^{14}C$(‰)	$\delta^{13}C$‰	YBP *	Calendaric Age **	Probability ***
RT-2838	-211.87±3.8	-23.5	1915±40	56–144 CE	99

* Conventional ^{14}C age before 1950.
** Calendaric ages calculated after Stuiver and Reimer 1993.
*** The result is within the range of one standard deviation and its probability is given in percentage.

PHASE I: A WINEPRESS OF THE BYZANTINE PERIOD

A severely damaged Byzantine-period winepress was excavated close to surface level on the eastern side of the hilltop (see Fig. 1:4; Plan 1). The collection vat (L1008; 1.0 × 0.9 × 1.0 m) was made of mudbricks and its sides were lined with bright pink plaster containing lime and carbon. North of the collection vat stretched the treading surface (L1028), its bedding laid directly atop the sand and constructed of small *kurkar* stones mixed with a sticky clay material. A mosaic paved some of the area, as is attested by a patch (20 sq cm) preserved where the treading surface joins the collecting vat.

Few fragments of pottery jars (see below) were the only finds from this period recovered from the entire excavated area. Hence, it may be assumed that the activity during the Byzantine period was limited to the operation of the winepress.

Pottery

Jars (Fig. 14).— Both jars were recovered from the walls of the collecting vat. Fragment No. 1 belongs to an Ashqelon-type jar (Mayerson 1992). Most of the jars of this very common type had a convex shoulder, whereas this fragment has a straight shoulder and a rounded, slightly upward rim. Similar rims, mostly with a convex or straight neck, were discovered at Ma'on (Nirim) in the western Negev, dated by Magness (1997:216, Fig. 1:10) to the sixth–seventh centuries CE. A similar fragment was unearthed in Phase 2 of Vault 1 at Caesarea (Blakely 1987: Figs. 38:136; 39:151).

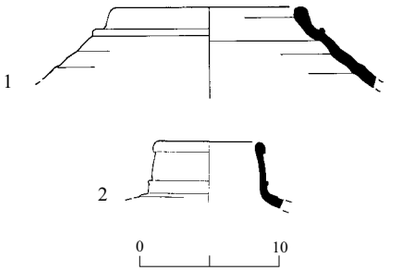


Fig. 14. Byzantine pottery.

No.	Type	Locus	Reg. No.
1	Ashqelon-type jar	5005	50216
2	Bag-shaped storage jar	5005	50216/05

SURFACE: THE MAMLUK (OTTOMAN) PERIOD

Pottery

Surface finds included pottery sherds dating to the Mamluk or Ottoman period.

Krater (Fig. 15:1).— Rim and wall fragment, made of a yellow fabric with a gray core, with a stamped and incised decoration. No parallels were found. Peter Gendelman (pers. comm.) suggested dating the sherd to the Ottoman period, based on its form, fabric texture and decoration.

Jar (Fig. 15:2).— The rim is folded outward, and a tapered ridge is located on the exterior, c. 1 cm below the rim. The shape of the rim suggests it belonged to a jar of the late Mamluk or the Ottoman period. Jars of similar types were used in the coastal plain for infant burials (Glick 1998: Fig. 134:10, 11); the jar from Or 'Aqiva may have been interred in the sand dunes and damaged over time.

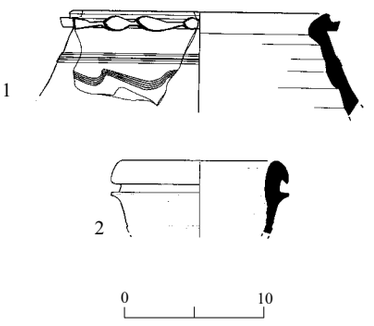


Fig. 15. Mamluk/Ottoman pottery.

No.	Type	Locus	Reg. No.
1	Krater	4001	4001/1
2	Jar	4001	5041/01

SUMMARY

The first settlement at the Or ‘Aqiva site dates to MB II. Fragments of a jar handle and a cooking pot from the early phase of that period were discovered among the sherds collected at the site. The early activity on the hill was possibly related to intensive settlement during MB IIA in the northern Sharon plain, manifested, e.g., at the nearby sites of Tel Mevorakh and Tel Burga (Kochavi, Beck and Gophna 1979:142–151).

Two, or perhaps three, structures on the top of the hill are attributed to Phase III. Their precise plans are unclear, due to considerable damage caused following the abandonment of the site. The pottery and coins date these buildings to the Early Hellenistic period or the Ptolemaic reign. Presumably, the residents of this isolated settlement on the hill, set among sand dunes and marshes, were engaged in some form of agricultural activity and animal husbandry and were allied with the flourishing city of Dor, located about 10 km to the north.

Following the abandonment of these buildings, the site remained deserted for a long period of time. The buildings at the top of the hill collapsed and the mudbricks dissolved in the rains of the ensuing winters. The settlement area was covered with about 0.4 m of alternating layers of sand and clay. Judging from the formations exposed in the sections, this unusual stratification was caused by dissolving mudbricks and depositions of dune sand.

In the Roman period, the hill was resettled and a *kurkar*-stone limekiln was built in the northern part of the site. Based on the radiocarbon date from the site, we date this installation from the second half of the first century to the first half of the second century CE. It was most likely situated there in order to take advantage of the readily-available stones from the Hellenistic or Roman remains. Once these stones were burnt, the kiln was abandoned.

The site was reutilized when a winepress was constructed at the northern end of the hilltop. The numerous sherds found in the infrastructure and plaster date the press to the fifth century CE. The site was deserted following the cessation of activity of the winepress and the entire area was covered by drifting sand.

Two sherds from the Mamluk (Ottoman) period (Fig. 15), as well as handgun bullets and a 1982 Spanish coin, attest to activity from the time the site was deserted until the founding of modern Or ‘Aqiva and recent excavations.

NOTES

[1] The excavations (Permit Nos. A-2399 and A-2442) were directed by Eli Yannai on behalf of the Israel Antiquities Authority (IAA), with the participation of Itzik Argeman, Maya Shamla and Inna Angel of the IAA Center District staff. Eli Yannai and Itzik Argeman took the field photographs and Avraham Hajian prepared the site plans. Pottery restoration and drawing were carried out by Erella Tzarfati

and Marina Shuiskaya, respectively. Vered Eshed examined the anthropological remains, Donald T. Ariel treated the numismatic material, and Débora Sandhaus and Peter Gendelman added valuable comments regarding the pottery. Administration was provided by Shlomo Ya'aqov-Jam and the project was financed by Ḥevrat Mivne Ta'asiya Ltd. Thanks are due to all who helped bring this report to publication.

[2] Mordechai Haiman directed the archaeological survey of the surrounding area, on behalf of the IAA.

[3] A number of rim fragments without bases could not be defined as fish plates nor as outturned rim bowls in the fish-plate tradition (Fig. 3:17–19, 22, 23).

[4] For a discussion of the West Slope technique, see Rosenthal-Heginbottom 1995:222.

[5] The charcoal sample was taken from L1021, located in and associated with the courtyard between the Hellenistic buildings (Phase III). The credible Roman-period date may be explained by the charcoal being blown there from the kiln.

[6] The proposed reconstruction was suggested by Yeshu Drey, to whom I am grateful for his assistance toward our understanding of the kiln firing process.

[7] I wish to thank Dr. Peter Gendelman, who examined the finds and suggested the identification of the sherd, as well as that of other pottery fragments from the Roman and Byzantine periods.

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