

GLASS FINDS AND REMAINS OF A GLASS INDUSTRY FROM MISKA

Yael Gorin-Rosen

INTRODUCTION

The salvage excavation at Miska (see Spivak, this volume) yielded large quantities of glass vessels and remains of a large-scale glass industry.¹ Most of the glass vessels were retrieved from a refuse pit in Area A; they are the focus of this report. All the illustrated vessels and production waste are from this area. A short description of the finds from Areas B, C and D follows.

As most of the vessel types found in this excavation are already known and previously published, the typology employed here follows those descriptions, and mainly relates to types discussed in the latest and most updated studies from the region.

THE GLASS FINDS

AREA A

Large quantities of glass vessel fragments were retrieved from this area, mainly dating from the Late Roman and early Byzantine periods (fourth–early fifth centuries CE). The assemblage is rich in vessel shapes but rather homogenous in the type of fabric and quality of the workmanship.

The glass assemblage from Miska shows affinities with several glass-vessel groups, all of which relate to local production centers in three regions: the Galilee and foothills of Mount Carmel; the central Judean foothills; and the eastern *marzeva* (trough) between Nahal 'Iron and Nahal Hadera. The first group was produced in the well-known glass workshop at Jalame, in the northern foothills of Mount Carmel, dated to the second half of the fourth century CE (Weinberg 1988). The central Judean foothills' group was manufactured at

¹ I wish to thank Polina Spivak for inviting me to study this material. The glass was restored by Olga Shorr, drawn by Carmen Hersch and photographed by Clara Amit.

Khirbat el-Ni'ana, on the road between Yafo and Jerusalem, and presents a large and varied assemblage from the fourth–early fifth century CE (Gorin-Rosen and Katsnelson 2007). Dating to the same period is the eastern *marzeva* group, in the Sharon region, known from the site of Ḥorbat Biz'a (Gorin-Rosen 2012), located some 25 km north of Miska.

Several other published glass assemblages from the Sharon region include types similar to those found at Miska, e.g., Khirbat Ibreyktas (Gorin-Rosen 1998; Kletter and Rapuano 1998), Ḥorbat Mēsar Stratum I (Katsnelson 2009; Sa'id 2009), Ḥorbat Kosit (East) (Katsnelson 2010a), Naḥal Ḥadera (North; Katsnelson 2010b) and Ḥorbat Ḥanut (Jackson-Tal 2018).

The glass finds of Miska are all dated to the Late Roman and early Byzantine periods, namely the fourth and beginning of the fifth centuries CE. They reflect the Late Roman traditions and material culture in both shapes and decorations, for example, in the dominance of bowls and beakers, occurring together with some bottles and jugs and a few kohl-tubes.

Some of the typical Byzantine glass vessels, such as wineglasses, oil lamps and windowpanes, are absent from this assemblage. The absence of early and late Byzantine-period types at Miska clearly stands out when compared with typical Byzantine assemblages from the region, such as those from Ḥorbat Rozez and Ḥorbat Nazur (Winter 2010a; 2010b; for a general discussion of Byzantine glass from Israel, see Gorin-Rosen and Winter 2010).

Only three glass fragments of the Early Islamic period were identified, all found in the upper layers of the site. Two, from L110, B1104 (not illustrated), date to the Umayyad period and include one small rim fragment of a jar with an in-folded hollow rim and a short mouth—similar to a complete Umayyad jar from Beisan/Bet She'an (Scythopolis; Hadad 2005: Pl. 20:375), and a fragment of a neck decorated with a thick wavy trail, an example of a type also known from Umayyad Bet She'an (Hadad 2005: Pls. 14:270–275; 19:358). The third fragment, from L121, B1158, which was found in the upper layer of the refuse pit together with Early Islamic pottery (see Vincenz, this volume: Fig. 7:9, 12), is better preserved and will be discussed below (Fig. 9).

The Glass from the Refuse Pit

The vessels from the refuse pit (Sqs I–J/6) are presented according to the depositional layers suggested by Spivak (this volume), beginning with the lowest layer and proceeding upward. Spivak did not assign this pit to any specific strata of the excavation. The glass vessels found in all the layers are contemporary—no clear difference could be detected between the types—and lack the characteristics of Byzantine-period glass assemblages, as mentioned above.

Locus 136, Basket 1242 (Fig. 1)

Ten glass fragments, four of which are presented below, were retrieved from the lowest sandy layer within the refuse pit. These vessels were made of a similar fabric and quality of workmanship, and all have delicate walls and blowing spirals.

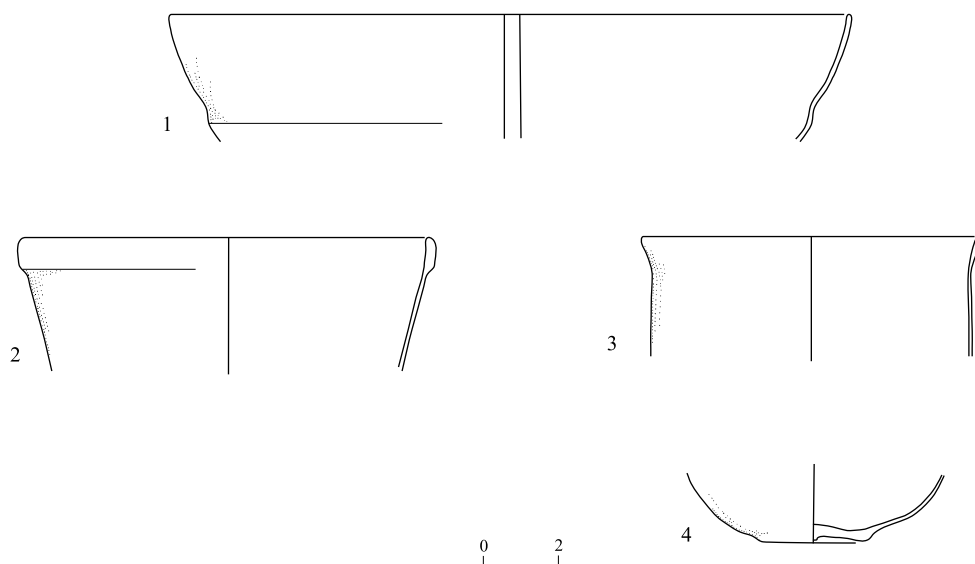


Fig. 1. Glass vessels from L136.

Shallow Hemispherical Bowl with Rounded Rim (Fig. 1:1).— Rim No. 1 is rounded and very simple. It probably belongs to a shallow bowl with a concave bottom, similar to a bowl from Ḥanita Tomb XV, which was found with four coins dating from 255–261 CE (Barag 1978:17–19, Fig. 9:29), or to a bowl with a ring base.

1. L136, B1242/2. Fragment of rim and wall. Greenish blue glass covered with black and silver weathering (removed) and iridescence. Small and medium-sized, oval and rounded bubbles and blowing spirals. Low quality fabric. Rounded rim. Thin, curving wall. Rim diam. 18 cm.

Deep Bowls with Upright or Slightly In-Curved Thickened Rim with a Slight Ridge below It (Fig. 1:2).— The general shape of this bowl is rather simple, characterized mainly by a slight curve of the thickened rim and of the ridge below it (see below, Fig. 2:1 for the same type of bowl).

Deep bowls of this type were found at Ḥorbat Biz'a (Gorin-Rosen 2012:53*–54*, Fig. 2:4, 5, and see therein further references to Khirbat Ibreiktas and Jalame, as well as to two groups from Ḥorbat Mēsar and Ḥorbat Kosit [East]), and appear to have been a local type of the fourth century CE. A similar bowl was also found in Ḥorbat Ḥanut Burial Cave 2 (Jackson-Tal 2018:4–5, Fig. 2:2, and see therein further references to Late Roman bowls of this type).

2. L136, B1242/4. Fragment of rim and wall. Bluish green glass covered with black and silver weathering (removed) and iridescence. Small bubbles, black impurities and blowing spirals. Slightly flaring rounded rim. Thin, slightly curving wall. Rim diam. 11 cm.

Small Bowl with Short, Flaring Rim (Fig. 1:3).— The slightly slanting wall and flaring rim of No. 3 could belong to a small bowl with a base similar to the vessel in Fig. 1:4, or to small bowls with a pushed-in ring base like those found at Naḥal Ḥaggit—dated to the third century CE—and various other examples known from the Galilee, dated to the third and fourth centuries CE (Winter 2010c:159–161, Fig. 5.3:18, 19—complete example, 20–24—similar rims of different sizes, and see therein further references to comparanda from burial caves in the Galilee: Ḥurfeish, Ḥorbat ‘Eitayim, Ḥanita and Asherat).

3. L136, B1242/1. Fragment of rim and wall. Light bluish green glass with yellowish veins covered with black and silver weathering, iridescence and pitting. Small bubbles and blowing spirals. Slightly flaring rounded rim. Thin, slightly curving wall. Rim diam. 9 cm.

Bowl or Beaker with Convex Bottom with a Small Thickened Button in Its Center (Fig. 1:4).— This base is simple and probably belonged to a small bowl of the local repertoire, although it is rather unique.

4. L136, B1242/3. Complete base and wall. Greenish blue glass covered with black and silver weathering (removed) and iridescence. Rather low quality of glass with bubbles and blowing spirals. Concave base with a thickened small button in its center and remains of glass from the pontil (pontil mark 0.8 cm). Thin, curving wall. Base diam. 2.5 cm.

Loci 131, 133 (Fig. 2)

The next layer of the pit yielded fragments of glass vessels made of a similar fabric and quality of workmanship, all exhibiting blowing spirals.

The vessels in L131, B1219 include various bowls: a bowl with a double fold below the rim (e.g., Fig. 3:1); a bowl with a thickened rim (e.g., Fig. 4:1); a bowl with a low ring base (e.g., Fig. 2:4); two bowls with thickened solid bases (e.g., Fig. 4:2–4); and three bases of the pushed-in ring type (Fig. 2:5–7).

In L133, B1223, thirty diagnostic vessels were found, of which seven are presented in Fig. 2:1–4, 8–10. This basket includes the most common types found at the site. The following list includes all the additional specimens which were not catalogued: two rims of bowls/beakers, as in Fig. 2:2; six rounded rims of various bowls; two complete “disc bases”, as in Fig. 2:8; seven low hollow ring bases, Fig. 2:4; two complete pushed-in ring bases, as in Fig. 2:6, 7; three bottle rims, as in Fig. 2:9, 10; and at least three concave bottoms of bottles of different sizes. Most of these vessels are of bluish green shades, with two exceptions made of yellowish green/brown glass. The vessels found in L133, B1223 bear a strong resemblance to the vessels found at Ḥorbat Biṣ‘a (Gorin-Rosen 2012: Figs. 2, 3).

Deep Bowls with Upright or Slightly In-Curved Thickened Rim with a Slight Ridge below It (Fig. 2:1).— Rim No. 1 is of the same type as Fig. 1:2, described above.

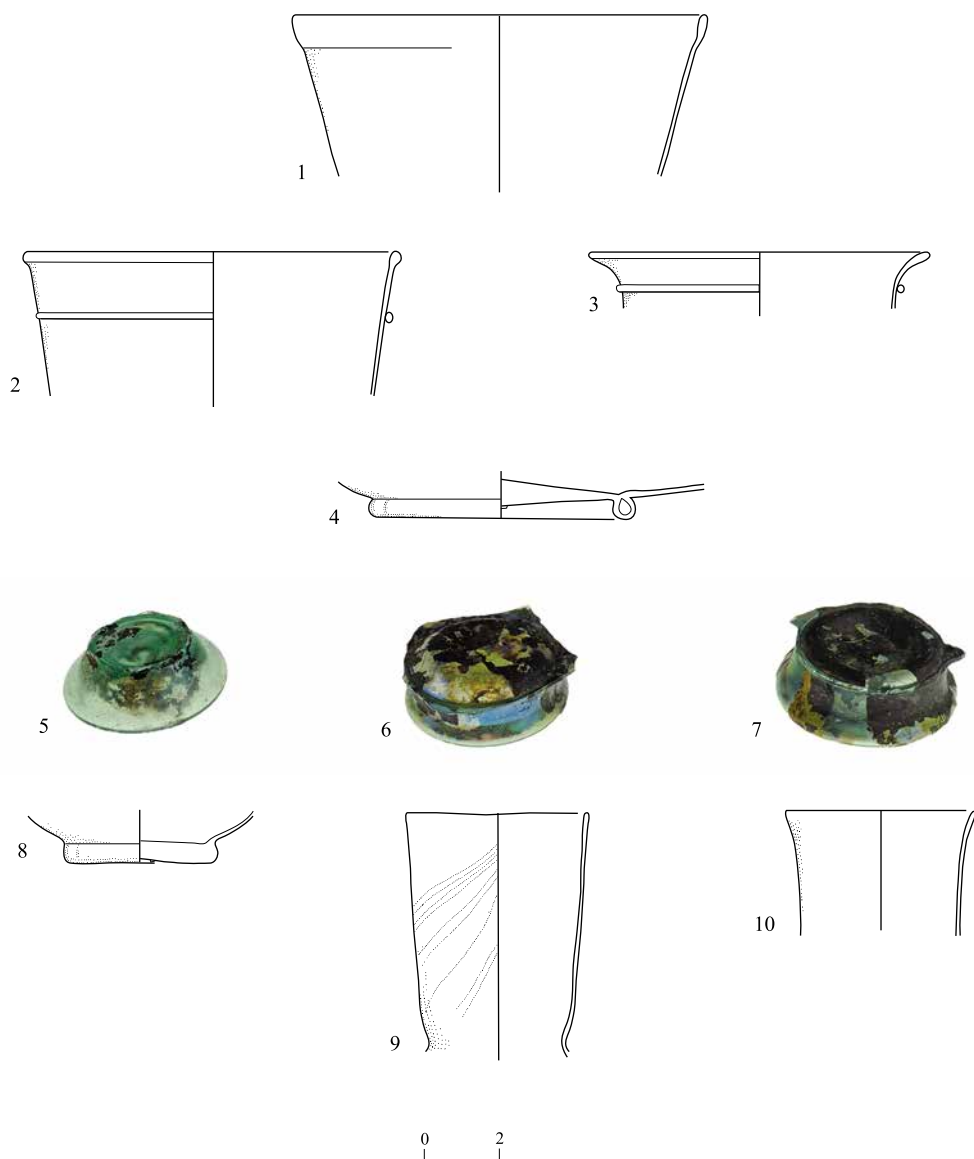


Fig. 2. Glass vessels from L131 and L133.

1. L133, B1223/3. Fragment of rim and wall. Light greenish blue glass covered with black and silver weathering (removed) and iridescence. Many small bubbles, blowing spirals and polishing marks on exterior. Upright thickened rounded rim. Thin, slightly curving wall. Rim diam. 11 cm.

Deep Bowls or Beakers with Applied Horizontal Trail below Rim (Fig. 2:2, 3).— This rim type could belong to a deep bowl or a beaker decorated with an applied horizontal trail. It appeared during the third century CE, as in the excavations at Nahal Haggit (Winter

2010c:161–162, Fig. 5.3:27–30). Vessel No. 2 has an upright thickened rim and is similar to bowls found in Burial Cave 2 at Ḥorbat Ḥanut (Jackson-Tal 2018:4–5, Fig. 2:8, 9, and see therein further references to bowls from Jalame, dated to the second half of the fourth century CE).

Similar bowls with slightly in-curving rims were found at Ḥorbat Biz'a (Gorin-Rosen 2012:53*–54*, Fig. 2:10, and see therein further references to Jalame and Khirbat Ibreiktas, as well as to two recently published groups from Ḥorbat Mēsar and Ḥorbat Kosit [East]).

Vessel No. 3 is characterized by a flaring rounded rim with an applied trail situated just below it. Deep bowls with such rims were found in Ḥorfeish Burial Cave D, dated to the third century CE (Gorin-Rosen 2002b:146*–147*, Fig. 5:13, 14, and see therein further references to bowls from other burial groups dated to the fourth century CE). This rim is also similar to that of sack-shaped beakers, e.g., within the same burial group at Ḥorfeish (Gorin-Rosen 2002b: Fig. 10:33–36); however, the diameter of vessel No. 3 is wider than that of the sack-shaped beakers and seems to belong to a cylindrical-shaped body.

2. L133, B1223/4. Fragment of rim and wall. Light greenish blue glass covered with black and gold weathering, iridescence and severe pitting. Flaring thickened rim with an applied trail of the same color, 1.7 cm below it. Rim diam. 10 cm.

3. L133, B1223/2. Fragment of rim and wall. Light greenish blue glass covered with black and silver weathering (partly removed) and iridescence. Many small bubbles. Flaring delicate rim with a thin applied trail below it. Thin, very delicate wall. The vessel is of fine workmanship. Rim diam. 9 cm.

Bowls with Ring Bases (Fig. 2:4–7).— Many bowls of this type were found. One example from L133 and three from L131 are presented below.

Number 4 is a low hollow ring base with a flat bottom, probably of a shallow bowl. This type of base was common from the Early Roman until the early Byzantine period, exhibiting slight differences in its form through this period. The bowls of this type from this excavation are all dated to the fourth century CE, or slightly later in the early fifth century CE.

Bowls with similar bases were found in the Sharon region, for example, at Ḥorbat Kosit (East), where they are dated to the fourth and early fifth centuries CE (Katsnelson 2010a:135–136, Fig. 2:6, 7), and in Ḥorbat Ḥanut Burial Cave 2 (Jackson-Tal 2018:5–6, Fig. 3:10–13). Bowls of this type were also found at Khirbat el-Ni'ana, where they are dated to the fourth–early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:133–134, Fig. 30:6, 7).

Number 5 could belong to a bowl or jug (see below, Fig. 3:12–16). Numbers 6 and 7 are of medium size, characterized by high, hollow ring bases with a crude pontil scar. They could belong to bowls or jugs. These bases were very common during the Late Roman and early Byzantine periods. Bowls with similar bases were found in the region, for example, at Ḥorbat Kosit (East) (Katsnelson 2010a:135–137, Fig. 2:8, 9), dated to the fourth and early fifth centuries CE.

4. L133, B1223/7. Complete base and beginning of wall. Light greenish blue glass covered with black and silver weathering, iridescence and pitting. Low, hollow ring base with flat bottom, thickened with slight concavity in its center and small pontil scar (0.7 cm) and traces of glass from the pontil. The vessel is of fine workmanship with cutting marks on the interior. Base diam. 7 cm.

5. L131, B1219/1. Complete base and beginning of wall. Greenish glass covered with black and silver weathering, iridescence and pitting. Bubbly glass. Hollow ring base with flat bottom, thickened with crude pontil scar (1 cm). Base diam. 4.6 cm.

6. L131, B1219/2. Complete base and beginning of wall. Yellowish green glass covered with black and silver weathering, iridescence and pitting. High, hollow ring base with flat bottom. Small pontil scar (0.4 cm). Base diam. 4.8 cm.

7. L131, B1219/3. Complete base and beginning of wall. Bluish green glass covered with black and silver weathering, iridescence, pitting and sand deposits. High, hollow ring base with convex bottom, thickened in the center with a small pontil scar (0.7 cm). Base diam. 7 cm.

Bowl or Beaker with Slightly Concave, Solid "Disc Base" (Fig. 2:8).— Base No. 8 belongs to a rather large group of characteristic "disc bases", which are mainly similar in shape and workmanship, but differ in size and the small details of the design. All the bases exhibit the beginning of a slanting wall, rather than an upright one, which might attest that they belong to bowls and not to cylindrical beakers. A group of such bases was found at Ḥorbat Biz'a (Gorin-Rosen 2012:54*–55*, Fig. 2:14–16, and see therein further discussion and references to Ḥorbat Mēsar and Meẓad Tamar).

8. L133, B1223/6. Complete base and beginning of wall. Light bluish green glass covered with black and silver weathering (removed), iridescence and pitting. Thickened flat base with slight concavity in the connection between base and wall. Small pontil scar (0.7 cm). Thin curving wall. Base diam. 4 cm.

Bottle with Cylindrical Mouth (Fig. 2:9, 10).— This type of a simple rounded rim, at the edge of a cylindrical mouth, usually characterizes large and medium-sized bottles, dated to the Late Roman and Byzantine periods. Such rims were found at Ḥorbat Biz'a (Gorin-Rosen 2012:56*, Fig. 3:1, and see therein further references to Jalame and Caesarea Maritima). Complete bottles with similar rims were found in Ḥorbat Ḥanut Burial Cave 3 (Jackson-Tal 2018:8, 11, Fig. 5:1, 2), dated to the Late Roman and Byzantine periods.

9. L133, B1223/1. Almost complete mouth (mended) with beginning of shoulder. Light greenish blue glass covered with black and silver weathering (removed), iridescence and slight pitting. Small

bubbles, a few black impurities and blowing spirals. Uneven upright rounded rim. Cylindrical funnel mouth with constriction at its joint with the neck or shoulder. Rim diam. 5 cm.

10. L133, B1223/5. Fragment of rim and mouth. Light greenish blue glass covered with black and silver weathering (removed) and iridescence. Bubbles, a few black impurities and blowing spirals. Slightly flaring rounded rim. Cylindrical funnel mouth. Rim diam. 5 cm.

Loci 127, 128 (Figs. 3–5)

The glass vessels retrieved from this layer of the pit were also made of similar fabric and workmanship.

A very rich assemblage was found in L127, B1177, of which many vessels are included in Figs. 3 and 4. The following list summarizes all the additional specimens which were not catalogued: 13 rims of various sizes with a double hollow fold below the rim, similar to Fig. 3:1, 2; 25 fragments of bowls with out-folded rims of various sizes; 3 bowls with hollow ring bases, as in Fig. 2:4, in addition to at least 4 such bowls, similar to those in Fig. 3:5–10, and 1 that is similar to the vessel in Fig. 3:16; 3 pushed-in bases of beakers or jugs, as in Fig. 3:12–14; 1 rim of a beaker with a solid base and at least 3 more bases, similar to Fig. 4:8, 9; 2 bottle rims; 2 jugs with in-folded rims; and at least 2 bottles with thick concave bottoms.

The vessels found in L127, B1177 strongly resemble those found at Ḥorbat Biz'a (Gorin-Rosen 2012) and Khirbat el-Ni'ana, dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007).

A second basket (B1179) from the same locus includes several vessels presented below (Figs. 3:3, 4; 4:1, 3–5; 5:1, 2, 5).

Only one basket (B1201) was found in L128 and included one base of a mold-blown vessel made of amber-color glass (Fig. 5:7).

Bowls with Horizontal Ridge below the Rim.— Two bowls with horizontal ridges below the rim were found in L127, B1177 (not illustrated). They represent one of the most common and characteristic types of the fourth century CE (Weinberg and Goldstein 1988:45, 47, Fig. 4-6:49–64; Gorin-Rosen and Katsnelson 2007:78–79, Fig. 1:6–9). Many bowls of this type were found at Miska.

Bowls with similar rims were found in the region, for example, at Ḥorbat Kosit (East), dated to the fourth and early fifth centuries CE (Katsnelson 2010a:135–136, Fig. 2:3–5). Others were found at Caesarea Maritima (Israeli 2008:401, Nos. 70–72).

Bowls with Double Fold below the Rim (Fig. 3:1, 2).— These bowls represent a very common type, which first appeared during the late first–early second centuries CE and continued to be produced, with minor differences, up to the fourth–early fifth centuries CE. Bowl Nos. 1 and 2 are probably a later subtype, widely distributed in Israel.

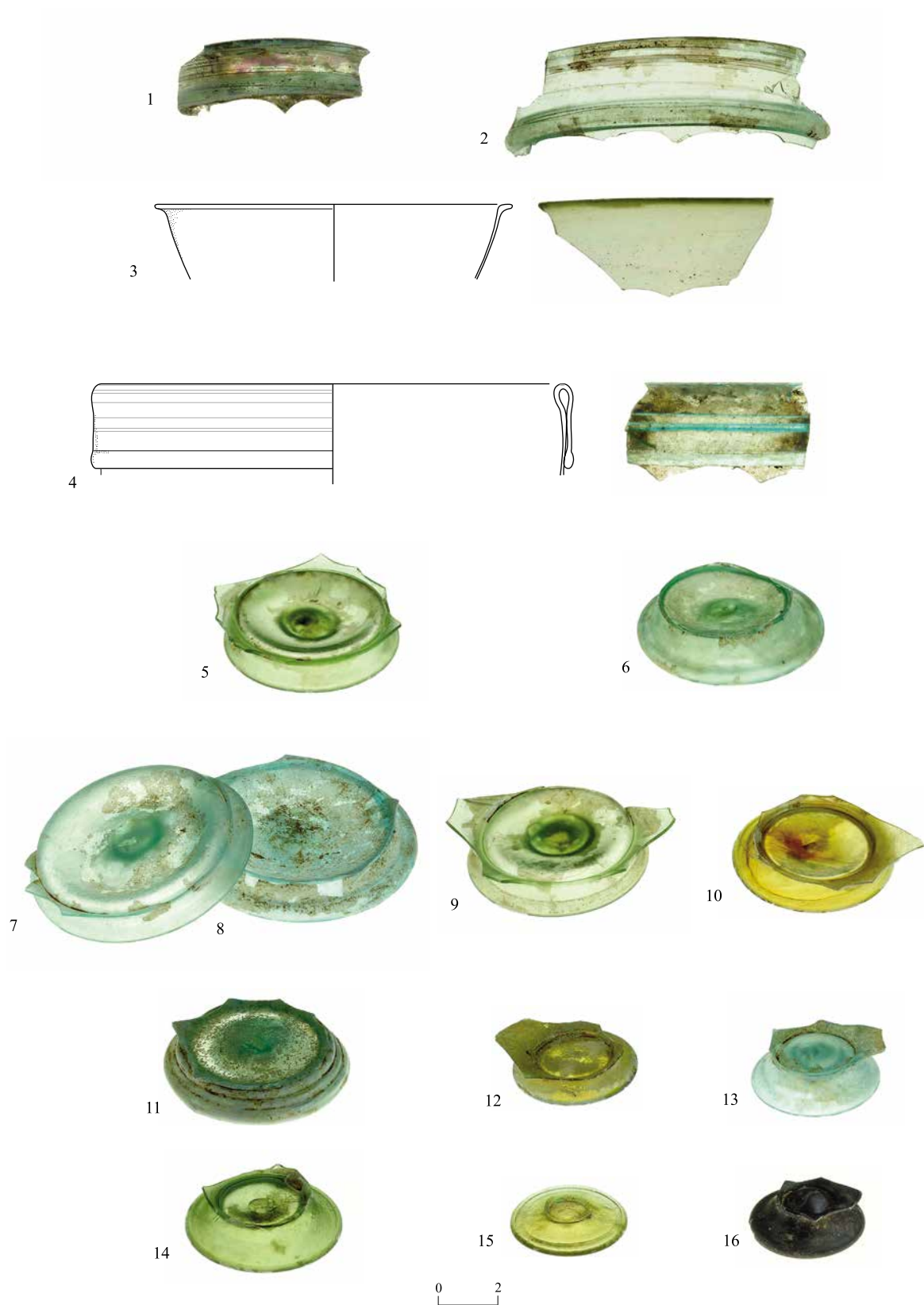


Fig. 3. Glass vessels from L127.

Rims of this type were found in the glass factory dump at Jalame, dated to the second half of the fourth century CE. Weinberg and Goldstein (1988:53–55, Fig. 4-15:109, 112, 113) noted that although these fragments were found at Jalame in relatively small numbers, they should be identified as a local product of this region. Such rims were found at Khirbat el-Ni'ana, belonging to the repertoire of glass vessels assigned to local production, dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:81–83, Figs. 3:2–8; 28:1–5).

Rims of this type were also found elsewhere in the region, e.g., at Ḥorbat Mēsar (Katsnelson 2009: Fig. 6:2) and Ḥorbat Kosit (East) (Katsnelson 2010a:137, Fig. 3:15). A complete bowl with a rim and base similar to Fig. 3:6, 11 was found in a burial cave at Tel Barukh (Jackson-Tal 2015:57, Fig. 1.49:2; Color Plate 10:2).

1. L127, B1177/1. Fragment of rim and wall. Light greenish blue glass covered with enamel-like weathering, iridescence and sand deposits; dull surface. Flaring rim with double hollow folds below it. Thin wall. Rim diam. 10 cm.

2. L127, B1177/2. Fragment of rim and wall. Light bluish greenish glass covered with silver weathering (removed), iridescence and sand deposits. Bubbles and blowing spirals. Upright rounded rim with double hollow folds below it. Thin wall. Rim diam. 13 cm.

Bowls with Flaring Rims (Fig. 3:3).— This bowl is characterized by its delicate flaring rim. A similar rim, although of a wider bowl, was found at Khirbat el-Ni'ana, among vessels dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:76–78, Fig. 1:1).

3. L127, B1179/8. Fragment of rim and wall. Yellowish green glass covered with black and silver weathering (removed). Many small bubbles, black impurities and blowing spirals. Flaring delicate rim. Thin, slightly curving wall. Rim diam. 12 cm.

Bowls with Out-Folded Collar Rim with Applied Trails (Fig. 3:4).— This rim is rather massive, with a thick folded collar decorated inside with turquoise trails. The trails were applied before the folding out of the rim and therefore, are placed between two layers of glass. Another bowl of the same type, but with a slanting rim, was found (Fig. 6:3). A very similar rim with blue threads was found at Tel Tanninim (Pollak 2006:164, Fig. 131:50, and see therein further references to similar bowls from Shuni, Beirut and Jalame). Various bowls with similar rims of the massive plain collar type were found at Khirbat el-Ni'ana, among the glass vessels dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:79–80, Fig. 2:4–7).

4. L127, B1179/9. Fragment of rim and wall. Bluish green glass decorated with turquoise trails. The glass is covered with silver weathering (removed), iridescence and sand deposits. Many small bubbles and black impurities. Out-folded rim decorated with multiple fused-in trails. Four trails are inside the upper fold and three are in the middle, above the lower fold. The rim is rather thick and massive. Rim diam. 14 cm.

Bowls with Ring Bases (Fig. 3:5–10).— Many bowls of this type were found (see above, Fig. 2:4, 6, 7).

Bowls with ring bases are very common during the Late Roman and early Byzantine periods. Bowls with similar bases were found at sites in the region, e.g., at Ḥorbat Kosit (East) (Katsnelson 2010a:135–137, Fig. 2:8, 9), dated to the fourth and early fifth centuries CE. Additional examples, known from the glass workshop of Khirbat el-Ni‘ana, were dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:86–89, 132–134, Figs. 6:1–5; 30:1–3). The distribution of this type is very wide, including, e.g., a few such vessels from Ḥorbat ‘Uza, in the western Galilee, dated to the fourth century CE (Gorin-Rosen 2009:95, Fig. 2.52:9–13, and see therein further references to assemblages from the Galilee).

5. L127, B1177/10. Complete base and beginning of wall. Yellowish green glass covered with silver weathering, iridescence and sand deposits. Bubbles and blowing spirals. Pushed-in hollow ring base with a thickened center and remains of glass and metal from the pontil (1.4 cm). Base diam. 7 cm.

6. L127, B1177/11. Complete base and beginning of wall. Greenish glass covered with silver weathering, iridescence, sand deposits and pitting. Rather low quality of workmanship, very uneven deformed in the center. Uneven pushed-in hollow ring base with a thickened center and remains of glass from the pontil (1 cm). Base diam. 7.8–8.0 cm.

7. L127, B1177/8. Complete base and beginning of wall. Greenish blue glass covered with silver weathering, iridescence, sand deposits and severe pitting. Pushed-in hollow ring base with uneven thickened bottom and remains of glass from the pontil (1.8 cm). Base diam. 8.1 cm.

8. L127, B1177/9. Complete base and beginning of wall. Greenish blue glass covered with silver weathering, iridescence, sand deposits and severe pitting. Uneven pushed-in hollow ring base with a thickened convex center and remains of glass from the pontil (1.3 cm). Base diam. 8.3 cm.

9. L127, B1177/16. Almost complete base and beginning of wall. Light green glass covered with silver weathering, iridescence and sand deposits. Bubbles and blowing spirals. Uneven pushed-in hollow ring base with a flat bottom and thickened center and remains of glass from the pontil (1.7 cm). Base diam. 7 cm.

10. L127, B1177/13. Complete base and beginning of wall. Yellowish brown glass with brown veins, covered with silver weathering and iridescence, slightly pitted. Bubbles and blowing spirals. Uneven pushed-in hollow ring base with a flat bottom and thickened center and remains of glass from the pontil (0.8 cm). Base diam. 5.8–6.0 cm.

Bowls with Trail-Wound Base (Fig. 3:11).— Many bowls of this type were found, an example of which is the group in Fig. 7:1–7.

This type of base was the most common type at Khirbat el-Ni‘ana, where more than 50 complete or nearly complete bases and dozens of base fragments were found in the 1996–1997 excavations and in the 1991 excavations. All of these were locally produced at the site during the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:88–90, 134, Figs. 7, 31, and see therein further discussion of the distribution of this type, e.g., at Ashqelon, ‘En Gedi, Jerusalem, Shekhem/Neapolis, Khirbat Badd ‘Isa, as well as in the western Samarian foothills, at the Red Tower [al Burj al-Aḥmar] and Ḥorbat Nashe, and further north in the Carmel region, at Ḥorbat Sumaq, Raqit, Qaṣṭra and Ṭirat Ha-Karmel).

11. L127, B1177/12. Complete base and beginning of wall. Greenish blue glass covered with silver weathering, iridescence, sand deposits and severe pitting. A trail base wound four times; the beginning and the end of the trail are visible. Thick flat bottom with thickened center and remains of glass from the pontil (pontil mark 0.8 cm). Base diam. 6.6–6.7 cm.

Jugs or Beakers with Pushed-In Ring Bases (Fig. 3:12–16).— Many bases of this type were found; only a few are presented below and in Fig. 6:7, 8. They are similar to the bases of bowls, but smaller, and probably belonged to vessels that also had a smaller diameter. These bases, belonging to either beakers or jugs, were very common and widely distributed during the fourth century CE.

This type of base was common at Khirbat el-Ni‘ana, dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:93, 135, Figs. 8:11–14; 32:5, 6, and see therein further references to Shekhem/Neapolis, Jalame, Qaṣṭra and Akhziv). This type is very widely distributed, known, for example, from Caesarea Maritima (Israeli 2008:379, 404, Nos. 103–105, and see therein further references to assemblages from the Galilee), with a few more examples from Ḥorbat ‘Uṣa, in the western Galilee, dated to the fourth century CE (Gorin-Rosen 2009:95, Fig. 2.54:13–16, and see therein further discussion and references).

12. L127, B1177/15. Complete base and beginning of wall. Yellowish green glass covered with white enamel crust, silver weathering, iridescence, sand deposits and severe pitting. Uneven pushed-in hollow ring base with a pontil scar (1 cm). Base diam. 5 cm.

13. L127, B1177/21. Complete base and beginning of wall. Greenish blue glass covered with silver weathering, iridescence, sand deposits and severe pitting. Pushed-in hollow ring base with a thickened center and remains of glass from the pontil (pontil mark 1.5 cm). Base diam. 5.5 cm.

14. L127, B1177/14. Complete base and beginning of wall. Greenish glass covered with silver weathering and iridescence. Bubbles and blowing spirals with a slight defect in the connection of base and body. Pushed-in hollow ring base with a small bottom, thickened in its center with remains of glass from the pontil (pontil mark 1.1 cm). Base diam. 6.2 cm.

15. L127, B1177/18. Complete base and beginning of wall. Yellowish green glass covered with silver weathering, iridescence and sand deposits. Bubbles and blowing spirals. Pushed-in hollow ring base with pontil mark (0.8 cm). Base diam. 4.5 cm.

16. L127, B1177/9. Complete base and beginning of wall. Yellowish brown glass covered with black crust, iridescence and pitting. Pushed-in hollow ring base with a thickened center and remains of glass from the pontil (pontil mark 1.2 cm). Base diam. 4 cm.

Deep Bowls with Upright or Slightly In-Curved Thickened Rim with a Slight Ridge below It (Fig. 4:1).— This bowl is of the same type as Figs. 1:2 and 2:1 (see above). It seems that in order to create the thickened rim, it was out-folded, tooled and heated.

1. L127, B1179/1. Fragment of rim and wall. Light greenish blue glass covered with black and silver weathering (removed) and iridescence. Many small and medium-sized bubbles and blowing spirals. Slightly incurving, thickened rounded rim. Thin, slightly curving wall. Rim diam. 11 cm.

Bowl or Beaker with Slightly Concave, Solid Base/“Disc Base” (Fig. 4:2–4).— Base Nos. 2–4 are similar in shape and workmanship, but differ in size. All the bases exhibit the beginning of a curving wall. This type was very common in the region, as seen in the excavation of Miska, as well as at Ḥorbat Biṣ‘a and Ḥorbat Mēsar (Gorin-Rosen 2012:54*–55*, Fig. 2:14–16, and see therein further discussion and references). A base of this type was described above in Fig. 2:8.

2. L127, B1179/6. Complete base and beginning of wall. Light greenish blue glass covered with black and silver weathering, iridescence and pitting. Asymmetric, thickened flat base with slight concavity at the joint between base and wall. Small pontil scar (0.8 cm). Thin curving wall. Rim diam. 3.5–4.0 cm.

3. L127, B1179/4. Complete base and beginning of wall. Greenish glass covered with black and silver weathering (removed), iridescence and slight pitting. Thickened flat base with slight concavity



Fig. 4. Glass vessels from L127.

in its center and at the joint between base and wall. Small pontil scar (0.8 cm). Thin curving wall. Rim diam. 4 cm.

4. L127, B1179/9. Complete base and beginning of wall. Light greenish blue glass covered with black and silver weathering (removed), iridescence and pitting. Asymmetric, thickened flat base with slight concavity in the joint between base and wall. Small pontil scar (0.8 cm). Thin curving wall. Rim diam. 3.8–4.0 cm.

Vessel with Pinched Toes around the Base (Fig. 4:5).— Two similar bases with spaced, rather large toes were found (Figs. 4:5; 7:8). The toes are nearly identical in size, with equal spaces between them. They could belong to bowls or flasks.

There are two types of this vessel. The more common one has small densely spaced toes, as found, for example, at Ḥorbat Biz'a, Ḥorbat Mēsar, Caesarea Maritima and Jalame (Gorin-Rosen 2012:54*–56*, Fig. 2:17, and see therein further discussion and references). The other type has large spaced toes as the example from Miska and is less common. One such base was found at Khirbat el-Ni'ana, within the large assemblage of glass vessels dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:107–108, Fig. 15:3, and see therein further references).

5. L127, B1179/5. Part of base and beginning of wall. Light greenish glass covered with silver weathering, iridescence and pitting. A thick, pushed-in concave bottom with large pinched toes around it. Five complete toes remain, while at least four or five more were broken. Crude pontil scar with traces of glass and metal (pontil diam. 1 cm). Base diam. 4–5 cm.

Beakers with Solid Base (Fig. 4:6–9).— This vessel type is characterized mainly by its typical bases, although the rims are also very characteristic, e.g., Fig. 4:6, which has a flaring rounded rim and a trail wound c. 3 cm below it. The bases are frequently found in excavations and considered a reliable dating tool for the fourth century CE. These beakers are a standard component of the glass vessel repertoire of the fourth century CE; only a few of these types continued to be produced at the beginning of the fifth century CE. The rims are quite fragile and therefore, are usually found broken.

A rather wide range of forms of this type was found at Khirbat el-Ni'ana, within the large assemblage of locally produced glass vessels, dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:90–91, 93, Fig. 8:4–9, and see therein further references).

6. L127, B1177/3. Fragment of rim and beginning of wall. Light greenish glass with turquoise trail covered with silver weathering, iridescence and sand deposits. Small bubbles with blowing spirals. Upright rounded rim. Rim diam. 7 cm.

7. L127, B1177/4. Complete base and beginning of wall. Greenish blue glass covered with silver weathering (almost completely removed), iridescence and sand deposits. Solid base with concavity in its center and large pontil scar with traces of glass from the pontil (1.3 cm). Base diam. 4.2 cm.

8. L127, B1177/20. Complete base and beginning of wall. Greenish glass covered with silver weathering, iridescence and pitting. Solid base with concavity in its center, flat bottom with a large pontil scar and traces of glass from the pontil (1.2 cm). Base diam. 4.8 cm.

9. L127, B1177/17. Complete base and beginning of wall. Greenish blue glass covered with silver weathering, iridescence and pitting. Thick solid base with concavity in its center, a large pontil scar and traces of glass from the pontil (1.6 cm). Base diam. 4 cm.

Bottle with Cylindrical Mouth Decorated with Applied Horizontal Trails (Fig. 5:1, 2).— These large and medium-sized bottles have a simple rounded rim at the edge of a cylindrical mouth, and are usually decorated with applied horizontal trails below the rim. The trails are either of the same color as that of the vessel or of darker colors, as in the two bottles presented below. This type of bottle is dated to the Late Roman and Byzantine periods. Rims of such bottles were found at Ḥorbat Biz'ā (Gorin-Rosen 2012:56*, Fig. 3:1, and see therein further references to Jalame and Caesarea Maritima). Complete bottles of this type with trails of the same color as that of the bottle or of a darker color were found in burials at Tel Barukh (Jackson-Tal 2015:61, 67, Figs. 1.54:1; 1.55:1; Color Plate 11:1).

This type of rim continued to be produced during the Byzantine period and even later, during the late Byzantine period. In spite of the possibility that this vessel could indicate a Byzantine date for the Miska assemblage, its fabric and workmanship are like those of all the rest of the assemblage and therefore, a date in the Late Roman period is offered. Furthermore, a Byzantine date is highly unlikely as there is no other vessel in the assemblage that can be of such a late date.

1. L127, B1179/7. Fragment of rim and mouth. Light greenish glass with turquoise trails, covered with silver weathering (removed), iridescence and sand deposits. Bubbly glass with a few black impurities. Rounded rim, cylindrical funnel mouth with applied turquoise trail wound at least five times around the mouth or neck. Rim diam. 5–6 cm.

2. L127, B1179/3. Fragment of rim and mouth. Light greenish blue glass covered with silver weathering (removed), iridescence and sand deposits. Many bubbles and blowing spirals. Uneven rounded rim. Cylindrical funnel mouth with applied trail wound at least seven times around the mouth or neck. Rim diam. 5.7 cm.

Bottle and Jugs with Funnel Mouth and In-Folded Rim (Fig. 5:3–5).— These rims belong to medium-sized bottles and jugs with a short funnel mouth and an in-folded rim, short necks and globular or squat bodies. They were very common during the fourth century CE and probably continued to be produced during the early fifth century CE.

A few bottles and jugs of this type were found at Khirbat el-Ni'āna, dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:93, 98–99, Figs. 11:1, 2, 4; 33:3; 34:2, 3, and see therein further references). Similar bottles were also found in burials at Tel Barukh (Jackson-Tal 2015:64–65, Fig. 1.53:1, 2; Color Plate 10:6, 7). Such bottles were also found at Caesarea Maritima, dated to the Late Roman and early Byzantine periods (Israeli 2008:379, 405, Nos. 112, 113).



Fig. 5. Glass vessels from L127.

3. L127, B1177/5. Almost complete rim, mouth, neck and beginning of shoulder. Light bluish green glass with yellowish elongated veins, covered with silver weathering, iridescence and sand deposits. Low quality of fabric and workmanship: many bubbles and blowing spirals. Uneven in-folded rim. Funnel mouth with a short cylindrical neck. Rim diam. 4.2 cm.

4. L127, B1177/6. Complete rim, mouth, neck and beginning of shoulder. Light greenish blue glass covered with silver weathering, iridescence and sand deposits; severely pitted. Many bubbles and blowing spirals. Uneven in-folded rim, funnel mouth and short cylindrical neck. Rim diam. 4.7–5.0 cm.

5. L127, B1179/2. Small fragment of rim and complete handle. Light yellowish greenish glass covered with silver weathering (partly removed), iridescence and sand deposits. Funnel mouth with in-folded rim. The handle is drawn up from the shoulder to below the rim, and then upward to the rim's edge.

Bottle or Jug with Pear-Shaped Body (Fig. 5:6).— The rim of No. 6 is broken, although it appears to have been a funnel mouth with an in-folded or rounded rim. A continuation of the neck into the body without any constriction is a characteristic feature of this vessel type. A similar bottle was found at Jalame (Weinberg and Goldstein 1988:73–74, 76, Fig. 4-36:307).

6. L127, B1177/7. Complete body and neck, missing rim. Light greenish blue glass covered with silver weathering, iridescence, sand deposits and slight pitting. Many bubbles and blowing spirals. Complete pear-shaped body with tapering neck and beginning of funnel mouth. Slightly concave bottom with pontil scar (1.2 cm). Base diam. 5 cm.

Mold-Blown Vessel with Vertical Ribs (Fig. 5:7).— This base probably belonged to a bottle or jug with a cylindrical body, decorated with mold-blown ribs. Examples for such vessels were found in the Galilee, in Burial Cave 2 at Khirbat el-Shubeika, dated to the Late Roman and early Byzantine periods (Gorin-Rosen 2002a:311–312, Fig. 4b:24–26, and see therein further references). The color of the vessel from Miska is rather rare at the site. A vessel of this color was found in a burial cave at Naḥal Ḥadera (North), dated to the third and fourth centuries CE (Katsnelson 2010b:146–147, Fig. 2:9).

7. L128, B1201. Almost complete base and beginning of wall. Yellowish brown glass with brown veins covered with silver weathering, iridescence and slight pitting. Thick concave bottom with pontil scar (1.3 cm). The wall is decorated with mold-blown, uneven vertical ribs. Thin wall. Base diam. 4 cm.

Loci 117, 121 (Figs. 6–9)

The glass vessels retrieved from L117 and L121 in the upper light brown layer of the pit are, in general, similar to those found in the underlying layer, in L127. The main difference is in the occurrence of an Early Islamic vessel (Fig. 9) in L121.

Shallow Hemispherical Bowl with Thickened, Rounded In-Curving Rim (Fig. 6:1).— This bowl is characterized by its very unusual in-curving rim edge. It resembles the bowl in Fig. 1:1 in its general shape but has a different rim than that bowl. A rim similar to the one described here was found at Caesarea Maritima, dated together with a large group of bowls to the Late Roman and early Byzantine periods (Israeli 2008:376, 401, No. 73).

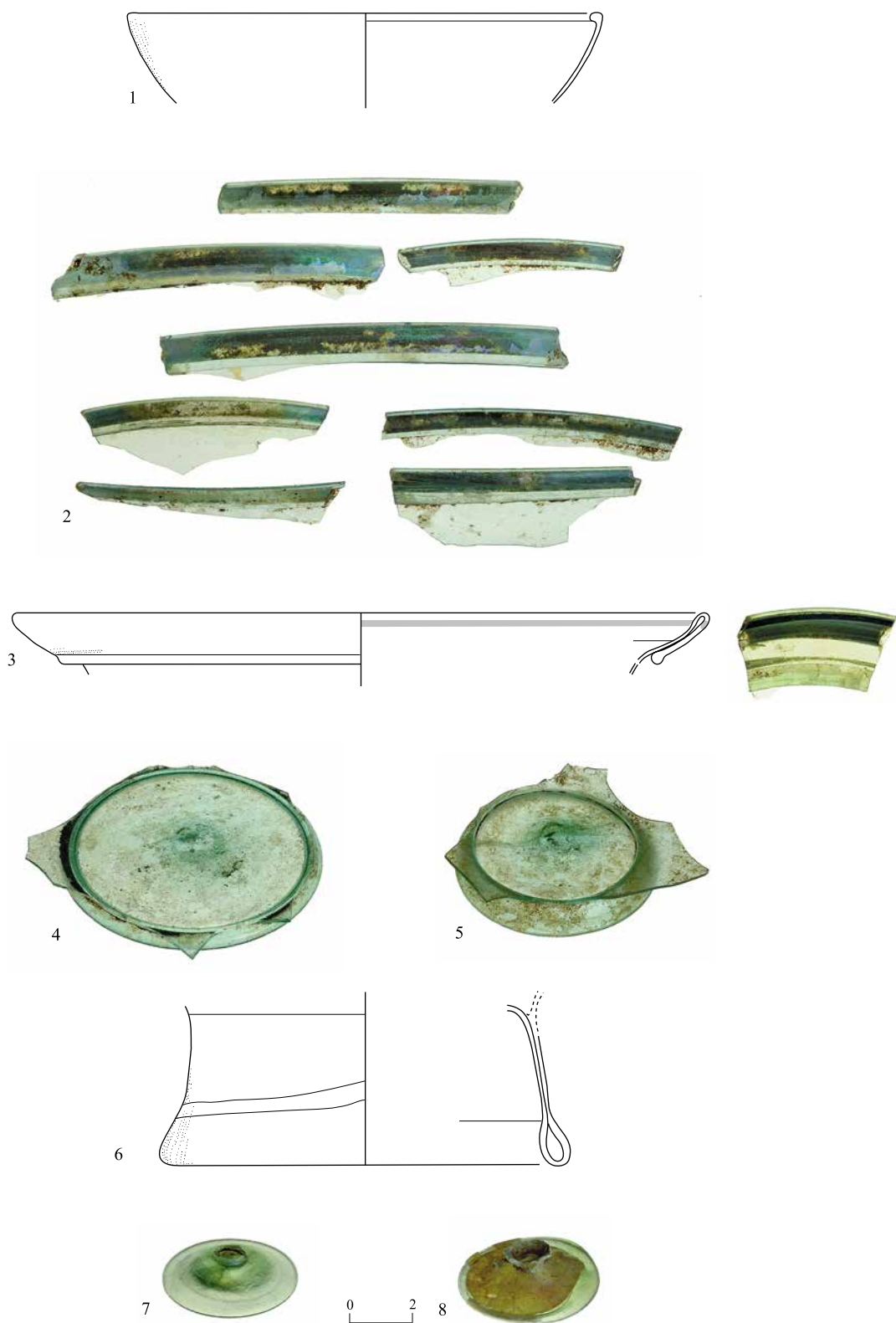


Fig. 6. Glass vessels from L121.

1. L121, B1121/1. Small fragment of rim and wall. Light greenish blue glass covered with silver weathering, iridescence and sand deposits. Small and medium-sized bubbles, black impurities and blowing spirals. Rounded in-curving rim with thickened edge. Curving wall. Rim diam. 15 cm.

Bowls with Out-Folded Hollow Rims (Fig. 6:2).— A group of rims of this type represents only a selection of those found in the excavation. They all belong to bowls that probably had hollow ring bases. They share the same color, fabric and workmanship, as well as their state of preservation. As this type of rim was very common from the second until the seventh century CE, its date at Miska is determined mainly by its association with other vessel types, or is based on minor characteristic features. At Miska, all rims of this type should date to the fourth and early fifth centuries CE. Contemporary rims of this type were widely distributed at sites such as Khirbat el-Ni'ana, dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:79–80, 93, Fig. 2:1–3, and see therein a further reference to Jalame), and at Caesarea Maritima, where the rims were associated with coins from the mid-fourth to the mid-fifth century CE (Israeli 2008:376–377, 402, Nos. 78–82).

Bowls with Slanting Out-Folded Collar Rim with Applied Trails (Fig. 6:3).— This rim is out-folded twice; both folds are hollow with a blue fused-in trail on the upper fold. The rim is slanting and probably belongs to a shallow bowl, whereas a similar rim seen in Fig. 3:4—which is also double folded and displays fused-in trails—is upright and probably presents a deeper version of the same vessel. A very similar bowl was found at Caesarea (Israeli 2008:391, 418, Fig. 255), assigned by Israeli to a group of decorated vessels known from Beirut and dated to the sixth and seventh centuries CE. However, in this case, the shape of the rim is also typical of vessels of the Late Roman period. A similar plain rim was found, for example, at Khirbat el-Ni'ana, dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:79–80, Fig. 2:8, and see therein further references). It seems that vessels with a rim of this type were in use during the fourth and early fifth centuries CE, and that their production technique reappeared at a later time.

3. L121, B1141/2. Fragment of rim and wall. Green glass with blue trail. The glass is covered with silver weathering (removed), iridescence and sand deposits. Out-folded rim decorated with horizontal blue trail inside the upper fold. Both folds are hollow. Rim diam. 22 cm.

Bowls with Ring Bases (Fig. 6:4–6).— Many bowls of this type were found, of which three examples are presented below. Base No. 4 is a wide, low and hollow ring base with a flat bottom, probably from a shallow bowl, as in Fig. 2:4 (see above for further discussion of this type).

Base No. 5 is of medium size, characterized by a slightly higher, hollow ring base with a crude pontil mark. Bowls of this type were already described in Fig. 3:5–10 (see above for further discussion of this type).

Base No. 6 differs from the other two base types in its irregular size. The ring base is wide and very high. A similar bowl was found at Khirbat el-Ni'ana, dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:86–88, Fig. 6:6, and see therein further references).

4. L121, B1141/3. Complete base and beginning of wall. Light bluish green glass covered with silver weathering, iridescence and sand deposits. Very bubbly glass with black impurities. Low, hollow ring base with flat bottom, thickened with a slight concavity in its center and pontil scar (1.2 cm). The vessel is of good workmanship, although the fabric is of inferior quality. Base diam. 9.2 cm.

5. L121, B1141/4. Complete base and beginning of wall. Light greenish blue glass covered with iridescence, sand deposits and slight pitting. Low, hollow uneven ring base with flat bottom, thickened with a thick concavity at its center and a rather large pontil scar (1.4 cm). Base diam. 7 cm.

6. L117, B1126/1. Half of a base and beginning of wall. Bluish green glass covered with silver weathering, iridescence and sand deposits. Many small and medium-sized bubbles and blowing spirals. High, uneven hollow ring base. The bottom is missing. Base diam. 13 cm.

Jugs or Beakers with Pushed-In Ring Bases (Fig. 6:7, 8).— A few bases of this type were found in L121, of which Nos. 7 and 8 were photographed and catalogued. This type was described in Fig. 3:12–16 (see above for references).

7. L121, B1141/5. Complete base and beginning of wall. Green glass covered with silver weathering and iridescence. Uneven pushed-in small ring base with small pontil scar (0.6 cm). Base diam. 4.6 cm.

8. L121, B1141/6. Complete base and beginning of wall. Green glass covered with silver weathering, iridescence and sand deposits. Uneven hollow ring base with scar and traces of glass from the pontil (0.8 cm). Base diam. 4.7–4.8 cm.

Bowls with Trail-Wound Base (Fig. 7:1–7).— Many bowls of this type were found, of which seven are presented below. This type was described above (Fig. 3:11).

1. L121, B1141/7. Almost complete base and beginning of wall. Yellowish green glass covered with silver weathering, iridescence and sand deposits. A trail base wound four times; the beginning of the trail is visible. Flat bottom thickened in center with remains of glass from the pontil (pontil mark 1 cm). Base diam. 7.2–7.5 cm.

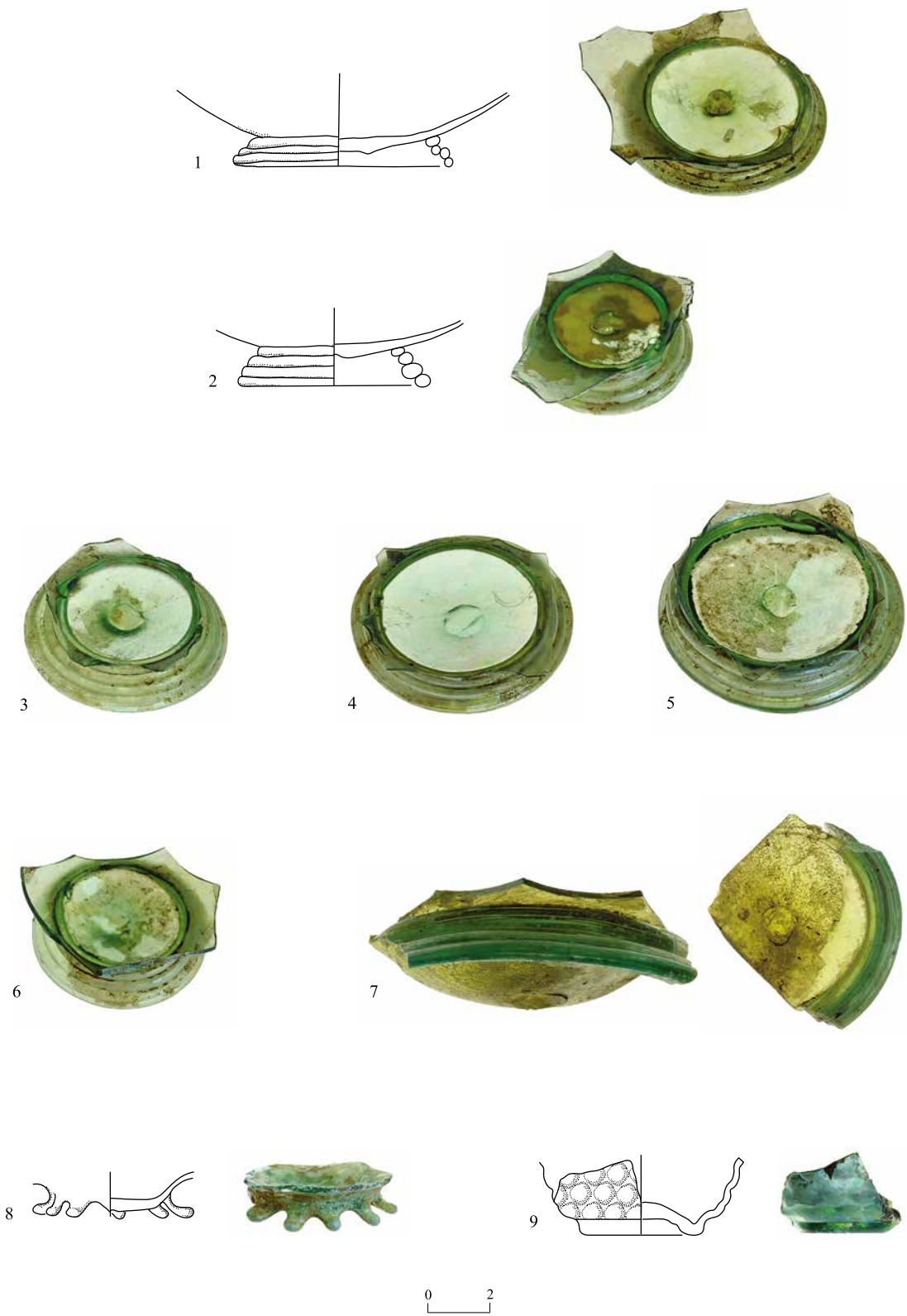


Fig. 7. Glass vessels from L117 and L121.

2. L121, B1141/8. Complete base and beginning of wall. Bluish green glass covered with silver weathering, iridescence, sand deposits and pitting. A trail base wound four times; the beginning of the trail is visible. Thick flat bottom with scar and remains of glass from the pontil (1 cm). Base diam. 6 cm.

3. L121, B1141/9. Complete base and beginning of wall. Greenish glass covered with silver weathering, iridescence and sand deposits. A trail base wound five times; the beginning of the trail is visible. Thick flat bottom thickened at the center with scar and remains of glass from the pontil (1.2 cm). Base diam. 6.9 cm.

4. L121, B1141/10. Complete base and beginning of wall. Greenish glass covered with silver weathering, iridescence, sand deposits and pitting. A trail base wound four times; the beginning of the trail is visible. Thick flat bottom sunken in the center with remains of glass from the pontil (1.2–1.3 cm). Base diam. 6.8–7.1 cm.

5. L121, B1141/11. Complete base and beginning of wall. Bluish green glass covered with silver weathering, iridescence, sand deposits and pitting. A trail base wound three times; the beginning of the trail is visible. Uneven, thick convex bottom sunken in the center with remains of glass from the pontil (1.1 cm). Base diam. 7.4–7.8 cm.

6. L121, B1141/12. Complete base and beginning of wall. Bluish green glass covered with silver weathering, iridescence and sand deposits. A trail base wound four times; the beginning of the trail is visible. Thick flat bottom thickened at the center with remains of glass from the pontil (0.8 cm). Base diam. 5.4–5.6 cm.

7. L121, B1158. Part of base and beginning of wall. Yellowish green glass vessel with bluish green trail covered with silver weathering, iridescence, sand deposits and severe pitting. A trail base wound three times. Sunken bottom thickened at the center with remains of glass from the pontil (1.1 cm).

Vessel with Pinched Toes around the Base (Fig. 7:8).— This base is similar to the one in Fig. 4:5 (see above for further discussion of this type).

8. L117, B1126/3. Complete base and beginning of wall, some toes broken. Greenish glass covered with white enamel-like crust, iridescence, sand deposits and severe pitting. A thick flat bottom with large pinched toes around it. Six complete toes remain, while at least four or five more were broken. Lower part of the bottom is uneven with small scar (pontil diam. 0.7 cm).

Mold-Blown Bottle with Grape Design (Fig. 7:9).— This base fragment belongs to a well-known group of vessels, usually dated to the Late Roman period. A similar base was found

at Khirbat el-Ni‘ana, as is the case for the base described above (Fig. 7:8), dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:107–108, Fig. 15:2, and see therein further references).

9. L121, B1141/1. Part of base and beginning of wall. Bluish green glass covered with black and silver weathering, iridescence and severe pitting. Mold-blown vessel with grape pattern on the body and rather thick wall toward base. A thick concave base with pontil scar (0.8 cm). Base diam. c. 4 cm.

Bottle with Upright Rim and Wide Cylindrical Neck (Fig. 8:1).— This bottle is almost complete. It belongs to a rather common type of bottle, known from burial complexes dated to the Late Roman and early Byzantine periods. A similar bottle was found in Ḥorbat Ḥanut Burial Cave 3 (Jackson-Tal 2018:11, Fig. 6:5). An almost identical bottle was found at Khirbat el-Ni‘ana, dated to the fourth and early fifth centuries CE (Gorin-Rosen and Katsnelson 2007:140–143, Fig. 35:1, and see therein further references to a tomb at the Dominus Flevit compound on the Mount of Olives, Jerusalem). A bottle with a similar shape but with an additional indented decoration on the body was found in a burial cave at Tel Barukh (Jackson-Tal 2015:67–68, Fig. 1.55:2; Color Plate 11:4).

1. L121, B1121/2. Complete bottle, only small part missing on one side. Light greenish blue glass with greenish veins near the rim. Covered with silver weathering, iridescence, sand deposits and pitting. Blowing spirals. Upright uneven rounded rim, wide cylindrical neck, short squat body and pushed-in concave bottom, lacking pontil scar. Rim diam. 3.8 cm, base diam. c. 4 cm, height 10 cm.

Bottle or Jug with Funnel Mouth and In-Folded Rim (Fig. 8:2).— Rim No. 2 could belong to either a bottle or a jug, but is probably a jug as a small part of the rim—where the handle would have been attached—is broken, as in Fig. 5:5. This type was very common during the fourth century CE and probably continued to be produced during the early fifth century CE, as already discussed above (Fig. 5:3–5).

2. L117, B1126/2. Almost complete rim and mouth with small part of the neck. Yellowish green glass covered with silver weathering, iridescence, sand deposits and pitting. Uneven in-folded rim, asymmetric funnel mouth with a short uneven neck. Rim diam. 4.6 cm.

Double-Kohl Tubes (Fig. 8:3–5).— Three fragments of the lower parts of double tubes were found in L121; all bear remains of applied trails on the body.

Double tubes with a trail decoration that was applied along the body—not only around its center—were common burial goods during the Late Roman and Byzantine periods. Barag classified and dated them based on the type of handles attached to the tubes and the decorations (Barag 1970:175–179, Fig. 39, see types decorated with trails: Type 12:1, 1-2, 2-2, 3-1, 3-2, 4-1, 5-1, 7-1, 8).



Fig. 8. Glass vessels from L117 and L121.

Although the fragments found are small, they have no remains of handles on the lower part of the body and therefore, might belong to the earliest examples that lacked handles but exhibited trail decorations, dated to the fourth century CE (Barag 1970:175, Type 12:1, and see therein further examples and discussion). These fragments could also belong to a type with two handles attached to the rim and a basket handle on top, as in an example found at Beit Fajjar in a tomb dated by the excavator to the fourth century CE (Husseini 1935: Pl. 85:3), and later dated by Barag from the mid-fourth to mid-fifth century CE (1970:177, Type 12:3-1, and see therein further references to 'Ein Yabrud and the site of the Lions Gate, Jerusalem). A complete example with three handles, as the one from Beit Fajjar, was found

in a burial cave in the Naḥalat Ahim Quarter, Jerusalem, dated to the Byzantine period (Kogan-Zehavi 2006:65*, Fig. 4:13). Three double-kohl tubes with trail decorations on the body were found in burial caves at Tel Barukh (Jackson-Tal 2015:75–79, Figs. 1.59:2; 1.60:1, 2; Color Plate 12:2, 4, with further references therein). A very fine example of this vessel is on display in the Israel Museum, Jerusalem (Israeli 2003:231, Cat. No. 290, and see further references therein).

A few more fragments of double tubes were found, including a basket handle from the same locus as the fragments described above, but in a different basket (B1121); two fragments of the upper part of the tube with in-folded rims; and one fragment of the lower part of the tube (L117, B1161).

3. L121, B1158. Fragment of the lower part. Yellowish green glass covered with silver weathering and iridescence. Double tube with remains of elongated trail wound at least four times on the body. Narrow pontil scar on the bottom.

4. L121, B1158. Fragment of the lower part. Greenish blue glass with turquoise trail covered with silver weathering, iridescence and pitting. Double tube with remains of thick, elongated turquoise trail wound at least two times on the body. Narrow pontil scar on the bottom.

5. L121, B1141/13. Fragment of the lower part. Bluish green glass covered with silver weathering, iridescence, sand deposits and pitting. Rather small tubes and delicate workmanship. Double tube with remains of elongated trail wound at least three times on the body. Narrow pontil scar on the bottom.

Bottle with Ridged Neck (Fig. 9).— This bottle type was very common during the Early Islamic period, mainly the eighth and ninth centuries CE. Examples were found in most of the sites settled during this time, e.g., Ramla, Caesarea, Bet She'an and Tiberias (Gorin-Rosen 2010:233–235, Pl. 10.6:9, 10, and see further references and discussion therein). This bottle is the latest find in this excavation.

1. L121, B1158. Almost half a rim and part of the neck. Greenish blue glass covered with sand deposits and slight pitting. Uneven, thick rounded rim and thick wall. Five horizontal constrictions tooled on the neck creating six protruding ridges. Rim diam. 3 cm.



Fig. 9. Glass vessel from L121.

AREAS B, C AND D

In Area B, meager glass fragments were found in only four baskets: one basket from the surface (L104, B1118), including production waste; a second basket with a raw glass chunk found in a fill (L118, B1076); a third basket (L129, B1189) yielding one vessel fragment dated to the fourth or early fifth century CE, together with production waste; and a fourth basket that was found in a locus of the Early Islamic stratum (L135, B1234) and yielded remains of production waste.

In Area C, mainly remains of glass production were found, alongside five vessel fragments. The glass production remains (Loci 205, 207, 211, 215, 219, 229, 233–236, 247) included raw glass chunks of various sizes and hues, as well as several fragments of furnace debris, two of which are of a furnace floor (L211, B2026; L215, B2050). The glass vessels from this area belong to types discussed above, dated to the fourth or early fifth century CE. The only exception is a small fragment of a glass bracelet found on the surface (L207, B2067), which probably dates from the Ottoman period. It is a twisted bracelet of dark color decorated with a white trail.

Only two baskets of glass were retrieved from Area D: one from L203, B2005, including a fragment of a concave base; and one from L232, B2084, including four fragments of production debris.

REMAINS OF A GLASS INDUSTRY

Surveys conducted in the region of Miska unearthed a rather large quantity of glass production debris. Some of these finds were previously briefly mentioned by Roll and Ayalon (1989) in their survey of Apollonia and the southern Sharon. In their latest survey of the site, they pointed out that pottery from the Byzantine and Early Islamic periods was documented, as well as large quantities of raw glass and furnace fragments, indicating large-scale glass production (Roll and Ayalon 1989:158). The salvage excavation conducted by Spivak (this volume) sheds new light on this industry and its dating (see below).

The remains of glass production were found in large quantities in all the excavated areas of Miska. The majority were retrieved from Area A, some in Areas B and C and very few from Area D.

Debris from Glass Furnaces

A glass industry is usually divided into two production stages: primary, i.e., the raw glass making, and secondary, including the production of glass vessels and objects from chunks of raw glass (for further discussion of the terminology and technology, see Gorin-Rosen 2000; Gorin-Rosen and Katsnelson 2007:124–127, 129, and references therein).

The production debris was found in most of the loci of Area A, from the surface downward, in the refuse pit and in other locations. This debris was found together with glass vessels dated to the fourth and early fifth centuries CE in nearly all loci, with the exception of two baskets from the surface level, which included modern glass vessels as well (L102, B1015 and L110, B1065).

Small chunks of raw glass were found in L101, L102 and L103. Debris from furnaces and more chunks of raw glass occurred in L103, L109–113, L117–120 and L122.

To identify and describe the debris, an understanding of the shape of the furnaces and the way that they operated is needed. The mass glass production site at Bet Eli‘ezer, Ḥadera, provides an insight into the process of primary production in glass furnaces (Gorin-Rosen 1995:42–43; 2000:52–54), with additional information obtained from the furnaces uncovered at Apollonia (Tal, Jackson-Tal and Freestone 2004). In these examples, the furnace comprises a firing chamber—divided into two compartments, with two separate openings—and a melting chamber measuring approximately 2×4 m; the firing chambers are smaller.

The furnace compartments were dug into the ground and lined with mud bricks made of local soil. The same type of brick was used to roof the installations. The measurements of the bricks at Bet Eli‘ezer are as follows: length 10 cm, width 30 cm and height 10 cm. It was suggested that most of the bricks at that site, including the glazed ones, were reused since several glazed bricks were found in the exterior walls of some of the furnaces (for a reconstruction of this furnace, see Gorin-Rosen 2000:52–54, Fig. 4; see also Gorin-Rosen 1995:42–43).

The secondary glass production was carried out in glass workshops—which were of a smaller size, built from bricks, stones and roof tiles. They produced a slightly different composition of debris than the primary production sites, the most characteristic being the blowing waste, including moils, glass buttons, drops and deformed vessels (Gorin-Rosen 2000:56).

Much of the debris found at Miska is composed of bricks heated to different degrees. In some bricks the organic textures are still visible (Fig. 10:1), while in others, the brick is burned and coated on one side with a layer of glaze or molten glass, which probably formed on the furnace walls and ceiling during the production process. Other than having a surface layer of molten glass, the bricks from the walls sometimes have veins of molten glass inside them. Parts of the bricks were intensively exposed to high temperatures and include large amounts of glass inside them (Fig. 10:2, 3).

Fragments originating from the furnace floors were identified in a layer of broken raw glass above a flat surface of a heated floor (Fig. 10:4, 5). In two examples from L113, B1061, the layer of the floor was situated below the raw glass and above the furnace bottom. Other examples show the bottom layers below the furnace floor, where molten debris had sunk and cooled in layers (Fig. 10:5).

The diagnostic features of the floor are known from the finds at Bet Eli‘ezer, where remains of floors from 17 furnaces were uncovered (Gorin-Rosen 2000:52–54, Photo 8),

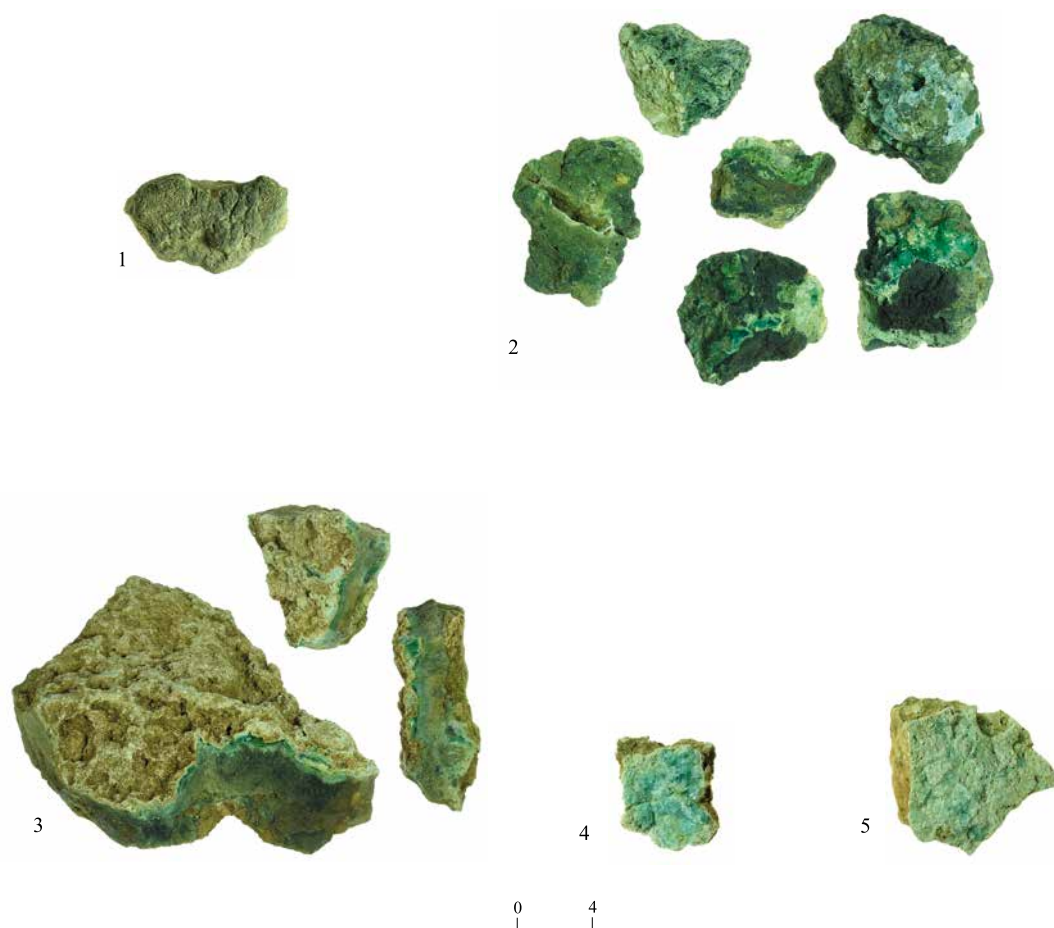


Fig. 10. Remains of glass production.

No.	Locus	Basket	Description	Notes
1	122	1134/1	Fragment of the core of a burned brick	
2	122	1134/2	Fragments of burned bricks with layers of glass on the surface, and glass veins inside	
3	103	1024	Fragment of a furnace bottom, below the floor with layers of debris	Large fragment (length 17 cm; width 3.5–5.0 cm), broken into three fragments, revealing its inner structure
4	113	1061/1	Fragment of furnace floor with remains of raw glass chunks on top	The furnace floor was made of limestone, the raw glass is clear bluish; there is a thin white layer between the clear glass and the floor
5	113	1061/2	Fragment of furnace floor almost clean with tiny remains of raw glass chunks on top	The furnace floor was made of limestone, the raw glass is clear bluish; there is a very thin white layer between the clear glass and the floor

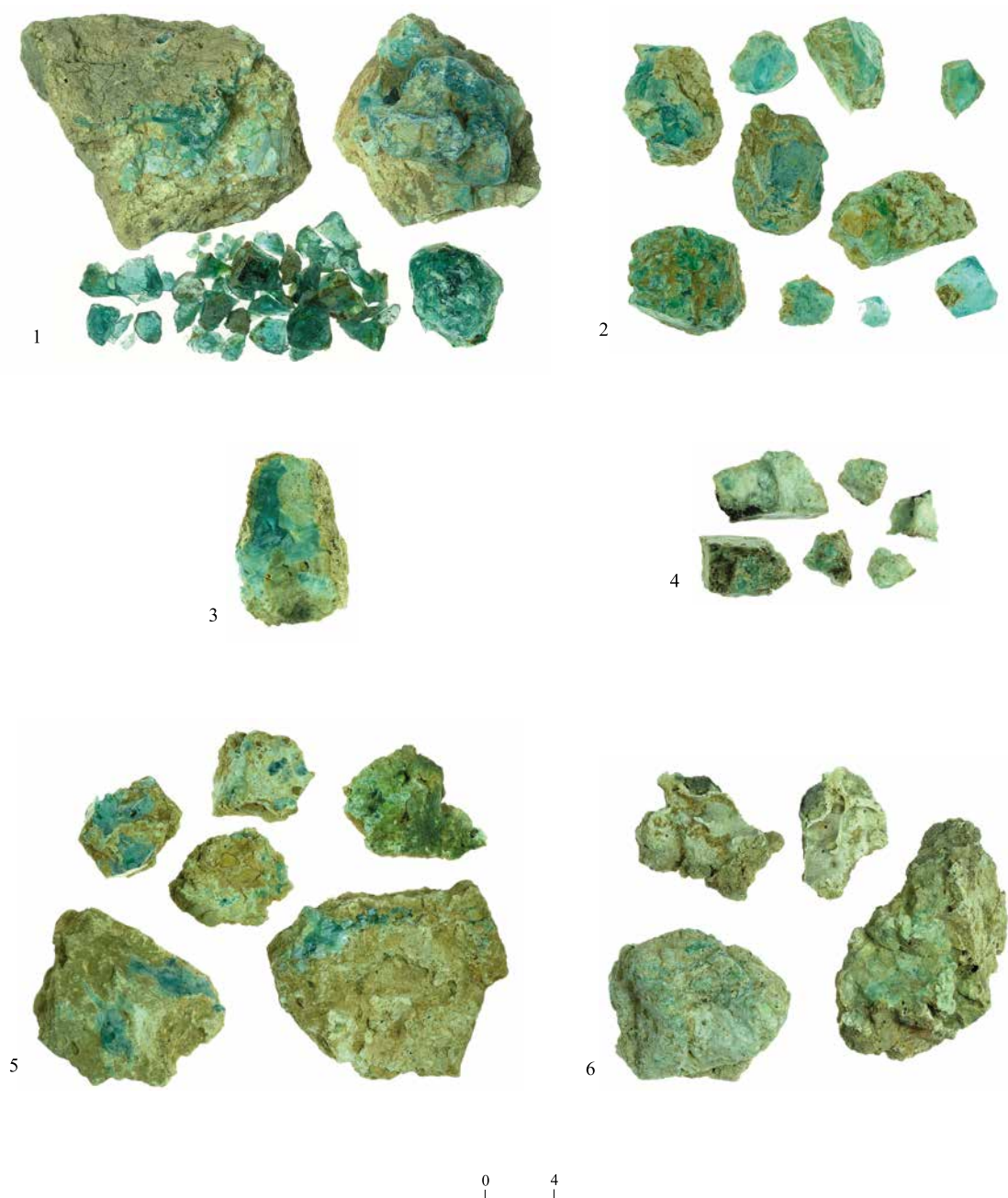


Fig. 11. Remains of glass production.

and from Apollonia, where additional glass furnaces were unearthed (Tal, Jackson-Tal and Freestone 2004).

Another type of debris includes chunks of raw glass of various sizes and shapes, some still attached to fragments of the furnace wall or floor (Fig. 11:1, 2). Figure 11:3 shows an example of clear raw glass attached to furnace debris. The dominant color of the raw glass

◀ Fig. 11

No.	Locus	Basket	Description	Notes
1	122	1132	Chunks of raw glass in a pile and two large chunks of raw glass mixed with debris from the furnace	
2	110	1147	Raw glass chunks and fragments mixed with debris from the furnace	Selection of examples from a very rich basket with c. 10 kg of debris
3	110	1147	Raw glass chunk found with debris from the furnace	
4	104	1118	A broken chunk of debris from the furnace with mixed texture: the surface is glazed, and the inside has an ice-like texture with small spots of clear raw glass and ashes	The chunk was broken into six fragments, revealing its structure
5	117	1111	Fragments of bricks mixed with glass, and debris from the furnace	A selection of examples from a very rich basket
6	122	1134	Fragments of bricks with ashes and glass, and glazed bricks	A selection of examples from a very rich basket

found in the excavation is greenish blue or bluish green. Less common are fragments of raw glass having a whitish ice-like texture as in Fig. 11:4, with very little clear glass in them. These fragments represent glass that has been partly vitrified and could no longer be used by the glassmakers. Therefore, I suggest that this type of debris is an indication of glass making from raw material at the site, as this type of debris would not have been transferred far from the place of production.

Examples of debris with a mixture of the different types described above, which are typical of the finds retrieved from the excavation, are shown in Fig. 11:5, 6.

SUMMARY AND CONCLUSIONS

The rather large amount of raw glass chunks and debris from destroyed furnaces found at Miska points to a primary production, namely a raw glass industry. Although the chunks and debris were not found *in situ*, it can be assumed that the furnaces were located near the refuse pit in Area A—where most of these remains were found—as this kind of debris would have been too heavy to be moved and could not be recycled or reused. This kind of debris is known to have been reused as building material, but this is not the case here.

The remains of the glass industry are probably contemporary with the glass vessels and therefore, should probably be dated to the fourth and early fifth centuries CE. If so, this site adds important information concerning the history of primary glass production in the region. The earliest furnaces of the rectangular type, used for mass production, were found at Wadi Natrun, Egypt, and are dated to the Early Roman period (first–second centuries

CE; Nenna, Picon and Vichy 2000; Nenna et al. 2005; Nenna 2015). Subsequently, the next earliest published examples are those from Apollonia, dated to the Byzantine period (Tal, Jackson-Tal and Freestone 2004), and those from Bet Eli‘ezer, which represent the largest glass industry from the ancient world ever found, dated to the late Byzantine and Umayyad periods (Gorin-Rosen 2000:52–54).

Based on the surveys of Roll and Ayalon, the first settlement at Miska should be dated to the Roman III (192–324 CE) and Byzantine I (324–500 CE) periods, contemporary with other settlements founded within the region of the wooded hills with *hamra* soil in the southern Sharon (Roll and Ayalon 1989:17, 144, Fig. 86). They suggested that these new settlements, with very limited areas available for agriculture, expanded their income by the development of new economic branches, such as pottery and glass production, using the local oak trees as fuel (Roll and Ayalon 1989:150). They also noted that this area was where both east–west and north–south roads crossed.

Based on the information gleaned from the surveys and excavations at Miska, the primary glass production may be assigned to the fourth century CE, thus reinforcing the important role of this economic branch in the region. The abundance of wood in the area of Miska guaranteed a consistent supply of this major component in the glass production process; other components, such as sand and lime, could be found near the coast or in sand dunes. The only component that the ancient glassmakers had to import was soda—a light-weight element, which was obtained in the form of naturally occurring natron, probably brought from Wadi Natrun, Egypt. The accessibility of Miska to the main crossroads would have been significant for the import of natron, but also equally important for exporting and trading the raw glass chunks.

The operation of a single furnace would have yielded around ten tons of raw glass, and therefore, it would seem that most of the raw glass produced at Miska was intended for export.

It is noteworthy that the glass vessels, although found in somewhat high numbers, exhibit a rather homogeneous use of fabric and a limited repertoire of forms pertaining to the fourth and early fifth centuries CE. Although lacking evidence for a secondary glass production at the site, such as moils, drops or blowing waste, the nature of the glass repertoire at Miska might attest to the existence of a glass workshop somewhere in the settlement, yet to be found.

REFERENCES

- Barag D. 1970. *Glass Vessels of the Roman and Byzantine Periods in Palestine*. Ph.D. diss. The Hebrew University, Jerusalem (Hebrew; English summary, pp. I–VIII).
- Barag D. 1978. *Ḥanita, Tomb XV: A Tomb of the Third and Early Fourth Century CE* (‘Atiqot [ES] 13). Jerusalem.
- Gorin-Rosen Y. 1995. Ḥadera, Bet Eli‘ezer. *ESI* 13:42–43.

- Gorin-Rosen Y. 1998. The Glass Vessels. In R. Kletter and Y. Rapuano. A Roman Well at Khirbet Ibreiktas. *'Atiqot* 35:54–56.
- Gorin-Rosen Y. 2000. The Ancient Glass Industry in Israel: Summary of the Finds and New Discoveries. In M.-D. Nenna. *La route du verre: Ateliers primaires et secondaires du second millénaire av. J.-C. au Moyen Âge* (Travaux de la maison de l'Orient méditerranéen 33). Lyons. Pp. 49–63.
- Gorin-Rosen Y. 2002a. Excavations at Khirbet el-Shubieka 1991, 1993: The Glass Vessels. In Z. Gal ed. *Eretz Zafon: Studies in Galilean Archaeology*. Jerusalem. Pp. 288–322 (Hebrew; English summary, pp. 186*–187*).
- Gorin-Rosen Y. 2002b. The Glass Vessels from Burial Cave D at Ḥurfeish. In Z. Gal ed. *Eretz Zafon: Studies in Galilean Archaeology*. Jerusalem. Pp. 140*–166*.
- Gorin-Rosen Y. 2009. The Glass Vessels from Strata 9–6. In N. Getzov, D. Avshalom-Gorni, Y. Gorin-Rosen, E.J. Stern, D. Syon and A. Tatcher. *Ḥorbat 'Uza; The 1991 Excavations II: The Late Periods* (IAA Reports 42). Jerusalem. Pp. 78–98.
- Gorin-Rosen Y. 2010. The Islamic Glass Vessels. In O. Gutfeld. *Ramla: Final Report on the Excavations North of the White Mosque* (Qedem 51). Jerusalem. Pp. 213–264.
- Gorin-Rosen Y. 2012. Remains of a Glass Industry and Glass Finds from Ḥorbat Biz'a. *'Atiqot* 70:49*–62*.
- Gorin-Rosen Y. and Katsnelson N. 2007. Local Glass Production in the Late Roman–Early Byzantine Periods in Light of the Glass Finds from Khirbat el-Ni'ana. *'Atiqot* 57:73–154.
- Gorin-Rosen Y. and Winter T. 2010. Selected Insights into Byzantine Glass in the Holy Land. In J. Drauschke and D. Keller eds. *Glass in Byzantium: Production, Usage, Analyses (International Workshop Organized by the Byzantine Archaeology Mainz 17th–18th of January, 2008)* (Römisch-germanischen Zentralmuseums Tagungen 8). Mainz. Pp. 165–181.
- Hadad S. 2005. *Islamic Glass Vessels from the Hebrew University Excavations at Bet Shean* (Qedem Reports 8). Jerusalem.
- Husseini S.A.S. 1935. A Fourth-Century A.D. Tomb at Beit Fajjār. *QDAP* 4:175–177.
- Israeli Y. 2003. *Ancient Glass in the Israel Museum: The Eliahu Dobkin Collection and Other Gifts* (Israel Museum Catalogue 486). Jerusalem.
- Israeli Y. 2008. The Glass Vessels. In J. Patrich. *Archaeological Excavations at Caesarea Maritima: Areas CC, KK, and NN; Final Reports I: The Objects*. Pp. 367–418.
- Jackson-Tal R.E. 2015. The Khirbet al-'Aura/Tel Barukh Cemetery: Glass Vessels. In O. Tal and I. Taxel. *Samaritan Cemeteries and Tombs in the Central Coastal Plain: Archaeology and History of the Samaritan Settlement outside Samaria (ca. 300–700)* (Ägypten und Altes Testament 82). Münster. Pp. 57–107.
- Jackson-Tal R.E. 2018. Glass. In R. Badhi and E. Ayalon. *Ḥorbat Ḥanut. HA–ESI 130* (October 23). http://www.hadashot-esi.org.il/report_detail_eng.aspx?id=25464&mag_id=126 (accessed December 23, 2019).

- Katsnelson N. 2009. Glass Vessels. In K. Sa'ad. Ḥorbat Mesar. *HA-ESI* 121 (December 7). http://www.hadashot-esi.org.il/Report_Detail_Eng.aspx?id=1283&mag_id=115 (accessed February 5, 2011).
- Katsnelson N. 2010a. Baqa el-Gharbiya Area: The Glass Vessels from Ḥorbat Kosit (East). *'Atiqot* 64:133–142.
- Katsnelson N. 2010b. Baqa el-Gharbiya Area: The Glass Vessels from Naḥal Ḥadera (North). *'Atiqot* 64:143–152.
- Kletter R. and Rapuano Y. 1998. A Roman Well at Khirbet Ibreiktas. *'Atiqot* 35:43–59.
- Kogan-Zehavi E. 2006. A Burial Cave of the Byzantine Period in the Naḥalat Aḥim Quarter, Jerusalem. *'Atiqot* 54: 61*–86* (Hebrew; English summary, pp. 160–161).
- Nenna M.-D. 2015. Primary Glass Workshops in Graeco-Roman Egypt: Preliminary Report on the Excavations of the Site of Beni Salama, Wadi Natrun (2003, 2005–2009). In J. Bayley, I. Freestone and C. Jackson eds. *Glass of the Roman World*. Oxford. Pp. 1–22.
- Nenna M.-D., Picon M., Thirion-Merle V. and Vichy M. 2005. Ateliers primaires du Wadi Natrun: Nouvelles découvertes. In *Annales du 16^e Congrès de l'AIHV (London 2003)*. Nottingham. Pp. 59–63.
- Nenna M.-D., Picon M. and Vichy M. 2000. Ateliers primaires et secondaires en Égypte à l'époque gréco-romaine. In M.-D. Nenna ed. *La route du verre: Ateliers primaires et secondaires du second millénaire av. J.-C. au Moyen Âge* (Travaux de la Maison de l'Orient méditerranéen 33). Lyons. Pp. 97–112.
- Pollak R. 2006. The Glass. In R.R. Stieglitz. *Tel Tannim: Excavations at Krokodeilon Polis 1996–1999* (ASOR Archaeological Reports 10). Boston. Pp. 155–193.
- Roll I. and Ayalon E. 1989. *Apollonia and Southern Sharon: Model of a Coastal City and Its Hinterland*. Tel Aviv (Hebrew; English summary, pp. IV–IX).
- Sa'ad K. 2009. Ḥorbat Mesar. *HA-ESI* 121 (December 7). http://www.hadashot-esi.org.il/Report_Detail_Eng.aspx?id=1283&mag_id=115 (accessed February 5, 2011).
- Spivak P. This volume. Remains of the Late Roman to Late Ottoman Periods at Miska in the Southern Sharon.
- Tal O., Jackson-Tal R.E. and Freestone I.C. 2004. New Evidence of the Production of Raw Glass at Late Byzantine Apollonia-Arsuf. *JGS* 46:51–66.
- Weinberg G.D. 1988. The Glass Factory and Manufacturing Processes. In G.D. Weinberg ed. *Excavations at Jalame: Site of a Glass Factory in Late Roman Palestine*. Columbia, Mo. Pp. 24–37.
- Weinberg G.D. and Goldstein S.M. 1988. The Glass Vessels. In G.D. Weinberg ed. *Excavations at Jalame: Site of a Glass Factory in Late Roman Palestine*. Columbia, Mo. Pp. 38–102.
- Winter T. 2010a. The Byzantine-Period Glass Vessels from Ḥorbat Rozez. *'Atiqot* 62:145–155.
- Winter T. 2010b. Glass Vessels from the Byzantine Period at Ḥorbat Naḥur. *'Atiqot* 64:99*–104* (Hebrew; English summary, p. 160).
- Winter T. 2010c. The Glass Vessels. In J. Seligman. *Naḥal Ḥaggit: A Roman and Mamluk Farmstead in the Southern Carmel* (IAA Reports 43). Jerusalem. Pp. 155–168.