

REMAINS FROM THE CRUSADER AND LATE OTTOMAN PERIODS AT THE FRENCH SCHOOL ON YEFET STREET, YAFO (JAFFA)

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INTRODUCTION

During October–November 2009 and June 2014, a salvage excavation was undertaken on 27 Yefet Street, Yafo (Figs. 1, 2),¹ at the former French School, which was built in the 1880s by the St. Joseph French Catholic order.² Such ecclesiastical-sponsored education institutions were founded in various cities in the Holy Land, initiated by European governments and Christian churches, as the Ottoman Empire gradually declined in power (Kark 1990:36–38; Blumberg 2007:15ff.). The school is located on the southeastern outskirts of historical Yafo, on one of the plots that was settled following the dismantling of the city's fortifications. The school was active for over a century and was recently converted into a wing of a new hotel.

Several large-scale excavations were carried out in the plots bordering the French School. These excavations uncovered building remains, fortifications and burials, dating from the Late Bronze Age to the late Ottoman period, e.g., at the French Hospital Compound (Re'em 2010; Dayan and Levy 2012; Dayan, Levi and Samora-Cohen, this volume); graves from the Hellenistic and Roman periods and walls and irrigation channels from the late Ottoman period on Rabbi Yehuda Me-Raguza Street (Arbel and Rauchberger, this volume [b]); a large cemetery with dozens of tombs from the Persian, Hellenistic and Roman periods

¹ The excavations (Permit Nos. A-5744, A-7142) were carried out on behalf of the Israel Antiquities Authority and financed by the RFR Israel company. Limor Talmi and Yoav Arbel directed the 2009 excavation, and Yoav Arbel directed the excavation in 2014 and was the field photographer. The excavation was assisted by Lior Rauchberger (area supervision), Chen Ben-Ari and Anjelina Dagot (GPS), Oksana Ashkenazi (field registration), Tsila Sagiv (field photography), Mark Kunin and Avi Hajian (surveying), Anna de Vincenz (Ottoman pottery), Edna J. Stern (Crusader pottery), Brigitte Ouahnouna (glass finds), Nimrod Marom (archaeozoology), Inbar Ktalav (molluscs), Alexander Glick and Polina Spivak (historical weapons and ammunition), Robert Kool (numismatics), Yossi Nagar (physical anthropology), Clara Amit (studio photography) and Victoria Nosikovsky (metallurgical laboratory). Yoni Amrani and the late Shlomo Ya'akov-Jam managed the field administration and Diego Barkan coordinated with the IAA Tel Aviv District.

² For a photograph of the school in its early days, with the founder, Miss Arnot-Walker and a group of female students, see Ze'evi 1985:130.

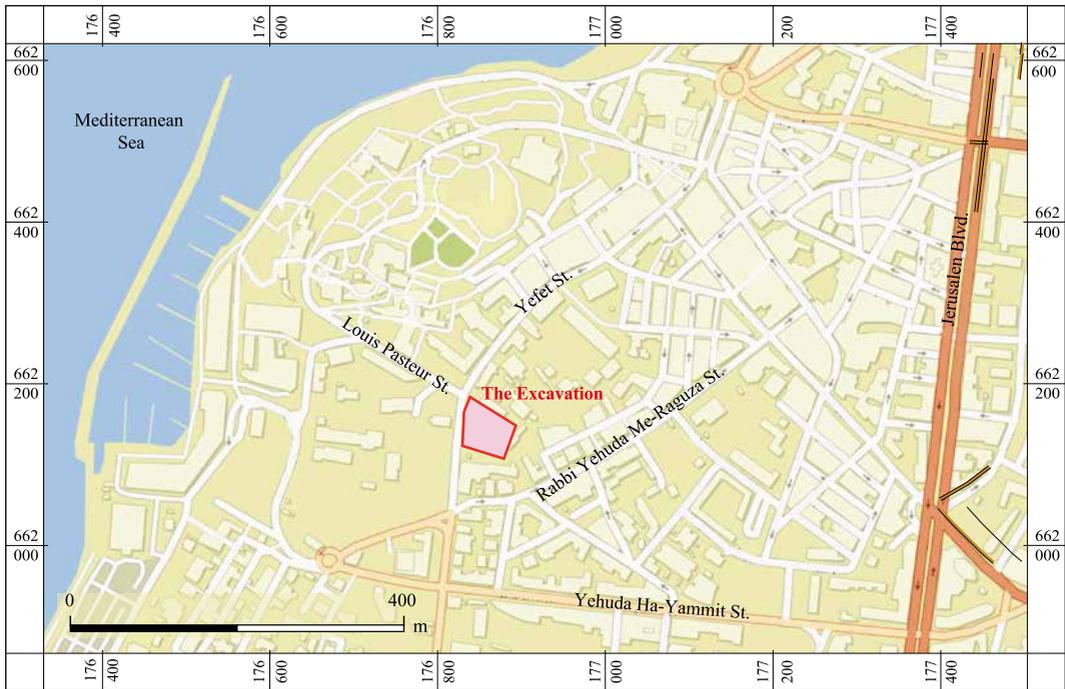


Fig. 1. Location map (© all rights reserved by the Survey of Israel, printed with Survey of Israel permission).

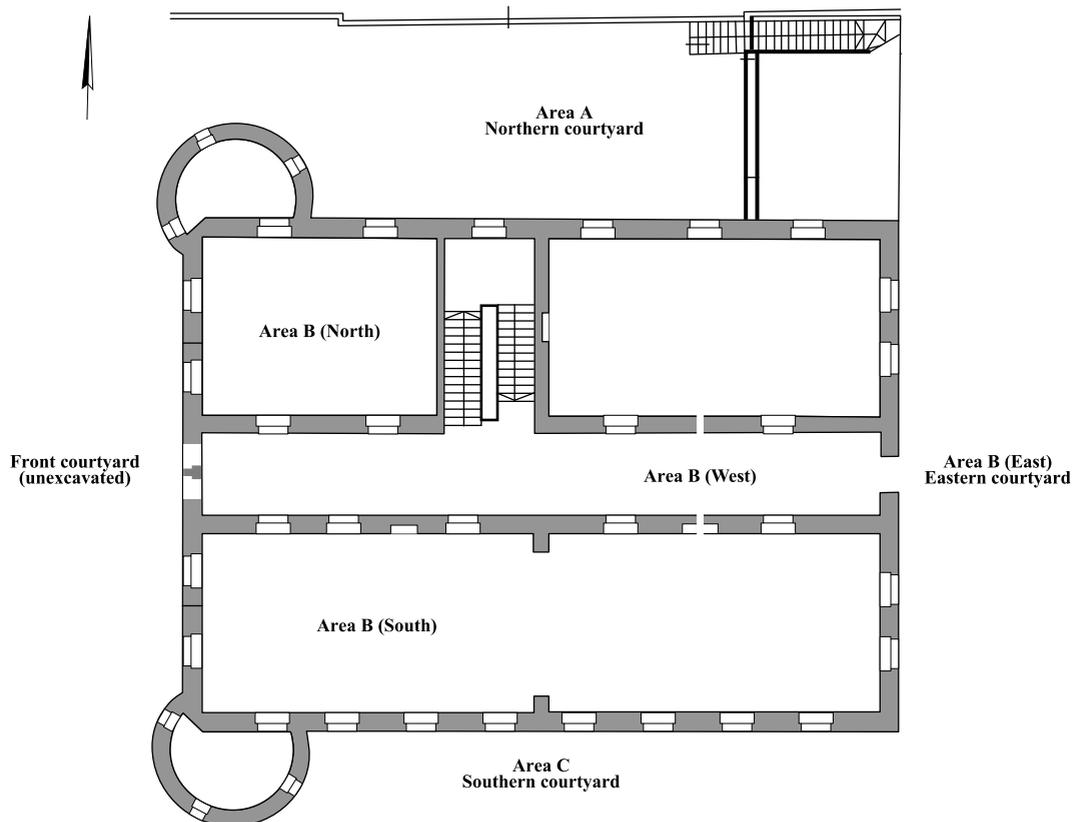


Fig. 2. Facade of the French School, looking east.

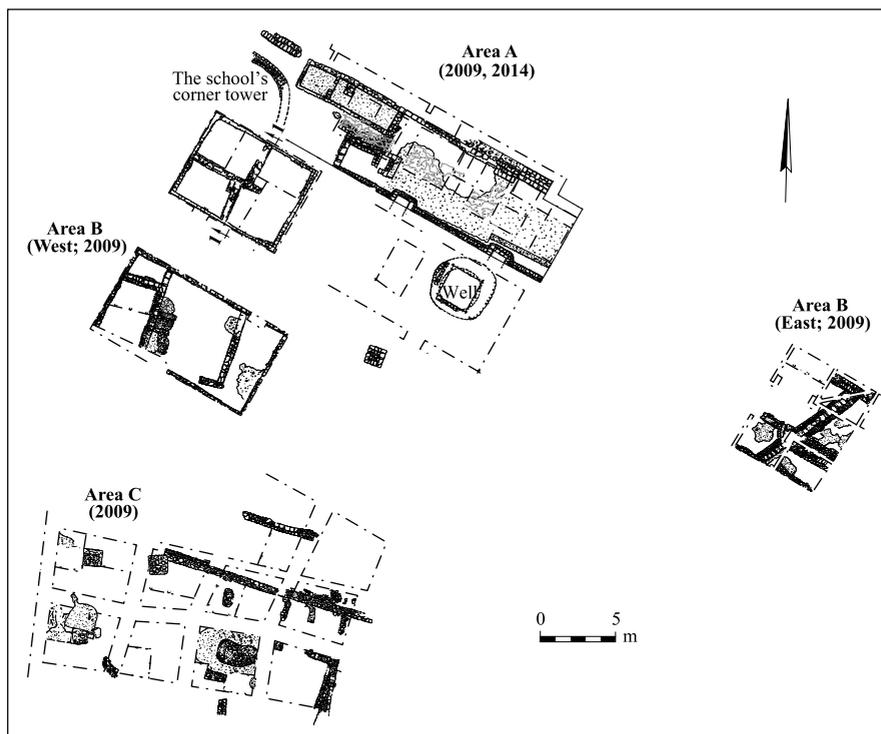
on Andromeda Hill (Avner-Levy 1998); and dwellings from the Abbasid and Crusader periods, a Crusader-period fortification and Ottoman-period walls on Louis Pasteur Street, between Yefet Street and the Yafo harbor (Arbel and Rauchberger 2018). The excavation on Louis Pasteur Street and another in a small plot on the same street also uncovered pottery assemblages from the Persian and Hellenistic periods (Ritter-Kaplan 1982).

THE EXCAVATION

The French School excavation encompassed three areas, conforming to the layout of the school (Plans 1, 2). Area A was opened in a long and narrow courtyard in the northern part of the school, between the main building and the boundary wall separating the school from the neighboring Church of Scotland Tabitha School. The excavations in this area yielded a substantial amount of Crusader-period pottery, and building remains and a water reservoir of the late Ottoman period. The excavation in Area B extended beneath the school's ground floor and in part of its back courtyard—the eastern courtyard; it exposed a pedestal from the



Plan 1. Plan of the school and location of excavation areas.



Plan 2. Excavation areas.

Crusader period, and a well, channels and wall foundations from the late Ottoman period. Area C, excavated under the school's southern courtyard, exposed three additional Crusader-period pedestals, late Ottoman-period wall remains and two pit graves of uncertain date (see Appendix, below).

THE CRUSADER PERIOD (Plans 3, 5)

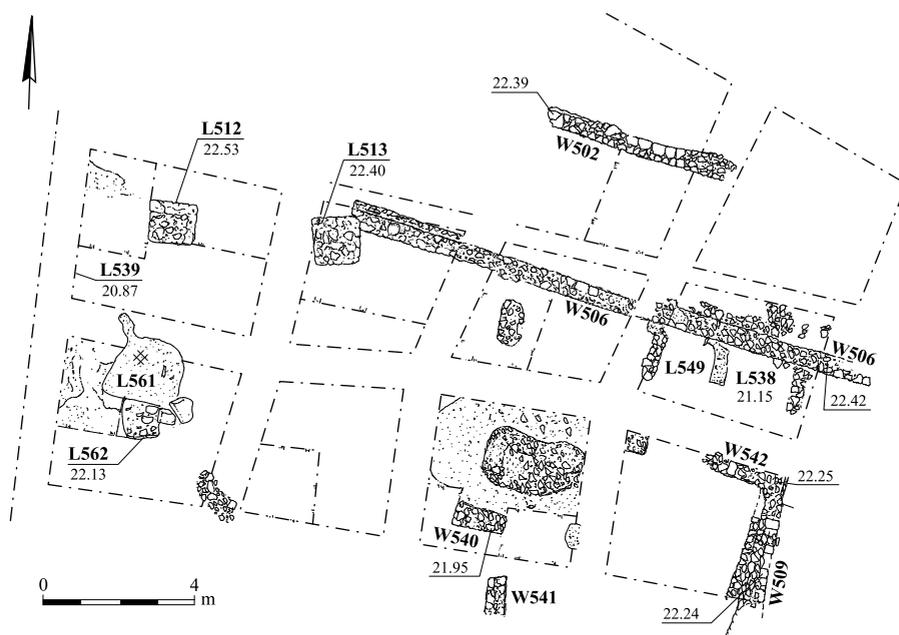
Four pedestals (L512, L513, L528, L314) that probably supported pillars or vaults were exposed in Areas B and C (Fig. 3; Plans 3, 5). The pedestals were built of dressed *kurkar* stones solidified with cement. Their positions do not form an orderly layout, and therefore, it is likely that additional ones existed, which were not preserved or exposed in the excavation. Similar pedestals were discovered in Crusader-period contexts at 'Akko (Stern 2011; Abu-'Uqsa and Abu Hamid 2012; Stern and Porat 2014) and Caesarea ('Ad et al. 2017). The pottery retrieved from accumulations abutting the four pedestals included mainly Crusader-period sherds (see Stern, below: Fig. 23). Three glass vessels with well-established parallels at other sites of the Crusader period were also found in these accumulations (see Ouahnouna, below: Fig. 24). Crusader-period arrowheads were found near one of the pedestals (L528), which also abuts the remains of a tamped-earth floor (L561), overlying a shell-rich bedding.



Fig. 3. A Crusader-period pedestal (W513) next to Ottoman W506, looking east.

Such shell beds are a common feature of Crusader-period contexts in Yafo. The faunal remains from the Crusader-period accumulations include cowrie shells that may have been used as amulets (see Ktalav, this volume), as well as the bones of cattle and pigs, along with smaller numbers of sheep, goats and a few remains of donkeys (see Marom, this volume).

The Crusader-period sherds from Area C were mostly small and worn, indicating long exposure to weathering, which may have been due to agricultural tilling of the soil (see Stern, below). The impact of weathering was also noted on the faunal remains from this area (see Marom, this volume). A large amount of Crusader-period pottery was also found



Plan 3. Area C.

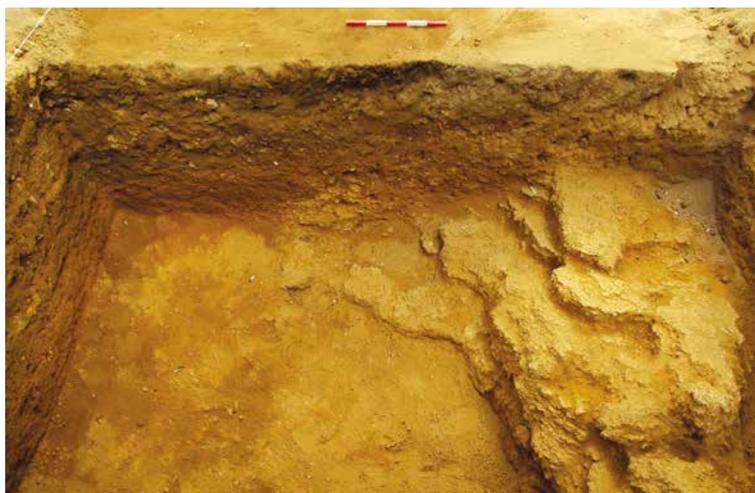


Fig. 4. The Crusader-period layer in Area A: soil and ash accumulations over bedrock, looking east.

in Area A, in soil accumulations overlying the bedrock and underlying the foundations of Ottoman-period buildings (Fig. 4). These sherds were larger and far less worn than those from Area C. The soil accumulations in which they were found may have formed part of an intentional fill, deposited at this location to seal a section of Yafó's Crusader moat. This

suggestion is based on the location of the excavation in proximity to the Crusader-period fortifications unearthed at the French Hospital (Re'em 2010), the relatively steep decline of the local bedrock in both that excavation and the present one, and the state of preservation and composition of the pottery assemblage (see Stern, below).³ Historical sources mention the systematic destruction of the Crusader fortifications by the Mamluks, following the fall of the city in 1268 CE (Tolkowsky 1924:121–122; Boas 2011:124). Archaeological evidence of this destruction event was identified at the French Hospital (Re'em 2010) and on Yehuda Ha-Yammit Street (Haddad and Rauchberger 2019:29, 38).

THE LATE OTTOMAN PERIOD (Plans 3–5)

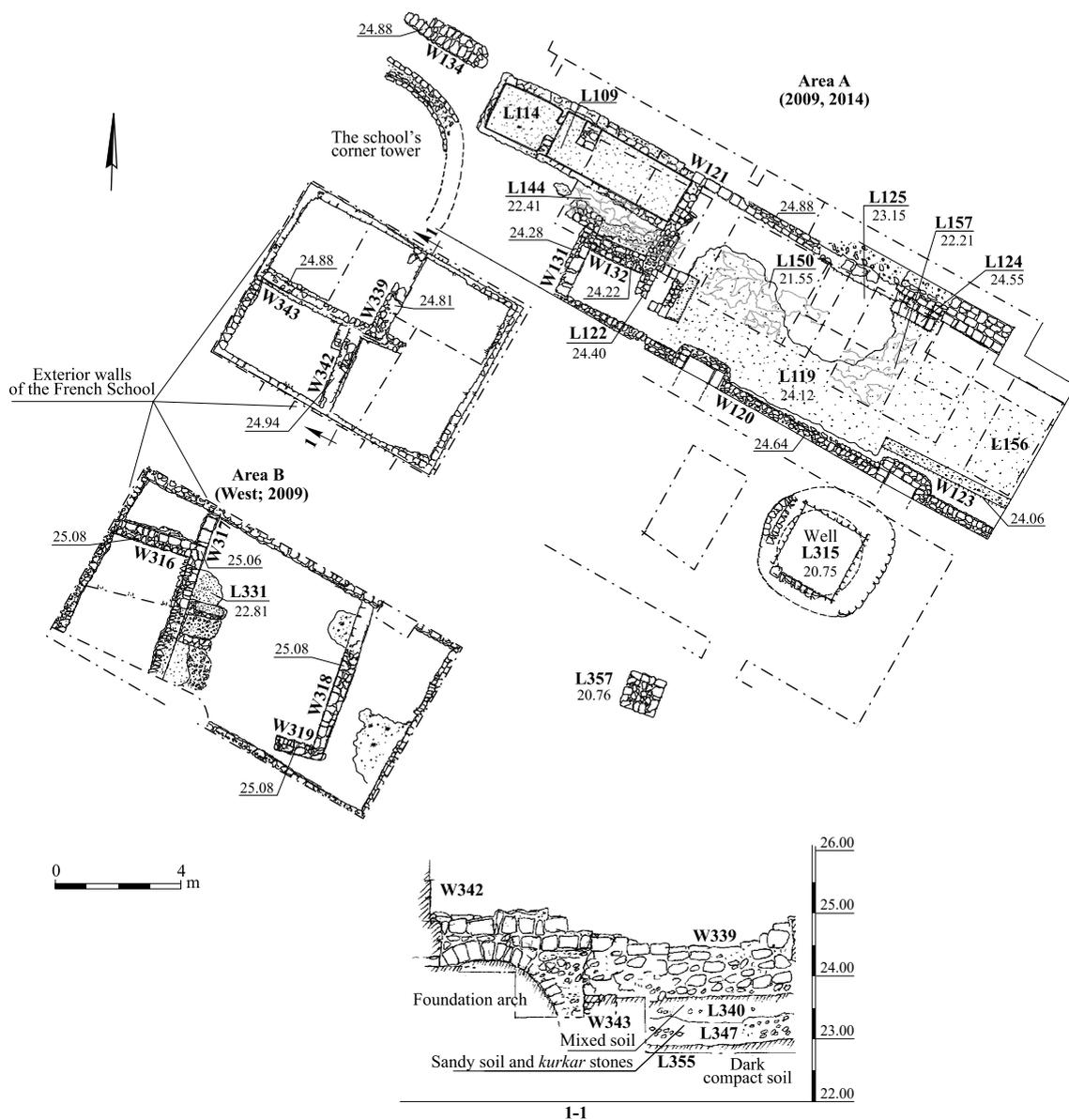
The findings of the late Ottoman period comprise the remains of a structure, a well, irrigation channels and a reservoir, all of which were probably dismantled with the construction of the school and sealed beneath its floors.

The well (L315) was exposed in Area B, under the school's basement, near the backyard (Plan 4). This twenty-meter-deep well is one of the deepest known in Yafo. Its interior was lined with dressed *kurkar* blocks. Iron bars, probably remaining from an engine-powered pumping mechanism, were found near the well opening (for other examples of wells from Yafo, see Peilstöcker et al. 2006; Arbel 2008; Rauchberger 2012). An irrigation channel (L311), found c. 20 m southeast of the well, in Area B (East), may have directed water from the well to the surrounding farming plots (Plan 5). The channel was built of small unworked stones solidified with cement, and its inner part was coated with plaster (for other examples of irrigation channels from Yafo, see Peilstöcker et al 2006; Arbel and Rauchberger, this volume [a]; this volume [b]). It was cut by a stone-capped drainage conduit, possibly a sewer (L303), which was part of the school's infrastructure (Plan 5; Fig. 5). Near the channel and sewer were the fragmentary remains of a contemporaneous floor (L304) and a wall (W309). The soil accumulations associated with these remains contained late Ottoman-period pottery and a coin of the Ottoman Sultan Abdul 'Aziz (r. 1861–1875; IAA No. 838281).⁴

The reservoir in Area A was built between two long parallel walls, W121 on its northeastern side and W120 on its southwestern side. A broad plastered platform (L119; Fig. 6) is all that remains of the southeastern part of the reservoir. The platform was accessed by a short flight of stairs in northwestern W121 (Fig. 7). An irregularly-shaped lime pit, which was probably used during the construction of the school, destroyed part of Platform 119. A spout-shaped conduit drained this part of the large reservoir into a 0.7 m deep plastered pool to its west (Figs. 8, 9; Plan 5). A stone-built, plastered partition divided the pool into a

³ I wish to thank Edna J. Stern of the of the IAA for this important observation, based on variations in the state of preservation of the ceramic material between different excavation areas that could explain their original Crusader-period function, similar to the situation identified in various excavations in 'Akko.

⁴ Thirteen coins were found in the excavation, but only four could be identified, all of which dated between the middle and the late nineteenth century CE. The coins were studied by Robert Kool of the IAA.



Plan 4. Areas A and B (West), plan and section.

southeastern rectangular part (L109) and a smaller northwestern square-shaped part (L114). The fully preserved bottom of this partition showed that it did not traverse the entire width of the pool, and hence, its purpose is unclear. A stone step on the pool's floor, abutting its northern wall, may have been part of a stairwell that descended into the pool. Next to the pool were the remains of a contemporaneous structure. Its surviving walls (W131,

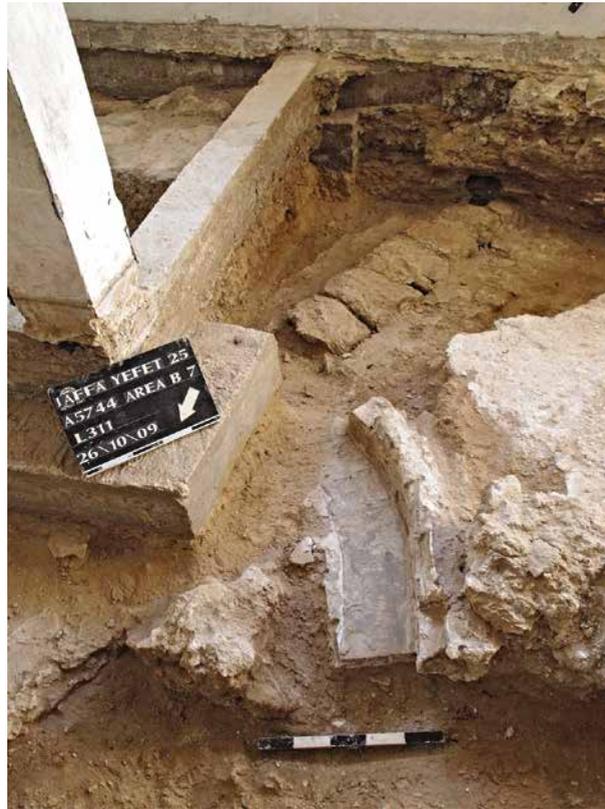
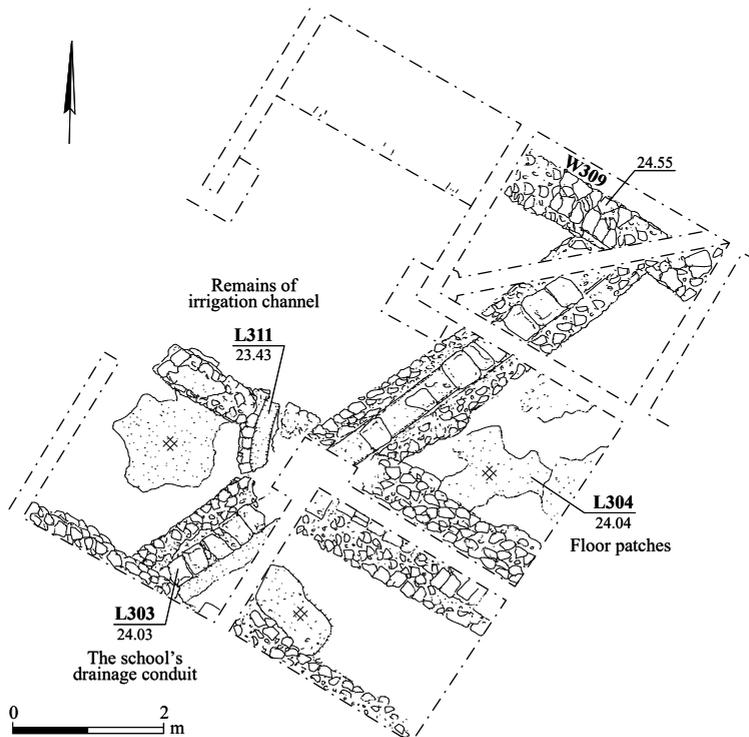


Fig. 5. Irrigation and drainage channels, looking southeast.



Plan 5. Area B (East).



Fig. 6. Floor of the upper part of the Ottoman-period reservoir (L119), looking west.



Fig. 7. Stairs leading to the reservoir, looking north.



Fig. 8. The western pool, looking east.



Fig. 9. Conduit between the two parts of the Ottoman-period reservoir, looking west.

W132) were built of roughly cut *kurkar* blocks solidified with compact clay, a common construction method in Ottoman-period Yafo (Plan 5; Fig. 10).

During the construction of the school, the reservoir was filled in and sealed under a checkered-tile floor. Excavation of this fill yielded a large quantity of pottery of the late Ottoman period, including many fragments of roof tiles from various factories in Marseilles,



Fig. 10. Remains of the Ottoman-period structure near the reservoir, looking south.

France, and a complete British stoneware medicine bottle (see Vincenz, this volume: Fig. 5:11). Two coins were also found in this fill: a 1901 issue of Abdul Ḥamid II (IAA No. 838279) and a coin of the Austro-Hungarian monarch Franz Josef (r. 1848–1916; IAA No. 838280). Other artifacts from this fill included a ribbed rhombus-shaped bead (Fig. 11:1), the handle of a bronze or copper *shebriyeh* dagger (Fig. 11:2), a carved bone handle (Fig. 11:3) and a rare, almost perfectly preserved clay figurine of a woman draped in a gown and holding a basket, of which only the head is missing (Fig. 11:4). The figurine appears to be an ornament of a late Ottoman date, based on its context and design. While clay figurines of this size were common in the Hellenistic period (Erlich and Kloner 2008), the design of the present artifact is unknown in that period (Adi Erlich, pers. comm.) and more reminiscent of porcelain figurines from nineteenth-century Europe. Furthermore, a Hellenistic date for the figurine is unlikely as no layer of this period was exposed at the site, although Hellenistic-period remains were uncovered in numerous other excavations in Yafo (Arbel 2017:68–70).

Seven wall segments from a single complex (W316, W317, W318, W319, W339, W342, W343) were exposed in Area B (West). These walls had arched foundations, a common construction technique of the late Ottoman period in Yafo (Plan 4: Section 1–1; Figs. 12–14). The wall faces were made of dressed stones, while their core consisted of small stones and packed earth. No floors were associated with these walls, except for a small plastered patch abutting W317 (L331), indicating that their lower courses were originally underground. These construction remains are unequivocally dated to the late Ottoman period, based on their stratigraphic position, the use of foundation arches as wall supports and the abundant pottery found in the related fills. The complex to which these walls belonged is likely to have been dismantled to make way for the construction of the French School.

The ceramic assemblage from the late Ottoman-period structure consists of both local storage vessels and table and cooking ware, and European hardpaste vessels, including English and French imports, among them a European imitation of a porcelain teacup, as



Fig. 11. Finds from the fill within the reservoir: (1) ribbed bead; (2) tip of a *shebriyeh* handle; (3) carved bone handle; (4) figurine.

well as a Chinese porcelain cup (see Vincenz, this volume: Figs. 3; 4:1–8; 5:1–4, 7–9). The fills in-between the walls of this structure also yielded two late nineteenth-century glass perfume bottles and a few fragments of similarly-dated glass bracelets made in Britain (see Ouahnouna, below: Figs. 19:1, 2; 20). Four fragments of nineteenth-century cannon balls were found in the same context (see Glick, below: Fig. 21). These fragments may have been fired by city defenders loyal to Ibrahim Pasha during the Peasant Uprising of 1834.

Other finds from the fill near W318 and W319, and another fill near W342, include: a metal key(?), with a cross-shaped decoration at its tip (Fig. 15:1); an elongated fork-like bronze object (Fig. 15:2), used in the production and mending of fishing nets (see Galili, Rosen and Sharvit 2010:85–87; Galili, Zemer and Rosen 2013:154); an iron knife blade (Fig. 15:3); and two flint artifacts from the firing mechanism of flintlock weapons (see Spivak, below: Fig. 22). A few dispersed human bones, which were also found within these fills, may have originated from pit graves that did not survive, similar to two such graves found in Area C, in the southern courtyard of the French School (see Appendix 1, below).

Remains of poorly-preserved buildings of the late Ottoman period were exposed above the Crusader-period layer in Area C. A 13 m long wall segment (W506) was excavated in the northern part of this area (Plan 3). Wall 506, of which four courses remain, was built of small- and medium-sized uncut stones above a stone foundation and was reinforced with cement. Another wall (W502), parallel to W506, was exposed 4 m north of it. The two walls were constructed in similar technique and of the same materials, and may have lined a road. A partly-preserved structure was exposed south of these walls, including two external walls (W509, W542) and two internal ones (W540, W541). The soil accumulation associated with



Fig. 12. Ottoman W316 and W317 under the school's foundation, looking north.



Fig. 13. Ottoman W342 and the school's foundations, looking west.



Fig. 14. Ottoman W343 cut by the school's foundations, looking west.



Fig. 15. Finds from the fill near W318, W319 and W342: (1) iron key(?) decorated with a cross; (2) metal tool for net making/mending; (3) blade of an iron knife.

this structure yielded a silver coin of Abdul Ḥamid II from 1897–1898 (IAA No. 838278) and a fragment of a shell-made artifact, possibly a cross (see Ktalav, this volume: Fig. 1), along with late Ottoman-period pottery.

THE FINDS

CRUSADER-PERIOD POTTERY

Edna J. Stern

Two ceramic assemblages dated to the Crusader period were found in the excavation, one in Area A and the other, in Areas B and C. Judging from the different state of preservation of the sherds in these assemblages, they each represent a distinct episode in the Crusader-period history of the site. The diagnostic material provides secure dates for the contexts and architectural remains with which it was associated.

The local and imported wares retrieved from these excavation areas are known from other excavations in Yafo (Kletter 2004; Bouchenino and Jakoel 2017; Burke Strange and Stern, in press; Stern, this volume)⁵ and ‘Akko (Acre; Stern 2012). This report follows the typology and type abbreviations used in the publication of ‘Akko (see Stern 2012 for a more detailed discussion of these types). Only a representative selection of the pottery from the present excavation is illustrated, comprising the chronologically diagnostic and well-preserved vessels, as well as those which have rarely been found in Yafo. This report provides a summary description of the Crusader-period pottery, with references to comparable types from ‘Akko (Stern 2012). Where relevant, reference will be made to

⁵ Such wares were also uncovered in an excavation conducted by Amit Re’em at the French Hospital, 2007–2008 (Permit Nos. A-5170, A-5522); the publication of that material is in preparation for IAA Reports.

recent data from chemical and petrographic analyses of pottery from various excavations in Yafo, regarding the identification of Levantine pottery workshops (Stern, Waksman and Shapiro, forthcoming).

Area A (Fig. 16)

The pottery from this area mainly dates to the thirteenth century CE. The assemblage includes jugs (AC.PL.3) and jars (AC.PL.5), which appear to have been made of a local, coastal-plain fabric, similar to that of the Acre Ware. Similar vessels from Yafo were shown to have been produced in ‘Akko (Stern, Waksman and Shapiro, forthcoming). Also included are mold-made oil lamps of a type commonly found in Yafo (Kletter 2004:205, Fig. 16:10; Bouchenino and Jakoel 2017:90*, Fig. 3:23); thick-walled, open and closed glazed cooking vessels of a red, sandy fabric, which were probably produced in Beirut based on chemical and petrographic analysis of similar vessels from Yafo (BE.CW.2; Stern, Waksman and

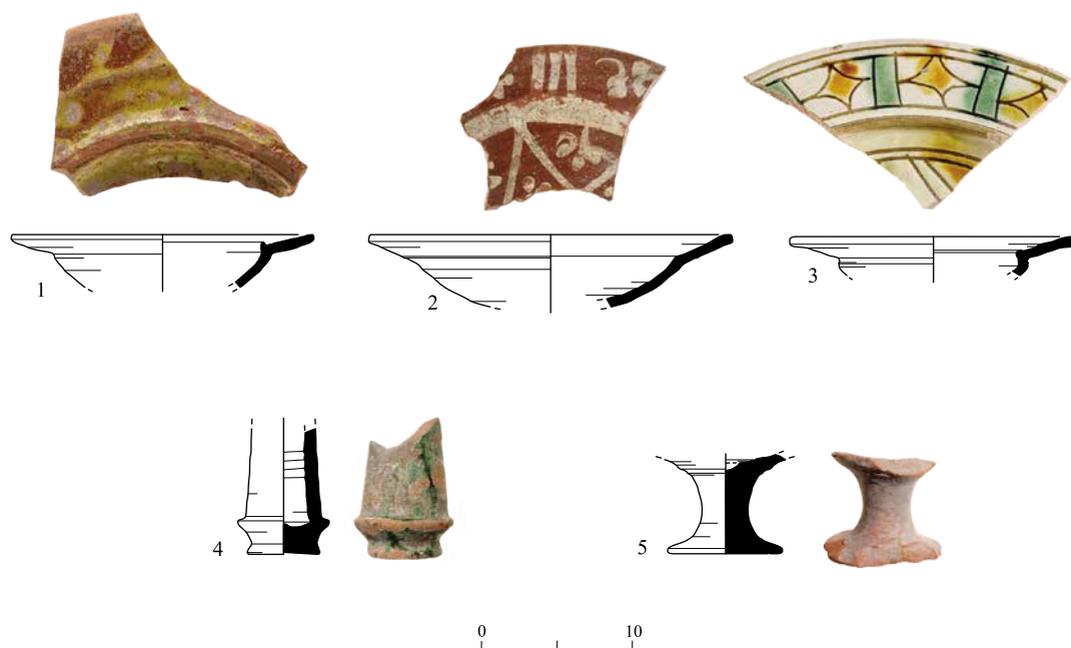


Fig. 16. Crusader-period pottery, Area A.

No.	Vessel Type (Provenance)	Locus	Basket	Parallels
1	Reserved-slip glazed bowl (Beirut and vicinity)	148	5082	Stern 2012:44–47, Type BE.GL.3, Pl. 4.20:8, 9
2	Slip-painted glazed bowl (Beirut and vicinity)	141	5068	Stern 2012:44–47, Type BE.GL.4, Pl. 4.21:2, 3
3	Port St. Symeon Ware glazed bowl	148	5082	Stern 2012:55–58, Type NSY.GL.4, Pls. 4.34; 4.35
4	Albarello jar (Cyprus)	156	5097	Stern 2012:60–65, Type CY.GL.1, Pl. 4.41:7
5	High-footed lamp (Cyprus)	135	5048	Stern 2012:60–65, Type CY.GL.1, Pl. 4.41:8–14

Shapiro, forthcoming); reserved-slip glazed bowls (BE.GL.3; Fig. 16:1); and slip-painted glazed bowls (BE.GL.4; Fig. 16:2), possibly manufactured in Beirut and its vicinity (Stern, Waksman and Shapiro, forthcoming). Imported vessels, originating from production centers in the eastern and western Mediterranean, include amphorae (TUR/GR.PL.1), Port St. Symeon Ware glazed bowls (NSY.GL.4; Fig. 22:3), Aegean Ware glazed bowls (GR.GL.6) and Proto-maiolica Ware bowls (SIT.GL.2). A selection of Cypriot vessels was also found in this assemblage, including glazed bowls (CY.GL.3–5), jugs (CY.GL.2), an Albarello jar (Fig. 16:4) and a high-footed lamp (Fig. 16:5). The last two forms were previously found in 'Akko (CY.GL.1) but not in Yafo.

This pottery assemblage is very similar in its state of preservation and composition to two other assemblages from Crusader-period contexts unearthed near the French School: the fill of a Crusader-period moat at the French Hospital (Re'em 2010; see also n. 6) and an accumulation, which may also have filled another section of that moat, on Yehuda Ha-Yammit Street (Stern 2013). It is, therefore, suggested that the pottery described above was found in the fill of a moat or of another fortification element of the Crusader period. The good state of preservation of most of the vessels, and the fact that they were preserved in large fragments, indicate that these vessels were not brought from a distant location. It is more likely that they were the debris of nearby residential buildings that were destroyed shortly before the material was deposited. The fill should probably be dated to shortly after the Mamluk conquest of Yafo, when the Crusader-period fortifications were terminated.

Areas B and C (Fig. 17)

The pottery recovered from these areas was found in the foundation trenches of massive square pillars (see above) and is more worn and fragmented than that of Area A. It is dated to the twelfth and thirteenth centuries CE, and was mixed with pottery sherds dating to the Hellenistic, Byzantine and Early Islamic periods. The types of vessels are the same as those which were found in Area A, with the addition of several others, including: handmade geometric painted ware, usually rare in Yafo (VL.PL.5; Fig. 17:1); a handmade basin decorated with incisions on the rim (VL.PL.1); mold-made oil lamps; unglazed vessels, including Acre Ware jugs and jars (AC.PL.3, 5; Fig. 17:2), similar to those found in Area A; thin- and thick-walled, open and closed, glazed cooking ware (BE.CW.1, 2); glazed cup and saucer oil lamps, made of a red fabric similar to that of the Beirut cooking ware (BE.GL.1); and glazed bowls decorated with a reserved slip and slip painting (BE.GL.3, 4; Fig. 17:3). The imported material comprises vessels from various locations in the eastern Mediterranean, including a form of a handmade jug or jar that may have been manufactured in the Troodos Mountains in Cyprus, and is a rare find in the Levant (CY.PL; Fig. 17:4). Many types of imported glazed bowls were found, including Aegean and Byzantine wares decorated with the well-known designs of slip painting (GR.GL.3; Fig. 17:5) and Fine Sgraffito Ware (GR.GL.4; Fig. 17:6); Zeuxippus Ware bowls (TUR/GR.GL; Fig. 17:7); Port St. Symeon Ware bowls (NSY.GL.4; Fig. 17:8); Cypriot glazed bowls (CY.GL); and simple monochrome green glazed bowls from an unknown source (VL.GL.4).

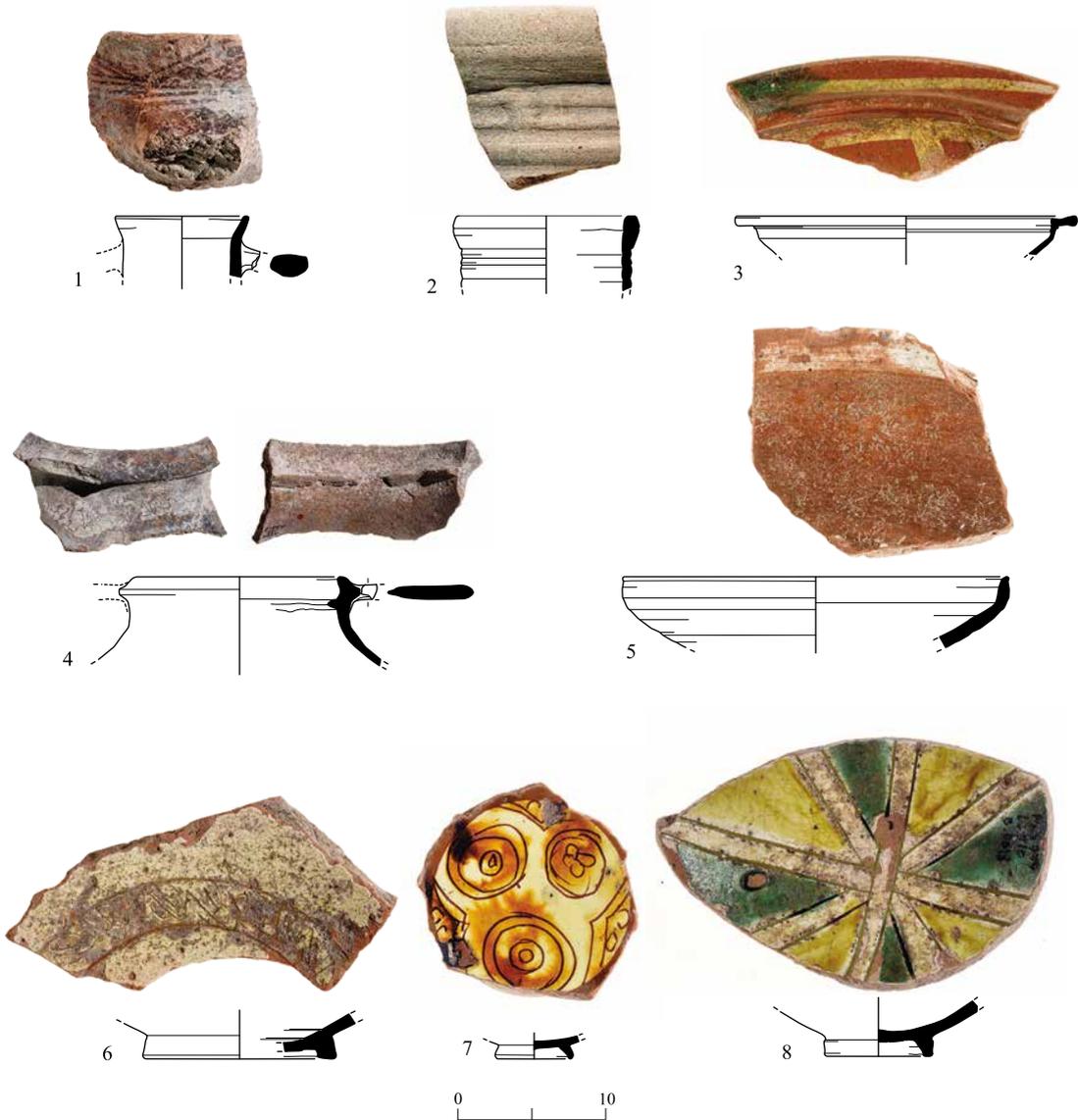


Fig. 17. Crusader-period pottery, Areas B and C.

No.	Vessel Type (Provenance)	Locus	Basket	Parallels
1	Handmade red-painted jug	520	7026	Stern 2012:49–50, Type VL.PL.5, Pl. 4.26:4, 5
2	Acre Ware jar	522	7039	Stern 2012:34–38, Type AC.PL.5, Pl. 4.9:6, 7
3	Slip-painted glazed bowl (Beirut and vicinity)	527	7055	Stern 2012:44–47, Type BE.GL.4, Pl. 4.21:10
4	Jar/jug (Cyprus?)	521	7034	Stern 2012:58–59, Type CY.PL.1, Pl. 4.40:1, 2
5	Aegean Ware slip-painted glazed bowl	n/a ⁱ	6025	Stern 2012:65–69, Type GR.GL.3, Pl. 4.48:7, 8
6	Fine Byzantine Sgraffito Ware glazed bowl	300	6000	Stern 2012:65–69, Type GR.GL.4, Pl. 4.48:9, 10
7	Zeuxippus Ware glazed bowl	524	7053	Stern 2012:72–76, Type TUR/GR.GL.1, Pl. 4.53:3–8
8	Port St. Symeon Ware glazed bowl	510	7028	Stern 2012:55–58, Type NSY.GL.4, Pls. 4.34; 4.35

ⁱ n/a = not available.

The Crusader-period pottery from Areas B and C clearly indicates that the pillars were built during the thirteenth century CE (for similar pillars from 'Akko, see Stern 2011: Fig. 3; Abu-'Uqsa and Abu Hamid 2012: Fig. 9; Stern and Porat 2014: Figs. 2–5).

THE GLASS VESSELS

Brigitte Ouahnouna

Seventy fragments of glass vessels, 30 of which were diagnostic, and eight small fragments of glass bracelets were found in the excavation. The finds include material from both the Crusader (twelfth–thirteenth centuries CE) and late Ottoman (end of the nineteenth/beginning of the twentieth centuries CE) periods, corresponding to the site's stratigraphy and the dates provided by other types of diagnostic finds (see above).

The Crusader Period (Fig. 18)

Three pushed-in tubular bases were found. This type of base could belong to either beakers, bowls, jugs or bottles; sometimes, the type of vessel can be identified based on the vessel size and proportions, and the wall incline; however, this was not the case with the present examples. Similar bases were found, for example, in the Qishle excavations in Yafo (Gorin-Rosen, in press), and in the medieval-period Beirut Souks (Jennings 2006:229–231, Fig. 10.10:4, 5, 12–14).

The Late Ottoman Period (Figs. 19, 20)

This assemblage includes material from the late nineteenth century CE, as in other sites in Yafo, such as Ha-Zorfim Street (Ouahnouna, in prep.). Figure 19:1 is an incomplete, small oval vessel, probably a perfume bottle, bearing the inscription BW&Co—the mark of the Burroughs and Wellcome pharmaceutical company established in London in the 1880s.⁶ Another perfume bottle by the same manufacturer, dating to the 1880s, though of a different shape, is on display at the Victoria and Albert Museum in London (Item LL74387).⁷ Figure 19:2 is an intact miniature perfume bottle, and Fig. 19:3 is an intact ink bottle or inkwell, preserved with its original sealing cork.

Bracelets (Fig. 20).— The excavation yielded eight small bracelet fragments of different types, including plain, twisted and faceted variations, either monochrome or polychrome. Such bracelet types are known from Mamluk, Ottoman and modern times (see Shindo 2001). The main production center of glass bracelets in the region during the Ottoman period was Hebron; however, other workshops existed at that time as well (Spaer 2001:198).

⁶ <http://www.wellcome.ac.uk/About-us/History/WTX051562.html>

⁷ <http://collections.museumvictoria.com.au/items/1612741>



Fig. 18. Crusader-period glass finds.



Fig. 19. Late Ottoman-period glass finds.

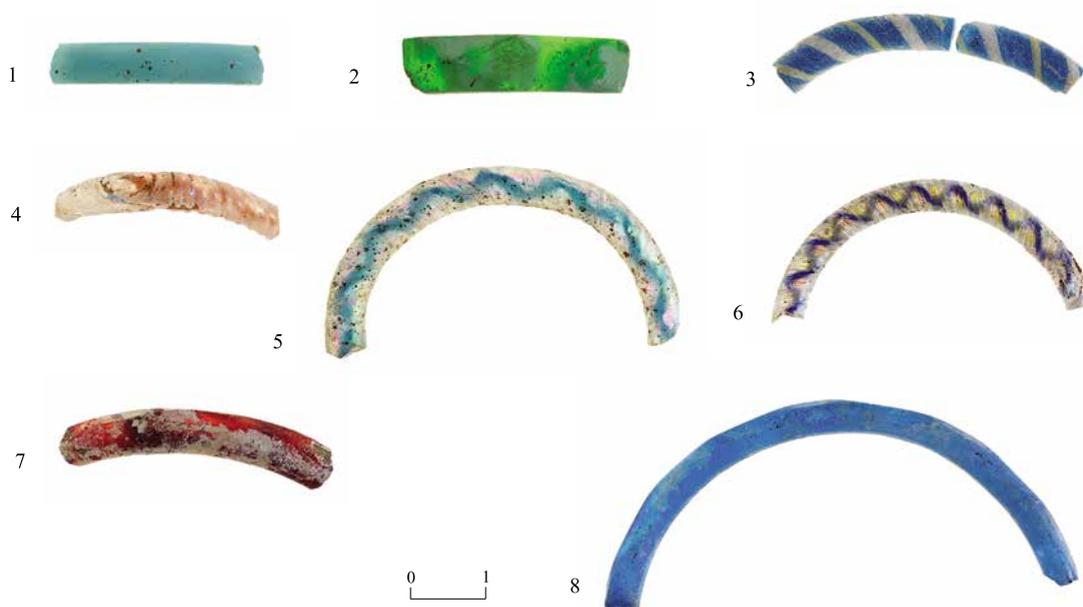


Fig. 20. Late Ottoman-period glass bracelets.

THE CANNON BALLS

Alexander Glick

Four cannon-ball fragments were found in the excavation, all representing types of common shell ammunition of the Ottoman period. The state of preservation of the fragments did not allow for a precise identification, and their small number prevented statistical analysis of the finds. All four cannon-ball fragments were found in the fills that were used as bedding for the Ottoman-period structures, which preceded the French School. Most of the other finds associated with these fragments were dated to the late Ottoman period (see Vincenz, this volume: Figs. 3; 4:1–8; 5:1–4, 7–9; Ouahnouna, above: Figs. 19:1, 2; 20). Figure 21:1, 2 were the fragments of a common shell. Such shells were fired from a heavy mortar, a short-barreled artillery piece, which fired projectiles at low velocities in high-arcing ballistic trajectories. Such cannons were mostly employed for the bombardment of large fortified

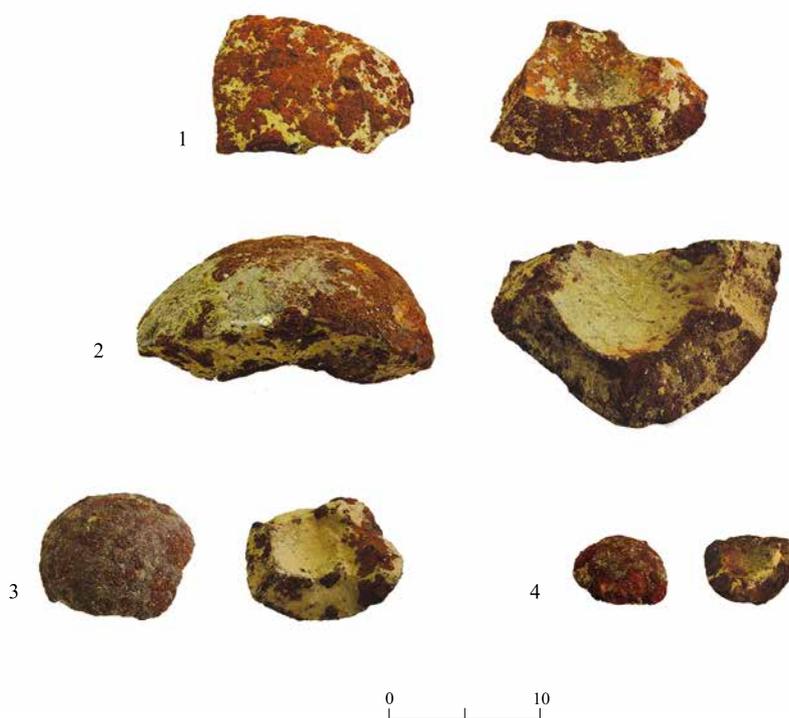


Fig. 21. Canon-ball fragments.

No.	Ammunition Type	Locus	Basket	Diam. (mm)	Wall Thickness (mm)	Cannon Type
1	Common shell	328	6063	c. 280	47	Heavy mortar
2	Common shell	338	6091	c. 280	58	Heavy mortar
3	Common shell	326	6054	c. 120	30	Cannon
4	Common shell	328	6069	c. 90	17–26	Cannon

targets in siege operations. These two fragments may have been used with a 274-mm, 10-inch French mortar or a 284-mm, 50-pound Prussian-made mortar. Figure 21:3 belonged to a 12-pound cannon of an unidentified provenance. Figure 21:4 belonged either to a 4-pound French or Russian cannon, or to a 6-pound British or Austrian cannon.

The presence of common shells of a 4–12-pound, smooth- and long-barreled cannon in Yafo is of special interest. Firing such ammunition using a long-barreled cannon demanded much skill. This was due to the unreliable fuses and the requirement for intricate calculations to avoid disabling the gun and endangering the operating crew. For that reason, this type of ammunition in such a long-barreled cannon was infrequently used in the early period of artillery. The finds indicate that highly skilled cannon operators were present at Yafo in the late Ottoman period. The production of smooth-barreled artillery ended in the 1860s, although their use continued into the early twentieth century, while they were gradually replaced with rifled cannons.

The cannon balls described here were in use for a relatively long time. It is, therefore, impossible to determine with confidence to which of the five war episodes that took place in late eighteenth–early nineteenth-century Yafo they belong. A possible explanation for the presence of such common shell ammunition in late Ottoman-period Yafo is that they were deposited during Napoleon's siege of the city in 1799. However, according to historians, while long-barreled cannons already used common shells in Napoleon's army, they were still rare (Glik 2017). At that time, between the eighteenth and nineteenth centuries CE, common shell ammunition was not usually included in the standard carts and was supplied only in specific cases of need. French 12-pound cannon supply carts usually carried 48 round shot balls and 20 canister shots, while 4-pound cannon carts carried 100 round shot balls and 50 canister shots. Therefore, it is more likely that the present examples of common shell ammunition belonged to a later conflict of the nineteenth century CE, i.e., the Peasant Uprising against Egyptian rule in 1834.

Although all four of the cannon-ball fragments are of post-impact shells, there is no evidence that the site was a military post or that it had any other function that would attract such fierce fire. While the site was located in proximity to Ottoman-period Yafo's southeastern bastion, the distance was still too great to be traversed by the fragments of fired ammunition. It is also possible, however, that the fill containing the shell fragments originated at a different location in Yafo. Future research in Yafo may shed further light on this subject.

TWO FLINTLOCK GUNFLINTS

Polina Spivak

The excavation yielded two flint tools, one of which was broken. Both artifacts clearly demonstrate the techno-typological characteristics of flint elements that were used in the mechanism of flintlock guns, muskets and pistols, i.e., gunflints (Garigen 1991; Ballin 2012). In such a mechanism, a flint tool was fitted into the jaws of the weapon's hammer.

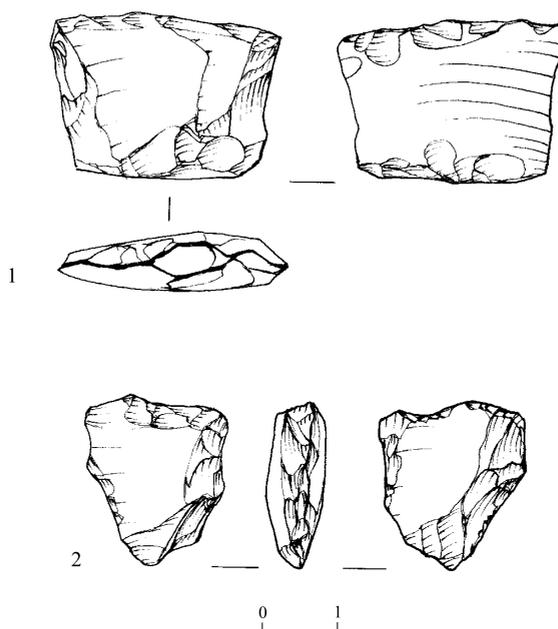


Fig. 22. Gunflints.

When firing, the flint would strike the frizzen—a flat piece of steel—resulting in the spark that ignited the gunpowder charge in the pan.

The two items were made of a local flint of good quality, modified by bifacial knapping. The complete example (Fig. 22:1) has a trapezoidal shape and an asymmetrical trapezoidal section, features which allowed the element to be firmly attached to the hammer's jaws. In the broken example (Fig. 22:2), the thin edge—which is worn by use, giving this element its lens-like contour—was the active edge. Due to the high degree of wear, it is unclear whether the two elements were prepared from blades or flakes. It is likely that the broken element originally had the shape and dimensions of the complete tool ($3.0 \times 2.2 \times 0.7$ cm). The relatively small size of the two elements indicates that they were used in small, personal weapons (Lotbiniere 1984:207). Similar artifacts were previously documented elsewhere in Yafo (Arbel 2012; Barzilai, in press; Spivak, forthcoming) and at 'Akko (Shapiro, forthcoming).

A precise dating of the gunflints from the present excavation, as well as of those previously found in Yafo, is not possible. The two items described here were found in the fills that sealed the foundations of a nineteenth-century CE building complex, possibly a well house (L315; see below). In that context, they were associated with cannon balls from the late eighteenth and the early nineteenth centuries (see Glick, above). The proximity of the site to the southeastern Ottoman-period bastion raises the possibility that the flint elements were the consequence of warfare, such as the campaigns of Abu Dahab (1775), Napoleon (1799), the post-Napoleonic skirmishes or the disturbances during the Egyptian occupation in 1832–1840, although none of these possibilities can be substantiated. It

should be noted that some of the weapons activated by flint elements were in use until the twentieth century (Saidel 2000).

Flint artifacts like the two examined here were used in the mechanisms of French, English and German weapons between the seventeenth and the nineteenth centuries CE (Ballin 2012). The provenance of such artifacts has often been identified based on their contour (Ballin 2013) and the color and transparency of the raw material (Lotbiniere 1984:207). It has been shown that gunflints were imported to the Levant from England, for example at 'Akko, and from other production centers (Ballin 2014, and see references therein). Nonetheless, the two flint items from the French School excavation represent a local production of an expedient nature. It should be noted that lead and in a few cases iron balls, used as ammunition for flintlock weapons, were also retrieved in other excavations at Yafo (Kletter 2004; Arbel, in press).

CONCLUSIONS

The evidence from the excavation at the French School demonstrates that during the Crusader period, construction activity and the movement of large capacities of soil took place at the site, possibly in two separate phases. However, the surviving architectural remains from that period, mainly the pedestals in Areas B and C, fail to join into a cohesive architectural plan, and other building remains are too few and poorly preserved to allow a feasible reconstruction of their original layout. The finds in Area A suggest the existence of a Crusader-period moat that traversed the site and was systematically sealed by the Mamluks, although this interpretation is uncertain.

The remains of the late Ottoman period are better preserved than those of the Crusader period, although a reconstruction of a clear site plan is similarly difficult. The excavation data indicate a single activity phase during this period, prior to the construction of the French School. A number of structures and installations, which were erected at the site in the early nineteenth century, were partly dismantled for the construction of the school in the latter part of that century, requiring a major effort in the filling up of the spaces in-between the derelict walls of the former building remains. The exposed remains of that period show an orderly spatial organization, which together with the presence of a well, irrigation channels and a water reservoir indicate that the excavated area was the site of a well house, one of many that were built in-between the orchards and agricultural plantations surrounding Yafo during the nineteenth century (Kark 1990:242; Sasson and Amitai-Preiss 2017).⁸ The soil fills, which sealed these remains, originated at least partly in waste

⁸ One such well house was partially exposed in an excavation at the Magen Avraham Compound, near the junction of Yehuda Ha-Yammit Street and Jerusalem Boulevard (Arbel and Rauchberger, this volume[b]). A reconstructed well house can be found at the Ganor Compound, on the southern margins of the Flea Market (Gorzalczany 2008; Rauchberger 2012).

accumulations, as shown by the presence of large amounts of pottery with almost no intact vessels and of faunal remains with butchering marks. It is noteworthy that such marks were found on the pig bones, indicating either the nearby presence of a Christian community, or that part of the local Muslim community did not observe the religious constraints regarding the consumption of pork (see Marom, this volume). The replacement of the well house with the French School should be understood as part of the process whereby various late Ottoman-period public structures were replaced by modern complexes in late nineteenth-century Yafo.

APPENDIX 1: EARLIER BURIALS

Two disturbed burials were exposed on the western and eastern edges of Area C. One of the graves contained a few disarticulated bones (Fig. 23).⁹ The state of fusion of the foot bones indicates an individual older than 15 years (Johnston and Zimmer 1989). The second burial included a few disarticulated bones and teeth. The state of bone fusion and the degree of tooth wear indicate a 25–40 year-old individual (Hillson 1986:176–201). The two graves are likely to have belonged to the cemetery of the Persian–Byzantine period that was exposed in the adjacent Andromeda Hill (Avner-Levy 1998; Dayan, Levy and Samora-Cohen, this volume).



Fig. 23. Grave and one of its capstones, looking west.

⁹ The human remains were examined and analysed in the field by Yossi Nagar.

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