A NEW LOOK ON SOME OLD GLASS FINDS FROM PALMYRA

Krystyna Gawlikowska Independent

Abstract: Glass finds from Polish excavations in Palmyra from 1959 to 1973 in tombs and in Diocletian's Camp, not all of them already published, are reviewed and presented with new photographs and drawings.

Keywords: Palmyra, glass, tombs, Kufic inscription

The Polish excavations in the sixties and early seventies of the last century yielded a number of glass finds coming from two main sectors: the Valley of Tombs and Diocletian's Camp. In the Valley of Tombs [Fig. 1A], the underground tomb of Zabda was excavated in 1959 by Kazimierz Michałowski, and three other hypogea nearby in 1962 (Michałowski 1960: 137–204; 1964: 145–180). Later on, Anna Sadurska worked in the grotto behind the Camp,

which proved to be a much dilapidated tomb, that of 'Alainê. She has also explored two years later two neighboring tombs (Sadurska 1975; 1977). The work in Diocletian's Camp went along simultaneously, under the direction of Michałowski and later others [Fig. 1B]. Some glass finds from these excavations were published and five complete pieces were presented in the local museum, while fragmentary vessels were kept in storage there.

FINDS FROM THE TOMBS

The Zabda tomb was never finished and sparingly used. Several sculptures found there were never fixed in the walls, but apparently abandoned on the floor. They can be dated in the 1st century AD, though certain forms of vessels persist until mid-2nd century. Six glass vessels survived: two of them complete, two with only

¹ Nos 1–3 below and Michałowski 1960: 24–25, Fig. 19 (left); 1962: 213–214, Fig. 244; Gawlikowska and Al-As'ad 1994: Nos 18 and 57. I am indebted to Barbara Tkaczow for her help with locating the archival documentation.

² These finds were re-examined in 2006 and drawn by Marcin Wagner.

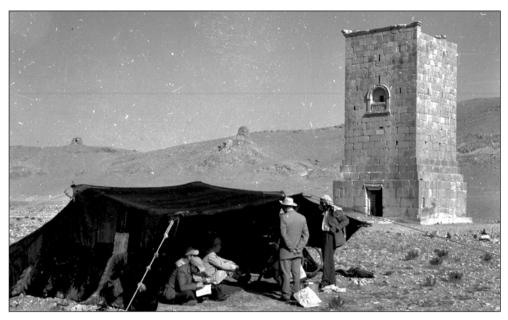


Fig. 1A. Polish Mission in the Valley of Tombs near the tower-tomb (Photo M. Biniewski)



Fig. 1B. Work begins in Diocletian's Camp (Photo H. Romanowski)

780

small losses, and two fragmentary ones of restorable shape. Three were published: an aryballos which might have served as urn, but was found empty, a jar and an infundibulum (our Nos 1–3) (Michałowski 1960: 199–200, Figs 222–223; Gawlikowska and Al-As'ad 1994: nos 2, 6, 8). Two more small fragmentary aryballoi and a nearly complete unguentarium in storage are presented here for the first time. The vessels from the Zabda tomb were well made of good quality glass. The colors are light green to green and olive green. Nos 2 and 3 were found together in the same burial, others singly.

1. Big aryballos [Fig. 2:1]

Excavation No. T23/59,

Museum No. 7217/18

Michałowski 1960: 199, No. 35, Fig. 222; Gawlikowska and Al-As'ad 1994: No. 2, Pl. I 1

H. 13.5 cm, Diam. body 13 cm, rim 8 cm Olive-green, white iridescence.

Mended and restored. Some losses.

Globular body, cylindrical flaring neck and collar-like rim, slightly concave base. Two handles from shoulders, bent at right angle under the rim. On the body three faintly visible, horizontally abraded lines, not noticed before.

See Filarska 1952: 154, No. 149, Pl. XXXIII 2; Kunina 1997: No. 229; Arveiller-Dulong and Nenna 2005: 289, No. 870

Second half of 1st century.

This type could have been used as a household vessel for storage and transport of cosmetic oils. It is also found in secondary use as a cinerary urn for ashes of the deceased, mainly in the western part of the Empire, where the cremation

prevailed (Arveiller-Dulong practice and Nenna 2005: 272). This custom appears sporadically in Greece and Asia Minor (Lightfoot 2003: 342; 2007: 107). In Palmyra, a similar big aryballos was found in 2007 in the tomb of 'Agraban [Fig. 2:3], as well as a cinerary urn closed with a lid and still containing burnt bones and ashes (Al-Hariri 2013: 151, 157, Fig. 12, urn top left, aryballos top right). The practice of cremation was extremely rare in Palmyra, but a probable case is signaled in a burial in the Yarhai tomb (Amy and Seyrig 1936: 256); a clay basin with carbonated bones was also found in the tomb of Zabd'ateh (Al-As'ad and Taha 1965: 38, Fig. 7).

2. Jar [Fig. 2:5]

Excavation No. T37/59,

Museum No. 7218/19

Michałowski 1960: 199, No. 36, Fig. 223 (left); Gawlikowska and Al-As'ad 1994: No. 6, Pl. I 3

H. 7 cm, Diam. body 6.8 cm, rim 5 cm Light green, small bubbles, no iridescence. Globular body, slightly concave base with pontil mark, irregular cylindrical neck flaring to the inturned rim.

Late 1st century.

See Abdul-Hak 1965: 26–27, Figs 4 (middle) and 10:5–6 (Emesa necropolis); Hayes 1975: 57, 80, Nos 141 and 294; Arveiller-Dulong and Nenna 2005: 420, No. 1166 (Sidon); Atallah and Gawlikowska 2007: Nos 66–68; Antonaras 2012: 194, No. 280.

The form continued in the Eastern Mediterranean up to the early 4th century.

3. Infundibulum [Fig. 3 left] Excavation No. T38/59, Museum No. 7219/20

Michałowski 1960: 200, No. 37, Fig. 223 (right); Gawlikowska and Al-As'ad 1994: No. 8, Pl. I 2.

H. 7.5 cm, present L. body 8 cm, Diam. body 6 cm, rim 3 cm

Light green, bubbly, iridescent. Tip of the spout missing. Nearly flat base, elongated body with a horizontal spout, cylindrical neck slightly flaring to folded-in rim.

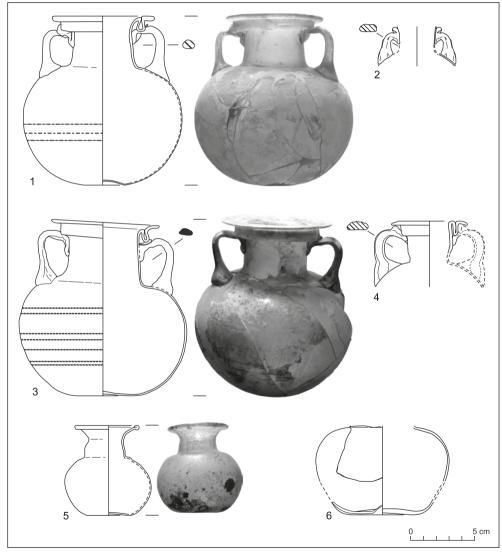


Fig. 2. 1 – aryballos No. 1; 2 – upper part of an aryballos, No. 5; 3 – aryballos from the 'Aqraban tomb; 4 – upper part of an aryballos, No. 7; 5 – jar, No. 2; 6 – body of an aryballos, No. 4 (All drawings and computer renderings M. Wagner)

782

Often used as fillers in the 1st and 2nd century in the Levant. Four such infundibula are kept in the Beiteddine Museum collection [Fig. 3 right] (Atallah and Gawlikowska 2007: 177–178, 234, 266, Nos 12–15, Pl. 2, Fig. 5). In Palmyra, one was found in the tomb of Barikhi (Al-Asʿad and Taha 2009: 161, not illustrated), and another in Tomb C by the Japanese mission (Saito 1994: 83–84, No. 63, Fig. 65). 1st century.

See Filarska 1952: No. 156, Pl. XXXV 3; Vessberg 1952: Pl. X 1–2 and XX 4–5; Chéhab 1986: Pl. XLVI 1; Dusenbery 1967: No. 49, Fig. 49; 1998: Nos K 3–1; Arveiller-Dulong and Nenna 2005: Nos 644–645.

4. Body of aryballos [Fig. 2:6] Found in 1959, not registered. Unpublished.

H. preserved 7 cm, Diam. base 5 cm, body 10.2 cm

Green, translucent, black patches of weathering.

Globular body, slightly concave base. Similar to an unpublished aryballos from the tomb of 'Aqraban (Reg. No. 9714). Vessberg 1952: Pl. IV:32; Sorokina 1987: type B, Fig. 2; Lightfoot 2007: 110, No. 255.
1st century.

5. Upper part of aryballos [Fig. 2:2]

Found in 1959, not registered.

Unpublished.

H. preserved 3.5 cm, originally over 8 cm Color unidentified under heavy metallic patina.

Trail strap handle attached to the globular body and, folded, to the cylindrical neck. Similar to a vessel from Tomb 2 in the Southeastern Necropolis (Gawlikowska and Al-As'ad 1994: No. 3, early 2nd century).

Isings 1957: Form 61. See Filarska 1952: 168–169, Nos 171–172; Antonaras 2012: 251, No. 410.

6. Unguentarium [Fig. 4:2]

Found in 1959, not registered. Unpublished.

H. 7.5 cm, Diam. base 1.4 cm, rim 2 cm Light green, iridescent.

Mended from many pieces, with small losses. Thin-walled, irregular conical body, flat base with pontil mark, cylindrical flaring neck with everted and flattened rim. 1st century.

A similar unguentarium was found in

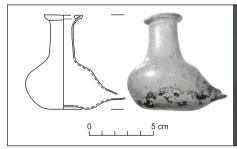




Fig. 3. Infundibulum No. 3 (left) and four infundibula in the Beiteddine Museum (right) (Photo M. Gawlikowski and computer renderings M. Wagner)

Tomb 5 (Artaban), see Gawlikowska and Al-As'ad 1994: No. 11. There are also two other fragmentary unguent bottles from the Zabda tomb, featuring light green, cylindrical necks with folded rims (not ilustrated). Unguentaria with very thin walls were often used or deposed as gifts in tombs (Lightfoot 2007: 142–143). Isings 1957: Form 28b. See Filarska 1952: No. 322, Pl. LI 3 and No. 326, Pl. LI 4; Whitehouse 1997: No 243; Arveiller-Dulong and Nenna 2005: Nos 842, 843 (Crete).

Tomb 15 excavated by Michałowski in 1962 in the Valley of Tombs yielded only one fragmentary aryballos of the same date as above (Michałowski 1964: 180, No. 36, Fig. 211).

7. Upper part of aryballos [Fig. 2:4] Excavation No. T13/62
H. preserved 5 cm, Diam. rim 6 cm
Colorless to light green, green handle.
The other handle is missing.
Short cylindrical neck constricted at the

junction with partly preserved globular body, outsplayed collar rim, strap handle attached to the body and folded under the collar

See Clairmont 1963: No. 565, Pl. XXXIV; Atallah and Gawlikowska 2007: 177, 233, No. 10, Pl. 1.

The anonymous tomb T 72 excavated by Sadurska in 1972 has only one fragmentary preserved glass (Sadurska 1975: 371).

8. Unguent jar [*Fig. 4:1*]

Reg. No. 72T19. Unpublished. H. preserved 3.4 cm, Diam. rim 3.3 cm Light green, patches of white weathering. Irregular neck, folded-in rim, rounded body.

1st-2nd century.

Similar jar was found by the Japanese mission in Tomb C (Southeastern Necropolis): Saito 1994: No. 58. See Gawlikowska and Al-As'ad 1994: No. 7 (Tomb 4, same necropolis). See also Atallah and Gawlikowska 2007: 196, 241, No. 67.

FINDS FROM DIOCLETIAN'S CAMP

All glass vessels from Diocletian's Camp except one (Michałowski 1962: 213–216, Fig. 244; Gawlikowska and Al-As'ad 1994: No. 57) were fragmentary. They include a restored facet-cut beaker (No. 9) and coil applied bases, apparently from the 4th and early 5th century, belonging to small bottles and juglets (Nos 10–13), as well as a mold-blown base of a bowl (No. 14).

9. Beaker [Fig. 4:3] Reg. No. CD 139/60. Michałowski 1962: 214, No. 109 (not illustrated and dated to the 4th-5th century)

Broken in many pieces, H. restored 10.6 cm, Diam. rim 7.6 cm

Found out of context in a Byzantine structures in the main street of the Camp. Colorless, yellow enamel-like weathering. Blown and then wheel-cut on the outside. Irregular conical body on a splayed foot, flaring cut rim. The decoration consists of a band of vertical ovals in two rows between two double grooves all around the body at middle-height of the vessel. The upper ovals are 15 mm high, the lower ones

17 mm. Together they form a honeycomb pattern. Another groove right below the rim.

1st century.

Isings 1957: Form 21, late 1st–early 2nd century. See also Goethert-Polaschek 1977: Form 35, No. 131, Pl. 35. In Palmyra, Ployer 2013: Nos 197, 198, Figs 130, 131 and 146.

Clairmont (1963: 56–86, No. 241) produced a detailed study on facets and linear cuttings on glass from Dura-Europos, especially in the 2nd–3rd century. According to Oliver Jr., the early Roman faceted glass can be divided into two main types: tall and short, depending on the proportion between height and rim diameter, respectively 1:1 and 2:1 (Oliver Jr. 1984: 36). This author dated these vessels to the late 1st–early 2nd century. Our vessel was more slender. It is similar to a beaker with three rows of decoration in the University Art Gallery, New Haven

(Matheson 1980: No. 100). Another close parallel is in British Museum (Harden et al. 1968: No. 104).

10. Base [Fig. 4:5A]

Not registered. Unpublished. H. preserved 1.4 cm, Diam. base 3.2 cm Color unidentified under heavy iridescence. Rounded body on a thin base-ring made of a single coil.

11. Base [Fig. 4:5B]

Excavation No. CD 15/70. Unpublished. H. preserved 2.4 cm, Diam. base 3.4 cm Green to olive-green, flaky white and grey weathering.

Thick bottom of a globular body on a thick coiled base-ring.

12. Base [Fig. 4:5C]

Excavation No. CD 21/70. Unpublished. H. preserved 2.8 cm, Diam. base 2.6 cm Light green, white iridescence. Thin globular body on a very thin trail base-ring.

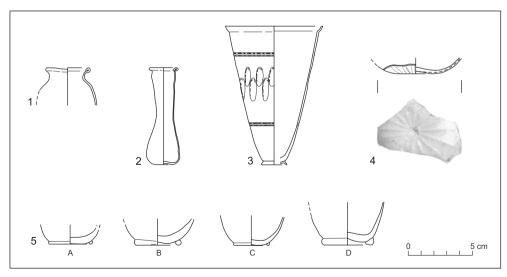


Fig. 4. 1 – unguent jar, No. 8; 2 – unguentarium, No. 6; 3–beaker, No. 9; 4 – base of a bowl, No. 14; 5 A-D – four bases of globular vessels, Nos 10–13

13. Base [Fig. 4:5D]

Excavation No. CD 20/70. Unpublished. H. preserved 3.2 cm, Diam. base 3.8 cm Light green, completely covered with dark patina.

Thick rounded body on a thick trailed base-ring with pontil mark.

All four bases were found behind the apse of Diocletian's principia, in or near the ash layer associated with the destruction by fire of the first phase of the building. Indeed, coil bases usually appear in the 4th or 5th centuries in the form of a single coil, as here, or of several wound coils, producing a high base-ring (Jennings 2006: 190–191, Fig. 8.4). They could be part of small bottles or juglets.

14. Base of bowl [Fig. 4:4]

Excavation No. CD 9/70. Unpublished. H. preserved 1.7 cm, Diam. base 3 cm Light green, transparent, grey weathering. Mold-blown.

Slightly concave base with pontil mark. Sixteen ribs starting at the center and rising radially on the rounded walls.

Found behind the apse of the principia. Early 8th century.

See Bamber 1988: Fig. 53:1,2; Kehrberg 1986: No. 57, Fig. 9.

Among the old finds are also three glass roundels once attached to glass containers. They were pressed on rounded vessels, making a bulb on inside, then stamped with a die, the excess matter forming a thick border. Two of them bear likenesses of a bird with raised tail and crest, probably a rooster, holding a twig in its beak (Gawlikowska 2009). Many similar stamped medallions are known, decorating Sasanian and early

Islamic glass and bearing images of various animals (Whitehouse 2005: Nos 27-33 roosters). Another medallion remained unpublished; it bears a Kufic inscription (No. 15) and belonged to one of the well-known Umayyad pharmaceutical vessels. Some glass containers provided with such roundels at the rim are known from elsewhere. The Arabic inscriptions, sometimes affixed upside down, urged sellers to be honest in their dealings, especially in respect to the weight of the content. However, they were obviously not sealings and could not offer any guarantee to the buyer. In Bet Shean, the marked vessels were bottles with large flaring necks to which were attached stamped roundels urging for the right measure.

15. Medalion with Kufic inscription [Fig. 5]

Inv. CD 18/73. Unpublished.

Diam. maximum 2.4 cm. Dark green, translucent, small iridescence. Stamped attached wall fragment bulging inside under the impact of the impression. Arabic inscription in four lines was stamped leaving a slightly bulging rim all around. Part of text damaged. The letters are not pointed.



Fig. 5. Medalion with Kufic inscription, No. 15 (Photo W. Jerke)

[و لاتكونو[ا من] [بلسم الله او [فحوا لكيل المكسرين

The object was found in 1973 in a room adjoining the northern corner of the tetrapylon in Diocletian's Camp, being part of structures encroaching on the main street of the Camp and its porticoes. Other evidence shows that this late occupation was of Umayyad date. Our roundel bears a text already known from Bet Shean (Hadad 2002: Nos 20–21; 2005: Nos 302–303, Pl. 15), but the last line is damaged. It is a Quranic quotation (Sura 26, 181): "In the name of Allah, give just measure, and be not among the defrauders". In our case, however, a strange mistake occurred: the words that should have formed line 3 in the adopted disposition ("and be not among") come actually as line 1. This can be explained only as a mistake of an illiterate artisan who confused the word order while copying the written text.³

SUMMARY

The few fragments from Diocletian's Camp are found out of context, in particular the 1st century beaker (No. 9) recovered from the Byzantine fill. Fragments Nos 10-13 are datable in the 4th-5th centuries; unlike the Islamic fragment No. 14, they can be linked to a major fire that destroyed the principia at an undefined date about that time and was followed by a reconstruction of the building to serve the same function. All finds from graves, on the other hand, are related to funerary customs such as use of perfumed oils and balms during burial ceremony. They are small aryballoi (Nos 4, 5,7) (Isings 1957: Form 61; Sorokina 1987) and small jars for ointments (Nos 2 and 8). The contents of the vessels were sprayed on the wrapped body or left open in the grave to evaporate. The infundibulum (No. 3) served to distribute a liquid drop by drop. Such vessels are well known from many collections [Fig. 3 right].

Unguentaria from Palmyra are generally conical or pear-shaped with a long neck, cylindrical or flaring (Isings 1957: Forms 28b [1st century] and 82B [2nd century]). Two were recorded in the Yarhai tomb (Amy and Seyrig 1936: 256, Fig. 13), three in the Southeastern Necropolis (Gawlikowska and Al-As'ad 1994: Nos 11, 13, 14), one in Zabda hypogaeum (No. 6) and three in the Barikhi tomb in the Southwestern Necropolis (Al-As'ad and Taha 2009: not illustrated). Of the same use were two small bottles found in Tombs A and C in the Southeastern Necropolis (Saito 1994: Nos 61-62, Fig. 65), and in the 'Aqraban tomb (Al-Hariri 2013: 157, Fig. 12, center bottom). Similar finds from the tower-tombs of 'Atenatan and Kitot will be published soon.

The bigger aryballos (No. 1) might have served as cinerary urn, though found empty. A nearly identical aryballos comes from the tomb of 'Aqraban [Fig. 2:2]. Glass containers (ollae) for ashes were common in the Roman West up to the 2nd century; the practice of incineration was unusual in Syria, but in Palmyra there are at least three cases known.

The reading of the inscription by Michał Gawlikowski.

Krystyna Gawlikowska k.gawlikowska@uw.edu.pl

REFERENCES

- Abdul-Hak, S. (1965). Contributions d'une découverte archéologique récente à l'étude de la verrerie syrienne à l'époque romaine. *IGS*, 7, 26–34.
- Al-As'ad, Kh., and Taha, O. (1965). Madfan Zabd'ateh al-Tadmuri [The Tomb of Zabd'ateh the Palmyrene]. *Annales Archéologiques de Syrie*, 15, 29–46 [in Arabic].
- Al-As'ad, Kh., and Taha, A. (2009). Madfan Mubarak bin Amrisha al-moassas 'am 98 m [The tomb of Mubarak son of Amrisha, founded in 98 AD]. *Majallat Maahad Al-Hadarat*, 8–9, 147–166 [in Arabic].
- Al-Hariri, Kh. (2013). The tomb of 'Agraban. Studia Palmyreńskie, 12, 149–157.
- Amy, R., and Seyrig, H. (1936). Recherches dans la nécropole de Palmyre. Syria, 17(3), 229–266.
- Antonaras, A. (2012). Fire and sand: Ancient glass in the Princeton University Art Museum. Princeton, NJ: Princeton University Art Museum.
- Arveiller-Dulong, V., and Nenna, M.-D. (2005). Les verres antiques du Musée du Louvre II. Vaisselle et contenants du I^{er} siècle au début du VII^e siècle après J.-C. Paris: Musée du Louvre.
- Atallah, M., and Gawlikowska, K. (2007). The glass in the Beiteddine Museum (Walid Joumblatt Collection). *BAAL*, 11, 167–278.
- Bamber, A. (1988). The glass. In A. Northedge, A. Bamber, and M. Roaf, *Excavations at 'Āna: Qal'a island* [=Iraq Archaeological Reports 1] (pp. 115–125). Warminster: Aris & Phillips.
- Chéhab, M. (1986). Fouilles de Tyr. La nécropole IV. Bulletin du Musée de Beyrouth, 36, 1–268.
- Clairmont, C. W. (1963). *The excavations at Dura-Europos. Final report* IV.5. *The glass vessels*. New Haven, CT: Dura-Europos Publications.
- Dusenbery, E. B. (1967). Ancient glass from the cemeteries of Samothrace. *IGS*, 9, 34–49.
- Dusenbery, E. B. (1998). Samothrace XI.2. The nekropoleis. Catalogues of objects by categories [=Bollingen Series 50]. Princeton, NJ: Princeton University Press.
- Dussart, O. (2007). Fouilles de Khirbet edh-Dharih, III. Les verres. *Syria*, 84, 205–247.
- Filarska, B. (1952). Szkła starożytne: katalog naczyń [Catalogue of ancient glassware]. Warsaw: Muzeum Narodowe w Warszawie [in Polish].
- Gawlikowska, K. (2009). Birds on Sasanian glass. In O. Drewnowska (Ed.), Here & there across the ancient Near East: Studies in honour of Krystyna Łyczkowska (pp. 31–43). Warsaw: Agade.
- Gawlikowska, K., and Al-As'ad, Kh. (1994). The collection of glass vessels in the Museum of Palmyra. *Studia Palmyreńskie*, 9, 5–36.
- Goethert-Polaschek, K. (1977). Katalog der römischen Gläser des Rheinischen Landesmuseums Trier [=Trierer Grabungen und Forschungen 9]. Mainz am Rhein: Philipp von Zabern.
- Hadad, S. (2002). Glass vessels with stamps from the Byzantine through Abbasid Periods at Bet Shean, Israel. *IGS*, 44, 35–48.
- Hadad, S. (2005). *Islamic glass vessels from the Hebrew University excavations at Bet Shean* [=Qedem Reports 8]. Jerusalem: Institute of Archaeology, the Hebrew University of Jerusalem.

- Harden, D. B., Painter, K. S., Pinder-Wilson, R. H., and Tait, H. (1968). *Masterpieces of glass: A selection*. London: British Museum Press.
- Hayes, J. W. (1975). Roman and pre-Roman glass in the Royal Ontario Museum: A catalogue. Toronto: The Royal Ontario Museum.
- Isings, C. (1957). Roman glass from dated finds [=Archaeologica Traiectina 2]. Groningen: J.B. Wolters.
- Jennings, S. (2006). Vessel glass from Beirut: BEY 006, 007, and 045 [=Berytus 48–49]. Beirut: Faculty of Arts and Sciences, American University of Beirut.
- Kehrberg, I. (1986). Summary report on glass. In F. Zayādīn (Ed.), *Jerash Archaeological Project* I. 1981–1983 (pp. 375–385). Amman: Department of Antiquities of Jordan.
- Kunina, N. (1997). Ancient glass in the Hermitage collection. St. Petersburg: State Hermitage.
- Lightfoot, C. S. (2003). From East to West: The early Roman glass industry. In D. Foy and M.-D. Nenna (Eds.), Échanges et commerce du verre dans le monde antique: actes du colloque de l'Association française pour l'archéologie du verre Aix-en-Provence et Marseille 7–9 juin 2001 [=Monographies instrumentum 24] (pp. 341–347). Montagnac: Éditions Monique Mergoil.
- Lightfoot, C. S. (2007). Ancient glass in National Museums Scotland. Edinburgh: NMS.
- Matheson, S. B. (1980). Ancient glass in the Yale University Art Gallery. New Haven, CT: Yale University Art Gallery.
- Michałowski, K. (1960). Palmyre. Fouilles polonaises 1959. Warsaw: PWN.
- Michalowski, K. (1962). Palmyre. Fouilles polonaises 1960. Warsaw: PWN.
- Michałowski, K. (1964). Palmyre. Fouilles polonaises 1962. Warsaw: PWN.
- Oliver Jr., A. (1984). Early Roman faceted glass. JGS, 26, 35-58.
- Ployer, R. (2013). Gläser. In A. Schmidt-Colinet and W. Al-As'ad (Eds.), *Palmyras Reichtum durch weltweiten Handel: archäologische Untersuchungen im Bereich der hellenistischen Stadt* II. *Kleinfunde* (pp. 206–242). Vienna: Holzhausen.
- Sadurska, A. (1975). Palmyre 1972. Tombeaux dans l'enceinte du Camp de Dioclétien. *EtTrav*, 8, 367–376.
- Sadurska, A. (1977). Le tombeau de famille de 'Alainê [=Palmyre 7] . Warsaw: PWN.
- Saito, K. (1994). Glass vessels. In T. Higuchi and T. Izumi (Eds.), Tombs A and C: Southeast necropolis Palmyra, Syria, surveyed in 1990–92 [=Publication of Research Center for Silk Roadology 1] (pp. 83–85). Nara: Research Center for Silk Roadology.
- Sorokina, N. P. (1987). Glass aryballoi (first–third centuries A.D.) from the northern Black Sea region. *JGS*, 29, 40–46.
- Vessberg, O. (1952). Roman glass in Cyprus. Opuscula Archaeologica, 7, 109–165.
- Whitehouse, D. (1997). Roman glass in the Corning Museum of Glass I. Corning, NY: Corning Museum of Glass.
- Whitehouse, D. (2005). Sasanian and post-Sasanian glass in the Corning Museum of Glass. Corning, NY: Corning Museum of Glass.

789	