Ḥadashot Arkheologiyot—
Excavations and Surveys in Israel 129

A Comparative Petrographic Examination of Plaster from Ḥorbat Ḥadat and Khirbat Umm el-ʻUmdan

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Two plaster samples from installations in the Modiʻin area were analyzed for their technological—i.e., type, phases of application and secondary deposition features—and petrographic characteristics: from Winepress F83a near Ḥorbat Ḥadat (Sample M-1; Segal, Ad and Shmueli 2017: Plan 9, Fig. 8) and from an Early Roman period (first century CE) ritual bath (*miqveh*) at Khirbat Umm el-ʻUmdan (Sample M-2; Onn et al. 2003:77).[2] It was hoped that this analysis will help in determining the relative chronology of the samples.

Two petrographic thin sections were prepared after impregnation with polyester resin under vacuum. The samples were then sliced and polished into a slide (0.03 mm thick). The petrographic thin sections were examined under a polarizing light microscope, Olympus-2. Petrographic descriptions follow Kempe and Harvey (1983), Bullock et al. (1985), Gibson and Woods (1990), Goren and Goldberg (1991) and Vandiver Druzik, and Galvan (1995).

The Plaster Samples

Sample M-1 (c. 1.5 cm thick).— The sample is an upper part of a chunk of plaster, comprising a top layer with a whitish beige hue over a pinkish layer. Both layers are composed of a dense matrix of pure lime with abundant aggregates of rather soft micritic and sparitic limestone. The reaction between the paste and the aggregates was very strong, producing high-quality plaster. The lower layer is characterized by the presence of burnt clay, which coats elongated pores (Fig. 1:a); this is the reason for the pink coloration of the layer. There are no signs of any vegetal, i.e., wood or straw, temper in either layer. The pores make up 10–15% of the volume. Elongated pores were filled with calcite, which had re-precipitated mostly as needle-like calcite (Fig. 1:b), as a result of minor secondary deterioration of the mortar. Identification: lime plaster of high quality, with a clay paste additive.

Sample M-2 (2.5 cm thick).— The specimen is gray in color, with black dots and a slightly polished surface. The bulk of the specimen consists of a heterogeneous matrix, due to mixing of lime with crude wood remains; the latter were either altered into charcoal or calcified in the high firing temperature (Fig. 2). Charred/calcified wood fragments constitute c. 40% of the mass and range 0.5–1.0 mm in size. The matrix is composed of micritic calcite and shows uneven secondary carbonation, possibly due to a pozzolanic reaction between the lime mortar

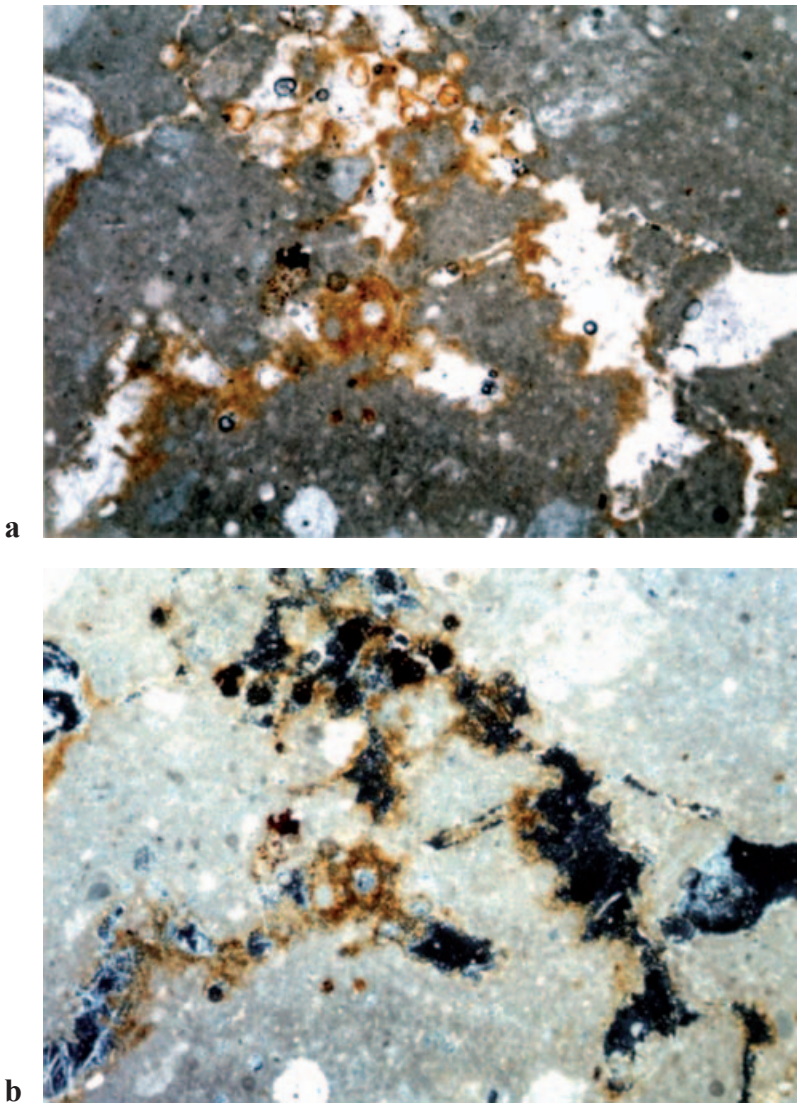

Fig. 1. Sample M-1 (Magnification c. 4 × 10): (a) plane-polarized light (PPL)—completely carbonated lime mortar (gray) with abundant elongated pores (white); note coatings of light brown burnt clay; (b) crossed-polarized light (XPL)—black pores containing needles of secondarily precipitated calcite.

and wood ashes that were used for temper. Crude rock aggregates, constituting c. 20% of the mix, are up to 0.3 cm in size and include marl, limestone, chert and an occasional ceramic shale-based sherd. The sherds were also heated, as evidenced by their cracking and the posterior precipitation of micritic calcite on the walls of the cracks. The fine aggregates (up to 2 mm), constituting less than 10% of the mix, include crushed limestone rocks, several individual crystals of feldspar, possibly fine-grained granite, and volcanic glass fragments. The plaster is strongly vesicular, with pores making up c. 30% of the volume, apparently due to its high wood content. Identification: hydraulic lime plaster of low quality or poor preservation, with abundant wood charcoal.

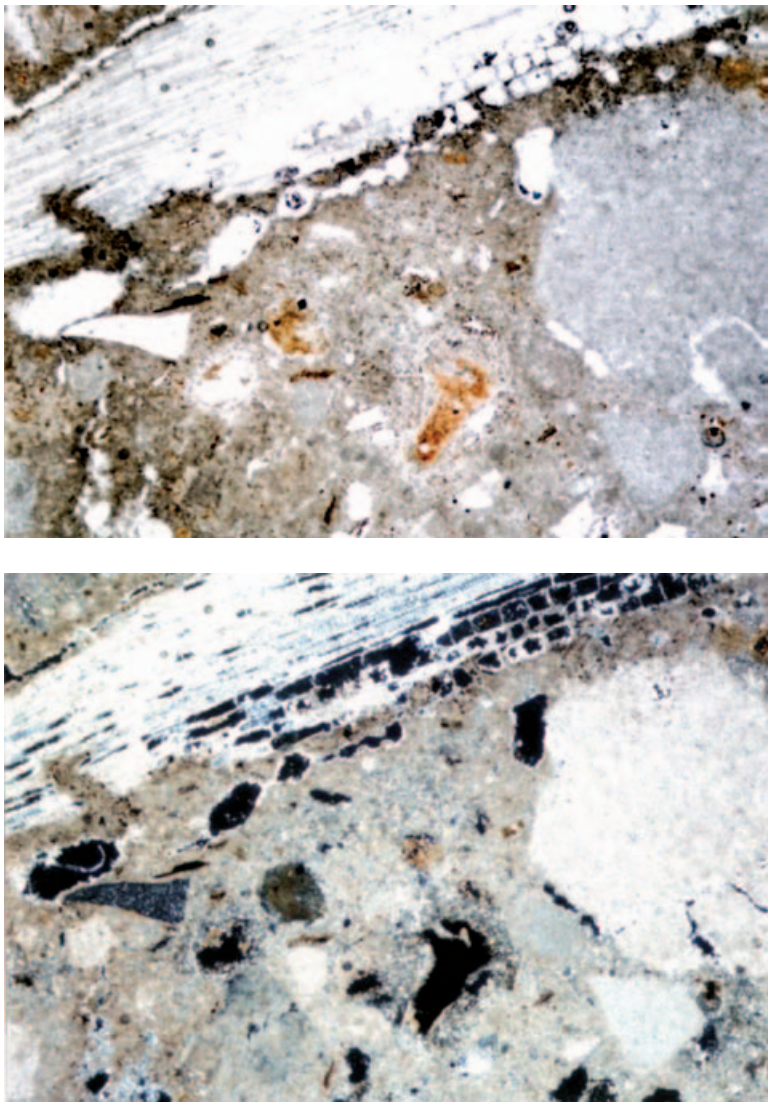

Fig. 2. Sample M-2 (Magnification ca. 4 ×10): incomplete carbonated lime mortar with strong calcification of a wood piece, preserving cellular structure (upper part)—(a) PPL; (b) XPL.

Discussion

The two samples represent completely different petrofabric types. Nevertheless, it should be questioned whether this difference can serve as an unequivocal chronological criteria. As shown in a previous study (Tsatskin 1999), the type of cementing material that was used depended on the function of the structure in which it was applied. It is not surprising then, that the plaster sample from Winepress F83a at Ḥorbat Ḥadat fits the petrofabric type found at other winepresses from the Roman–Byzantine periods in Israel. Thus, although it differs greatly from the plaster sample from the *miqveh* at Khirbat Umm el-‘Umdan, it cannot be conclusively stated that the winepress is of a later date, nor that the two installations are contemporaneous.

NOTES

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[2] I would like to thank Uzi ʻAd for asking me to study the plaster from the winepress at Ḥorbat Ḥadat and Shlomit Weksler-Bdolah for helping with retrieving the plaster sample from Khirbat Umm el-ʻUmdan. The late Alexander Onn was extremely helpful by approving the sampling at Khirbat Umm el-ʻUmdan and providing us with the date of the *miqveh*. Dafnah Strauss edited the article.

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