

# THE DISCOVERY OF TWO ADDITIONAL POTTERY KILNS AT AZ-ZURRĀBA/WĀDĪ MŪSĀ

by

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## Introduction

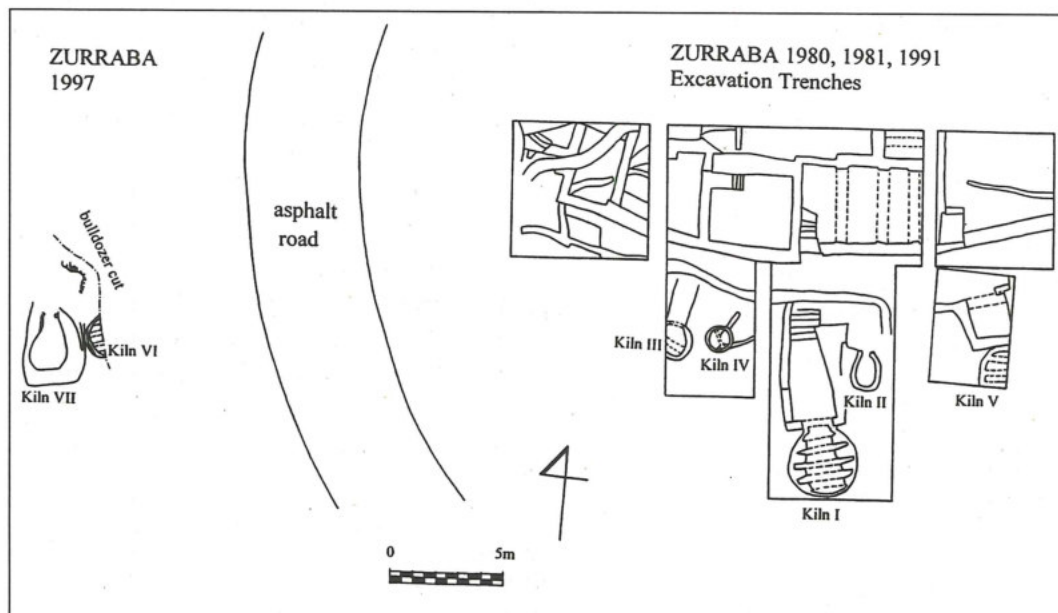
On 6 December 1997, the owner of the plot of land across the street from the excavated portion of the pottery workshops at az-Zurrāba cleared his land in preparation for building. The cleared section revealed the presence of two pottery kilns and a corner of a stone-built structure (Figs. 1 and 2), which were cleared and recorded on 7 December 1997 by Ahmed al-Momani, Khairieh 'Amr, Qais Tweissi (who is also responsible for the conservation and drawing of the finds), Saleh Al-Nawafleh (who helped with the sketch drawing of the kilns) and Jadallah Al-Nawafleh. Elevations for the area were provided by Mahmoud al-Hasanat of the PRPC.

The az-Zurrāba district of Wādī Mūsā is at the northwestern edge of the modern town, close to Petra. Excavations there by the Department of Antiquities over several seasons revealed the presence of a pottery



1. The two kilns in the bulldozer cut at az-Zurrāba after partial clearance. The vertical (50cm) scale stands on the outer floor associated with Kiln VI.

workshop and five pottery kilns dated to the late first/early second, late third/early fourth and mid-sixth centuries AD (Zayadine 1981: 350-351; 1982: 380-393; 1986: 185-187; 'Amr 1991). The discovery of the two kilns in 1997 brought the total of recorded kilns at



2. Location plan of the Kilns VI and VII in relation to the previously excavated part of the az-Zurrāba pottery workshop.

az-Zurrāba up to seven.<sup>1</sup>

### Description of the Kilns

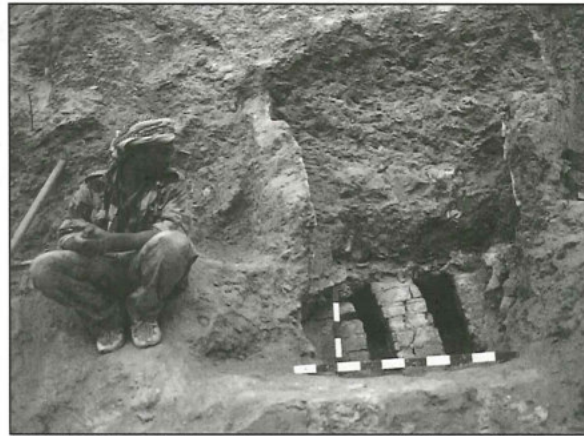
One of the problems of describing kilns is the variety of terms applied to the kiln components. Following the terminology adopted in an earlier paper to describe the az-Zurrāba kilns (Mason and 'Amr 1995), the terms defined by Swan (1984: 29-32) will be used here. Thus the *stoke-hole* is the opening through which the fuel is introduced, the *combustion-chamber* is where the fuel is burnt, in the combustion-chamber are built *supports* for the *raised oven-floor*, above which is the *superstructure* defining the *oven*, in which the pots are stacked for firing.

Both kilns are similar to the previously excavated az-Zurrāba kilns in that they are simple updraught kilns, with the combustion-chamber being directly below the oven. Both kilns are also totally built with brick without any stone elements, and would have originally had domed superstructures. The combustion chambers were dug into the ground, this being a common practice for additional insulation (see for example Adams 1961: 33, 37; 1962: 65, 66; 1986: 31-32; Golvin *et al.* 1982: 42, 43, 47, 88; Coulson and Wilkie 1986: 66; Anderson 1987: 42; Melkawi *et al.* 1994).

Following the nomenclature adopted during the previous seasons at az-Zurrāba, the two new kilns were designated as Kiln VI (the upper kiln) and Kiln VII (the lower kiln).

#### Kiln VI (Fig. 3)

Kiln VI is the smaller of the two, with a diameter of around 1.60m. The maximum preserved height is 1.50m. The floor of the combustion-chamber of Kiln VI is at an elevation of 1048.34m asl, and the combustion-chamber has three transverse arches sup-



3. Kiln VI with the side cut to reveal the combustion-chamber arch supports.

porting the raised oven-floor at around 70cm above the combustion-chamber floor.

At the same level as raised the oven-floor (1049.03m asl), we detected the outer floor level through which the combustion-chamber was cut. The stoke-hole is still in the section and judging by the orientations of the arch supports, it is most probably at the northern end of the combustion-chamber (similar to the stoke-hole of Kiln VII). The stoke-holes of Kilns I, II, III and IV are all roughly north-facing, while the orientation of the Kiln V arches also suggests a north-facing stoke-hole, see Fig. 2).

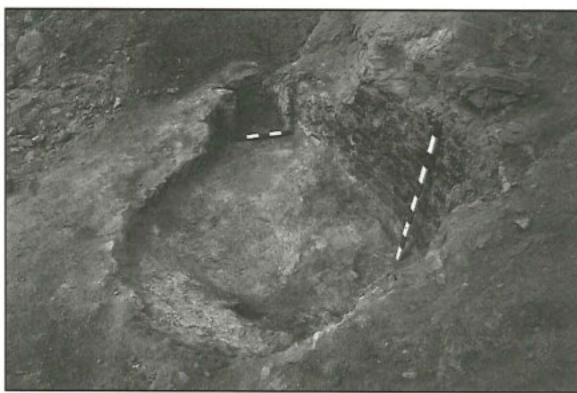
#### Kiln VII (Fig. 4)

The larger of the two kilns, only the combustion-chamber of this kiln was preserved to a maximum height of around one metre. The stoke-hole to the north is 0.47m wide. The floor of the combustion-chamber is at an elevation of 1047.66m asl, and its plan is an irregular oval measuring 1.70m east-west by 2.30m north-south (compare to the rectangular combustion chamber of Kiln I measuring 1.15-1.35 x 3.0m, Mason and 'Amr 1995: 629). The supports inside the combustion-chamber had been cleared at a later date

1. Since then, three more kilns were discovered under the dividing modern street during the excavation for the Wādi Mūsā wastewater network in September 1998, bringing the total number of recorded kilns up to ten. These kilns are at approximately 26, 30 and 81m to the north of the

excavated trenches, while the associated structures and archaeological strata extend for a length of around 350m north-south. These findings from az-Zurrāba will be published in the final report of the archaeological supervision of the Wādi Mūsā Water System and Wastewater Project.





4. Kiln VII, view to the north.

(also compare with Kiln I, Zayadine 1982: 380), while the interior lining had melted due to very high temperatures. The stone-built

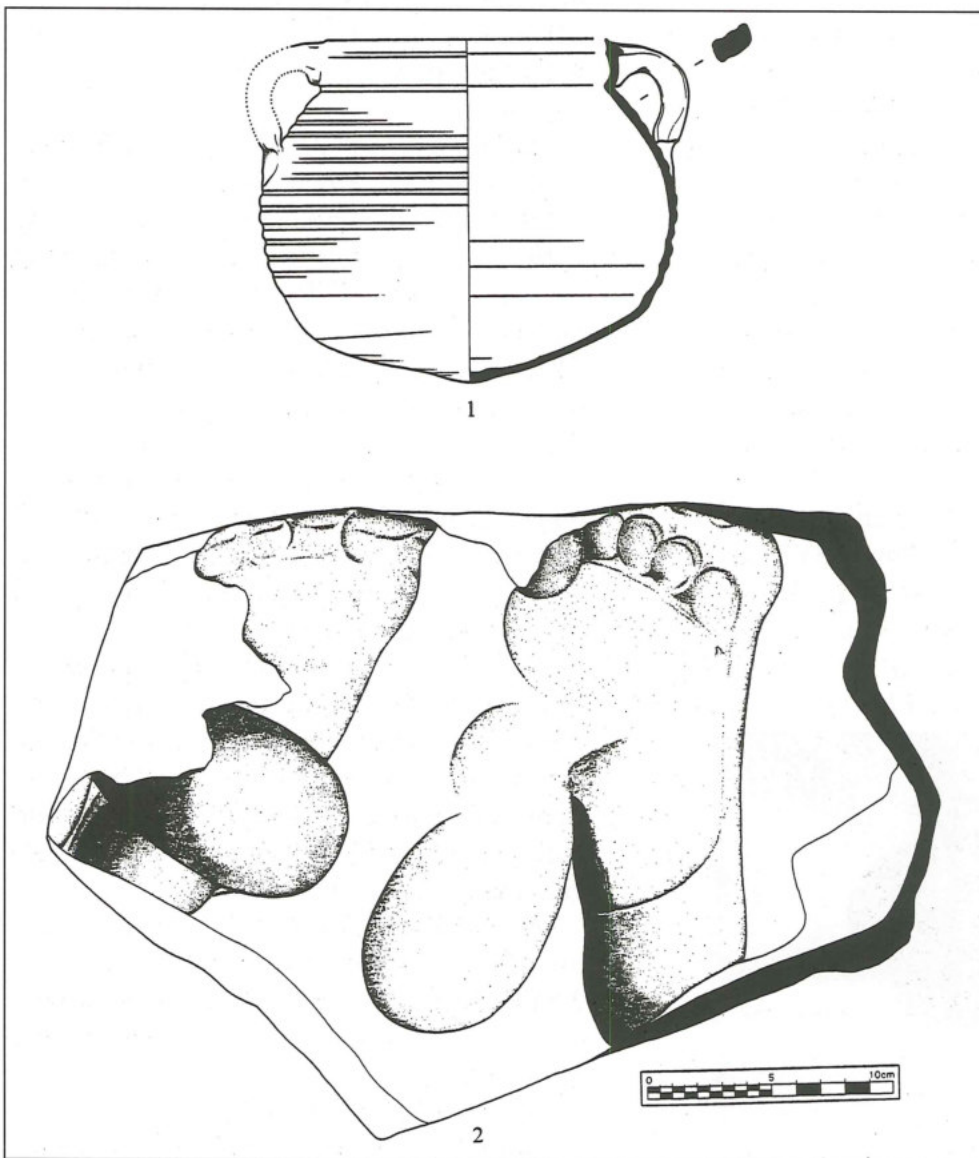
structure to the north is at a distance of around 1.0m and may be part of an entry-way also similar to that in front of Kiln I.

### The Finds

#### *Registered Objects Associated with Kiln VI*

The registered objects from the kilns are deposited at the Petra Museum. They are presented here by the *Registration number/ Petra Museum registration number (location)*.

*Zur 97.KVI.01/ JP5024 (Kiln VI interior)* (Fig. 5:1). Cooking pot. Broken and mend-



5. Registered finds from Kiln VI (drawing by Qais Tweissi).

ed, one handle and parts of body missing. Ware and interior: 2.5YR 5/6 red; exterior: 5YR 8/2 pinkish white. Many small to medium calcite, numerous sand inclusions. *Parallel examples: Garcia 1965: Pl. LVIII.1 (period Ic: after AD 106-ca. 150); Gerber 1997: fig. 4A (middle to second half of the first century AD).*

*Zur 97.KVI.02/ JP5025 (Kiln VI interior)* (Fig. 5:2). Brick with (six) foot impressions, one complete impression is around 24cm long. Broken and incomplete. Length: 36.2cm; width: 15-25cm; thickness: 10.5cm. Unevenly fired: 2.5YR 5/8 red and 5YR 5/1 grey. Very rough with numerous inclusions.

#### *Registered Objects Associated with Kiln VII*

*Zur 97.KVII.01/ JP5026 (Kiln VII interior)* (Figs. 6 and 7:1). .01a: Casserole; .01b: lid. Small pottery casserole with two handles and rounded base, plus fitted lid with central knob handle. Casserole and lid originally made in one piece then separated with an oblique cut resulting in perfect fit. Broken and mended, complete except for small part of casserole base and lid top; casserole also has small perforation near base. Casserole and lid of equal diameters: 13.1cm. Ware and interior: 5YR 6/6 reddish yellow; exterior: 5YR 6/6 reddish yellow - 5YR 6/4 light reddish brown - 5YR 8/2 pinkish white. Many small to medium calcite, numerous sand inclusions. *Parallel example for casserole: Garcia 1965: Pl. LIX.20 (de-*



6. Casserole and matching lid no. Zur97.KVII.01/ JP5026, from Kiln VII interior.

*scribed as bowl, period Ic: after AD 106-ca. 150).*

*Zur 97.KVII.02/ JP5027 (Kiln VII interior)* (Fig. 7:2). Zoomorphic (ibex) vessel spout, painted. Wheelmade cylinder with applied features. Horns and beard missing. Preserved height: 7.3cm. Ware: 2.5YR 6/8 light red; core: N6/0 grey; remnants of slip: 7.5YR 7/4 pink; paint: 10R 4/1 dark reddish grey. Many small to medium calcite, numerous sand inclusions.

*Zur 97.KVII.03/ JP5028 (Kiln VII interior)* (Fig. 7:3). Small pottery juglet with ribbed globular body. Handle and part of rim and neck missing, small perforation in body. Ware: 2.5YR 5/6 red; exterior: 2.5YR 6/4 light reddish brown with patch of 2.5Y 8/2 white. Few small calcite, many sand inclusions.

*Zur 97.KVII.04/ JP5029 (Kiln VII interior)* (Fig. 7:4). Small pottery bottle with pointed base. Complete except for chipping at the top of the rim, medium perforation at shoulder. Ware: 5YR 6/6 reddish yellow; unevenly fired surface: 7.5 6/4 light brown - 5YR 6/6 reddish yellow. Many small to medium calcite, mineral red and sand inclusions.

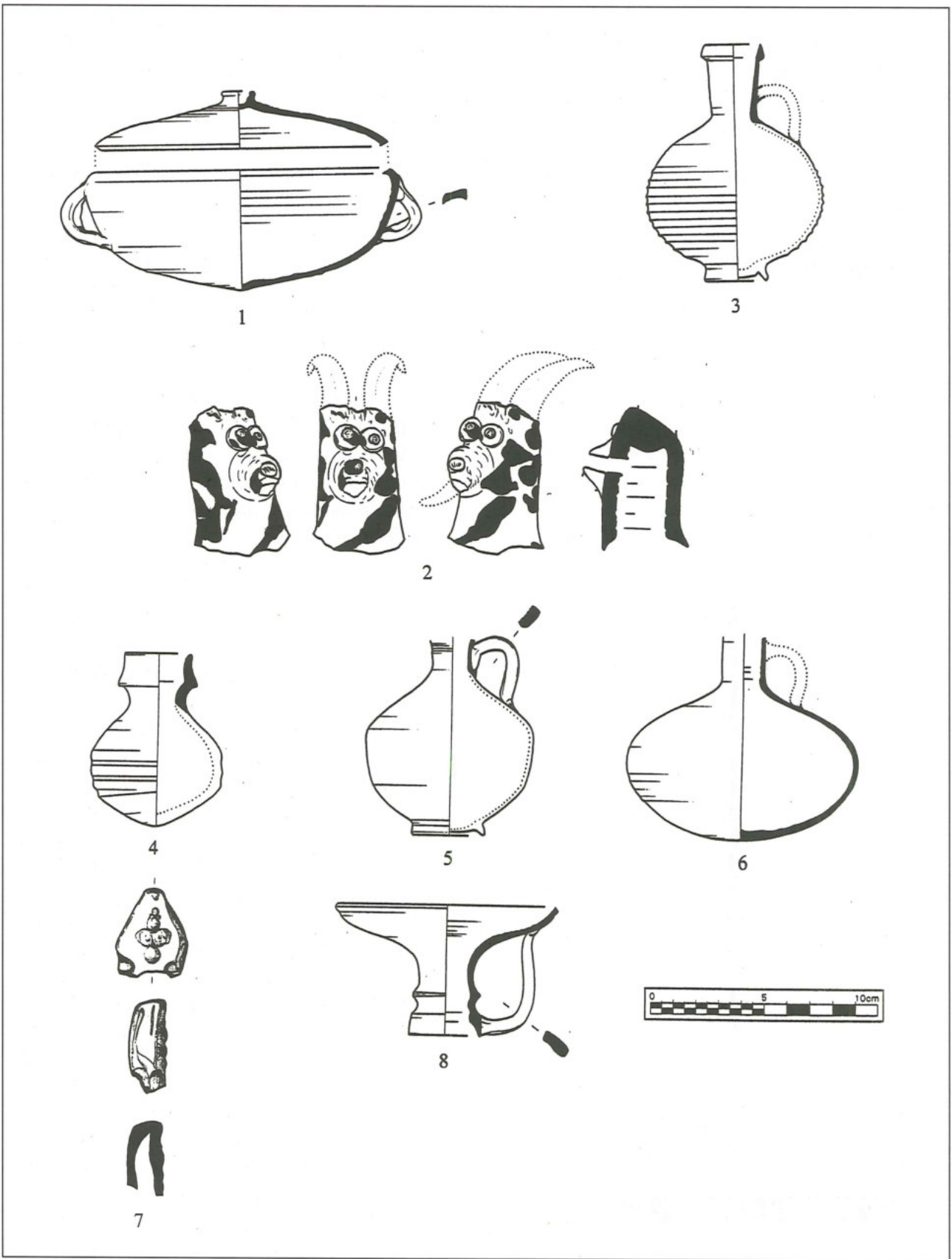
*Zur 97.KVII.05/ JP5030 (Kiln VII interior)* (Fig. 7:5). Small pottery juglet. Rim and part of neck missing, small perforation in base. Ware: 10R 6/6 light red. Many small calcite and sand inclusions.

*Zur 97.KVII.06/ JP5031 (Kiln VII interior)* (Fig. 7:6). Small pottery juglet with round base. Broken and mended, handle and rim missing. Ware and interior: 2.5YR 6/8 light red; exterior: 7.5YR 8/2 pinkish white with patches of 5Y 5/1 grey. Few small calcite, many sand inclusions.

*Zur 97.KVII.07/ JP5032 (Kiln VII interior)* (Fig. 7:7). Moulded lamp handle. Ware: 2.5YR 5/6 red - 5YR 5/4 reddish brown; core: 10YR 5/1 grey. Few small calcite and sand inclusions.

*Zur 97.KVII.08/ JP5033 (from structure north of Kiln VII) ( Fig. 7:8). Rim to shoul-*





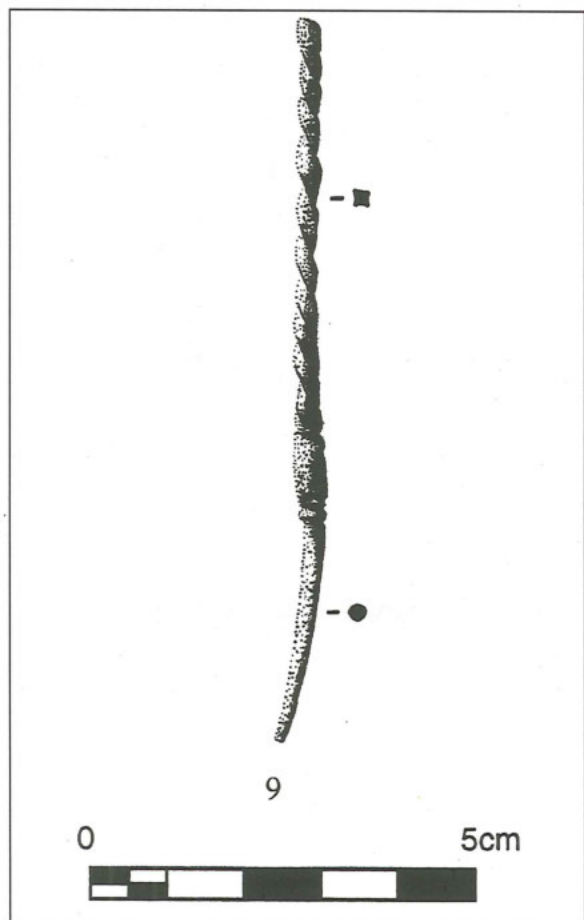
7. Registered finds from Kiln VII (drawing by Qais Tweissi).

der of jug, cut off after firing for reuse as funnel(?). Ware and interior: 2.5YR 6/8 light red; exterior: 7.5YR 6/4 light brown. Many small calcite and sand inclusions.

Zur 97.KVII.09/ JP5034 (Kiln VII interior) (Fig. 8). Bronze point with twisted handle. Probably a tool for gauging the thickness of pottery vessel walls.

### The Pottery from Kiln VI

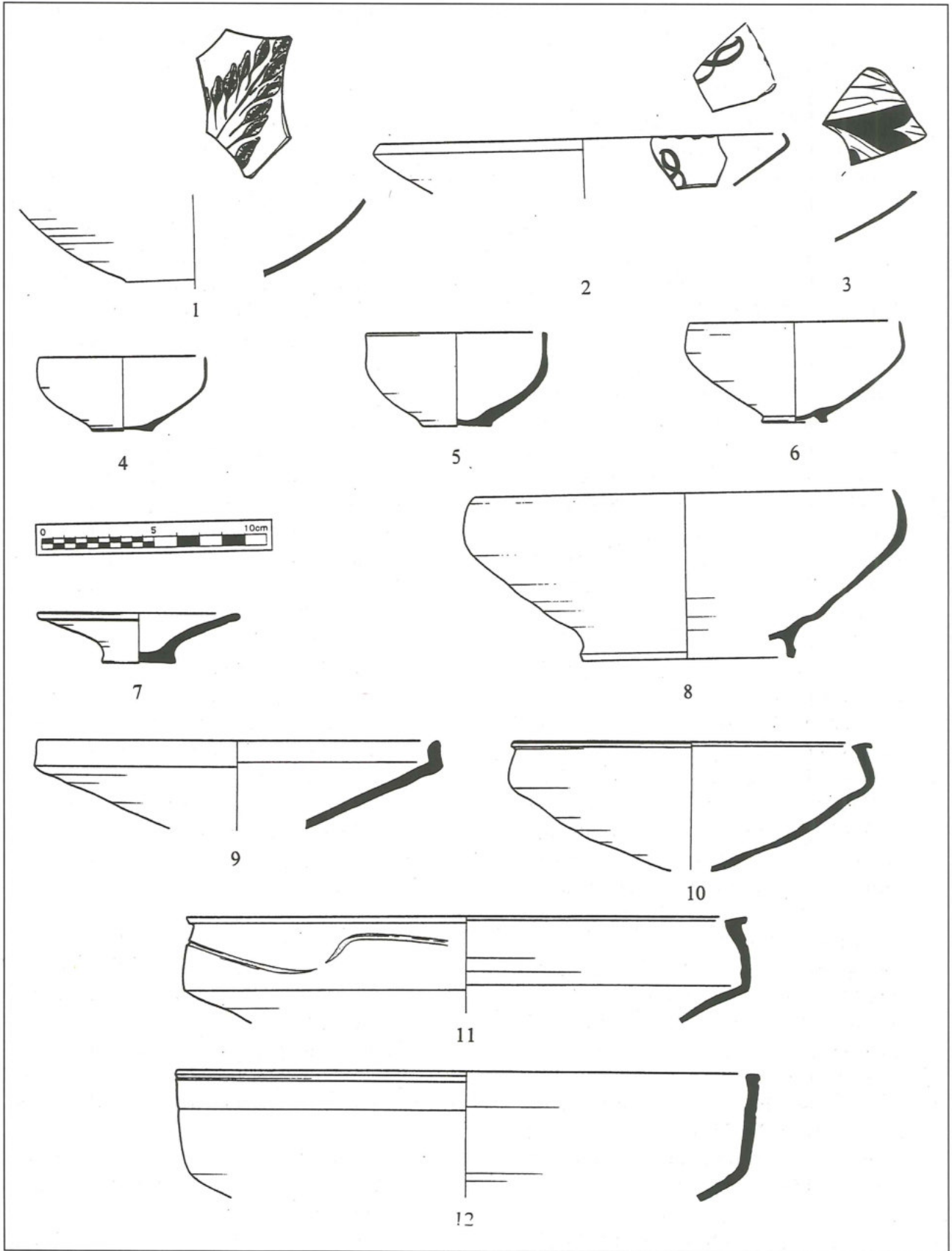
1. Painted bowl (Fig. 9:1). Ware, interior and exterior: 5YR 6/8 reddish yellow; interior paint: 2.5YR 5/6 red. Fine ware with few inclusions. *Parallel examples:* Villeneuve 1990: pl. III.4 (AD 100-150); Schmid 1995: figs. 9, 10.21 (end of the first century BC); Schmid 1996: 203 no. 690-2 (second half of the first century BC-ca. AD 20).
2. Painted bowl (Fig. 9:2). Ware and inter-



8. Bronze rod from Kiln VII (drawing by Qais Tweissi).

ior: 2.5YR 6/8 light red; uneven core: N5/0 grey; exterior: 2.5YR 6/8 light red with patch of 2.5YR 6/2 pale red; interior paint: 2.5YR 5/6 red; thin slip at rim exterior: 10YR 8/2 white. Many sand inclusions.

3. Painted bowl (Fig. 9:3). Ware: 2.5YR 6/8 light red; exterior: 5YR 6/4 light reddish brown - 10YR 5/2 greyish brown; interior: 5YR 7/4 pink; interior paint: 10YR 4/2 dark greyish brown. Few white inclusions. *Parallel examples:* Schmid 1995: fig. 9 (AD 20-50); Schmid 1996: 207 no. 700 (AD 20-50).
4. Cup with string-cut base (cutting through the base); more than half complete (Fig. 9:4). Ware, interior and exterior: 5YR 6/8 reddish yellow. Fine with some medium sand and white inclusions.
5. Cup with string-cut base; around two thirds complete (Fig. 9:5). Ware, interior and exterior: 2.5YR 6/6 light red; remnants of slip on exterior: 10YR 8/2 white. Many sand inclusions.
6. Cup; around two thirds complete (Fig. 9:6). Ware, interior and exterior: 5YR 6/6 reddish yellow; thin slip at exterior rim: 5YR 7/3 pink. Many small white and red inclusions.
7. Small flaring bowl or lid with string-cut "base" (Fig. 9:7). Ware, interior and exterior: 2.5YR 6/6 light red. Many white and red inclusions.
8. Bowl (Fig. 9:8). Ware, interior and exterior: 5YR 6/6 reddish yellow; remnants of slip at exterior rim: 5YR 8/1 white. Some white and red inclusions. *Parallel examples:* Schmid 1995: fig. 3.15 (ca. AD 20-100); Schmid 1996: 185 no. 642 (ca. AD 20-100).
9. Bowl (Fig. 9:9). Ware: 5YR 6/3 light reddish brown; medium core: 5YR 5/1 grey; interior: 5YR 7/3 pink near base - 2.5YR 6/6 light red toward rim, with bands of: 10R 5/6 red; exterior: 5YR 7/4 pink; slip at exterior rim: 10YR 8/3 very pale brown. Many sand, white and grey in-

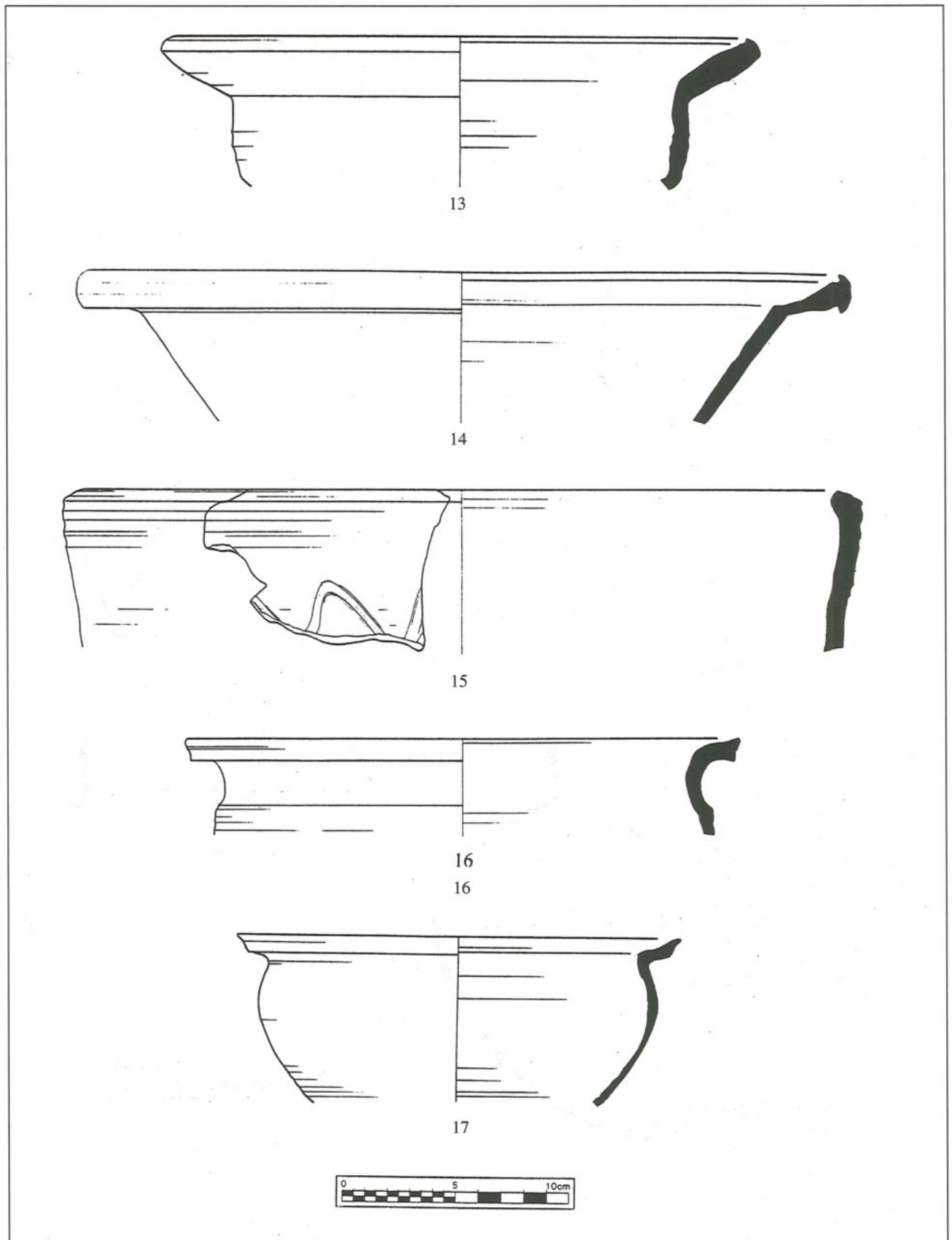


9. Pottery sherds from Kiln VI (drawing by Qais Tweissi).

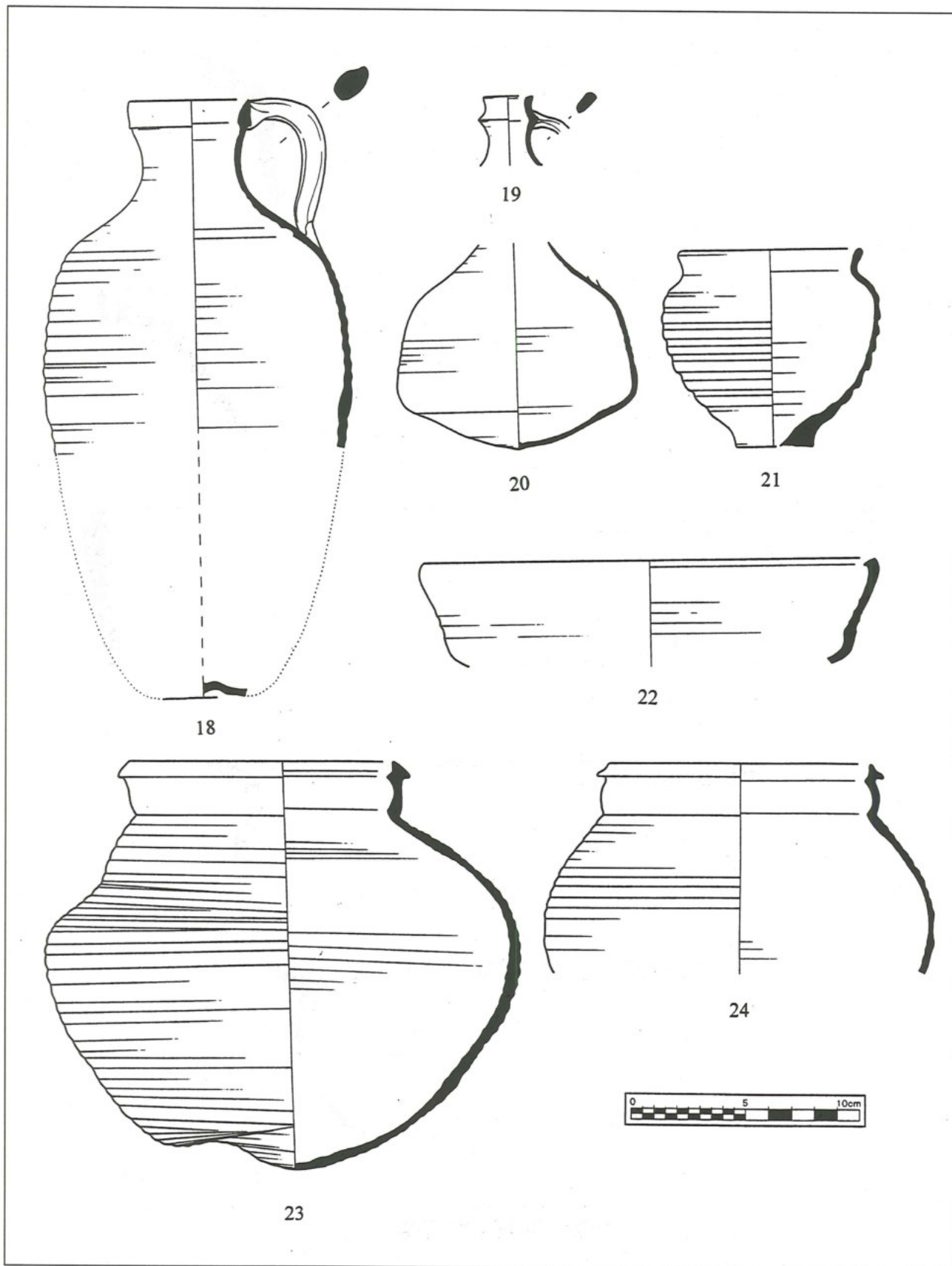


- clusions. *Parallel example: Garcia 1965: pl. LIX.2, 7, 12 (after AD 106 and probably by AD 150).*
10. Bowl (Fig. 9:10). Ware, interior and exterior: 2.5YR 6/8 light red; slip at exterior rim: 5YR 8/2 pinkish white. Fine with some white and red inclusions.
  11. Bowl with incised wavy line decoration at exterior (Fig. 9:11). Ware, interior and exterior: 2.5YR 6/8 light red; remnants of thin wash exterior rim: 2.5YR 6/6 light red. Some sand and white inclusions.
  12. Bowl (Fig. 9:12). Ware, interior and exterior: 5YR 6/6 reddish yellow; uneven slip on interior and exterior: 10YR 8/3 very pale brown where most thick. Many white and brown inclusions.
  13. Bowl (Fig. 10:13). Ware: 5YR 6/8 reddish yellow; thick slip interior: 5YR 6/1 grey; remnants of slip exterior: 10YR 8/2 white. Numerous sand and white inclusions.
  14. Bowl (Fig. 10:14). Ware: 5YR 6/8 reddish yellow; remnants of slip interior: 5YR 7/4 pink; thick slip exterior: 10YR 8/3 very pale brown. Many white and grey inclusions.
  15. Bowl/basin (Fig. 10:15). Ware: 2.5YR 6/8 light red toward the interior and 5YR 6/1 grey toward the exterior; thick slip at surfaces, exterior: 10YR 6/3 pale brown - 10YR 8/2 white; interior: 10YR 8/3 very pale brown. Numerous sand and white inclusions.
  16. Closed bowl (Fig. 10:16). Ware: 5YR 5/4 reddish brown; uneven core: 2.5YR 4/6 red; exterior and interior: 5YR 4/1 dark grey. Numerous sand, white and grey inclusions.
  17. Closed bowl (Fig. 10:17). Ware, interior and exterior: 2.5YR 6/8 light red; thin core: 2.5YR 5/6 red; slip exterior: 5YR 8/3 pink. Fine ware with some white inclusions.
  18. Jug with omphalos base; more than half complete (Fig. 11:18). Ware: 5YR 7/8 reddish yellow; exterior: 10YR 8/2 white; interior: 7.5YR 7/4 pink - 5YR 6/8 reddish yellow. Many sand, white and red inclusions.
  19. Jug (Fig. 11:19). Ware: 5YR 6/8 reddish yellow; exterior and interior: 5YR 4/1 dark grey, with remnants of 10YR 7/2 light grey slip. Fine ware with some white and grey inclusions.
  20. Jug; around two thirds complete (Fig. 11:20). Ware and interior: 2.5YR 6/8 light red; exterior slip: 5YR 8/1 white. Fine ware with some sand and white inclusions.
  21. Ampulla; more than half complete (Fig. 11:21). Ware 5YR 6/8 reddish yellow; medium core: 5YR 6/1 grey; exterior: 5YR 7/8 reddish yellow; slip upper exterior and interior: 5YR 8/2 pinkish white. Some sand, white and red inclusions.
  22. Casserole (Fig. 11:22). Ware and interior: 2.5YR 6/8 light red; exterior slip: 5YR 7/3 pink. Some sand, white and brown inclusions.
  23. Cooking pot; almost half complete, warped (Fig. 11:23). Ware: 5YR 5/6 yellowish red; wide core: 5YR 4/1 dark grey; interior: bands of 5YR 5/2 reddish grey and 7.5YR 5/4 brown; exterior: 5YR 6/4 light reddish brown with remnants of slip: 10YR 7/3 very pale brown. Some white, grey and grog inclusions (including a fragment of the rim of a late first century AD fine Nabataean bowl). *Parallel example: Gerber 1997: fig. 4B (middle to second half of the first century AD).*
  24. Cooking pot; around two thirds complete (Fig. 11:24). Ware: 2.5YR 5/8 red; exterior: 5YR 6/4 light reddish brown - 5YR 7/3 pink; interior: 7.5YR 8/2 pinkish white at rim - 5YR 5/4 reddish brown. Some sand, white and red inclusions. *Parallel example: Gerber 1997: fig. 4D (middle to second half of the first century AD).*



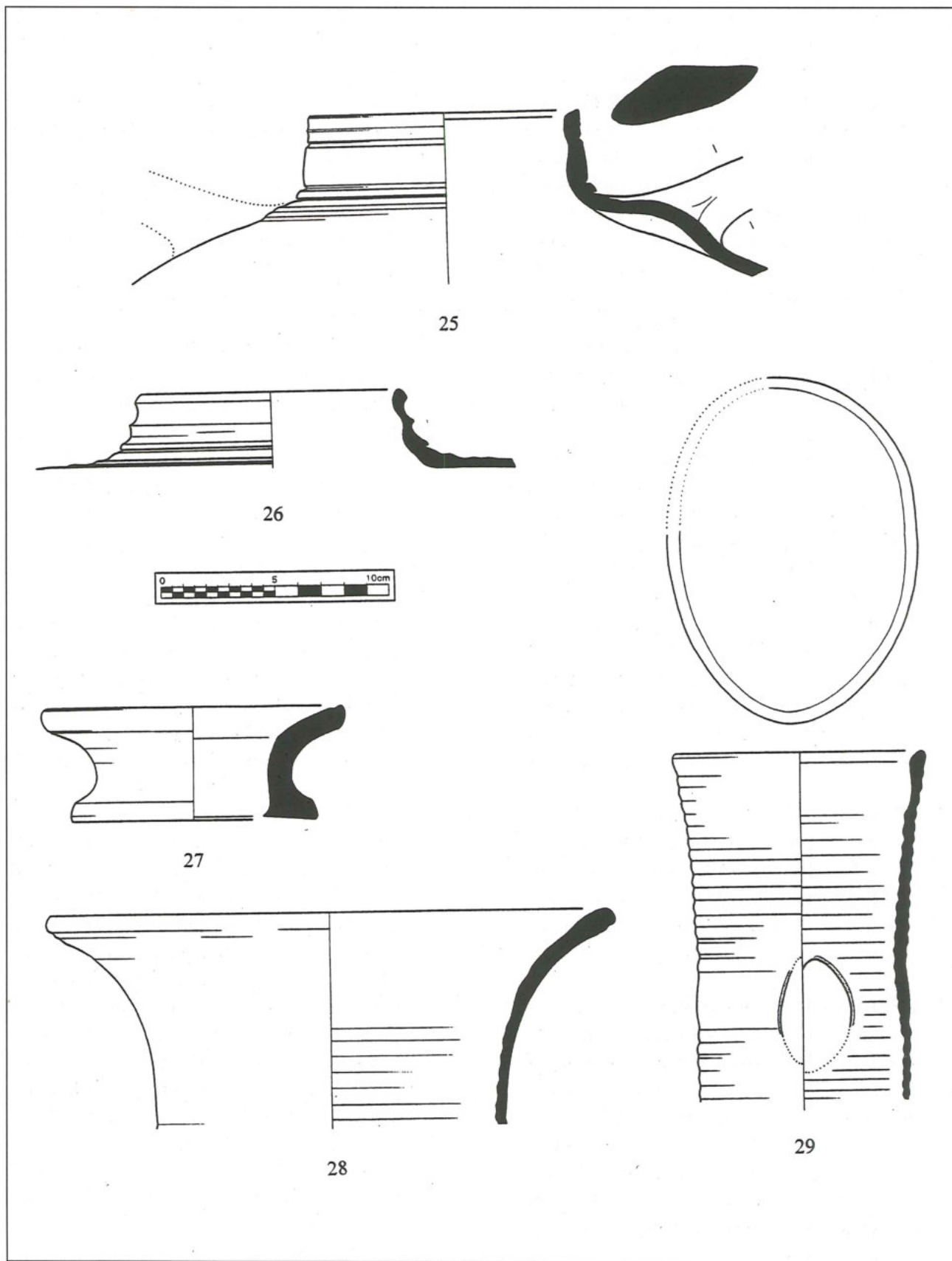


10. Pottery sherds from Kiln VI (drawing by Qais Tweissi).



11. Pottery sherds from Kiln VI (drawing by Qais Tweissi).





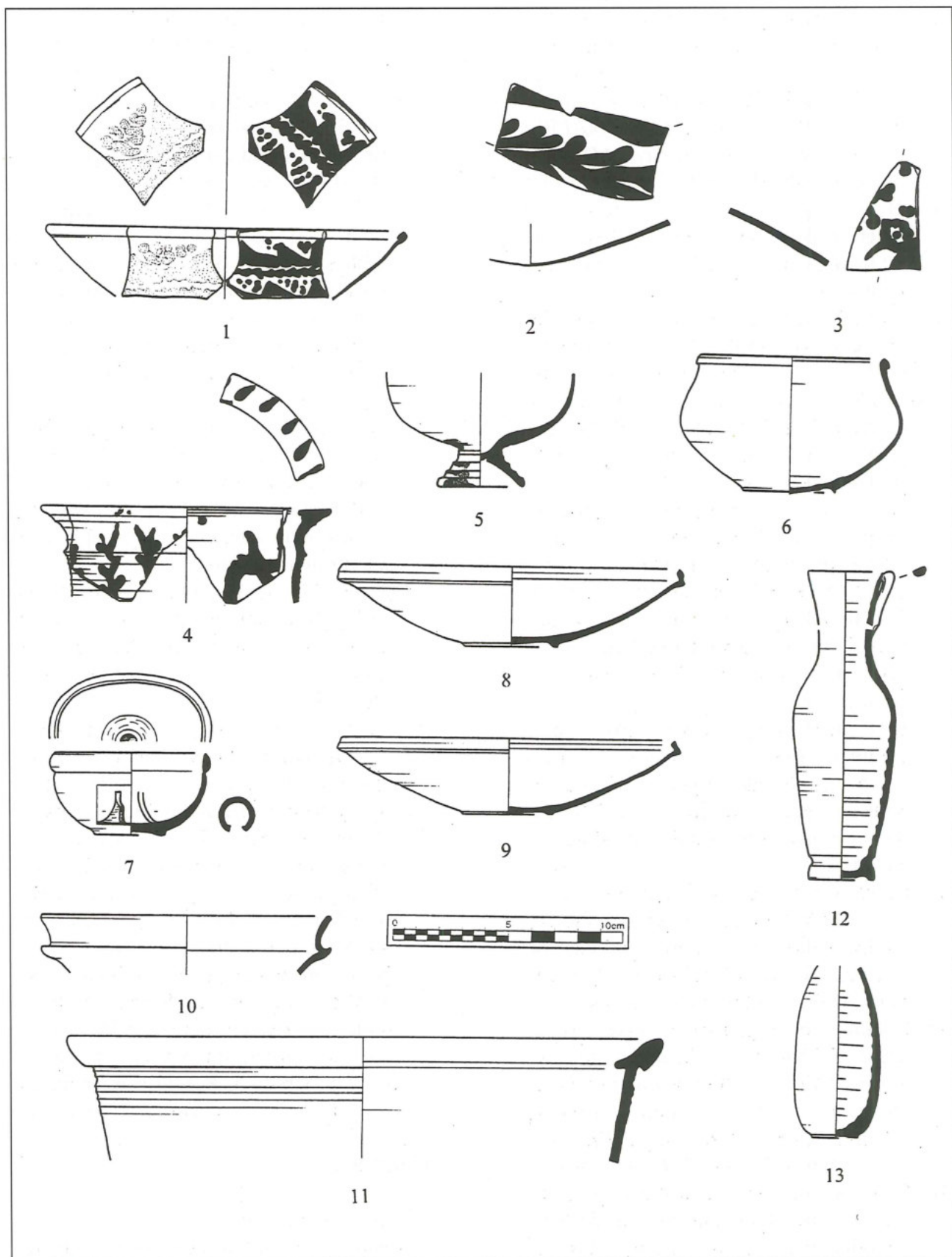
12. Pottery sherds from Kiln VI (drawing by Qais Tweissi).

25. Jar—probably with four handles (Fig. 12:25). Ware: 2.5YR 5/6 red; wide core: N5/0 grey; exterior: badly weathered with remnants of slip 5YR 6/6 reddish yellow - 10YR 8/4 very pale brown; interior: 2.5YR 6/4 light reddish brown. Many sand and grog inclusions. *Parallel example: Gerber 1997: fig. 6 (middle to second half of the first century AD).*
26. Jar (Fig. 12:26). Ware: 2.5YR 5/6 red; exterior: 2.5YR 6/8 light red - 7.5YR 8/2 pinkish white with patch of 5YR 4/1 dark grey; interior: 2.5YR 6/4 light reddish brown. Many sand, white and red inclusions.
27. Stand (Fig. 12:27). Ware and interior: 5YR 6/8 reddish yellow; exterior: 2.5YR 6/8 light red with remnants of slip: 5YR 8/1 white and patch of 5YR 6/1 grey. Many sand, grey and grog inclusions. *Parallel example: Khairy 1990: fig. 44.3 (second quarter of the first century AD).*
28. Large stand (?) (Fig. 12:28). Ware: 2.5YR 6/8 light red; slip exterior and interior: 10YR 8/2 white - 7.5YR 7/4 pink. Many sand, white and grey inclusions.
29. Flue pipe (Fig. 12:29). Ware: 5YR 6/8 reddish yellow; exterior: 5YR 5/6 yellowish red, slip: 5YR 7/4 pink; interior: 5YR 7/6 reddish yellow - 5YR 5/1 grey. Many sand, white and grog brown inclusions.

### The Pottery from Kiln VII

1. Painted bowl, with shadowing on the exterior (resulting from the evaporation of paint particles on the bowl stacked below this bowl during firing) (Fig. 13:1). Ware and exterior: 2.5YR 6/6 light red; interior: 2.5YR 5/8 red; interior paint: 2.5YR 4/1 dark grey; exterior shadowing: 2.5YR 5/2 weak red. Fine ware with few white inclusions.
2. Painted bowl (Fig. 13:2). Ware and exterior: 2.5YR 6/6 light red; interior: 2.5YR 5/8 red; interior paint: 5YR 4/1 dark grey. Fine ware with some white inclusions. *Parallel examples: Schmid 1995: fig. 9 (ca. AD 100); Schmid 1996: 209 no. 702-3 (ca. AD 100).*
3. Painted jug body sherd (Fig. 13:3). Ware: 2.5YR 5/8 red; exterior: 2.5YR 5/4 reddish brown; interior: 2.5YR 5/6 red; exterior paint: 5YR 4/2 dark reddish grey. Many sand, red and white inclusions.
4. Painted jar rim (Fig. 13:4). Ware and exterior: 2.5YR 6/6 light red; interior: 2.5YR 5/8 red; paint: 5YR 4/1 dark grey. Many white and red inclusions.
5. Painted chalice base (Fig. 13:5). Ware: 2.5YR 5/8 red; exterior and interior: 2.5YR 6/8 light red; paint: 2.5YR 4/2 weak red. Fine ware with some white and grey inclusions. *Parallel example: Villeneuve 1990: pl. III.5 (AD 100-150).*
6. Bowl (from the structure north of Kiln VII); more than three quarters complete (Fig. 13:6). Ware, exterior and interior: 2.5YR 6/6 light red; dripping slip at rim exterior and interior: 2.5YR 5/8 red. Many white and grey inclusions. *Parallel example: Villeneuve 1990: pl. II.2 (AD 100-150).*
7. Bowl with central stem and string-cut base; around two thirds complete (Fig. 13:7). Ware: 5YR 5/1 grey; exterior: 5YR 5/3 reddish brown; interior: 5YR 5/4 reddish brown. Many white and brown inclusions, some blistering at both surfaces.
8. Bowl; around three quarters complete (Fig. 13:8). Ware, interior and exterior: 2.5YR 6/8 light red, remnants of slip exterior rim: 7.5YR 8/4 pink. Fine ware with some white and quartz inclusions, some blistering on both surfaces. *Parallel examples: Villeneuve 1990: pl. IV.2 (AD 100-150); Schmid 1995: fig. 3.12 (ca. AD 100); Schmid 1996: 187 no. 657 (ca. AD 100).*
9. Bowl; around half complete (Fig. 13:9). Ware, interior and exterior: 2.5YR 5/8





13. Pottery sherds from Kiln VII (drawing by Qais Tweissi).

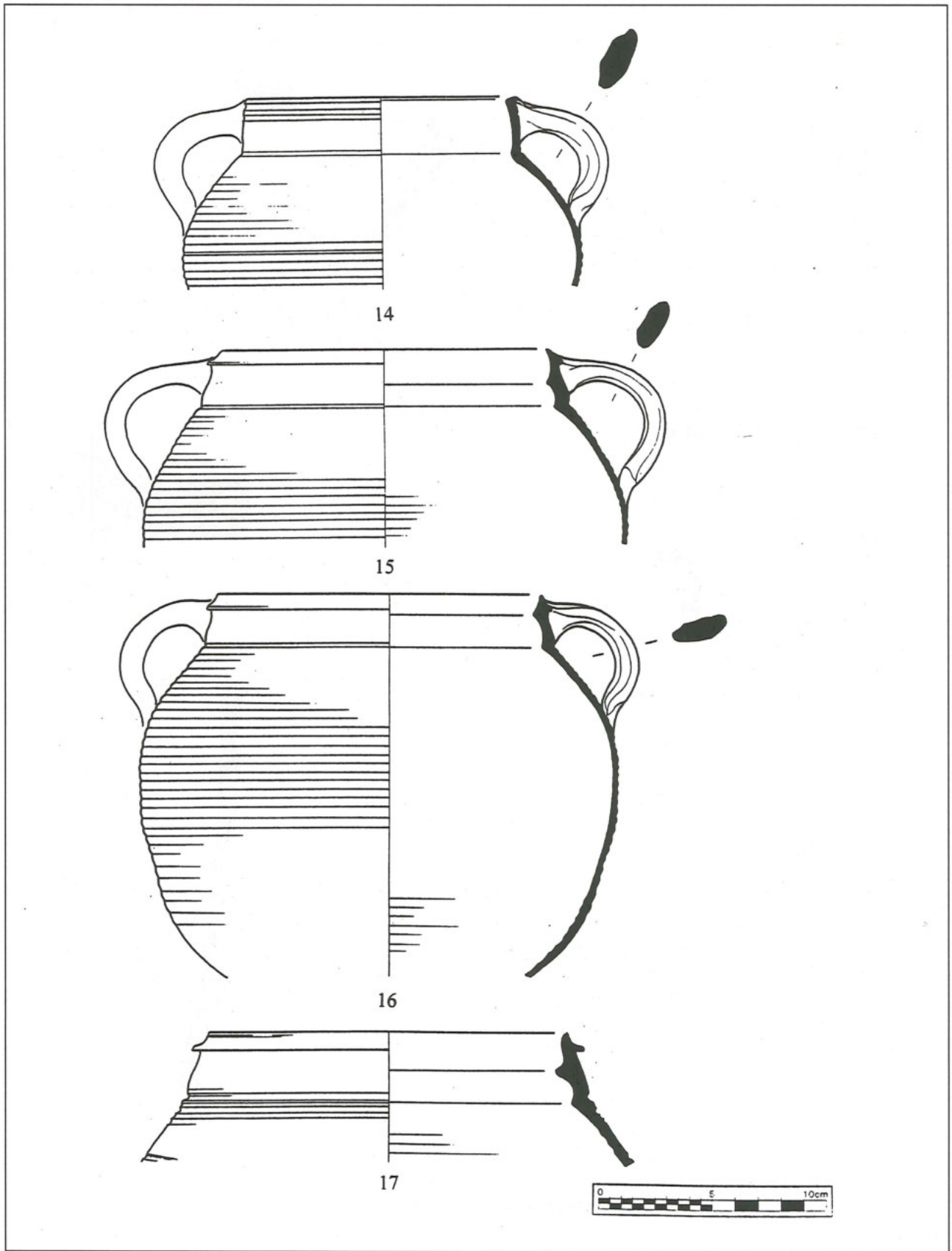
- red, remnants of slip exterior rim: 5YR 7/4 pink. Fine ware with some white and quartz inclusions, some blistering on both surfaces. *Parallel examples: Ville-neuve 1990: pl. IV.2 (AD 100-150); Schmid 1995: fig. 3.13 (ca. AD 100); Schmid 1996: 187 no. 657 (ca. AD 100).*
10. Bowl (Fig. 13:10). Ware, interior and exterior: 5YR 6/6 reddish yellow. Fine ware with some small white and sand inclusions.
  11. Large bowl (Fig. 13:11). Ware, interior and exterior: 5YR 6/6 reddish yellow; core: 5YR 6/1 light grey surrounded by 10YR 7/4 very pale brown; uneven slip exterior: 5YR 7/4 pink - 10YR 8/4 very pale brown. Many sand, white and brown inclusions.
  12. Juglet; around three quarters complete (Fig. 13:12). Ware: 5YR 8/3 pink - 2.5YR 6/8 light red near exterior; thin core: 2.5YR 6/2 pinkish grey; exterior: 2.5YR 6/8 light red; interior: 5YR 8/3 pink at body - 2.5YR 6/8 light red at neck. Fine ware with few sand and brown inclusions.
  13. Bottle with string-cut base; around half complete (Fig. 13:13). Ware and interior: 5YR 6/6 reddish yellow; thin core: 5YR 5/1 grey; exterior: 5YR 7/6 reddish yellow. Some sand and white inclusions.
  14. Cooking jar (Fig. 14:14). Ware and interior: 2.5YR 5/8 red; exterior: 5YR 6/6 reddish yellow; slip exterior and interior rim: 10YR 8/2 white where thickest. Many white and brown inclusions.
  15. Cooking pot (Fig. 14:15). Ware and interior: 2.5YR 5/8 red; thick slip exterior: 10YR 8/2 white. Numerous sand, white and brown inclusions. *Parallel example: Garcia 1965: pl. LVIII.9 (after AD 106 and probably by AD 150).*
  16. Cooking pot; more than third complete (Fig. 14:16). Ware and interior: 5YR 6/6 reddish yellow; slip exterior: 5YR 8/2 pinkish white. Numerous white and brown inclusions. *Parallel examples: Garcia 1965: pl. LVIII.5 (after AD 106 and probably by AD 150); Gerber 1997: Fig. 4E (middle to second half of the first century AD).*
  17. Jar with incised combing at upper shoulder (Fig. 14:17). Ware: 2.5YR 6/6 light red; wide core: N5/0 grey; exterior and interior: 5YR 6/3 light reddish brown with streaks of 5YR 6/4 light reddish brown. Many sand, white and brown inclusions, some bloating at exterior. *Parallel example: Garcia 1965: pl. LVIII.7 (after AD 106 and probably by AD 150).*
  18. Jar with incised wavy line decoration at shoulder (Fig. 15:18). Ware: 5YR 6/4 light reddish brown; wide core: 5YR 6/1 light grey; slip exterior: 10YR 8/2 white; burnt interior. Many sand, white and brown inclusions.
  19. Stand (Fig. 15:19). Ware: 5YR 7/8 reddish yellow; slip on all surfaces: 5YR 5/1 grey with "spots" of 5YR 7/1 light grey. Many sand, white and brown inclusions.
  20. Stand; almost half complete (Fig. 15:20). Ware: 5YR 6/6 reddish yellow; slip on all surfaces: 10YR 8/1 white. Many sand, white and red inclusions.
  21. Water pipe (Fig. 15:21). Ware, exterior and interior: 2.5YR 6/6 light red; "sandwich" core: N6/0 grey at centre surrounded by 2.5YR 6/8 light red; remnants of slip exterior: 5YR 7/4 pink. Numerous white and brown inclusions.
  22. Roof tile (Fig. 15:22). Ware: 2.5YR 3/6 dark red; medium core: 2.5YR 4/6 red; remnants of slip on surfaces: 10YR 8/4 very pale brown. Rough ware with numerous sand, white and grey inclusions.

## Comments

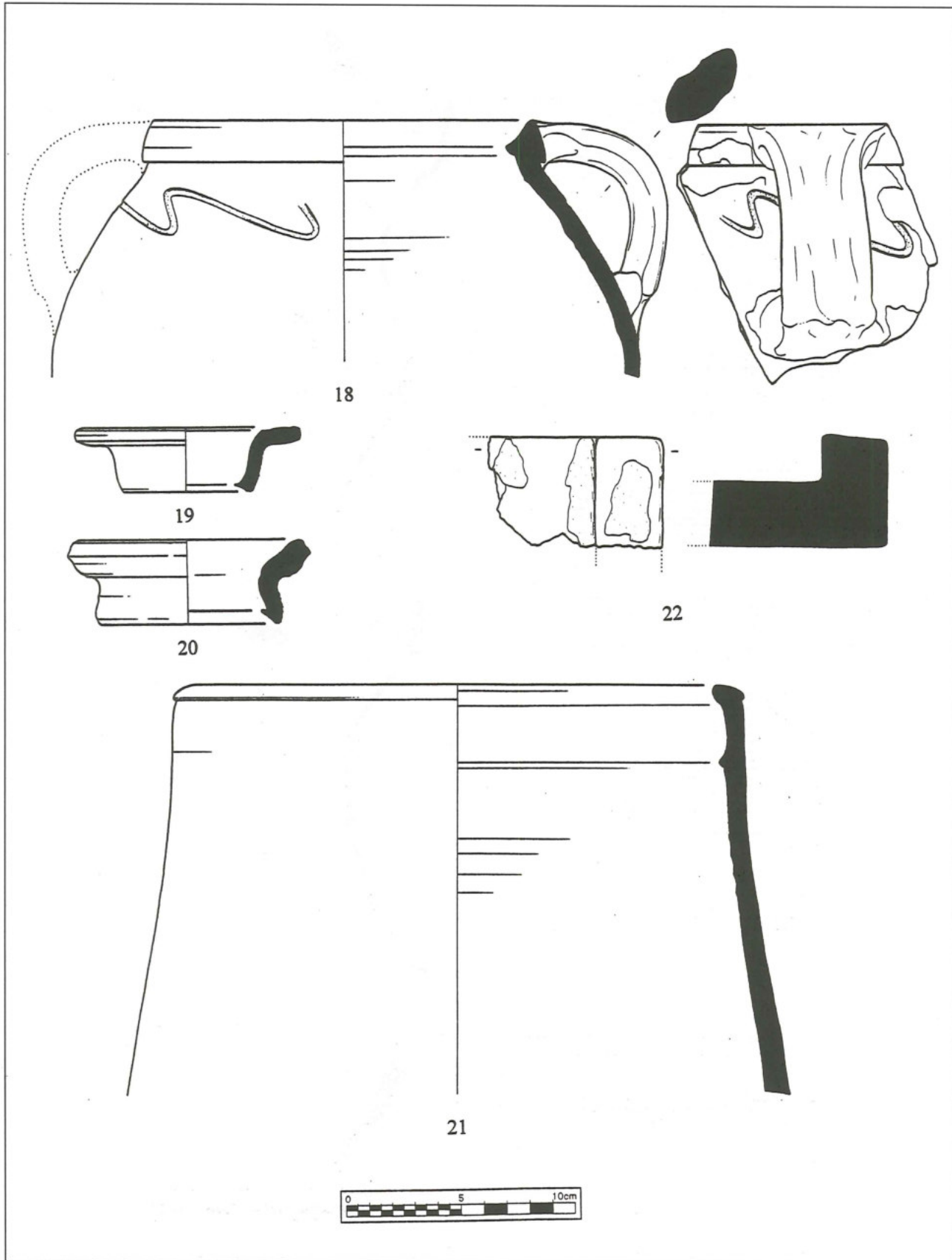
### *The Kiln Structures*

Despite the initial impression—created by the bulldozing as well as the natural





14. Pottery sherds from Kiln VII (drawing by Qais Tweissi).



15. Pottery sherds from Kiln VII (drawing by Qais Tweissi).



slope of the site—that Kiln VII should be earlier than Kiln VI (see Fig. 1), it is more likely that the two kilns form a pair similar to the pairs of Kilns I and II, and Kilns III and IV (see Fig. 2). Similar to the previously excavated pairs, Kilns VI and VII have their stoke-holes at the northern side, and the smaller Kiln VI is to the east of the larger Kiln VII.

Also due to the natural slope of the hillside on which the az-Zurrāba production centre is located, and the fact that the kiln combustion-chambers were placed underground, the comparison of elevations is not of much use in determining the chronological sequence of spatially distant features. For example, the late first/early second century AD Kilns III and IV are around 5m higher in elevation than Kilns VI and VII, although the difference of around 70cm in the levels of the Kilns VI and VII combustion-chamber floors is equal to the difference between the combustion-chamber floors of Kilns III and IV.

Unfortunately, due to the nature of the “excavation” and the limited time available to archaeologists at the site, only the external floor level of Kiln VI could be determined and only the combustion-chamber of Kiln VII survived up to a height of around 1.0m. Assuming the same external level for both kilns, the combustion chamber of Kiln VII would be around 1.35m deep. It is more likely, however, that there was a slope or steps separating the two kiln levels (which are 70cm apart), and a depth of around 1.00m for the Kiln VII combustion-chamber is comparable to the 96cm depth for the Kiln I combustion-chamber and the 1.11m depth for the Kiln III combustion-chamber, Kilns I and III being the two larger kilns of the previously excavated pairs.

It was already deduced from the previous excavations that the az-Zurrāba kilns show “a progression from building deep, rather narrow kilns towards wider and more sha-

llow constructions with more sophisticated fireboxes (combustion-chambers)” (‘Amr 1991: 321). Structurally, Kilns VI and VII are intermediate between Kiln III “used no later than the second century AD” (‘Amr 1991: 320) and Kiln I dated “around the beginning of the fourth century AD” (Zayadine 1982: 382-384; ‘Amr 1991: 320).

Considering the factors mentioned above in combination with those stated in the *Description of the Kilns* section, then Kilns VI and VII should be closer in date to the early fourth century AD Kiln I than the simpler narrow Kilns III and IV.

### *The Ceramics*

The finds from the kilns were obviously dumped inside them after they went out of use. This dumping would most probably have occurred shortly after the abandonment of the kilns as it is to be expected that the potters had a problem in finding areas for their large dumps—mostly fuel residue, production wasters and even probably earlier dumps in undesirable locations. It should also be noted that the mixing of pottery of various dates is typical of the az-Zurrāba deposits and indicates the profusion of production through time.

Generally speaking, products of the “Classical Nabataean” (late first to early second century AD) ceramics predominate the finds from Kilns VI and VII. Still, some of the finds deserve special attention especially considering that products of the later second and third centuries are still not well defined in the Nabataean tradition, and that many Nabataean tradition forms—especially those produced after the annexation of the Nabataean kingdom—are notorious for their longevity:

- The zoomorphic ibex head (*Zur 97.KVII.02/ JP5027*, Fig. 7:2) is rare in that it is painted. Such zoomorphic spouts became common in the “Late Roman” period, but this example is of a finer red ware than common, usually unpainted, ex-

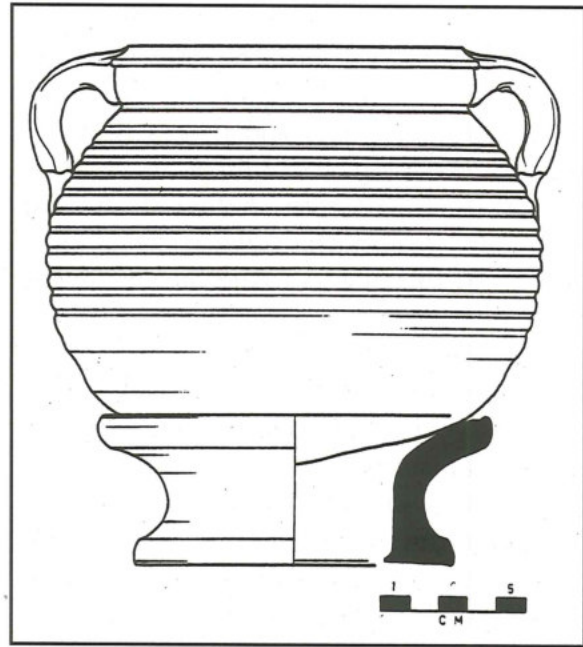


amples. Such black paint using wide brush strokes started being common in the late second/early third century AD.

- The bowl in Fig. 9:9 is a late development of the “fine Nabataean wares”. Its gritty sandy ware and “band firing” confirm a rather late date.
- The bowls and jar in Figs. 9:10-12, 10:15-17 and 15:18 are also late developments of known classical Nabataean forms.
- The bowls in Figs. 10:13-14 and 13:11 are intermediate forms between the “Shelf-Rim Basins” (suggested date late first/second to third century AD, Magness 1993: 202) and “Rilled-Rim Basins” (suggested date late third/early fourth to sixth century AD, Magness 1993: 203).
- Although the pot-stands in Figs. 12:27 and 15:19-20 are not strictly diagnostic chronologically, Khairy (1990: 41) states that “...The lower part of these stands is heavier than the upper, so as to give a proper standing balance. However, for a similar example Murray and Ellis (1940: 14, Pl. IX.54) illogically suggest that ‘it stands on the narrower surface’”. The stands from az-Zurrāba have the heavier ends well-finished while the less heavy ends are roughly cut—while turned on the wheel—therefore the cut (unfinished less heavy) end has a better standing balance. Murray and Ellis (1940: 14, Pl. IX.54) describe their sherd as a stand “perhaps for setting a cooking pot upon”. A reconstruction drawing of such a pot stand (illustrated in Fig. 12:27) supporting a cooking pot (*Zur 97.KVI.01/JP5024*, Fig. 5:1; both vessels are from Kiln VI) is shown in Fig. 16, where the less heavy unfinished end is also too narrow to properly support the cooking pot.

*The Dating of Kilns VI and VII (and a revised date for Kilns III and IV)*

Combining all of the above data, the date



16. Reconstruction drawing showing the use of a pottery stand for supporting a rounded base vessel (drawing by Qais Tweissi).

for Kilns VI and VII should be between ca. AD 100 to 300, with a date of around the middle of the second century AD being the most probable.

Additionally, although we cannot assume that the development of the kilns versus time was linear, but also taking into consideration that the only dating evidence for Kilns III and IV was: “All the material retrieved from undisturbed levels in the balks (of Squares A.6 and A.7), including those that were covering the roof (dome) arch of Kiln III...dated to no later than the second century AD.” (‘Amr 1991: 320), then we may fairly safely suppose that the date for Kilns III and IV should be pushed back into the first century AD, a time from which we have an abundance of pottery wasters at az-Zurrāba (‘Amr 1991: 320-321).

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