SWISS-LIECHTENSTEIN EXCAVATIONS AT EZ-ZANṬUR IN PETRA 1989 THE SECOND CAMPAIGN*

by
Rolf A. Stucky *et al.*

The second campaign of the Archaeological Institute of the University of Basel at Petra on the terrace of ez-Zanṭur was carried out between August 26 and October 18, 1989. Participating were — besides the director of the excavation — as archaeologists: A. Bignasca, R. Fellmann, Y. Gerber, B. Kolb (field assistant), H.S.H. Prince Emanuel von Liechtenstein, St. Schmid, Ch. Schneider, M. Stucky and I. Zanoni; as osteologists: A. Kress and J. Studer; as topographers: H. Dupraz, B. and R. Glutz von Blotzheim, I. Sancho and U. Schor and as restorer: Ch. Pugin. About 40 local workers supported our field work.

The excavation is still under the patronage of the Swiss-Liechtenstein Foundation of Archaeological Research Abroad (SLFA). A group of about 20 members of the Foundation visited Petra for four days to get acquainted with the actual progress of our field work.

As during the previous season, we were happy to enjoy the active support and hospitality of the Jordanian Department of Antiquities. Special thanks are due to Dr. G. Bisheh, the then Director General of the Department of Antiquities, Dr. F. Zayadine, Assistant Director of the Department of Antiquities and Mr. S. Farajat, Inspector of Antiquities in Petra. During the second campaign, Mr. M. Abd el-Aziz was the representative of the Department of Antiquities and assisted us in all intents and purposes.

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The following persons have contributed to the present report: R. Fellmann, Y. Gerber (Late Roman pottery), R. Glutz von Blotzheim (surveying), M. Peter (coins), St. Schmid (Nabataean pottery), Ch. Schneider (Terra Sigillata), J. Studer (fauna), I. Zanoni (lamps).

Continuing the work of the campaign of 1988 on the terrace of ez-Zanṭur,[1] our investigations concentrated mainly on three points:
- excavation of the Late Roman buildings, as completely as possible;
- expansion of the excavation of the Nabataean building;
- continuing work in the Stratigraphical Trench on the eastern slope.

The Late Roman Settlement (Figs.1-2; Pls.I-II)

In October 1988 work had to be stopped in Room 8, because an enormous amount of stones in square 100/N-P made an expansion of the excavation southwards impossible. In 1989, we removed the stones and after the topographers had enlarged the rectangular grid, we were able to excavate the entire Room 8 belonging to a second building: It seems to be an open court (Pl. II:1). In the corner between Staircase 10 and the south-eastern wall, large quantity of bone and egg shell was found. Obviously this area was used for short-term storage. A circular stone-

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* The following abbreviations will be used: Campaign 1988: R. A. Stucky, 'Schweizer Ausgrabungen in ez-Zanṭur, Petra: Vorbericht der Kampagne 1988', *ADAJ* 34 (1990), p. 249-283. Munsell: *Munsell Soil Color Charts*, Baltimore 1975. "Stratigraphical Trench" written in capitals always refers to the trench on the eastern slope of the terrace.

1. See Campaign 1988.

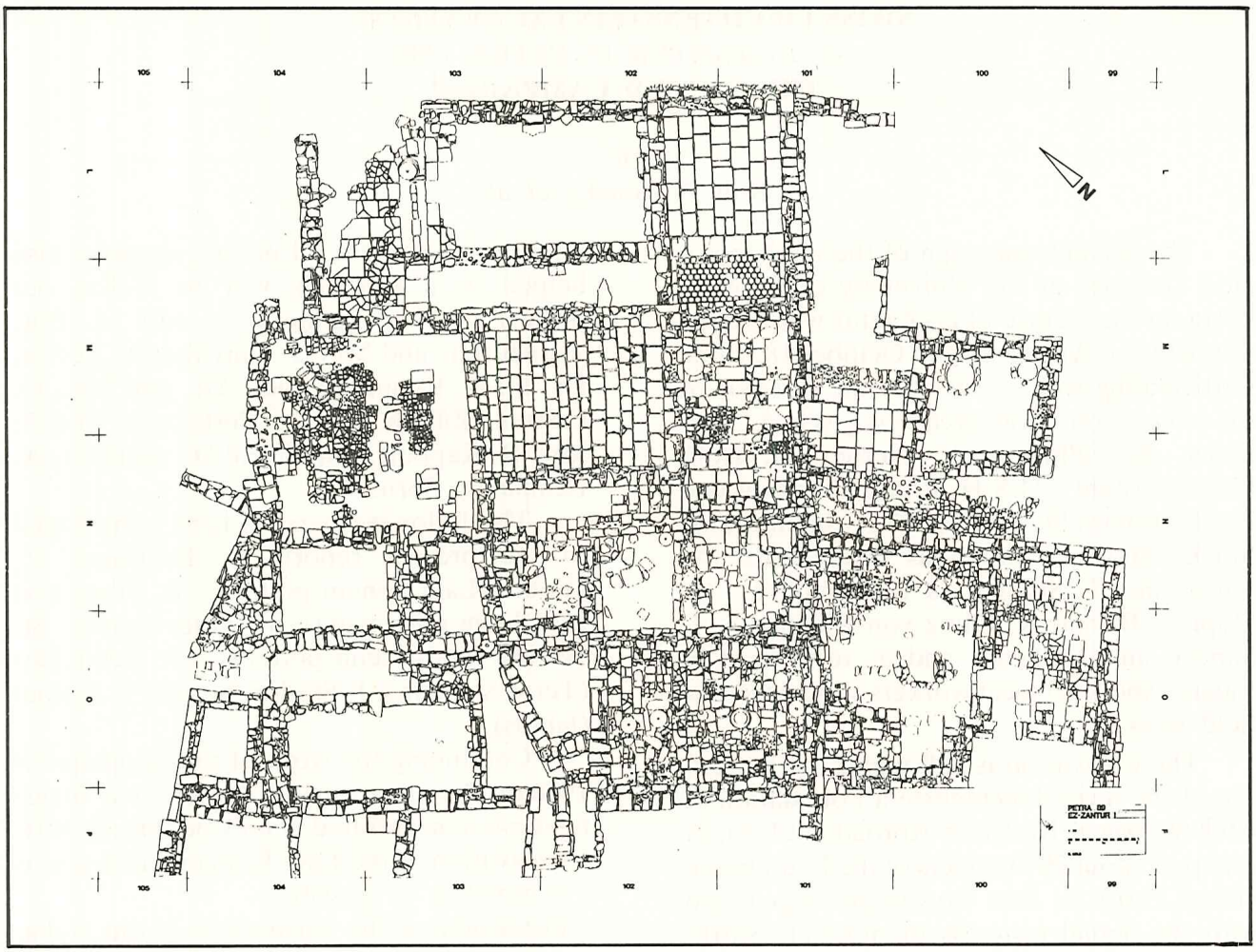

Fig. 1. Ez-Zanṭur 1989.

setting in the centre of the court enclosed an open fireplace. On its edge we found two lamps[2] — apparently in an original setting — and therefore buried during the earthquake of A.D. 363 (Fig. 3: 5,8; Pl. II:2-3).

The only way to enter this building leads through Court 8, from where Rooms 7, 9 and 27, as well as — via Staircase 10 — the upper floor, were accessible. The characteristic wall projections, originally carrying arches, indicate that only Rooms 9 and 27 were built with an upper storey; the structure of Room 28 in the southern part of the excavation area, so far only partly excavated, cannot be determined yet. Unlike Court 8, Room 27 was almost completely paved with limestone slabs, material from the Nabataean building that was apparently reused: in the southeastern corner of the Room we discovered the upper part of an Isis statuette, made of alabaster, lying back upwards in the dirt and replacing a missing edge of a stone slab.[3] Considering the style of the statuette, it cannot be dated to the fourth century A.D., but must have belonged to an earlier building of the first century B.C. or A.D.[4] (Pl. III:1). Realizing the fact that not only blocks, but also flagstones of the Nabataean building

2. See *infra* "Selected Finds from the Late Roman Settlement".

3. Neither alabaster nor marble seem to be found in Jordan. Apparently we are dealing with alabaster from Egypt not from Yemen; the statuette is most likely imported from Egypt.

4. I do not know the type showing a sitting, contemplative or mourning Isis from Egypt or from other places of the ancient world, except for Petra: F. Zayadine, 'Die Götter der Nabatäer', in: M. Lindner, *Petra und das Königreich der Nabatäer*, Munich 1989[5], p. 113ff., 122 Figs. 11-12; see also: *Cleopatra's Egypt*. The Brooklyn Museum 1988, p. 206f. nos. 100-101 (with references to newest literature).

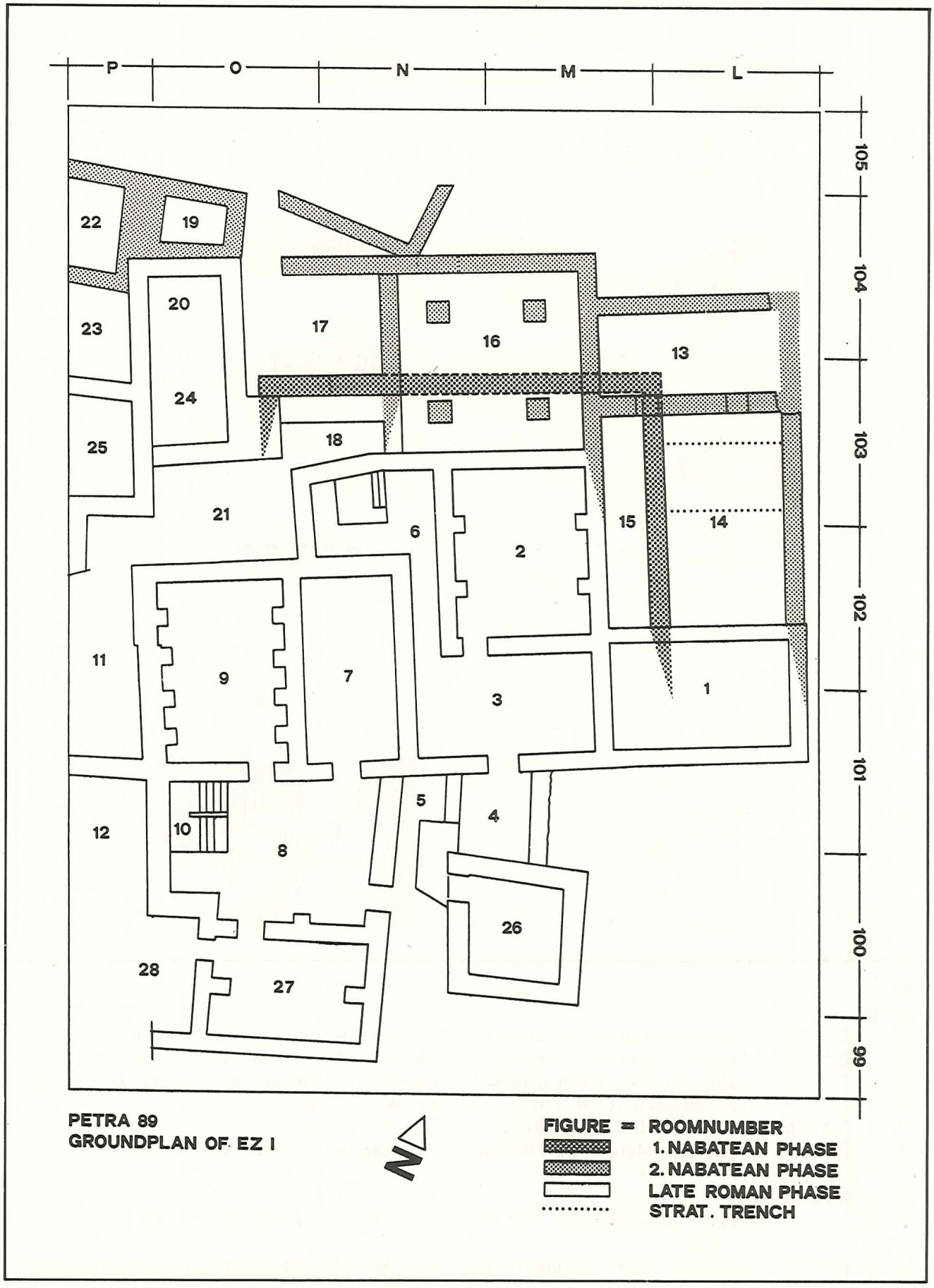

Fig. 2. Ez-Zanṭur 1989.

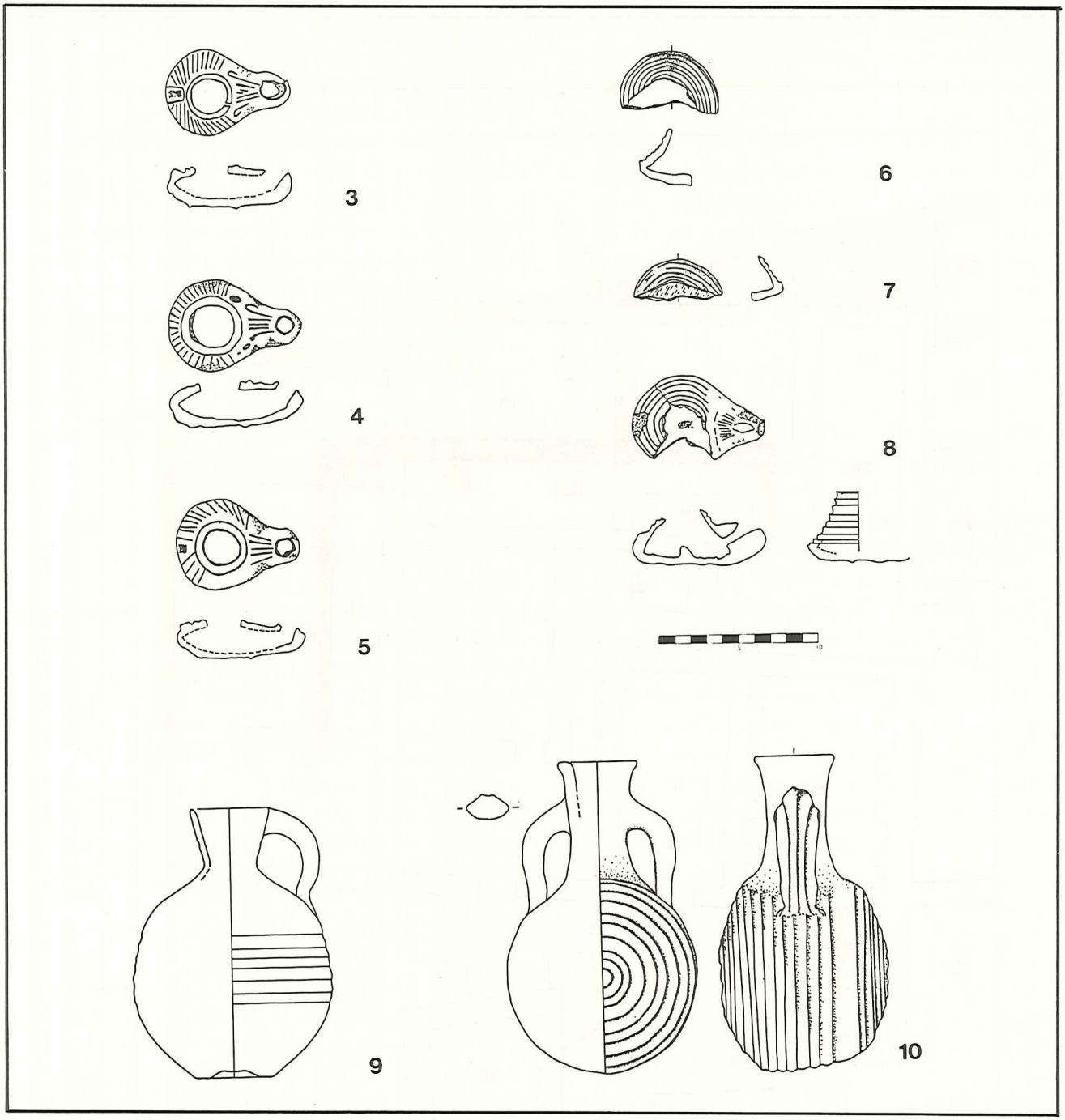

Fig. 3
Lamps

3. 225.*355* light red (Munsell 2.5YR 6/8). L.: 7.9 cm; W.: 5.3 cm; H.: 2.4 cm.
4. 225.*348* light red (Munsell 2.5YR 6/8). L.: 8.3 cm; W.: 5.6 cm; H.: 2.8 cm.
5. 225.*342* light yellowish brown (Munsell 10YR 6/4). L.: 7.8 cm; W.: 5.6 cm; H.: 2.5 cm.
6. 225.*339* red (Munsell 10YR 5/6). L.: 5.9 cm; W.: 3.7 cm.
7. 225.*356* red (Munsell 2.5YR 5/8). L.: 5.3 cm; W.: 2.4 cm.
8. 217.*319* light red (Munsell 2.5YR 6/6). L.: 8.1 cm; W.: 5.7 cm; H.: 3.5 cm.

Commonware Pottery

9. K.229.*371* pinkish gray (Munsell 7.5YR 6/2). H.: 16.8 cm; Diam. rim: 5 cm; Diam. max.: 12.4 cm.
10. K.230.*364* very pale brown (Munsell 10YR 8/3). H.: 19.5 cm; Diam. rim: 4.8 cm; Diam. max.: 11.9 cm.

were reused in the fourth century A.D., gives new and important aspects for the reconstruction of the plan of the older building: the precisely and perfectly set floors of Rooms 1, 2 and 4 apparently were not newly set, but already belonged to the Nabataean building and remained in their original positions. Like in Court 8, the southern corner of Room 27 was used for short-term storage, as indicated by numerous bones and a complete pilgrim flask, filled with small fish vertebrae[5] (Pl. III:2). It seems that the different parts of this second house were not built simultaneously: the walls of Rooms 8 and 27 adjoining the older southeastern wall of Rooms 7 and 9 have no bindings. A precise analysis and the dating of the construction phases will be discussed in the final report.[6]

A small, probably never covered Room 26 lies in square 100/M. The three circular structures, built of unlevigated but well fired clay and lying in three corners of the Room — obviously baking ovens — and the amount of ash indicate the original use of the Room as a bakehouse (Pl. I:2).[7] As in modern Jordanian and Syrian settlements, baking ovens were not integrated within the actual residential area of a house — presumably because of the high risk of fire — but were installed in its direct vicinity.

Contrary to our expectations, the rooms in the northwestern area show traces of later reuse as well: on the one hand, the drainage of the whole Late Roman settlement leads through this area; in some cases, the drains had even destroyed older walls to lead the waste water as directly as possible away from the residential area. Moreover, walls in the squares 103-105/O-P show traces of late repairs. In the eastern corner of Room 23 — probably a store-room or a cooking area — we discovered three large storage vessels and a mortar made of a column drum. A small, broken pot was lying between the storage vessels that had apparently been used as a deposit for savings: it contained 180 bronze coins (Pl. IV:1) that correspond, regarding their dates of issue, to the coins that were found last year in Room 1 together with the skeleton of a woman killed during the earthquake of 19 May, A.D. 363.[8]

Directly above this hoard, on a 70 cm higher level, we came across another drainage that obviously belonged to a house further south. This channel, running above the precisely dated coin hoard, proves that life on the terrace of ez-Zanṭur continued even after the earthquake of A.D. 363.

Selected Finds from the Late Roman Settlement

Lamps (Fig. 3:3-8; Pl. II:2-3)

As mentioned above, lamps found in Room 8 were still lying in an original setting around an open fireplace. We can distinguish two different types: on the one hand, there are three completely preserved lamps of the same type (225.*342*, 225.*348*. 225.*355*) (Fig. 3:3-5); on the other hand, we found fragments of two lamps that belong to the so called "boot-shaped" type[9] (225.*339*, 225.*356*) (Fig. 3:6-7). An almost complete example of this latter type was found in the corner between Staircase 10 and the southeastern wall of Room 8 (217.*319*) (Fig. 3:8).

The characteristic feature of the three specimens of the first type is a convex shoulder instead of a disk, usually typical for Roman relief lamps. The convex shoulder is decorated with a geometric radial relief. In some cases, it has a knobhandle, a double ring around the filler hole and transverse bars on the nozzle. The shape of the body is not circular but slightly oval and nozzle and body form a periform shape. This type is well represented in those areas of the settlement on ez-Zanṭur that were apparently in use when it was destroyed by the earthquake of A.D. 363. This type seems to be fairly well

5. See *infra* "Selected Finds from the Late Roman Settlement" and "La Faune de Petra".
6. This report is being prepared by B. Kolb.
7. Similar baking ovens called "ṭawabeen" were also found in Roman layers of Tell el-Ḥajj on the Euphrates.
8. See Campaign 1988.
9. C. Kennedy, 'The Development of Lamps in Palestine', *Berytus* 14 (1961-1963), p. 105 Pl. XXV no. 630.

known in Petra[10] and is usually called "Byzantine".[11]

The so called "boot-shaped" lamps show the following characteristics: they are wheel-made, have a circular body, the rim of the filling hole is slightly bent outwards, the nozzle is slightly elongated and the handle is made separately. T. Oziol compares the profile of this type with that of a boot.[12] The body of the lamp is composed of two unequal pyramids. The upper pyramid — actually the frustrum of the pyramid — is about three times higher than the lower pyramid. The lower pyramid— or the bottom of the lamp — is plain, while the upper pyramid is decorated with concentric relief circles. C. Kennedy classifies this lamp as type 16.[13]

As mentioned above, we found this boot-shaped type together with the "Byzantine" lamps, obviously used shortly before the destruction of the buildings in A.D. 363. The lamps of the "boot-shaped" type have therefore been in use at least since the middle of the fourth century A.D.

Pottery (Fig. 3:9-10; 4:11-16; Pl. III:2; IV:2)

Among the commonware pottery from the newly excavated rooms of the Late Roman buildings, there are two assemblages to be treated here.

As already mentioned, several fragments of glass vessels and well preserved pottery were found in Room 27 under a thick layer of debris, presumably caused by the earthquake of A.D. 363. Besides a small jug (K.230.*375*), we discovered a complete pilgrim flask (K.230.*364*) (Fig. 3:10; Pl. III:2). It has a rather flat body, characteristically assymetrical and decorated with concentric ridges, the rim is slightly everted; very similar in shape and decoration to another pilgrim flask found in Petra.[14]

S. Dyson divides the commonware pilgrim flasks from Dura Europos into two groups: one type showing a barrel-shaped body (Class I) and another type with flatter body and generally more elaborate rim (Class II).[15] The pilgrim flask from our excavations may be attributed to Class II judging from its main proportions, even though the prominent rim and the concave circumference, also typical of Class II, are missing.[16]

Comparing earlier pilgrim flasks makes clear that these two main types already existed in the first century B.C. - first century A.D.[17] Very interesting is the fact that we know the contents of the pilgrim flask.[18] Judging from the small fragments of fishbone, it must have contained a sort of fish sauce and was obviously used as a storage vessel.[19]

10. See P. C. Hammond, 'Survey and Excavations at Petra. 1973-1974', *ADAJ* 20 (1975), p. 13 Pl. J nos. 5, 6; F. Zayadine, 'Recent Excavations at Petra. 1979-1981', *ADAJ* 26 (1982), p. 393 Pl. CXXXIV nos. 372-376. Coins indicate a date between 402-450 A.D.
11. The term "Byzantine" does not correspond with Broneer's type XXXV (Byzantine Lamps). See O. Broneer, *Terracotta Lamps. Corinth IV.II*, Cambridge, Massachusetts 1930, p. 122ff.
12. T. Oziol and J. Pouilloux, *Salamine de Chypre I. Les lampes*, Paris 1969, p. 115 no. 475 Pl. XI (475). Pl. XX (475); T. Oziol, *Salamine de Chypre VII. Les lampes du Musée de Chypre*, Paris 1977, p. 287-288 Pl. 48 nos. 883, 884 (lampes byzantines tournées). Oziol dates this type to the fourth century A.D.
13. Kennedy, *op. cit.*, p. 105 no. 630. Kennedy dates the type to the end of the third/beginning of the fourth century A.D.
14. P. C. Hammond, 'Excavations at Petra 1975-1977', *ADAJ* 22 (1977), p. 83 Pl. XLVI, 1 (site 1). The pilgrim flask was found in a residential area on the northeastern slope of Petra.
15. S. L. Dyson, *The Excavations at Dura Europos. Final Report IV.3,1. The Commonware Pottery - The Brittle Ware*, New Haven 1968, p. 35f.
16. Compare Dyson *op. cit.* nos. 203-205, Figs. 8, 9 no. 203 may be dated to the middle of the third century A.D.
17. Compare glazed specimens from Dura Europos, Seleucia and Palmyra: N. Toll, *The Excavations at Dura Europos. Final Report IV.I,1. The Green Glaze Pottery*, New Haven 1943, p. 53ff. Fig. 25 no. 1935.525 belonging to Class II may be dated to the end of first century B.C.; N. C. Debevoise, *Parthian Pottery from Seleucia*, University of Michigan Studies. Humanistic Series XXXII, Ann Arbor 1934, Figs. 298-304. Mainly dated to level III (141 B.C. - A.D. 43) or level II (A.D. 43 - 116); R. Fellmann, *Le sanctuaire de Baalshamin à Palmyre V. Die Grabanlage*, Rome 1970, p. 75ff.
18. See *infra* "La faune de Petra".
19. For fish sauce in general see: S. Martin-Kilcher, 'Fischsaucen und Fischkonserven aus dem römischen Gallien', *Archäologie der Schweiz* 13 (1990), p. 37ff.

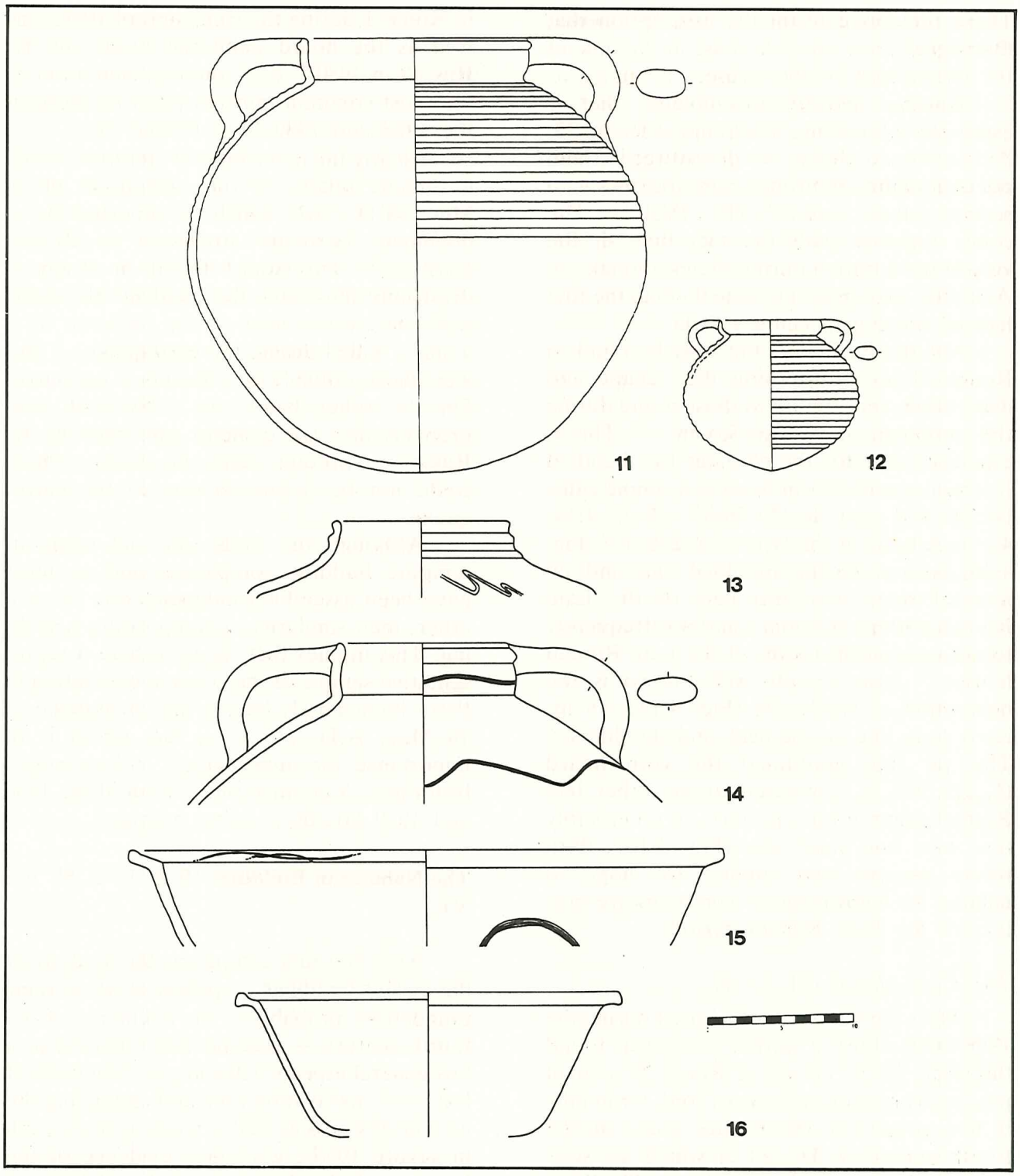

Fig. 4

Commonware Pottery

11. K.229.*366* light gray (Munsell 5YR 6/1). H.: 30 cm; Diam. rim: 15.2 cm; Diam. max.: 31 cm.
12. K.229.*363* pink (Munsell 5YR 7/4). H.: 10.3 cm; Diam. rim: 6.8 cm; Diam. max.: 11.8 cm.
13. K.229.335 very pale brown (Munsell 10YR 8/3). Diam. rim: 11.6 cm.
14. K.229.338 pinkish gray (Munsell 5YR 7/2). Diam. rim: 11.2 cm.
15. K.229.337 gray (Munsell 5YR 6/1). Diam. rim: 40 cm.
16. K.229.*377* very pale brown (Munsell 10YR 8/3). H.: 9.8 cm; Diam. rim: 26.2 cm.

These remains confirm the assumption that the pilgrim flask was still in use at the time of the destruction of the house.

Another pottery assemblage, that is especially interesting, was found in Room 23. As mentioned above, we discovered a small pot containing 180 bronze coins together with several other vessels[20] (Pl. IV:1-2). The coins, together with the fact that all the vessels were buried during the earthquake of A.D. 363, give reason to date them to the first half of the fourth century A.D.

Not unexpectedly, the vessels found in Room 23 are, concerning their shape and decoration, very similar to those found during the campaign of 1988 in Room 1.[21] This is especially true for the globular two handled jars with a vertical rim bearing a simple ridge (K.229.*338* and K.229.*366*)[22] (Fig. 4:14; 4:11). A bowl of the type of K.229.*377* (Fig. 4:16) with a flaring moulded rim and an internal ridge was also part of the Late Roman pottery in Room 1 and was frequently found in adjacent rooms of the Late Roman houses.[23] Also already well known is the decoration of K.229.*338* (Fig. 4:14), an incised wavy line on the neck and shoulders.[24] The jar that contained the coin hoard (K.229.*363*) is, compared to the other late Roman commonware pottery, of remarkably fine ware and small size (Fig. 4:12). With future analysis and studies, we hope to enlarge the knowledge of commonware pottery of the Late Roman period.

The Coin Hoard (Pl. IV:1)

After the discovery of a hoard during the 1988 excavations, a further hoard was found this year. In the corner of Room 23 a small pot, partly broken, was uncovered. Originally it had contained 180 bornze coins of the fourth century A.D., 20 of which lay scattered in the immediate vicinity (Pl. IV:1; Table 1).

The hoard corresponds, regarding its composition, fairly well with the hoard found in Room 1 during the campaign of 1988,[25] as well as the hoard published briefly by K. Russell in 1980[26]: even the representation of the most common mints is often identical in the 1988 and 1989 finds (Table 2).

Clearly the deposition of all three hoards is directly related to the earthquake of 19 May, A.D. 363, which is reported by a document (wrongly attributed to Bishop Cyrillus).[27] The hoard found in Room 1 drastically illustrates the incident: the coins were discovered next to the skeleton of a woman, killed during the earthquake — and were most probably the contents of her purse. On the other hand, the 1989 find, and probably also the complex published by K. Russell, represent sums of money which could not be recovered due to the earthquake.

Although the finds were all made in separate building complexes, and so must have been assembled independently of each other, their similarity of composition is striking. This implies that we have here a representative sample of the coins in circulation in Petra immediately before the earthquake of 19 May, A.D. 363 — a fact which is of importance for numismatists and economic historians. A detailed publication of the 1988 and 1989 hoards is being prepared.

The Nabataean Buildings (Figs. 1 - 2; Pl. I:1; V)

After the first campaign, the analysis of the earlier buildings — pulled down to their foundations probably at the beginning of the fourth century — was inevitably limited to a few general aspects. Cleaning certain parts of last year's excavation area and expanding the area northwards as well as working in a trench in square 103/L, gave new evidence of the layout and development of the Nabataean buildings.

The two-column-construction in square 103/L, with open parts in square 103-4/L

20. Only part of these vessels is illustrated here.
21. See Campaign 1988.
22. Compare K.18.*49* and K.14.*36* in: Campaign 1988.
23. Compare K.29.*24* in: Campaign 1988.
24. Compare K.18.*49* and K.8.*20* in: Campaign 1988.
25. See Campaign 1988.
26. K. W. Russell, 'The Earthquake of May 19, A.D. 363', *BASOR* 238 (1980), p. 47ff.
27. See Campaign 1988, note 42.

Table 1: Catalogue[28]

1	Nabatean Aretas IV	AE 18mm		18-40 A.D.	Meshorer 112-114
2	CIICaes	AE3	Cyz	331-334	RIC 81
3	CIICaes	AE3	Nic	330-335	RIC 189
4	Con	AE3		330-337	
5	CIICaes	AE3	Sis	337	RIC 262
6	Cs	AE4	Cyz	347-348	RIC 48
7-8	Cs	AE4	Ant	347-348	RIC 113
9-10	Cs	AE4	Ale	347-348	RIC 33
No. 11-128: Reverse FEL TEMP REPARATIO, soldier to l., spearing falling horseman.					
11	Cs	AE3	Are	353-355	RIC 215
12	Cs	AE2	Rom	352-355	RIC 267/269A/271
13	GCaes	AE3	Rom	352-355	RIC 274
14	GCaes	AE3	Rom	352-355	RIC 278
15	Cs	AE3	Rom	355-358	RIC 309
16-17	Cs	AE3	Rom	355-358	RIC 314
18	JCaes	AE3	Rom	355-358	RIC 315
19	JCaes	AE3	Rom	355-358	RIC 315/317
20-21	Cs	AE3	The	350-355	RIC 189
22	Cs	AE3	The	355-358	RIC 211
23	JCaes	AE3	The	355-358	RIC 212
24	Cs	AE2	Her	351-355	RIC 88
25	Cs	AE3	Her	351-355	RIC 90
26	Cs	AE3	Con	351-355	RIC 111?
27	Cs	AE3	Con	351-355	RIC 118
28-29	Cs	AE3	Con	351-355	RIC 127
30-31	Cs	AE3	Con	355-358	RIC 135
32	Cs	AE3	Con	355-358	RIC 137
33	GCaes	AE3	Nic	351-355	RIC 97
34-35	Cs	AE3	Nic	351-358	RIC 96/104
36	Cs	AE3	Nic	355-358	RIC 107
37	Cs	AE3	Nic	355-358	RIC 110
38	JCaes	AE3	Nic	355-358	RIC 111
39	Cs	AE2	Nic/Cyz	351-355	RIC 479,92/498,102
40	Cs	AE3	Nic/Cyz	355-358	RIC 479,98/499,113
41	GCaes	AE3	Cyz	351-358	RIC 107
42-45	Cs	AE3	Cyz	351-358	RIC 104/110
46-47	Cs	AE3	Cyz	355-358	RIC 115
48	Cs	AE2	Ant	350-355	RIC 148
49	Cs	AE2	Ant/Her	350-355	RIC 524,148/(436,88)
50	GCaes	AE3	Ant	350-355	RIC 154
51	GCaes	AE3	Ant	350-355	RIC 156
52	Cs	AE3	Ant	350-358	RIC 153/187A
53-56	Cs	AE3	Ant	350-358	RIC 155/188
57-59	JCaes	AE3	Ant	355-358	RIC 189
60-69	Cs	AE3	Ant	355-358	RIC 191
70	JCaes	AE3	Ant	355-358	RIC 192
71	JCaes	AE3	Ant	355-358	RIC 189/192
72-73	GCaes	AE3	Ale	351-355	RIC 81
74-77	Cs	AE3	Ale	351-358	RIC 80/82

28. Abbreviations: CIICaes: Constantine II Caesar; Cs: Constanius II; GCaes: Constantius Gallus Caesar; JCaes: Julian Caesar; J: Julian; Are: Arelate; Rom: Rome; Sis: Siscia; The: Thessalonica; Her: Heraclea; Con: Constantinople; Nic: Nicomedia; Cyz: Cyzicus; Ant: Antioch; Ale: Alexandria. Meshorer: Y. Meshorer, *Nabataean Coins.* Qedem 3, Jerusalem 1975; RIC: *The Roman Imperial Coinage* Vol. VII, London 1966, Vol. VIII, London 1981.

Cont. Table I

78-87	Cs	AE3	Ale	355-358	RIC	84
88	JCaes	AE3	Ale	355-358	RIC	85
89	GCaes	AE3	Ant/Ale	350-355	RIC	524,154/544,81
90-110	Cs	AE3	?	350-358		
111-112	?Caes	AE3	?	350-358		
113-127	Cs	AE3	?	350-358		
128	JCaes	AE3	?	355-358		
No. 129-180: Reverse SPES REI-PVBLICE, emperor standing l.						
129-130	Cs	AE4	Rom	358-361	RIC	320
131	JCaes	AE4	Her?	358-361	RIC	100?
132	Cs	AE4	Con	358-361	RIC	149
133	JCaes	AE4	Con	358-361	RIC	152
134	Cs	AE4	Nic	358-361	RIC	112
135	JCaes	AE4	Nic	358-361	RIC	113
136-137	Cs	AE4	Cyz	358-361	RIC	117
138-139	Cs	AE4	Cyz	358-361	RIC	119
140	Cs	AE4	Cyz	358-361	RIC	121
141-144	Cs	AE4	Ant	358-361	RIC	193
145-153	Cs	AE4	Ale	358-361	RIC	87
154-166	Cs	AE4	?	358-361		
167-169	JCaes	AE4	?	358-361		
170-180	Cs(/J?)	AE4	?	358-361 (-363?)		

Table 2:

Date	Russell 1980	1988	1989
-348	11,1%	7,7%	5,6%
351-358	64,4%	60,0%	65,6%
358-361(-363?)	24,4%	32,3%	28,9%

(Room 13), was built to give light and air to the representative, once painted Room 14/15.[29] The same function is assignable to the small Peristyl 16. The plinths of its southern column bases were still *in situ*, while the northern bases could only be inferred from their foundations. It also seems that this area was built in order to give air and light, rather than as a residential area. The Nabataean room, originally profiting of Peristyl 16, was probably about the size of Late Roman Room 2 and Corridor 6. Interesting is the precisely set pavement preserved in Room 2. Contrary to the Late Roman pavements, composed of reused and often fragmentary material and therefore irregularly set, the pavements of the Nabataean period are always composed of rectangular slabs set very neatly and almost without joints. Considering this outsanding difference, the regular pavements of Rooms 1, 2 and 4 may be assigned to the early phase of the settlement. As a matter of fact, the northern walls of the Late Roman Rooms 1 and 2 stand directly on the Nabataean walls and testify to the original connection between the Nabataean walls and pavements as well.[30] If this hypothesis could be confirmed, we gain, in spite of the almost entire destruction

29. See Campaign 1988.
30. We plan to cut a small trench in Corridor 6 as well as in Room 1 hoping to clarify the chronology of the pavements and the walls.

of the Nabataean buildings at the beginning of the fourth century A.D., new important evidence of the reconstruction of the original Nabataean layout.

The exact form and function of the rooms west of Peristyl 16 remain unclear. A more detailed analysis is hampered by the walls of a preceding building and late drainages.[31]

The northwestern limitation walls — well preserved in square 105/P — are built with carefully shaped ashlars; apparently these blocks were meant to be seen, and this wall may have been the external wall of the house. Moreover, the natural terrain starts to decline at this point, also indicating that the house presumably was not built further north-eastwards. As a matter of fact, the house was indeed standing already too close to the edge of the terrace: the external wall did not resist the thrust of the building, collapsed repeatedly and had to be rebuilt at least twice. Probably for this reason, the original outer wall of Peristyl 16 — still present in its southeastern part — collapsed and was replaced by a second wall. But this wall was not strong enough either; the foundations had been affected so dangerously by the thrust that we had to support them with a modern retaining wall (Pl. V:2). In the first century A.D., precautions had already been taken against the threatening collapse of this external wall. Two retaining walls, adjoining in an angle to the northern side of the house, were built. In square 104/O-P the original façade was hidden behind a cuneiform stone fill. In spite of this massive construction, the area adjacent to the north-eastern edge of Room 19 collapsed and the stones of the fill were practically forced out.

It seems that the builders were not really familiar with the statical problems of stone construction; this is impressively illustrated by the fact that only the lowest layer of the blocks of the external wall resisted the thrust, while the second layer was shifted 15 cm outwards (Pl. V:1). The northeastern corner of the house gives evidence of the ignorance of statical principles too. It is also designed to give light and air but standing on the lowest point of the terrace and therefore statically extremely exposed. No wonder that this corner collapsed at least twice. The eastern external wall of the Nabataean building was obviously also built without considering statical principles. Again it stands directly on the edge of the natural terrace without any special support.[32]

This spacious building had—as already mentioned above—a predecessor. From this building only traces of two rectangular adjoining walls have so far been identified: the wall lying under the mostly destroyed pavement of Room 14/15 continues under the pavement of Room 13, turns south-eastwards and ends in square 103-104/O. This can be determined because the flagstones in Room 13 obviously broke where they were set above the wall. Unfortunately, this earlier building was also completely pulled down. The pottery, lamps and coins indicate a date within the first century B.C. The enlarged succeeding Nabataean building dates toward the end of the first century B.C. Probably it was also for statical reasons that the earlier building did not last very long.

In Room 14, where the Nabataean pavement was almost completely destroyed, it was possible to open a stratigraphical trench of 4m×1.5m. The stratigraphy showed sandy layers — evidently for levelling the pavement — followed by a fill — apparently a result of expanding the house eastwards. Underneath, we found layers with the following common characteristics:

1. Their structure is very firm and could only be loosened with a small pickaxe.
2. The layers are thick, 3-10 cm, and fully interspersed with fragments of bones, pottery and lamps.[33]

31. Those walls of the building complex that can be assigned to the preceding Nabataean building are marked on Fig. 2.

32. The same thing happened to the building excavated by Khairy in 1981. The eastern part of the house fell down the slope: N. Khairy, 'Nabatäischer Kultplatz und byzantinische Kirche. Die Ausgrabungen in Petra 1981' in: M. Lindner, *Petra. Neue Ausgrabungen und Entdeckungen*, Munich 1986, p. 58ff. Fig. 1 and map 2.

33. The painted Nabataean bowls all show very light decoration. A complete example of this type was found in the Stratigraphical Trench (Pl. VI:3).

3. Any kind of limitation — a wall of stone or mud brick — is missing.
4. They appear only on the terrace and are missing in the Stratigraphical Trench on the eastern slope, opened only a few metres away.
5. Their characteristic colour is a bright light green.

Considering points 1 and 2, we are definitely dealing with habitation layers. They cannot be related to built houses (point 3), but rather — as a hypothesis — with tents. Visiting a modern nomadic tent indicates that we must not expect postholes and fixed wooden structures: the tent square is first stretched, then the wooden poles are simply put under it. On the whole a nomadic tent looks more like a canopy than a house.[34] If the identification of the green layers as tent floors may be confirmed, we have found for the first time in Petra a direct sequence of tent and house. It could also be possible that both ways of living were — like in modern times — coexisting for a while.

Unfortunately a broad excavation of these older structures is prevented by the intensive later settlement on the terrace of ez-Zanṭur. Further investigations concerning these important questions of urbanization can only be carried out in spatially limited trenches. Nevertheless, judging from the actual state of knowledge, we gain the impression that — in spite of some reservation — the stone-built houses gradually started to supersede the nomadic tents during the late second and first centuries B.C. From the very beginning, it was the aim of our work to try to clarify this cultural process in its different stages.

The Stratigraphical Trench (Pl. VI:1)

Against all fears, the profiles of the Stratigraphical Trench did not collapse during the wet winter months; having removed plastic, earth and stones that were placed to protect the trench after the previous season, we could continue work. On the whole 12 more layers were removed and examined: all the layers were purely "floating layers" (layers following the natural decline of the slope) (Pl. VI:1). Still no traces of a terrace wall that could have helped to support and strengthen the houses on ez-Zanṭur were found.

The layers can be dated to the climax of the Nabataean kingdom, i.e. the late second century B.C. - the first century B.C./A.D., as indicated by two complete vessels, numerous fragments of pottery, lamps and terracotta figurines as well as a few coins.

As important as the chronological evidence is the urbanistic evidence. The missing retaining walls can only be interpreted in one way: the Nabataeans must have built their houses like their tents, directly on the natural terrain, neglecting the possible statical problems. There was apparently no regular urbanistic system. As shown by aerial photographs, the representative buildings of the town along the Wadi and the collonaded main road — sanctuaries, agorai and other public places — were constructed after Hippodamic principles. By way of contrast, the habitation quarters obviously resembled more a tent camp, built in stone. Houses were built irregularly on the terraces and there was nothing like a standard habitation quarter with roads crossing at right angles, as in antique settlements in Greece, Asia Minor, Syria and Jordan.[35]

34. E. Rackow and W. Caskel, *Das Beduinenzelt*, Baessler-Archiv 21, Berlin 1938, p. 171ff. Pls. 8-9; *Beduinen im Negev*. Catalog of the Exhibition, Munich and Vienna 1980, p. 60ff. One of the most detailed descriptions of an Arab nomadic tent is given by Johann Ludwig Burckhardt alias Scheich Ibrahim, the rediscoverer of Petra: J. L. Burckhardt, *Bemerkungen über die Beduinen und Wahaby*, Weimar 1831, p. 29ff. Neo-Assyrian reliefs testify that the antique nomadic tents were similar: M. Wäfler, 'Nicht-Assyrer neuassyrischer Darstellungen', *Alter Orient und Altes Testament* 26 (1975), p. 144ff. Pl. 10, 1. 2; A. Parrot, *Assur*, Munich 1961, p. 48 Fig. 58; P. Briant, *Etat et pasteurs au Moyen-Orient ancien*, Paris 1982, p. 126ff.

35. For the Hippodamic System see: W. Hoepfner and E.-L. Schwandner, *Haus und Stadt im Klassischen Griechenland*, Munich 1986, giving examples of the mentioned regions. For Gerasa see: F. Zayadine (ed.), *Jerash Archaeological Project I, 1981-1983*, Amman 1986.

Due to our restricted knowledge, it is of course too early to get a definite idea of Petra's urbanistic system; our investigations will concentrate on these problems. From this point of view a sondage cut on a lower terrace where we found Nabataean structures directly under the surface is important. We hope to continue work in future campaigns on this spot.

Aspects of Typology and Chronology of Painted Nabataean Pottery (Fig. 5; Pl. VI: 2-3)

The finds from the yet uncovered 23 layers of the Stratigraphical Trench give the opportunity to work on the development of the typology, as well as the chronology, of Nabataean pottery. The following comments, mainly dealing with Nabataean bowls, outline our present state of knowledge.

The so far known earliest types of bowls show simple painted decoration: a slight red line on the inside of the rim, partly with drops, or double wavy or straight lines coming from the centre of the bowl and dividing it into four segments. This decoration is mainly confined to deep bowls (Fig. 5:18-19) or bowls with prominent shoulder[36] (Fig. 5:17). These painted bowls are often found together with unpainted bowls with slightly inverted rim, well known in the Hellenistic period[37] (Fig. 5:20).

Painted bowls of the following phase are shallower, sometimes carinated and with a slightly inverted rim. Their decoration was painted with a red slip, apparently used in different concentrations; therefore the leaves of the often floral decoration sometimes have varying shades. The pattern is either concentric (Fig. 5:25-26) or radial (Fig. 5:27).[38] An almost completely preserved bowl from the Stratigraphical Trench belongs to this type (Fig. 5:27; Pl. VI:3). It was found together with a common-ware jar and was presumably used as its lid. The undecorated bowls of this phase are shallow and have a rather sharply inverted rim (Fig. 5:28).[39]

Another change in shape and decoration of bowls is eminent mainly in layers of the Stratigraphical Trench running near the surface, as well as in the later phase of the Nabataean building on ez-Zanṭur.[40] The ware of the painted and the unpainted pottery is now very thin and very well fired. The rims of the painted bowls are very short and sharply set off the body, those of the unpainted bowls are also sharply inverted and often moulded (Fig. 5:21-24).[41] The decoration is painted with a darker,[42] almost homogeneous brown slip. Typical for this darker decoration are patterns with large palmettes and other floral elements sometimes set on a background of fine or criss-cross lines (Fig. 5:21-22).[43] The uniformity of shape and painted decoration in the above described phases is interesting. The shapes typical of painted bowls, are never found with unpainted bowls, and vice versa.

A fragment of a bowl from a small sondage on the eastern slope is outstanding. It shows a human face painted in white, brown and pink (Pl. VI:2).

Notes on the Terra Sigillata

Most terra sigillata found on ez-Zanṭur belongs to the Eastern Sigillata A (ESA),[44] characterised by fine cream coloured clay and

36. Compare: A. Negev, *The Late Hellenistic and Early Roman Pottery of Nabataean Oboda*, Qedem 22, Jerusalem 1986, p. 57ff.
37. See for example R. A. Stucky, *Ras Shamra - Leukos Limen. Die nach-ugaritische Besiedlung von Ras Shamra*, Paris 1983, p. 131 Pl. 73; J. W. Crowfoot *et al.*, *Samaria Sebaste III. The Objects from Samaria*, London 1957, p. 248ff.; A. Papanicolaou Christen and Ch. Friis Johansen, *Hama. Fouilles et Recherches de la Fondation Carlsberg 1931-38*.Vol. III.2. Les poteries hellénistiques et les terres sigillées orientales, Copenhagen 1971, p. 9ff.
38. See Negev, *op. cit.* p. 36-38. 53.
39. *Idem.*
40. See *supra* "The Nabataean Building".
41. Compare Negev, *op. cit.* 78.
42. The whole surface is darker; maybe this is due to a different atmosphere during firing.
43. Compare Negev, *op. cit.* 46-52. 61.
44. Concerning the chronology and typology of ESA, we are following J. W. Hayes, Sigillate orientali, in: *Enciclopedia dell'arte antica. Suppl., Atlante delle forme ceramiche* II, Rome 1986.

Fig. 5

Nabataean Pottery

17. EZ 98/II, FK 12 Ware, outer surface: very dark gray - reddish yellow (Munsell 5YR 3/1 - 5YR 6/6); Ware, inner surface: light red (Munsell 2.5YR 6/8); Decoration: red (Munsell 10R 4/6). H.: 5.1 cm; Diam.: 12 cm.
18. EZ 88/II, FK 10 Ware: light red (Munsell 2.5YR 6/6); Decoration: red (Munsell 10R 4.5/6). H.: 6.5 cm; Diam.: 14 cm.
19. EZ 89/II, FK 15 Ware: light red (Munsell 2.5YR 6/8); Decoration: red (Munsell 10R 4/6). H.: 3.9 cm; Diam.: 10 cm.
20. EZ 89/II, FK 12 Ware: light red (Munsell 2.5YR 6/7). H.: 5.8 cm; Diam.: 12 cm.
21. EZ 88/II, FK 3 Ware, outer surface: light red (Munsell 2.5YR 6/8); Ware, inner surface: light red (Munsell 10R 6/8); Decoration: dark reddish gray (Munsell 10R 4/1). H.: 3.5 cm; Diam.: 16.9 cm.
22. EZ 88/II, FK 3 Ware, inner surface: light red (Munsell 10R 5.5/8); Ware, inner surface: red (Munsell 10R 4/1); Decoration: dark reddish gray (Munsell 10R 4/1). H.: 2.5 cm; Diam.: 16.9 cm.
23. EZ 88/II, FK 3 Ware: light red (Munsell 2.5YR 6/8). H.: 3.5 cm; Diam.: 18 cm.
24. EZ 89/ I, FK 3 Ware: light red (Munsell 10R/2.5YR 6/8). H.: 5.8 cm; Diam.: 19.2 cm.
25. EZ 89/ I, FK 242 Ware: light red - red (Munsell 2.5YR 6/8 - 10R 4/6); Decoration: red (Munsell 10R 4/6). H.: 4.1 cm; Diam.: 16.6 cm.
26. EZ 89/ I, FK 245 Ware: light red - red (Munsell 2.5YR 6/8 - 10R 4/6); Decoration: red (Munsell 10R 4/6). H.: 3.6 cm; Diam.: 18 cm.
27. EZ 89/II, FK 7 Ware, outer surface: light red (Munsell 2.5YR 6/6); Ware, inner surface: light red (Munsell 10R/2.5YR 6/8); Decoration: dark red (Munsell 10R/ 2.5YR 3/6) and pink/reddish yellow (Munsell 7.5YR 8/5). H.: 5 cm; Diam.: 17.8 cm.
28. EZ 89/ I, FK 126 Ware: light red - pink (Munsell 2.5YR 6/6 - 7.5YR 8/4). H.: 3.95 cm; Diam.: 16.4 cm.

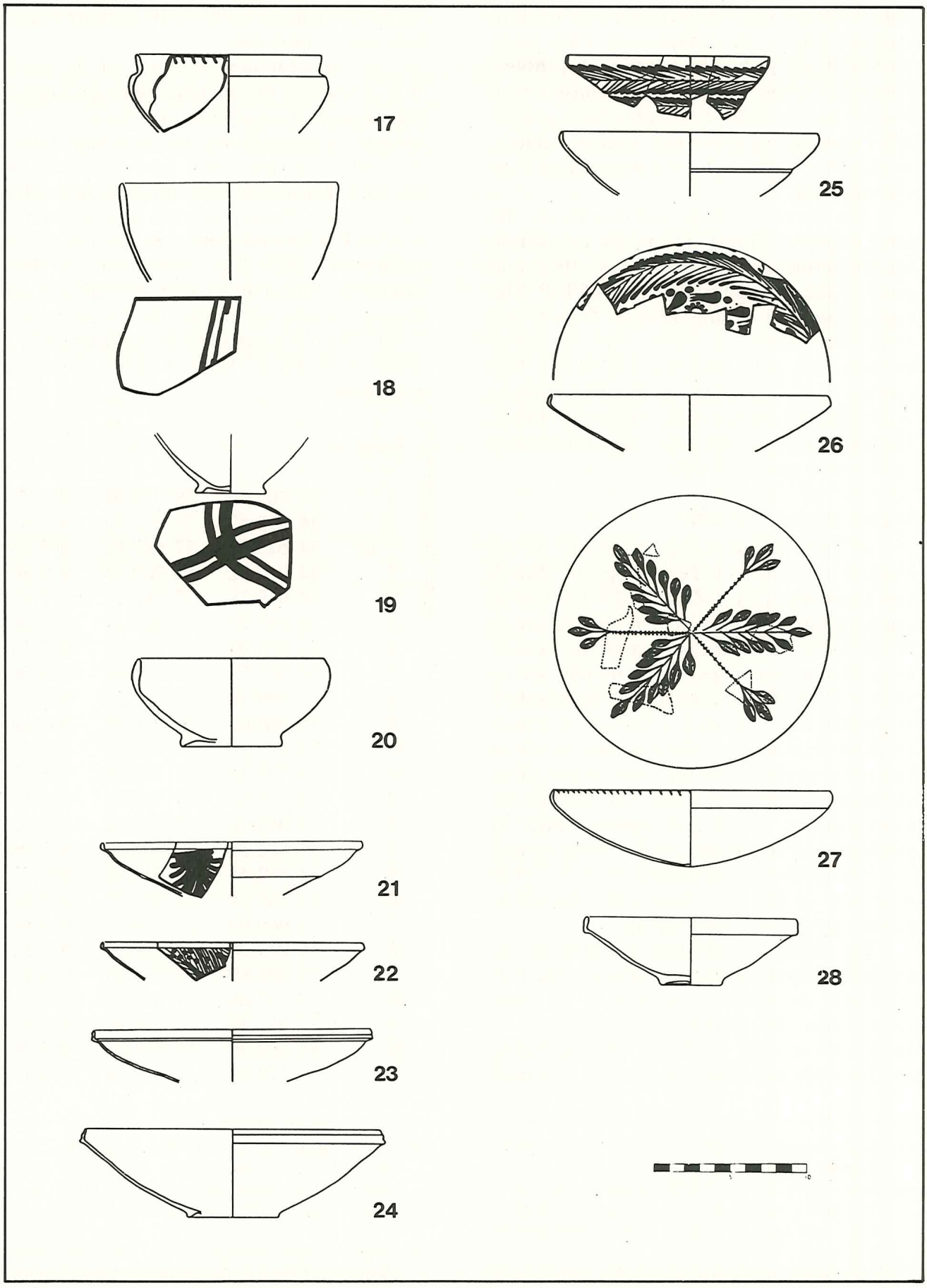

Fig. 5.

reddish brown slip.[45] Compared with western sigillata (WS), the shapes of ESA have thicker walls with less prominent profiles. Plates,[46] shallow bowls[47] and hemispherical bowls[48] are the main ES shapes represented. WS is only known through Italian sigillata, more precisely through Arretine judging from clay and slip.[49]

The terra sigillata was found in the Stratigraphical Trench and in the excavation on the terrace, in the trench in 103/L and north of the external wall in 103-105/L-P. The types from the Stratigraphical Trench and from the trench in 103/L may be dated between 150 B.C. and the end of the first century B.C./beginning of the first century A.D. Outside the external wall in 103-105/L-P, types dating to the first - second century A.D. were also collected.

Report on the Planning

A crew of surveyors, members of the Federal Institutes of Technology in Zurich and Lausanne (ETH-Z and EPF-L), staked out a rectangular grid of five metres lateral length each side on the surface of the excavation. The archaeologists had already set up axes in 1988. These axes had to be adapted, controlled and extended according to future excavation planning. Marked out positions had to be implanted in the form of iron poles in concrete. This is in order not to shift the exact position of the grid angles neither by inadvertence of workers nor by fixing strings.

An electronic theodolite Wild TC 1600 was used all the time, facilitating the whole surveying project substantially.

For fixing the absolute position of the excavation at ez-Zanṭur in relation to the City of Petra, as well as relating it to other excavations, the marked out grid had to be fitted into a map of Petra. The best map available has been one prepared by a Spanish team at a scale of 1:1000 with contour lines at one metre intervals.

A topographical network of 23 points was measured in extended surroundings of the excavation at ez-Zanṭur. The aim of this network is to determine the excavation grid of ez-Zanṭur or any other excavation in the centre of Petra with an accuracy of up to a few centimetres. These points are marked with an iron tack in concrete and a cross chiselled and painted in red. The coordinates of these points are given in one of the official surveying systems of Jordan, the Palestine Belt Grid, which was taken from the Spanish map mentioned above. Table 3 shows the list of coordinates.

Table 3

1	34 702.00	58 274.21	901.03
2	34 599.57	58 022.32	872.81
2 ex	34 613.94	57 967.62	875.15
3	34 982.12	58 209.24	923.80
4	34 950.38	57 962.77	872.95
5	34 533.10	57 840.14	923.29
6	34 673.04	57 815.22	912.13
7	34 905.72	57 834.98	904.36
8	35 090.76	57 883.52	899.13
9	35 380.67	58 039.85	915.60
10	34 471.16	57 719.53	885.20
11	34 775.16	57 762.04	908.27
12	34 817.62	57 783.96	911.17
13	35 040.10	57 793.91	914.92
14	34 882.35	57 704.42	937.08
15	34 662.44	57 511.44	898.17
16	34 843.56	57 587.82	918.61
17	35 066.60	57 650.11	928.88
18	35 289.28	57 727.93	911.51
19	35 392.89	57 779.84	902.25
20	34 792.60	57 444.63	909.49
21	34 955.32	57 504.91	919.95
22	35 202.76	57 601.94	955.76
23	35 110.47	57 472.14	939.18

45. Clay: around Munsell 7.5YR 8/6; slip: around Munsell 10R 4/8.
46. Hayes *op. cit.* type 2, 3, 4 (late second century B.C. - end of first century B.C./beginning of first century A.D.) and type 34 (second half of first century A.D.).
47. Hayes ***idem*** type 5 (first century B.C.) and type 56 (first half of second century A.D.).
48. Hayes ***idem*** type 19 (mid first century B.C.) and type 22 (late second century B.C. - end of first century B.C./beginning of first century A.D.; Hayes type 24 (first century B.C./A.D.).
49. Clay: around Munsell 2.5YR 6/8; slip: around Munsell 2.5YR 4/8. Determinable form: Haltern 8 (last quarter of the first century B.C.).

These activities served for training the archaeologists in surveying procedures, to be able to carry out some simpler surveying tasks during the next few seasons. We hope that this grid will be of value to future Swiss excavations as well as to any other team privileged to work in Petra.

La Faune de Petra

Le matériel osseux récolté lors de la campagne 1989 s'élève à presque 6000 ossements. Bien que 4000 d'entre eux correspondent à des esquilles indéterminables, 2000 os ont été identifés: 1600 représentent des mammifères ou des oiseaux, et 300 des restes de poissons. Une études préliminaire (qui regroupe le matériel nabatéen et romain) permet de dégager quelques généralités.

1) Précisons tout d'abord que le matériel osseux découvert à Petra correspond avant tout à des restes culinaires, comme le prouvent les nombreuses traces de décarnisation relevées sur les ossements.

2) Les animaux domestiques représentent plus de 90% du matériel. Le mouton et la chèvre forment la majorité des restes culinaires, mais le dromadaire, le cheval, le porc et la poule sont également consommés. La viande de chien ne fait pas partie de l'alimentation des habitants puisqu'aucun fragment de canidé n'a été découvert; sa présence est toutefois attestée par de nombreuses traces de morsures observées sur les ossements.

L'élevage ne procure pas seulement de la viande; les oeufs sont, entre autres, une denrée appréciée, vu le nombre de fragments d'oeufs de poules qui jonchent le sol d'habitat.

3) Les produits de chasse sont négligeables: seuls quelques ossements de gazelles, de cerfs, de sangliers et d'oiseaux ont été identifiés.

La pêche prend par contre une importance considérable dans l'alimentation carnée. La petite taille des ossements de poissons ne favorise guère leur récolte, d'où la nécessité d'un tamisage: des échantillons de couches archéologiques ont donc été préservés par les archéologues, pour être ensuite tamisés. Près de 300 restes de vertèbres et de crânes ont ainsi pu être prélevés. Leur étude n'est pas terminée, mais on peut déjà affirmer qu'une partie d'entre eux provient d'espèces pêchées dans La Mer Rouge.

4) Le matériel ne consiste pas seulement en des ossements récoltés dans les sédiments. L'heureuse découverte de récipients complets en céramique a permis d'analyser leur contenu: deux pots ont livré des vestiges d'animaux.

Dans un premier cas, un amas de restes de minuscules poissons s'est conservé au fond d'une gourde (Pl. III:2). Cette préparation correspond certainement à du "hallec", sauce très appréciée des romains et préparée à base de poissons macérés avec des herbes sèches odorantes et du sel. Après deux ou trois semaines de décomposition, on récolte un jus nommé "garum".

Une seconde petite jarre contenait plusieurs vertèbres caudales d'un mouton. Ce sont peut-être les restes d'une préparation culinaire de queue de mouton à queue grasse, type d'ovins largement répandu dans les pays chauds.

Ces quelques résultats laissent entrevoir une riche étude archéozoologique qu'une prochaine campagne permettra d'étoffer.

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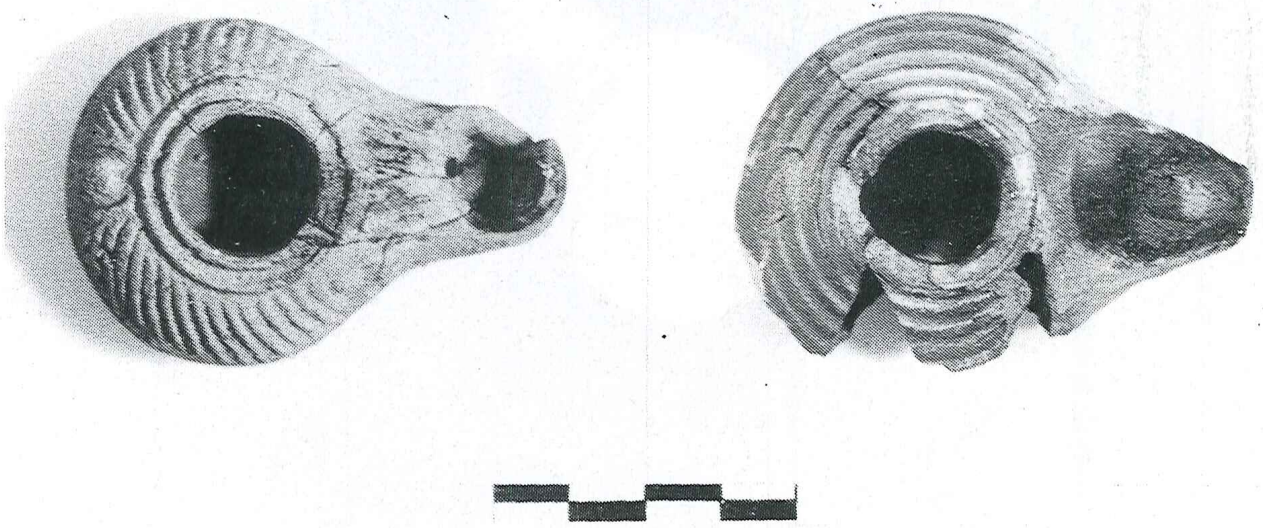
1. General view.

2. Room 26.

1. Room 8.

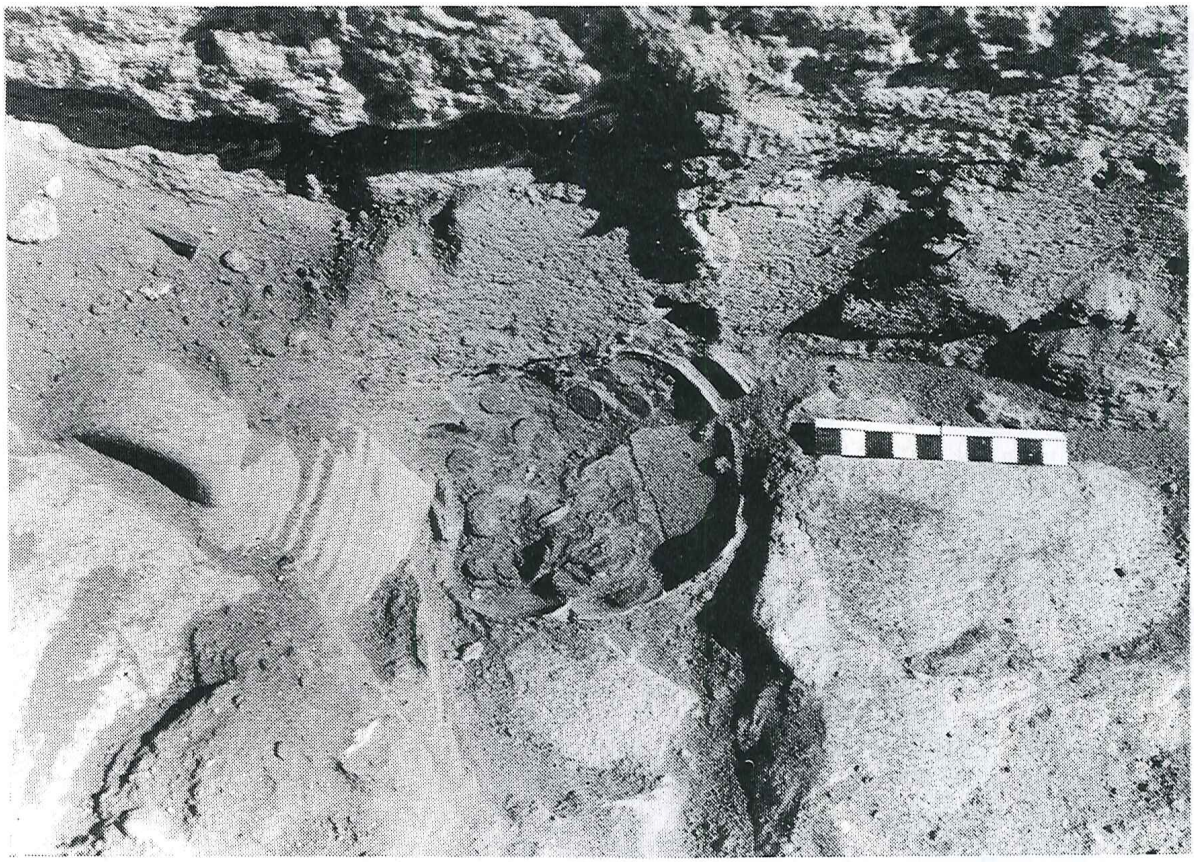


2. Lamp 225.*342.*

3. Lamp 217.*319.*

1. Isis.

2. Pilgrim flask K.230.*364 in situ.*



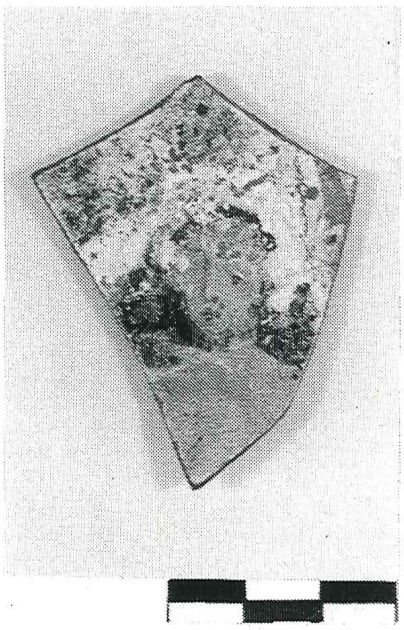
1. Coin hoard *in situ*.

2. K.229.*366*.

1. Outer wall Room 22.

2. Outer wall Rooms 16 and 17.

1. Stratigraphical Trench.



2. Painted sherd from a sondage on the eastern slope.

3. Nabataean bowl EZ 89/II, FK 7.