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The Stone Implements from Gane Ṭal

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Introduction

This report presents an assemblage of 51 stone objects (see *Catalogue*, below) from the excavation at Gane Ṭal (see Arbel and 'Ad, this volume). All the objects described below were found in Areas D and E, except for one object that originated in Area C2 (Cat. No. 29). The assemblage mainly consists of common household objects, such as grinding bowls, grinding stones, millstones and pierced stones. Eighteen of these objects were made of locally available beachrock or limestone, while 30 were made of basalt, a rock which does not naturally occur in the coastal region of Israel. Three additional objects of exotic materials include two marble tiles (Cat. Nos. 45, 46) and an unidentifiable object made of granite (Cat. No. 49).

Such household items are common finds in excavations in Israel, mostly comprising types which show little change through time and are best dated by the context in which they are discovered. The implements from Gane Ṭal were found in loci dated to the early or late Byzantine period, Stratum III, mainly in contexts of soil or debris accumulation, or in topsoil, Stratum I. Many of these implements show signs of long-term use and most are badly damaged. Only part of the ground stone assemblage from the excavation is presented here; additional implements which were discovered *in situ*, as well as a few fragments of chalk vessels of the Early Roman period, are described by Arbel and 'Ad (this volume).

The Finds

Grinding Implements

Grinding Stones

Four intact upper grinding stones were uncovered (Cat. Nos. 1–4; Fig. 1). Such implements were used together with larger, lower grinding stones or grinding bowls for grinding aliments such as cereals, herbs and spices, as well as minerals, pigments and medicinal materials (Neri 1994; Hovers 1996:183; Watts 2002:28; Taxel 2009:152). Other functions of these objects may have included rubbing, polishing and sanding of different materials.

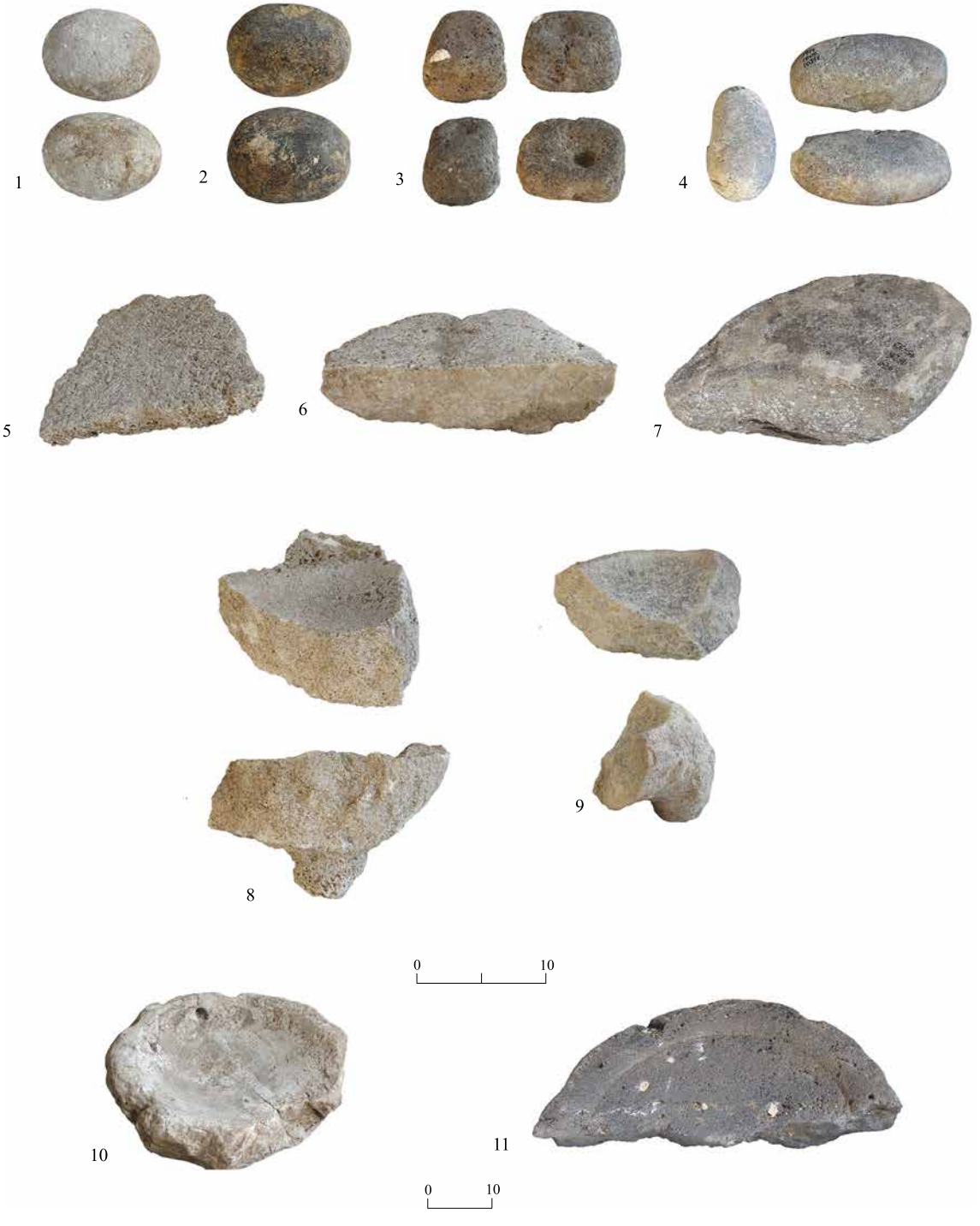

Fig. 1. Upper grinding stones (1–4), lower grinding stones (5–7), footed grinding bowls (8, 9) and grinding bowls (10, 11).

Parallels for the Gane Ṭal grinding stones, dating from the Early Roman to the Byzantine periods, are known from ‘En Gedi (Sidi 2007:554–555), Jerusalem (Geva 2006:222–225) and Ramat Ha-Nadiv (Kol-Ya‘akov 2000:482; Sidi 2000:181). Two of the objects, one from a floor foundation (Cat. No. 1) and another from a soil accumulation (Cat. No. 3), were found in loci dated to the early Byzantine period, while a third object (Cat. No. 2) was found in a soil accumulation, dated to the late Byzantine period. Catalogue No. 3 is made of basalt and appears to have been fashioned from a larger stone object into an upper grinding stone; possibly, a discarded basalt millstone, many of which were discovered at the site, could have been used for this purpose. A fourth grinding stone (Cat. No. 4) was discovered immediately below ground level, in a locus with material from the early and late Byzantine periods (see Vincenz, this volume; Ouahnouna, this volume).

Three lower grinding stones (Cat. Nos. 5–7; Fig. 1) are of the saddle quern type, which was used from prehistoric to modern times. Such querns were placed on a surface or inserted slightly into it and employed together with the smaller upper stones in a back and forth grinding motion.

Grinding Bowls

Catalogue Nos. 8, 9 (Fig. 1) are footed, shallow grinding bowls made of roughly executed local materials. These bowls have a smooth interior and a rough exterior. Based on parallels, the number of legs on the complete bowls would have been either three or four (Sidi 2007:550–551). The grinding was accomplished by means of small upper stones (e.g., Cat. Nos. 1–4). Catalogue No. 8, made of beachrock, was found within a soil layer above a stone-paved floor, dated to the early Byzantine period. Catalogue No. 9, made of limestone, was found in a soil accumulation dated to the late Byzantine period. Examples of locally produced, footed grinding bowls dated to the Roman–Byzantine periods are known from ‘En Gedi (Sidi 2007:550–551) and Ḥorbat Raqit (Ayalon 2004:269–270).

Two bowls (Cat. Nos. 10, 11; Fig. 1) are shallow and almost flat, and have flat bases. Their smoothed upper surfaces indicate that they may have been used for grinding. The limestone bowl (Cat. No. 10) is crudely made; it differs from the broad-rimmed bowl (Cat. No. 11), which is well-executed and made of vesicular basalt with large limestone inclusions. Catalogue No. 11 is notably larger than both the footed grinding bowls and the lower grinding stones presented above. It could have been a *mortarium*, used for tasks such as kneading dough; the absence of a channel surrounding the interior of the bowl speaks against the possibility that it is a small domestic pressing bed, examples of which were retrieved at Ḥorbat ‘Eleq, Ramat Ha-Nadiv (Tepper and Peleg-Barkat, in prep.). Both objects were found in soil accumulations: Cat. No. 10, in a context dated to the late Byzantine period, and Cat. No. 11, in a context dated to the early Byzantine period.

Millstones

Two types of millstones were securely identified: the hopper-rubber mill of the Olynthian type (Cat. Nos. 15–26), and the Pompeian-style donkey mill (not illustrated). A number of millstone fragments could not be attributed to any specific type due to their poor state of preservation.

Hopper-Rubber Mills of the Olynthian Type

The Olynthian hopper-rubber mill is composed of a rectangular lower stone and a square upper stone. The mill was probably introduced to the region by Greek settlers in the late Persian period; it became increasingly popular in the Hellenistic–Roman periods. The mill was operated by moving the upper stone on the immobile lower stone in a semicircular movement (Frankel 2003). The working surfaces of both the upper and lower stones are usually grooved to make the grinding more efficient.

The Olynthian millstones from Gane Ṭal were made of basalt, containing lime inclusions of various sizes, some rather large (Cat. No. 16). Catalogue No. 15 (Fig. 2) is the corner fragment of a square or rectangular upper stone, and Cat. Nos. 16, 17 (Fig. 2) are the fragments of two lower stones. The worn grinding surfaces and grooves of both the upper and lower surfaces of the lower stones (Cat. Nos. 16, 17) indicate that each mill was intensely used, probably during a long period of time. Most of the Olynthian millstones were found in loci dated to the early and late Byzantine periods, and none were found *in situ*. As this type of millstone is not typically known in the Byzantine period, it is conceivable that the items found at Gane Ṭal should be dated to the preceding, Late Roman, period. Although the excavation did not expose a Late Roman stratum at Gane Ṭal, three coins from this period were found, two in Area D1 and another in Area E1 (see Ariel, this volume: Cat. Nos. 3–5), the areas where most of the Olynthian millstones were also found.

Pompeian-Style Donkey Mills

Two fragments of the upper stone of a Pompeian-style donkey mill (Cat. Nos. 27, 28) were found within a locus dated to the early Byzantine period. Such mills, with an hourglass-shaped upper stone and a conical lower stone, are known in Israel from the first century CE, and became the dominant type of millstone in the Byzantine period (Frankel 2003:18).

Mortars

Catalogue Nos. 36, 37 (Fig. 2) were defined as mortars based on the depth of the vessels. In antiquity, mortars were used together with stone or wooden pestles for the pounding rather than grinding of aliments and other materials. Both mortars presented here were probably locally made; Cat. No. 36, discovered on a floor next to a clay oven dated to the early Byzantine period, is made of limestone, while Cat. No. 37, which is of an uncertain chronological context, is made of beachrock. Catalogue Nos. 38, 39 (Fig. 2) can be identified

Fig. 2. Hopper-rubber millstones of the Olynthian type (15–17), mortars (36, 37), grinding bowl/ mortar (38–40) and pierced stone (43).

as either shallow mortars or deep grinding bowls. Catalogue No. 40 has a rough, minimally worn inner surface, indicating that this vessel may have been a basin used for storage, although it is also possible that this vessel was little used before it was discarded. Catalogue Nos. 38, 40 are made of limestone, while Cat. No. 39 is made of basalt.

Pierced Stones

The two pierced stones unearthed in the excavation (Cat. Nos. 43, 44; Fig. 2) were found in a locus dated to the early Byzantine period. Although pierced stones are common finds in agricultural sites dating from all stages of the Byzantine period, their function has not yet been determined. Pierced stones of similar form were found, for example, at ʻEn Gedi (Sidi 2007:555–557) and Ḥorbat Raqit (Ayalon 2004:272).

CONCLUSIONS

The excavation at Gane Ṭal yielded a standard repertoire of household stone-made tools, typically used in the preparation of food. Industrial activity is indicated by the presence of two fragments of a Pompeian mill. The items were produced either from locally available materials, such as beachrock and limestone, or from imported material, such as basalt, which was brought to the site from elsewhere in the region. The white limestone inclusions in the basalt of the large grinding plate (Cat. No. 11) and the hopper-rubber mills (Cat. Nos. 15–17) suggest that the raw material for producing these items originated from the same basalt field. Chemical analyses of millstones discovered in Israel have revealed that most were made of basalt originating in the area west of Tiberias (Williams-Thorpe and Thorpe 1993:263, 304; Segal 2010)—a possible source for the Gane Ṭal implements as well. As for the Olynthian mills, despite the Byzantine contexts in which most of these items were found, such implements are usually known from earlier periods. It is likely that the majority of the fragments found originated in the Early Roman phase of occupation, and reached the contexts in which they were found accidentally, long after their last use.

CATALOGUE: STONE IMPLEMENTS[i]

Cat. No.	Object	Area	Locus	Basket	Material	Measurements[ii] (cm)	Description
1*	Grinding stone	E1	1583	15314	Limestone	D 9.56–9.92 Th 5.32	Circular pebble with two flat surfaces
2*	Grinding stone	D2	1100	10687	Limestone	D 8.63–9.74 Th 5.88	Circular pebble, smooth and rounded on its sides and top; flat, extremely worn grinding surface, slightly chipped, charred
3*	Grinding stone	D1	1043	10300	Vesicular basalt	L 7.28 W 5.35 H 4.4	Loaf-shaped stone with rounded top and sides; flat, worn and damaged grinding surface
4*	Grinding stone	D1	1000	10511	Red-veined limestone	L 12.48 W 5.9 H 4.24	Pebble with rounded top and sides; flat and worn grinding surface
5*	Grinding stone	D1	1000	10446	Beachrock	L 22.5 (p) W 17 (p) Th 3.24	Fragment of lower stone; roughly cut base and sides; flat and worn grinding surface
6*	Grinding stone	D1	1000	10233	Marble/ Limestone?	L 15.8 (p) W 22.4 H 6.11	Fragment of loaf-shaped lower stone; roughly cut base and sides; flat and very smooth grinding surface; groove in center
7*	Grinding stone	E1	1626	15452	Breccia	L 22.6 (p) W 18.4 Th 8.17	Fragment of lower stone; roughly cut base and sides; flat and worn grinding surface
8*	Footed grinding bowl	D1	1056	10576	Beachrock	L 18 W 13.9 H 14.2 Th wall 3.4; base: 5.4	Fragment of grinding bowl with one preserved leg stump; rim not preserved; rough ext., very smooth int.
9*	Footed grinding bowl	D2	1075	10513	Limestone	H 12 D 17	Fragment of grinding bowl with rounded rim and one preserved leg stump; rough, unpolished ext., smooth int.; charred
10*	Grinding bowl	D2	1097	10679	Limestone	H ~16 D ~33–38	Shallow bowl with rounded rim made from fieldstone; untreated ext., very smooth int.

[i] Items marked with an asterisk are illustrated in Figs. 1, 2.
[ii] (p) = preserved

CATALOGUE (cont.)

Cat. No.	Object	Area	Locus	Basket	Material	Measurements[ii] (cm)	Description
11*	Mortarium/ grinding bowl	D1	1035	10561	Vesicular basalt	H 8.33 D ~57	Large circular, shallow bowl with roughly cut base, broad flat rim and very smooth int., particularly in center
12	Grinding stone	D1	1000	10460	Vesicular basalt with lime/quartz inclusions	L 22.5 W 10.9 Th 6	Fragment of lower grinding stone of unknown type; broken on all sides; rough base, very smooth grinding surface
13	Grinding stone	D1	1005	10092	Fine-grained basalt with large lime/ quartz inclusions	L 12.7 W 9.3 (p) Th 4.3	Fragment of lower grinding stone of unknown type; broken on all sides; flat, fairly rough base, very smooth grinding surface
14	Grinding bowl	E1	1608	15430	Fine-grained basalt	H 5.9 D ~36 Th 4.6	Fragment of shallow grinding bowl with rounded rim and flat base; roughly polished ext.; smooth, worn int.
15*	Olynthian mill	E1	1594	15345	Fine-grained basalt	L 13.47 (p) W 18.8 (p) H 8.8	Corner fragment of upper stone; slot partly preserved; badly worn, flat and grooved grinding surface
16*	Olynthian mill	D1	1016	10174	Fine-grained basalt	L 14.3 (p) W 14.2 (p) H 25–4.65	Fragment of lower stone; two grooved grinding surfaces of which one is more worn
17*	Olynthian mill	D1	1032	10315	Vesicular basalt	L 23.8 (p) W 21.5 (p) Th 3.88–6.55	Corner fragment of lower stone; two flat, grooved and worn grinding surfaces
18	Olynthian mill	D1	1000	10191	Fine-grained basalt	L 19.1 W 10.4 H 3.33–6.94	Fragment of lower stone broken on all sides, part of bulge preserved; two extremely worn grinding surfaces; damaged on bulge side, no visible grooves; the opposite side carries barely distinguishable grooves
19	Olynthian mill	D1	1000	10609	Fine-grained basalt	L 18.5 (p) W 10.8 (p) H 6.76	Fragment of roughly cut upper stone; worn grinding surface with parallel, vertical grooves
20	Olynthian mill	D1	1000	10610	Vesicular basalt	L 15 (p) W 10.7 (p) H 9.53	Corner fragment of upper stone; worn grinding surface with almost worn out striations

CATALOGUE (cont.)

Cat. No.	Object	Area	Locus	Basket	Material	Measurements[ii] (cm)	Description
21	Olynthian mill	D1	1016	10172	Fine-grained basalt	L 8.2 (p) W 11.4 (p) Th 7.36	Corner fragment of lower stone; flat, roughly cut base; straight and roughly cut sides; worn grinding surface with parallel, vertical grooves
22	Olynthian mill	D1	1036	10255	Fine-grained basalt with lime/quartz inclusions	L 12.5 (p) W 13.5 H 9.51	Corner fragment of large upper stone; broken on all sides including top; grinding surface flat and extremely worn, indicating secondary use as paving stone
23	Olynthian mill	D2	1068	10529	Vesicular basalt with lime inclusions	L 19 (p) W 10.2 (p) H 6.96	Fragment of upper stone; rounded and smooth top; flat and worn grinding surface without traces of grooves
24	Olynthian mill?	E2	1551	15270	Fine-grained basalt with lime/quartz inclusions	L 10.27 (p) W 6.22 (p) H5.85	Small fragment of upper stone; part of slot preserved; flat, very smooth grinding surface without grooves
25	Olynthian mill	E1	1583	15304	Fine-grained basalt with lime inclusions	L 6.56 (p) W 16.7 (p) Th 2.9–5.22	Lower right corner of lower stone; roughly cut base and sides; worn grinding surfaces with almost undistinguishable parallel, vertical grooves
26	Olynthian mill	E1	1633	15501	Fine-grained basalt	L ~13 W 7.8 (p) H 3.24–4.63	Corner fragment of lower stone of Olynthian mill; extremely smooth grinding surface; flat and smooth base with possible grooves
27	Pompeian mill	D1	1064	10449A	Vesicular basalt with lime/chalk inclusions	L 13 (p) W 7.5 (p)	Fragment of upper stone; part of square opening with extremely smooth surfaces preserved; the back of the opening is flat and smooth, which may indicate secondary use of the stone as grinding stone
28	Pompeian mill	D1	1064	10449B	Vesicular basalt	H ~22.5 (p) Th 8.7	Fragment of center of upper stone; rough ext. and smooth int. surfaces, grinding surface very smooth; on one of the broken surfaces is an extremely smooth spot with a semicircular rusty stain

CATALOGUE (cont.)

Cat. No.	Object	Area	Locus	Basket	Material	Measurements[ii] (cm)	Description
29	Millstone	C2	769	7560	Vesicular basalt	D ~44 Th 4.89–5.90	Fragment of what appears to be a circular millstone with sloping edge; rough ext., flat and very smooth grinding surface
30	Millstone	D1	1016	10173	Vesicular basalt with lime/chalk inclusions	L 17 (p) W 11.5 H 4.1–8.2	Fragment of millstone, possibly Olynthian; triangular in section; flat, smooth grinding surface without striations
31	Millstone	D1	1027	10240	Fine-grained basalt with lime/ quartz inclusions	L 11.5 (p) W 8.4 (p) Th 3.77–4.52	Corner fragment of lower grinding stone of unknown type, possibly Olynthian; roughly cut base, straight and roughly cut sides; flat, worn grinding surface without grooves
32	Millstone	D2	1083	10581	Fine-grained basalt	L 13.5 (p) W 9.5 (p) Th 2.5	Corner fragment of lower grinding stone of unknown type, possibly Olynthian; roughly cut base, extremely smooth grinding surface
33	Millstone	D2	1094	10706	Fine-grained basalt	L 11.6 W 7.3 Th 5.65	Fragment of lower millstone, possibly Olynthian; one straight, roughly cut side, partly preserved; flat, roughly cut base; flat and worn grinding surface
34	Millstone	E3	1508	15121	Vesicular basalt	L 9.5 W 8 Th 3.23	Small fragment of mill/ quern stone of unidentifiable type; broken on all sides; flat, coarse base; flat, worn grinding surface; charred after breaking
35	Millstone	E3	1509	15090	Vesicular basalt	L 7.8 W 4.35 Th 2.85 (p)	Small fragment of mill/ quern/grinding stone of unknown type; broken on all sides, including base; flat and worn grinding surface
36*	Mortar	D1	1006	10052	Limestone	H 12.4 D 22 Th wall: 4.5–8.0; base: 2.5	Circular mortar with rounded rim made of fieldstone; base not preserved; untreated ext., very smooth int.
37*	Mortar	D1	1000	10147	Beachrock	H 12.6 D 16 Th base: 7	Fragment of mortar; flat rim and flat, very thick base; rough, unpolished ext., very smooth int.

CATALOGUE (cont.)

Cat. No.	Object	Area	Locus	Basket	Material	Measurements[ii] (cm)	Description
38*	Grinding bowl/mortar	E1	1544	15195	Limestone	L 16 (p) W 14.2 (p) H 9.3 D 12.5	Mortar made of fieldstone; untreated ext., very smooth int.
39*	Grinding bowl/mortar	E1	1632	15484	Fine-grained basalt	H 7.83 D ~38.4	Fragment of utensil with rounded rim and flat base; roughly polished ext., smooth, worn int.; partly charred
40*	Grinding bowl/basin	D2	1097	10651	Limestone	L 22 W 13.5 (p) H 7.94	Fragment of square/rectangular utensil; smooth ext. surface, rough int.
41	Mortar	E1	1658	15543	Limestone	H 11.5 (p) D ~29	Fragment of large, deep mortar; smooth ext. and int.; broken on all sides except int. and ext.
42	Mortar	D2	1066	10628	Limestone	L 15 W 14 H 8.82 (p)	Fragment of mortar made of fieldstone; flat base; rim not preserved; very smooth int.
43*	Pierced stone	D1	1005	10051	Limestone	D 18 cm Th 6.46	Fragment of roughly circular, pierced stone with two flat surfaces; int. of central piercing is very smooth
44	Pierced stone	D1	1035	10256	Red-veined limestone	D ~17 Th 6.74	Fragment with badly damaged surfaces; pierced from opposite sides, creating a conical profile; small part of the surface that is preserved is rough and unpolished (weight?)
45	Tile	D1	1024	10345	Gray-veined marble	L 15 (p) W 12.3 (p) Th 2.8	Fragment of floor tile; flat, worn top with nicks along short sides; roughly cut base with clearly visible, coarse chisel marks; straight edges; upper part flat, lower part roughly cut
46	Tile	D1	1066	10443	Marble	L 9.2 (p) W 6.25 (p) Th 1.5	Fragment of floor or wall tile; one straight edge partly preserved; highly polished top and base
47	Unidentified	D1	1000	10101	Limestone	L 20 W 10.5 Th 5	Fragment of what appears to be circular object; ext. with visible chisel marks, int. very smooth

CATALOGUE (cont.)

Cat. No.	Object	Area	Locus	Basket	Material	Measurements[ii] (cm)	Description
48	Unidentified	D1	1000	10195	Limestone	D 16.5–17 Th 7.83	Circular stone with two shallow depressions on opposite sides of the center; possibly an unfinished pierced stone; made of fieldstone; depressions have clear chisel puncture marks on their int.
49	Unidentified	D1	1000	10235	Granite	L ~16 W ~15 Th ~10	Object made from black granite with some partly preserved, highly polished surfaces of which one is flat
50	Unidentified	D1	1040	10326	Limestone	L 10.74 (p) D 4.08	Limestone cylinder; broken off at one end, flat in the other
51	Unidentified	D1	1040	10400	Vesicular basalt with lime/chalk inclusions	L 10.26 D ~21.3	Circular stone with square, central depression; rough ext. surfaces; vesicular basalt with medium and large chalk inclusions; possible secondary use of handle lug of upper stone of Pompeian mill

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