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LXXVI

TELL SABI ABYAD
THE LATE NEOLITHIC SETTLEMENT

Report on the Excavations of the University of Amsterdam (1988) and the
National Museum of Antiquities Leiden (1991-1993) in Syria

II

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Report on the Excavations of the University of Amsterdam (1988) and the National Museum of Antiquities Leiden (1991-1993) in Syria

II

edited by

PETER M.M.G. AKKERMANS

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CHAPTER 4

THE FLINT AND OBSIDIAN INDUSTRIES

LORRAINE COPELAND

Introduction

The flint and obsidian artefacts found in the first excavation season at Sabi Abyad were studied by this writer and published in the first report (Copeland 1989). The sample was relatively small and came from the three phases already recognised at that time: levels 1-3 or Early Halaf (302 artefacts), levels 4-6 or Transitional Neolithic to Halaf (31 artefacts) and level 7, Late Neolithic (174 artefacts). The situation is very different today after three more excavation seasons, when more than 6000 flint and obsidian artefacts were recovered from larger exposures (especially from the levels sparsely represented in the first report), and a longer succession. This can now include material from older Neolithic levels 8-11, revealed in 1992 and 1993. As a result, a more representative typelist has been constructed, based on the large artefact samples. These will form the database for the study of the course through time of lithic industrial traditions at Sabi Abyad, from the Balikh IIB to Balikh IIIA phases. This information, when viewed together with that from the other finds at Sabi Abyad, will contribute to our knowledge of the lifeways of the Balikh valley populations and how they developed through the near-thousand year span of the 6th millennium B.C.

Method and Definitions

Method of study

The finds from each successive season were received by this writer in bags marked according to date, square, locus and lot number. The bags were opened individually and each artefact was examined and classified. Among the attributes additionally studied were: choice of raw material and blank, present physical condition, techniques of debitage (core-reduction and production of tools), retouched tool-types. Representative pieces were drawn (figs. 4.1-4.18).

Later, as soon as the stratum designations were received from the excavators, the contents of each bag (locus/lot) could be assigned to a stratum; a list of artefacts per stratum was therefore drawn up for each square, although this meant dropping the

locus/lot number, due to the unmanageability of the tabulation that would have been needed. This does not mean that the crucial subject of spatial distribution of artefacts has been abandoned (it will be studied elsewhere by M. Verhoeven (in prep.)). Rather, in line with the procedure adopted for the other finds, the lithic material will be presented according to level (and, effectively, Balikh phase), even though this results in the lumping of the sub-strata. Accordingly, the lithic artefacts from each square have been amalgamated per level, the results shown on tables 4.4 and 4.5.

Some artefacts which were assigned to strata which crossed Balikh phase (and sometimes level) boundaries were omitted, as were certain lots from unclear contexts between strata.

Choice of raw material and blank

Flint is the main stone material in all exposures, with obsidian amounting to less than one quarter of the total in each assemblage (table 4.3). Judging by the form of cortex remaining on artefacts, river pebbles were a popular core-blank form; these are rounded cobbles of varying size, easily obtainable from the fossil Pleistocene terraces which border the present Balikh flood plain (Besançon and Sanlaville 1981). Other flint sources were also exploited, e.g. nodular flint from seams in the limestone bedrock of the region. From further afield, perhaps brought in as imports, are the thin slabs (3-4 mm thick) of honey-coloured tabular, often fossiliferous, flint with a thin chalky cortex. Low proportions of this material occur in each level, broken into fragments and used almost exclusively to make 'Tile Knives' (tabular scrapers). The location of the seams from which this material was obtained by the Sabi Abyad folk is not known, although such formations have been widely observed (e.g. at the Cilician Gates, cf. Minzoni-Deroche 1933, and by this writer at Azraq Oasis).

The prevailing raw material is a glossy or slightly matt fine-grained flint, sometimes banded or mottled, most often in light brown tones. It grades into beige and grey, or into darker brown and even black. Black seems to occur towards the centre of the nodule, which is brown at the edge. Rare cases of white or pied pieces occur, and coarse-grained material is not common; where this occurs, it is usually from near the outer coat of the nodule and is usually grey or beige. The other colours recognised are a rare rosy-mauve and a chestnut shade. Very occasionally limestone, basalt and gypsum flakes were encountered.

As table 4.1 shows, this material is present in relatively similar amounts through time, i.e. between levels. An exception may be the case of the lowest level, 11, where the dominance of brown is replaced by beige tones. However, these and other fluctuations, may be due to some of the samples being small, or to the number of pieces whose original colour has been altered by burning or heat treatment.

As to the obsidian, only studies as to its components have been carried out (Boerma in Copeland 1989:271-273). It is for the moment assumed that the raw

Level	Square	Flint Colour						No.
		Black	Beige	Brown	Grey	Rose	Other	
11	P.15	9.37	35.93	14.06	30.31	18.75	1.56	64
10	P.15	11.62	25.58	37.20	13.95	11.62	–	43
8	P.15	13.37	35.03	29.29	9.55	12.10	0.36	157
7	P.15	–	28.08	58.69	6.52	4.34	4.34	46
6	Q.15	18.64	21.61	22.03	28.81	4.66	4.64	236
6	Q.14	11.69	20.52	33.50	23.84	8.38	1.76	455
5	Q.14*	13.77	25.74	21.50	24.54	10.77	3.56	167
4	P.15	7.05	27.05	52.94	10.58	1.17	1.17	85

* Arrowhead cache excluded

Table 4.1. Percentages of flint raw material at Sabi Abyad, per level.

material was imported from sources in eastern Anatolia. The usual tones: dense black, greenish grey, dark brown, pale grey, etc., are present, including rare colourless pieces or striped pieces.

Present physical condition

As was to be expected from their findspots on the house floors or fills in the village, the artefacts were not fresh; their edges were damaged or abraded either by rough usage or trampling by man or animal. An outstanding feature of certain assemblages was the trace on many artefacts of intense burning, which had caused pot-lid fractures, twisting, calcination or reduction to tiny fragments or dust. Experiments have shown that flint will fracture internally or 'explode' when heated above ca. 400 °C (Griffiths et al. 1975), even if for just a short time (Nadel 1989). It was impossible to detect if heat-treatment to improve flaking quality had been practised (see Inizan et al. 1975). Almost no flint pieces were patinated, but the obsidian component included specimens which had been patinated to a matt grey, had worn to cortex on the facet margins, or were scratched or striated on the ventral surface; some had been used to a degree that caused a crushed, blunt effect on the retouched edge (fig. 4.18, no. 10). Residues of bitumen were seen on only two artefacts. Rare traces of polish are described below.

Techniques of debitage

A wide variety of means of producing blanks for tools was evidently known and used at Sabi Abyad. Judging by the poor state of the majority of the cores, the nodules were utilised to the limit, so that the first stage in the process of core-reduction or *chaîne opératoire* is hard to reconstruct from the core sample; only two of them (fig. 4.2, no. 11) in their present condition could produce some of the larger flakes or rare intact blades in the collections. However, it is possible by other means, e.g. through a study of the flakes and blades, to have an idea of the knapping-methods practised. For example, the rare slanting 'dihedral burin-like' butts (Nishiaki 1992) could represent bipolar cores at an early reduction stage.

A study of the butts on the blanks (table 4.2) clearly shows that the modes of debitage practised through time at Sabi Abyad were quite consistent. There is no perceptible percentage difference between the lithics of the phases represented by levels 11 to 3, at least according to type of butt (or its absence) or as to the place on the core-platform of the removal-blow, nor as to the way the core was refreshed for the next removal. On a sample of more than 700 pieces drawn from squares P15, Q15 and Q14 flakes struck off with a hard stone hammer, i.e. with plain butts, form a third to a quarter of the flint butts, while the punctiform/linear butts, which form around a quarter of the whole, represent more delicate flaking methods, using a punch or soft hammer. All other butt types form low percentages of 2-5%. Pieces without butts cause problems, since many tips and segments might 'belong' to the

Level	Square	Type of Butt								No.
		Cortex	Plain	Faceted	Dihedral	Removed	Punctiform	Absent/ Broken	Other*	
11	P.15	6.66	26.66	2.22	2.22	4.44	15.55	42.50	–	45
10	P.15	8.00	32.00	2.00	2.00	2.00	20.00	34.00	–	50
8	P.15	8.27	30.44	0.96	0.96	5.51	29.65	34.82	–	145
7	P.15	8.88	15.55	2.22	2.22	11.11	33.33	26.26	–	45
6	Q.14	7.07	32.15	3.24	1.17	4.71	29.20	20.35	2.06	339
5	Q.14	6.00	37.50	3.50	2.50	6.50	22.50	21.50	–	200
4	P.15,Q.14	11.66	23.33	1.66	3.33	5.00	16.66	38.33	–	60
3B	Q.14	7.69	33.33	2.56	5.12	2.56	20.51	28.30	–	39

* e.g. "PPNB Scar"

Table 4.2. Percentages of butt types at Sabi Abyad, per level.

pieces with butts, having been deliberately broken. Shattered butts are placed as 'absent'.

A special butt type is that having damage due to a removal on the bulb ('blade with inverse proximal scar'), a feature which is quite prevalent in PPNB sites (Copeland, in prep.). It is virtually absent at Sabi Abyad. The butts of the obsidian element, not shown on the table, consist when present mainly of punctiform or linear forms. Plain butts can occur on the rare obsidian flakes.

In table 4.3 the relative proportions of flakes versus blades and bladelets (excluding butt-ends and other debris) show that flakes always greatly outnumber blades and that these flakes represent the three stages of reduction: core peeling (cortex and part-cortex flakes), core-preparation (*éclats de taille*), and core-refreshment (tablets, etc.) before the desired flake or blade is obtained. Blades are always markedly fewer, and are often deliberately broken and the parts (butt, mid-section, tip) used separately for tools.

The dimensions of the artefacts are varied as shown by the drawn pieces, but overall, even in the complete flint tools, small sizes prevail, especially in the obsidian. Tools are made without marked preference on all types of flakes and blades (with or without cortex), on fragments and even on cores.

Use of phase and period names

The meaning of the term 'Late Neolithic', as used in the first report (Copeland 1989) to refer to the period immediately preceding the Halaf (or in broader terms Amuq B) has since been changed. Following Akkermans (1993:112-113) the term is used here to include the Balikh phases II (early pottery Neolithic) and III (Transitional and all Halaf periods). For a detailed account on the Balikh chronological framework and terminology, the reader is referred to Akkermans (1993; see also Foreword, this volume).

The typelist: definitions of terms, with comments

The typelist was drawn up specifically for Sabi Abyad's lithics and is divided into four parts: (1) flint tools, (2) flint debitage, (3) obsidian tools and (4) obsidian debitage, as was done in the first report, for the same reason: that the flint and obsidian industries are so different in morphology, style, usage, and often in debitage techniques as to give the impression that they were produced either by different or non-local knappers, or by a set of techniques better suited to the different properties of each material.

Since no microscopy has been carried out so far on the artefacts to determine their probable function, the artefacts have been classified by conventional methods into the well-known types of modified (retouched pieces: tools) and unmodified (unretouched pieces and cores: debitage). The large number of artefacts with 'utilisation

LEVEL	11		10, 9, 8		7		6		5		4		3B	
Percentage of:	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Flint tools/all flint	24	25.53	66	15.75	12	12.24	367	15.88	236	30.63	97	15.74	72	16.11
Flint blades / flint debitage	3	4.28	34	9.63	5	5.81	168	8.64	62	11.29	33	6.35	32	6.03
Flint flakes/ flint debitage	18	25.71	191	54.07	52	61.17	995	51.20	302	55.00	288	55.49	211	55.38
Flint cores/ flint debitage	19	27.14	31	12.25	3	3.38	67	3.48	18	3.27	19	3.66	15	3.93
Sickle elements/ flint tools	1	4.16	3	4.54	–	–	33	8.99	18	7.62	18	18.55	9	12.50
Scrapers/flint tools	6	25.00	9	13.03	4	33.33	77	20.98	29	12.28	12	12.37	17	23.61
"Tile Knives"/ flint tools	–	–	–	–	1	8.33	12	3.26	3	1.27	3	3.09	4	5.55
Fine & abrupt ret./ flint tools	8	33.33	15	22.72	1	8.33	74	20.16	27	11.44	16	16.49	6	8.33
Flint arrowhead/ flint tools	–	–	1	1.51	–	–	3	0.81	61*	25.80	3	3.09	2	2.77
Pressure-flaking/ flint tools	1	4.16	1	1.51	–	–	8	2.17	–	–	2	2.06	2	2.77
All obsidian/ all artifacts	46	42.85	46	10.02	19	16.23	381	14.58	123	13.54	202	24.69	129	22.20
Obsidian tools/ all obsidian	20	43.47	21	66.00	5	26.31	130	34.12	37	30.08	51	25.24	24	28.60
CTB's/ obsidian tools	8	40.00	1	4.76	1	20.00	12	9.23	2	5.40	1	1.96	3	12.50
SBBF group/ obsidian tools	1	5.20	5	23.80	–	–	30	23.07	3	8.10	2	3.92	3	12.50
Fine & abrupt ret./ obsidian tools	3	15.00	7	33.33	1	20.00	53	40.76	20	54.05	30	58.52	9	37.50
Obsidian arrowhead/ obsidian tools	–	–	–	–	1	20.00	1	0.76	2	0.08	4	7.84	1	4.01

* *includes "cache" of 58*

Table 4.3. Comparison of the techno-typological features at Sabi Abyad, per level.

retouch' was mentioned above; it was decided not to count pieces with this feature (either flint or obsidian) as 'tools' unless the retouch was more consistent and patterned. The present tool count is therefore probably a minimum.

Since certain types appear in the assemblages which are not so far well attested at sites in northern Syria, it seems best to define the terms used in this report and to comment on them as follows.

(a) Flint tools

(1) *Heavy-duty types*. These are divided into two categories: in the flaked group are large pebbles made into choppers, axes, and roughouts (fig. 4.6), while the second group contains objects which are not flaked but used as they are, for example, battered flint balls (fig. 4.11, no. 5), used as hammerstones, or pieces with a smoothed area, perhaps used as polishers, as well as unique pieces such as the nodule with a central hole (pulley? tent peg?). They are rare in all levels.

(2) *Arrowheads*. With one notable exception, flint specimens are rare to absent in all levels. There are three types. First, the large, tanged Byblos Points (characteristic in the 7th and early 6th millennium B.C.). These are present in the form of tip or tang fragments. The tips have inverse retouch at the point; some may in fact be borers, but the distal inverse retouch is typical of Byblos Points. The tang fragments have opposed basal notches and/or abrupt bilateral retouch or pressure-flaking and some of these could be worn drill bits. There are two more convincing body specimens with the typical notched tanged base (figs. 4.3, no. 1 and 4.7, no. 5).

Second, the transverse arrowheads, found as a cache in one room of a level 5 house. This cache (the exception referred to above) consists of 56 tiny double-ended transverse arrowheads (fig. 4.17, nos. 1-10) and two fragments (cf. Copeland and Akkermans 1993). These artefacts are remarkable in having an oblong form and two cutting or *tranchet* edges, in contrast to the single edge of other specimens in the Near East, which either have a trapeze shape or a distinct sub-cylindrical tang as at Arjoune (Copeland, in press) and in the eastern and southern Levant, e.g. Dhuweila 2 (Betts 1993) and Nahal Issaron (Goring-Morris 1993). Our specimens are made on wide honey-coloured blade segments, their edges being the lateral edges of the original blank. The two breaks are variously retouched as described in detail below (the level 5 description).

The third type is the short tanged 'Ubaid' or desert arrowhead also known as the Haparsa Point, known from many Levant and Arabian 5th-4th millennium B.C. sites (Bar-Yosef 1981). Apart from a surface find (fig. 4.12, no. 5), only one other is present at Sabi Abyad (in obsidian), made by unifacial pressure-flaking (fig. 4.12, no. 2). Obsidian arrowheads are discussed below.

(3) *Pressure-flaked piece*. In this category are placed flint pieces (usually fragments) formed by, or with traces of, pressure-flaking (cf. 'ripple-flaking'; *retouche en echarpe*), i.e. retouch done by pressure via a punch rather than by percussion (fig. 4.4, no. 1).

Included is the javelin fragment (fig. 4.7, no. 2), a type referred to by some as a 'bifacial knife', but not included here are (a) pieces classed as arrowheads, if pressure-flaked, and (b) the series of 'Tile Knives', which are described with the scrapers even though their edges are pressure-flaked. Pressure-flaking, carried out either on one face (as in Tawilan knives; Goring-Morris 1993) or on both faces of an artefact, is characteristic of certain early Neolithic phases in the Levant (cf. Byblos and Aswad) and it was present at several of the 7th millennium sites found on the Balikh survey (Copeland, in prep.). However, it was also much used (bifacially or unifacially) on larger pieces in the southern Levantine Chalcolithic facies of the 5th and 4th millennium B.C. Although not frequently seen in Syria, it is present on a '*poignard*' at Ras Shamra VA (de Contenson 1992, Pl. XXIX, 3). Our javelin/bifacial knife appears to be equivalent to the 'bifacially flaked knives' of the Negev Late Neolithic (Goring-Morris 1993), also known in e.g. the Black Desert (Betts 1993).

(4) *Lustred sickle element*. The lustre or sickle sheen on these pieces (fig. 4.8, nos. 1-7) is presumed to derive from the harvesting or cutting (when green) of organic material (Unger-Hamilton 1988). Analogous with finds in the Near East of complete sickles, each element is inserted in series into a haft, by using bitumen as an adhesive (as at Assouad; M.-C. Cauvin 1973). It would seem that the Sabi Abyad specimens were often reversed and re-shaped, since sometimes the sheen is on the backed or truncated edge (fig. 4.8, no. 3). The areas covered by the lustre are usually small. Many sickle elements are made on snapped blades without any retouch ('simple' in the typelist; fig. 4.8, no. 2). The 'backed' pieces have abrupt retouch on the lateral edge, among these being those with convex 'crescentic' backing (fig. 4.8, no. 1). The 'truncated' group have one or both ends retouched (fig. 4.8, no. 4). Those with both lateral and end retouch are 'backed and truncated' (fig. 4.8, no. 7). The retouch is most often roughly carried out, and the pieces are made on a variety of flake or blade blanks including debitage pieces, on which the perpendicular cortex or natural plane is exploited as a back.

(5) *Shape-defined sickle element*. Under the microscope, some morphologically element-like artefacts have been found to have polish, and are regarded as sickle elements (Unger-Hamilton 1988). Hence our use of this term for unlustred but apparently utilised pieces with appropriate shape and retouch type (fig. 4.8, no. 8).

(6) *Truncated piece*. In this category are placed pieces with abruptly retouched truncation(s) which do not seem to represent either sickle elements or straight-ended end-scrapers.

(7) *Backed knife*. Two groups can be distinguished: (1) blades or flakes with abrupt retouch on one lateral edge, and (2) blades or flakes with a perpendicular 'back' formed by cortex or debitage plane (fig. 4.8, no. 9). All the classified pieces appear to have been utilised on the opposed lateral edge, but this should be verified under the microscope.

(8) *Scraper*. Side-scrapers or *racloirs* (fig. 4.4, nos. 3 and 5), and *raclettes* (which have small, parallel retouches) are not usually well-made and grade into scrapers on

the distal end of flakes and blades. Among the latter are end-scrapers with lateral retouch (fig. 4.10, no. 2) and 'front' fragments (fig. 4.1, no. 8), while small, thumbnail and nosed specimens are placed with the flake-scrapers (fig. 4.4, no. 6). There are some steep, domed or carinated forms (fig. 4.10, no. 4) and this category includes rare heavier '*rabots*', perhaps made on nodules.

The 'Tile Knives' form a special group (fig. 4.9). They are made on (probably non-local) grey or honey-coloured thin slabs with fine cortex on each face. Early specimens are 5-7 mm thick, later ones only 2-3 mm thick. Pieces broken off the original slab are finely retouched bifacially through the cortex to form a single scraping edge, confined between the perpendicular fracture planes. The term 'Tile Knife' is used here to distinguish the type from 'tabular scrapers' elsewhere which are, in fact, often made on flakes (cf. Rosen 1984). The term was first used by Kapel (1967) for similar artefacts in Qatar. They are further known from the eastern and southern Levant (Betts 1993; Goring-Morris 1993), as well as in Syria at Ras Shamra, where they appear in level IVC-B (de Contenson 1992). They are also known from Samarran contexts (Braidwood et al. 1944). Interestingly, on one or both cortex surfaces of several specimens a white plaster coating is present, scratched or striated (fig. 4.16, no. 9 and fig. 4.18, no. 1). Striations occur on a Ras Shamra specimen (de Contenson 1992, Pl. LXXXIX, 3) and on the 'tabular scrapers' at Kvish Harith (Rosen 1984:115 and fig. 10). Our pieces were probably used in the production or use of the white plaster often seen in the Sabi Abyad structures.

(9) *Burin.* The dihedral burins (which greatly outnumber those on truncations) include axial (*bec-de-flûte*) or right-angle types, and some with a natural plane opposed to the spall removal facet. Some quite robust specimens occur (fig. 4.3, no. 9). A very few are double-ended. Truncation burins, where a removal is opposed to a retouched surface, are rare in the assemblages (fig. 4.2, no. 9).

(10) *Borer.* Piercers are borers with thin, sharp points (fig. 4.1, no. 11); the becs (cf. *bec-burinante-alterne*) have somewhat thicker points (fig. 4.3, no. 4) but on both types the points are short. A very common type is the 'corner-borer', where the point occurs on one corner of the distal end (figs. 4.1, no. 12 and 4.4, no. 6); one can only speculate as to the function of these pieces. In contrast, the drills have thick, rod-like points and are assumed to have been rotated in a haft as are drill bits; this can only be proved by microscopic examination (see Unger-Hamilton et al. 1987), but on some specimens the tip has broken off (fig. 4.10, no. 7).

(11) *Notch.* Notched pieces form a varied group and grade into denticulates. The notch occurs singly on one or both lateral edges, or (more rarely) on the distal end (fig. 4.15, no. 8). Pieces with very small nicks are not included since they may be the result of trampling.

(12) *Denticulates.* These are usually made on thick flakes or blades and have areas of continuous notching, forming a saw-like edge (fig. 4.4, no. 2).

(13) *Composite*. There are many artefacts with different areas of retouch suggesting a double purpose. Combinations include, for example, notch/scraper (fig. 4.10, no. 1) and scraper/borer (fig. 4.1, no. 12).

(14) *Splintered piece*. These are pieces with squamous bipolar retouch, thought to have been used as wedges or in the process of pressure-flaking (fig. 4.17, no. 16).

(15) *Fine retouch*. As noted above, the division is problematic between pieces with traces (possibly accidental) of fine 'nibbled' retouch (cf. 'utilisation'), which are not here listed with the tools, and those classed as having been deliberately finely retouched, where the retouch removes only the extreme edge of the blade (fig. 4.14, nos. 1, 5). The tiny retouches seem to be mainly semi-abrupt, and can occur either on one edge (fig. 4.11, no. 3) or on both (fig. 4.16, no. 2). The latter category includes pieces where (as is usually the case) the second area of retouch is on the inverse.

(16) *Abrupt retouch*. Included here are artefacts showing abrupt or scalariform lateral retouch on (a) one edge or (b) on both (fig. 4.10, no. 6). Pieces with mixed fine and abrupt lateral retouch, and alternate or inverse retouch, are included (fig. 4.4, no. 5). Not included is retouch which seems to represent voluntary blade-breaking methods such as 'burinating', corner retouching, notching, etc., since these features are so frequently seen on unretouched blades or bladelets which do not seem to be tools.

(b) Flint debitage

(1) *By-product*. Regarded as 'waste', these are the by-products of the setting-up of the core, for flaking or for refreshment, re-shaping etc. (figs. 4.3, no. 3 and 4.16, no. 1). In category one are crested blades (deriving from a specific type of core-preparation for blade-production; cf. fig. 4.15, no. 1), and tablets, thought to have been taken off the base between reduction stages (fig. 4.1, no. 6). In category two are the other elements with truncated facets which may reflect the re-shaping of flake cores or artefact repair. The spalls are regarded as pieces detached during the formation of burins and have a bulb of percussion.

(2) *Core*. Four types are distinguished, although the exhausted state of the sample renders the categories somewhat subjective. In category one are included cores with one flat flaking-surface (fig. 4.1, nos. 1, 3) and others with two flat flaking-surfaces ('change-of-orientation'; fig. 4.15, no. 11). The prismatic and pyramidal cores (category two) are those for the production mainly of blades and bladelets (figs. 4.5, nos. 1 and 6 and 4.16, no. 2) and are usually debited from a sub-circular plain base towards the apex. Category three includes exhausted core-bases and discoidal forms without distinct platform, or with 'wandering ridges', some being very small (fig. 4.5, no. 3). Category four includes broken and amorphous cores. There is a remarkable similarity in the proportion of cores after level 8: around 3-7% in levels 7-3 (cf. table 4.3).

(3) *Flake.* Unretouched flint flake forms are very varied in size and shape. Cortical (fig. 4.11, no. 4) and partly-cortical (fig. 4.10, no. 1) flakes (category one), flakes without cortex (category two) and tiny trimming-flakes or *éclats de taille* (category three) are the most abundant flint types at Sabi Abyad throughout the sequence, forming about 50% of the debitage, although less in level 11 (cf. table 4.3).

(4) *Blade; bladelet.* Unretouched blade blanks are always fewer than flakes in the assemblages, forming less than 14% of the debitage. Bladelets are even fewer, in contrast to the situation in the obsidian component. Hard-hammer, soft-hammer and punch techniques produce different forms (figs. 4.11, no. 7 and 4.14, nos. 1-3). The three categories consist of (1) blades with cortex, (2) blades with butt and without cortex (the rare intact blades included), and (3) segment or tip fragments of blades or bladelets.

(5) *Flake or blade fragment.* Included here are broken, unretouched artefacts which cannot be recognised as having been either flakes or blades before breakage.

(6) *Debris, chips, chunks.* Although each piece has evidently been worked by man, it cannot be placed into any of the above classes. Included are 'exploded' artefacts which have been burnt, very tiny flakes ('chips') and chunks perhaps from initial core-peeling.

(c) Obsidian tools

(1) *Polished or ground piece.* A few pieces of obsidian have been ground or polished (fig. 4.18, no. 11); they appear to be fragments of larger objects such as beads or pendants (or in one case a palette). The grinding results in a roughened, cortex-like surface. Ground obsidian occurs in Turkish sites and at, e.g., the Amuq B/C phases at Ras Shamra (levels VC, IVA, IVB and IIIA1; de Contenson 1992, Pl. CVII, 4).

(2) *'Outil de Çayönü'.* At Sabi Abyad there are no typical pieces but some fragments suggest the same type (figs. 4.18, no. 3 and 4.17, no. 16). Known mainly from early Turkish sites (and at later Neolithic sites to the east), this term is applied to thick obsidian blades which have had one, but more usually both, of the lateral edges abruptly retouched back almost to the central ridge, forming a rod-like, sometimes 'strangled' piece, occasionally with a spur at one end. On the ventral surface near the edge or edges is usually a matt area, thought to represent abrasion from utilisation in a haft (M.-C. Cauvin 1988). The single-edged pieces might be sickle elements (M.-C. Cauvin and Balkan 1983).

(3) *Pressure-flaked piece.* Pressure-flaking occurs on arrowheads (see below) and other fragments and shows the characteristic tiny retouch facets in scalar pattern produced by pressure (fig. 4.9, no. 7). It is very rare on obsidian pieces at Sabi Abyad, although prevalent further north at Turkish sites.

(4) *Arrowhead.* Both forms of obsidian projectile points (transverse and tanged) occur, although rarely. Some show pressure-flaking (fig. 4.12, no. 2). One lozenge-shaped fragment may represent a foliate. The transverse type is a blade segment made into

a triangular or trapeze shape by snapping (figs. 4.3, no. 6 and 4.17, no. 14) or retouch, and the wider of the lateral edges of the blade is assumed to be the cutting edge. Analogous with preserved specimens from Bronze Age Egypt, such pieces were either used singly or as parts of composite arrowheads and attached to a shaft with adhesive (Azoury and Bergman 1980). At Bronze Age Tell Hadidi on the Euphrates a transverse specimen was attached to the shaft using gypsum plaster (Miller et al. 1982). The tanged piece is the obsidian equivalent of the short 'desert' type with or without barbs ('wings') made in tabular flint (fig. 4.12, no. 2).

(5) *Truncated piece*. The equivalent in obsidian of those made in flint. In the case of pieces with two neat retouched truncations and morphology like that of sickle elements, it is possible that they were were so used, but this cannot be proved by naked-eye examination (fig. 4.4, nos. 10-11).

(6) *Fine retouch*. A numerically large group in the obsidian component, these are blades or parts of blades (most often segments) with runs of fine 'nibbling' retouch (fig. 4.13, nos. 5-8). Those with inverse and alternate retouch (category two) are common, with only the extreme edge of the blade removed. Categories three and four refer to the same types made on bladelets. Once again, the distinction between true and accidental retouch is somewhat subjective.

(7) *Abrupt retouch*. Here the retouch is abrupt rather than fine (fig. 4.9, no. 7). (N.B. *Outils de Çayönü* are not included). On some specimens the crushing or blunting effect is present and may represent heavy usage (fig. 4.17, no. 16).

(8) *Corner-thinned blade (CTB)*. Initially dubbed 'Kashkashok Blades' by Nishiaki, who was the first to distinguish the type at early Neolithic Tell Kashkashok on the Khabur drainage, where several hundred were found (Nishiaki 1990, 1991, 1992), these small artefacts are now called corner-thinned blades (henceforth CTBs), after the tiny inverse removal scar on the corner (or up to all four corners) of snapped blade segments (figs. 4.2, nos. 1-7 and 4.13, nos. 1-4). For Nishiaki (1990) the removal of the corner represents a method of hafting these pieces, in series, to knives or sickles. Many identical specimens were recovered from early Neolithic assemblages collected during the various Balikh-valley surveys, e.g. at Assouad, Mafraq Slouq, Breilat and Wazgöl (Copeland 1979, and in prep.).

Before Nishiaki's observations were made known, the rare specimens present in the material dealt with in the first report on Sabi Abyad lithics were seen as representing yet another blade-breaking method. However, whether a 'tool' or a by-product, this small artefact can now be seen as a distinct 'type'. In the present assemblages, the majority of CTBs have a single facet, but some have two, either at the same end or opposed on one edge, and there are rare triple specimens. They are seen more frequently in level II, the earliest yet excavated, and are rare and atypical in all other levels. Four categories are distinguished depending on whether additional retouch is present and on the number of facets (one, or more than one). This scheme diverges slightly from that suggested by Nishiaki (1992).

(9) *Splintered piece*. These are equivalent to pieces in flint.

(10) *Scraper*. Obsidian tools on flakes are scarce, but small numbers occur in most levels, an example being a broad specimen made on a core-tablet (fig. 4.12, no. 4).

(11) *Burin*. Burins are virtually absent in the obsidian component.

(12) *Borer*. Several small borers are present with minute sharp points made by alternate retouch (fig. 4.13, nos. 12-13). As to the drills, the same comments apply as were made on the flint specimens.

(13) *Notch, denticulate*. Equivalent to those in the flint component (fig. 4.18, no. 7).

(14) *Core for side-blow blade-flake (CSBBF)*. Henceforth CSBBF. These were first noted at Telul eth-Thalathat (Fukai and Matsutani 1981) in a Hassuna context, and were said to represent the cores or the part of the blade blank from which side-blow blade flakes (henceforth SBBF; see below) were struck. For Nishiaki (1992), who has made an extensive study of both types, they are 'short sections' rather than cores. At Hajji Firuz, Voigt (1983) regarded them as the tools and the SBBFs as the by-products. They consist of square blade segments, each end of which was truncated with a single blow (occasionally more) so as to form a negative facet (figs. 4.12, nos. 3 and 9, 4.14, no. 7 and 4.18, no. 13).

(15) *Side-blow blade-flake (SBBF)*. First distinguished at Neolithic Jarmo by L. Braidwood (1951) and then at other early Pottery Neolithic (e.g. Hassunan) sites in northern Iraq, this type is now known to occur in the Syrian Jezirah (Tell Kashkashok and the Balikh valley sites). The method used to produce them, and their status (tool or by-product?), have been much discussed in the literature (Copeland 1979; Hole 1983). They consist of very narrow segments of obsidian blades with a central ridge, which have been bitruncated close together to form a sliver-like artefact (fig. 4.2, nos. 13-14, and fig. 4.12, nos. 6-8, 10-12). They were detached from the original blade blank by a blow on the ridge which left negative facets on each truncation. According to Nishiaki (1992), those from Kashkashok were made necessarily on wide blades. However, at Sabi Abyad some minute specimens occur and there are various sizes (the largest shown on fig. 4.12, no. 12). Not all are typical, and sometimes the central ridge has been destroyed by the removal blow.

Although SBBFs seem to be characteristic of late Neolithic, Hassunan contexts in northern Iraq, and west to the Khabur and Balikh, their distribution in the rest of northern Syria remains unknown.

(16) *Composite*. Very rare in the obsidian, these are equivalent to those in flint.

(d) Obsidian debitage

(1) *Core*. Cores are scarce but a flat and a pyramidal type is present, the latter often minute (fig. 4.13, no. 14).

(2) *By-product, Flake*. Equivalent to those in flint (e.g. fig. 4.18, no. 7). Most flakes are small chips.

(3) *Blade, Bladelet.* The obsidian debitage consists almost entirely of blades and bladelets, most often incomplete. On those with butts, almost all of these were punctiform (fig. 4.17, no. 19). A frequently seen type is a small to medium-sized butt end, about 4 cm long, without its tip. However, segments are even more numerous, and the range of sizes is greater. A hint as to the original length is given by the rare intact specimens (see fig. 4.13, nos. 9-11). Many pieces have 'utilisation retouch' or nicks. Methods of breaking the blades (cf. Copeland 1989) include snapping, with or without the aid of a small retouched platform, percussion on the ridge, notching or 'burinating'. Snapped blades often have hinge fractures on the break. Obsidian seems to have been used differently from flint, judging by the pieces with crushed edges, worn or patinated facet-margins, striations or scratches, and the fact that CTBs, SBBFs and CSBBFs in flint are virtually absent.

It is presumed that the bulk of the obsidian was imported from sources in eastern Turkey in the form of already-formed blades. Was the Euphrates and its tributaries the channel by which it was distributed, as suggested by M.-C. Cauvin (1988)? Similar blades in flint are still produced in the same regions today and are sold by weight in bucketfuls.

(4) *Fragment.* Any worked piece unclassifiable into one of the above categories.

The Archaeological Material

The excavated artefacts are listed on tables 4.4 and 4.5 according to level. A description of the general aspects of each level follows.

Level 11

This, the earliest level so far excavated at Sabi Abyad, has a sample of 94 flint and 46 obsidian artefacts (table 4.4 and figs. 4.1 and 4.2). The material differs from that in the later levels in several respects. The raw flint is mainly in beige tones, followed by grey. Pebbles seem to have been the preferred core-blank form. The physical condition of the flints is poor, many pieces being broken or burnt. The debitage is distinguished by a higher proportion of cores (ca. 27%; fig. 4.1, nos. 1-4) than in other levels where the norm is ca. 3%. However, none are of the early Neolithic type known as naviform. Blades are scarce (ca. 4%) and unretouched flakes are also fewer than in later levels (about 25%). The predominant butt type is absent/broken (42%) or plain (26%; see tables 4.2 and 4.3).

Flint tools form ca. 25% of the assemblage, but this ratio is almost doubled in the obsidian component (42%). All the tools are small and often damaged. Some obsidian pieces are patinated and scratched as well, with worn facet-margins. Curiously, although there are relatively numerous (n= 9) CTBs, which form 45% of the obsidian tools (or 21.9% of all the tools), there are no SBBFs and only one dubious

SABI ABYAD: Classification Levels	7	8	9	10	11
I Flint Tools					
HEAVY-DUTY TYPE					
1. Flaked		1			
2. Battered, hammerstone		1			
ARROWHEAD:					
1. Tanged		1			
2. Transverse					
PRESSURE FLAKED PIECE		1			1
LUSTRED SICKLE ELEMENT:					
1. Simple or fragment		1			
2. Truncated					1
3. Backed		2			
4. 2 and 3					
5. Crescentic					
6. Toothed					
"SHAPE DEFINED ELEMENT":					
1. Retouched				1	
2. Other		1	1		
TRUNCATED PIECE					
BACKED KNIFE:					
1. Retouched back		1	1		
2. Natural back		1			1
SCRAPER:					
1. Racloir	1	3			
2. "Tile Knife" (Tabular scraper)	1				
3. Raclette	1				
4. End of blade	1				1
5. End of flake		3		2	4
6. Steep, carinated; rabot		1		1	1
BURIN:					
1. Dihedral on natural pan		8	1		3
2. Truncation					
BORER:					
1. Piercer: bec	2	6	1	1	1
2. Drill					

Table 4.4a. Typological and technological breakdown of flint artefacts in levels 11-7.

SABI ABYAD: Classification Levels	7	8	9	10	11
NOTCH	2	2		1	1
DENTICULATE	1	3			
COMPOSITE	1	1		2	1
SPLINTERED PIECE	1	2		1	1
FINE RETOUCH:					
1. Unilateral	1	8	2	1	6
2. Bilateral/Alternate		3	1		1
ABRUPT RETOUCH:					
1. Unilateral					1
2. Bilateral/Alternate					
SUB-TOTAL: FLINT TOOLS	12	50	7	10	24
II Flint Debitage					
BY-PRODUCT:					
1. Crested piece; tablet	1	5			
2. Refreshment element		6		1	4
3. Burin spall		4			3
CORE:					
1. Flat; change-of-orientation	1				
2. Prismatic; pyramidal	1	6		6	4
3. Globular; discoid	1	6	2	5	6
4. Inderminate; fragment		4		2	9
FLAKE:					
1. with cortex	8	51	7	17	7
2. non-cortex	18	49	1	6	3
3. "Eclat de taille"	26	44	7	9	8
BLADE, BLADELET:					
1. With cortex	2	24			
2. With butt, no cortex		3		3	3
3. Segment; tip	3	4			
FLAKE OR BLADE FRAGMENT	24	41	5	8	18
DEBRIS, CHIP, CHUNK	1	26		1	5
SUB-TOTAL: FLINT DEBITAGE	86	273	22	58	70
SUB-TOTAL: FLINT ARTEFACTS	98	323	29	68	94

Table 4.4b. Typological and technological breakdown of flint artefacts in levels 11-7.

SABI ABYAD: Classification Levels	7	8	9	10	11
III Obsidian Tools					
POLISHED OR GROUND PIECE			1	1	
"OUTIL DE ÇAYÖNÜ"					
PRESSURE FLAKED PIECE					
ARROWHEAD:					
1. Tanged					
2. Transverse	1				
3. Other					
TRUNCATED PIECE	2	3			1
FINE RETOUCH:					
1. On blade, lateral/bilateral	1	2			5
2. On blade, inverse, alternate		1			3
3. On bladelet, lateral/bilateral		1			
4. On bladelet, inverse, alternate					
ABRUPT RETOUCH:					
1. Lateral/bilateral			1	1	
2. Inverse; alternate					
CORNER-THINNED BLADE:					
1. Single, with retouch	1	1			1
2. Single, unretouched					7
3. Multiple, retouched					1
4. Multiple, unretouched					
SPLINTERED PIECE					1
SCRAPER					
BURIN					
BORER					
NOTCH, DENTICULATE			2	2	
CORE FOR SIDE-BLOW BLADE FLAKE					1
SIDE-BLOW BLADE FLAKE		3	1	1	
COMPOSITE		1			
SUB-TOTAL: OBSIDIAN TOOLS	5	12	5	5	20

Table 4.4c. Typological and technological breakdown of flint artefacts in levels 11-7.

SABI ABYAD: Classification Levels	7	8	9	10	11
IV Obsidian Debitage					
CORE:					
1. Flat					
2. Prismatic; pyramidal					1
BY-PRODUCT:					
1. Crested piece					
2. Refreshment element		1			1
FLAKE	1			2	
BLADE:					
1. With butt	1	6		1	
2. Tip or Segment	4	4		1	12
BLADELET:					
1. With butt	2			1	
2. Tip or Segment	1	1		1	6
FRAGMENT	5	1			6
SUB-TOTAL: OBSIDIAN DEBITAGE	14	13	0	6	26
Total Obsidian Artefacts	19	25	5	11	46
Total Artefacts in Levels 7 to 11	**117**	**348**	**39**	**79**	**140**

Table 4.4d. Typological and technological breakdown of flint artefacts in levels 11-7.

CSBBF (fig. 4.2, no. 9). The CTBs consist of one double and eight single types, and some are atypical in comparison with those known from earlier sites such as Assouad, in having additional retouching. Flint Tile Knives and arrowheads are absent, while scraper forms are more common. There is only one lustred sickle element. Level 11 has little resemblance to the Pre-Pottery Neolithic B or early Pottery Neolithic of the Levant and the Balikh valley where tanged arrowheads are characteristic. Nevertheless, the appearance of such a number of CTBs in proportions equivalent to those at Damishliyya (ca. 35% according to Nishiaki 1992), and the fact that these are virtually absent or atypical in later levels, hints that level 11 belongs to a Neolithic tradition earlier than that in the overlying levels 10-3 (Balikh IIB?).

Level 10

Level 10 produced 68 flint and 11 obsidian pieces (table 4.4 and fig. 4.2, nos. 9-15). Their condition differs from that in level 11 in being less broken up (absent butts 34%) and in having more dark brown flint. Cores are relatively frequent (n=13) and consist of the same small prismatic bipolar types as in level 11. Tools are scarce: no arrowheads or Tile Knives in the flint and only one CTB (two facets), and one SBBF in the obsidian, where they form 9% each of all tools or 25% of the four obsidian tools. There is one corner-borer, a type typical of later levels.

Level 9

Level 9 produced only 29 flint and 5 obsidian artefacts, most of which are debitage (fig. 4.3).

Level 8

Level 8 has a better sample of 323 flint and 25 obsidian artefacts, of which tools (15%) form a varied sample (figs. 4.3 and 4.4). There is a Byblos Point body fragment and another pressure-flaked piece, but Tile Knives are still absent. A globular flint object may be a hammerstone. Burins are slightly more numerous than in other levels (18%), outnumbering scrapers. Sickle elements are small and two are backed. A simple chopper on a pebble has only one facet on each face of its cutting-edge. In the obsidian there is a single CTB.

Generally, levels 10 to 8 seem to be developing towards the Transitional levels above, while retaining links with the earlier phase of level 11.

Level 7

Only 117 artefacts, 98 of flint and 19 of obsidian, were recorded (fig. 4.4, nos. 1-4 and table 4.4). Most of the raw material is brown (58%) or beige (28%); there is no black flint. The same features seem to be present as in levels 10-8, although none of the rarer types occurred except for one CTB. Worthy of note is an obsidian transverse arrowhead in an unclear context, attributed to level 7 (fig. 4.3, no. 6). It is not yet clear whether the scarcity of flint represents a genuine decline in flint use, or whether the village lay-out changed to include areas where flint was hardly used.

Level 6

This is the level in which the 'Burnt Village' was found, a complex of buildings partly destroyed by fire. In several loci the flints were calcined and blackened; some seemed to have exploded, others disintegrated to dust when lifted. It was sometimes possible to refit fragments into one tool, but many others defied classification. Fragments, chips, chunks and debris form 32% of the debitage. The damage factor

may have skewed the statistics. For example, there is a lower frequency of tools and a higher frequency of fine/abrupt retouch (20% of the tools) where the norm in other levels is under 16%. Nevertheless, there is a large sample of 2310 artefacts of flint and 381 of obsidian (table 4.5), giving a wide variety of artefact types (figs. 4.5 to 4.14).

In a sample of ca. 700 specimens, the raw material was dominated by brown and grey flint (65%) followed by beige (20%), and a few speckled, white and pied pieces appeared. Debitage methods do not differ from those in level 7. Cores form 3.5% of the debitage and most were much worked down; these, and the frequent by-products, indicate that flint artefacts were fashioned and repaired on site. Blades were equally scarce (8.6%) and of those butts which were recognisable, a third was plain and almost another 20% were punctiform or linear. A few examples of 'proximal inverse scars' appeared (fig. 4.14, no. 2).

The tool classes were similar to those of the earlier levels, but in each class there was more variety. The hammerstones are round flint balls, very battered. A nodule (apparently utilised) has a natural central hole. One fragment may be a polisher, and other heavy-duty pieces include axe or pick roughouts (fig. 4.6), one being an elongated pebble with battered tip, others roughly formed into choppers.

There are eight pieces with traces of pressure-flaking and hints of hunting tool-kits: a unique short-tanged Haparsa or desert-type arrowhead (fig. 4.12, no. 5) and the usual few fragments of Byblos points (fig. 4.7, no. 5), in one case Amuq-like.

A unique find, a fine example of the mid-section of a flint javelin or bifacial knife, made by bifacial pressure-flaking on a tabular slab, came from the upper room fill of a level 6 building (fig. 4.7, no. 2). As noted earlier, to the south such types occur together with transverse arrowheads (e.g. at Dhuweila 2; Betts 1993).

In the scrapers, which form almost a quarter of the tool total, thumbnail, carinated and nosed forms occur as well as fan-scraper-like pieces (fig. 4.11, no. 4), single and double *racloirs*, finely retouched *raclettes* and high-domed *rabots*. A dozen Tile Knives appeared (3.3%), some being fragments. Several have striations on the cortex, others have a coating of white plaster and were evidently used in the production or processing of plaster. They are thicker than later specimens, averaging 6mm at the bifacial edge. Sickle elements are not abundant (ca. 9%) and are the same stylistically, if more varied as to size, as before, i.e. rather roughly retouched or without retouch. Some are slightly denticulated and on one there is a trace of bitumen (cf. the bitumen-coated pieces in the reconstructed Assouad sickle; M.-C. Cauvin 1973).

The obsidian component of level 6 contains a variety of pieces similar to those in previous levels with some unusual forms as well (figs. 4.12-4.13). The dominant type is the blade or bladelet segment with characteristic snapping features or fracture negatives. The ratio of flint to obsidian is close to that of the neighbouring levels 5 and 7, as is the proportion of tools to debitage. As would be expected, the fine/abrupt retouch group is large (40%). Other tools include a heavily retouched piece resembling a Çayönü tool, some scratched, wide blade segments, a small celt-like polished

piece, a 'strangled' blade with alternate retouch together with a tiny pyramidal core and a large scraper on a tablet (fig. 4.12, no. 4). A few CTBs, all atypical, are present, mainly with single facets, but one has three facets and another has abrupt bilateral retouch on the side opposed to the facet (fig. 4.13, nos. 1-4). All seem to have 'utilisation retouch' on the edges.

The SBBFs and CSBBFs (fig. 4.12, nos. 3, 6-13) together form a third of the obsidian tools and, as we shall see, remain popular all through the other two Transitional levels 5 and 4. Their presence so late may indicate that they had a longer span here than in the east.

As a whole, the industry of level 6 seems to be oriented toward domestic activities (scraping, cutting, piercing, etc.) carried out in the houses at the start of the Transitional phase.

Level 5

This is the middle Transitional level, representing the building phases following those of the 'Burnt Village'. It produced a sample of 908 artefacts: 785 flint and 123 obsidian (table 4.5).

The level 5 debitage methods follow the same traditions as seen previously. There are close similarities in the types of raw material (mainly beige or grey), and in the ratio of flakes (55%) to blades (11%). Cores similarly make up ca. 3%, and the butt types are mainly plain (37%) or punctiform (22%).

In the flint tools there is the usual small number of heavy-duty types (hammerstones and choppers) as well as one incomplete Byblos Point and other possible tanged arrowhead fragments. There are fewer scrapers (ca. 12%), among which Tile Knives have decreased to 1.3%, and the fine/abrupt group has fallen to ca. 11%. However, these percentages are skewed by the presence of the arrowhead cache (see below); without this phenomenon, there would be 177 tools (22%), of which 29 would be scrapers (ca. 16%), and the fine/abrupt group would amount to 15%, i.e. totals closer to those of level 6. Worthy of note is a trace of bitumen on the dorsal surface of a sickle element and a pressure-flaked blade.

Level 5 contains two unique features: the 'concentration' and the 'cache' of transverse arrowheads. The so-called concentration consists of 80 flint artefacts found together in the southwest corner of a room (no. 14) in level 5 building I. Unusually, these are mainly blades and tools on blades in a glossy grey flint (and no obsidian). Many of these pieces, both tools and all the by-products and debitage types which no doubt went into their production, seem to have been struck from the same core (which was not present). The tools include borers, burins and scrapers (fig. 4.15). Tools in other flint types (e.g. black) were also present.

The cache of flint transverse arrowheads, consisting of 56 complete specimens and two fragments (fig. 4.17, nos. 1-10), has been described already elsewhere (Copeland and Akkermans 1993) and the following is a summary of that report. The

arrowheads were found all together in one corner on the floor of the level 5 house I. All but one have two *tranchet* edges and were made on ca. 2.8 cm wide blade blanks, each of which were bitruncated to form a narrow segment ca. 1-1.5 cm wide. At the centre of the segment the thickness is ca. 0.2-0.4 cm. The two truncations are variously retouched. On 21 more elongated pieces (as on fig. 4.17, nos. 1-4), retouch was done by bifacial pressure-flaking which meets in the centre and gives a lentoid section. On 25 more sub-rectangular types, only the dorsal surface is pressure-flaked (fig. 4.17, nos. 5-8), although the ventral surface is also laterally retouched to produce a lentoid section. On nine shorter, more trapeze-like specimens (e.g. fig. 4.17, nos. 9-10), the perpendicular break planes are left unretouched. It is this variant which most resembles the trapeze-like specimens of the obsidian sample. There is no indication as to how these projectiles were hafted to the arrow shaft but plaster is known to have been used in the single-edged pieces of the southern Levant (cf. Nadel 1989:65).

Level 4

The upper part of the three Transitional levels produced 613 flint and 202 obsidian artefacts (table 4.5 and figs. 4.17-4.18). The raw material and most other traits of the core reduction traditions resemble those of level 5. However, many pieces are broken with damaged butts; 16% of the coarsely-debited flakes and blades have cortex butts. In the flint tools there is an increase over level 5 of sickle elements (ca. 18%), most of which are made on square or oblong blade segments, and there are fewer scrapers (ca. 12%), which are in the same proportion as borers. Many of the latter are in 'corner borer' style. Tile Knives are now very thin (2-3 mm thick; see e.g. fig. 4.16, no. 9) and arrowheads are represented by a tang and a tip fragment.

In the obsidian there are three trapeze-type transverse arrowheads (one in a clear obsidian), only 2 mm thick (fig. 4.17, nos. 14-15, 18) and two other fragments, one a possible foliate; this group forms 7% of the obsidian tools. A curious piece is a wide blade segment with concave truncations forming a diabolo shape (fig. 4.17, no. 11). More 'normal' tools include a minute borer. The earlier obsidian types have markedly declined (one CTB and two atypical SBBFs) to 2-3% of the obsidian tools respectively, while the fine/abrupt group has increased to 58%. One piece is scratched and 'strangled', reminiscent of a Çayönü tool.

Level 3C

This is the earliest Balikh IIIB (Early Halaf) level, but it only produced a small sample: 49 flint and 13 obsidian artefacts (table 4.5 and fig. 4.18; see also the artefacts of the same phase described in Copeland 1989). This makes it difficult to compare Halaf lithics to those of the older ('Amuq B') phase of the late Neolithic. In the 41 pieces of debitage, most of which were in brown or beige flint, it can, however, be

SABI ABYAD: Classification Levels	3A-1	3B	3C	4	5	6
I Flint Tools						
HEAVY-DUTY TYPE						
1. Flaked		2			6	5
2. Battered, hammerstone	1	2			3	11
ARROWHEAD:						
1. Tanged		2		3	2	3
2. Transverse					59	
PRESSURE FLAKED PIECE		2		2	2	8
LUSTRED SICKLE ELEMENT:						
1. Simple or fragment	1	5	2	8	8	10
2. Truncated		2		4	1	9
3. Backed		1	1	4	6	5
4. 2 and 3				2	5	4
5. Crescentic		1			1	2
6. Toothed						3
"SHAPE DEFINED ELEMENT":						
1. Retouched	1	5	1	5	6	5
2. Other		4			8	7
TRUNCATED PIECE	1	3		3	3	6
BACKED KNIFE:						
1. Retouched back					3	7
2. Natural back				2	11	23
SCRAPER:						
1. Racloir		5		1	4	10
2. "Tile Knife" (Tabular scraper)	1	4		3	3	12
3. Raclette				1	8	7
4. End of blade		3	2	6	4	15
5. End of flake	1	5		3	7	20
6. Steep, carinated; rabot	1			2	3	13
BURIN:						
1. Dihedral on natural pan		2		1	3	14
2. Truncation					1	1
BORER:						
1. Piercer: bec		2		12	16	21
2. Drill		2			4	7

Table 4.5a. Typological and technological breakdown of flint artefacts in levels 6 to 3A-1.

SABI ABYAD: Classification Levels	3A-1	3B	3C	4	5	6
NOTCH	1	5		10	14	27
DENTICULATE	1	4		7	11	24
COMPOSITE		3		1	4	17
SPLINTERED PIECE		2		1	3	2
FINE RETOUCH:						
1. Unilateral	2	2	1	8	12	23
2. Bilateral/Alternate	1		1	5	8	18
ABRUPT RETOUCH:						
1. Unilateral		4		2	3	13
2. Bilateral/Alternate				1	4	15
SUB-TOTAL: FLINT TOOLS	12	72	8	97	236	367
II Flint Debitage						
BY-PRODUCT:						
1. Crested piece; tablet	2	7	1	6	17	21
2. Refreshment element		7	2	6	23	47
3. Burin spall	1	10		2	10	14
CORE:						
1. Flat; change-of-orientation		3		1	6	5
2. Prismatic; pyramidal		4	1	7	5	28
3. Globular; discoid		3		10	4	26
4. Inderminate; fragment		5	2	2	3	13
FLAKE:						
1. with cortex	10	29	5	85	102	238
2. non-cortex	7	61	7	69	65	311
3. "Eclat de taille"	16	121	7	134	135	446
BLADE, BLADELET:						
1. With cortex	–	8	1	6	18	36
2. With butt, no coretx	6	8	1	17	30	97
3. Segment; tip	3	7	1	10	14	35
FLAKE OR BLADE FRAGMENT	17	103	11	151	108	490
DEBRIS, CHIP, CHUNK	2	7	2	10	9	136
SUB-TOTAL: FLINT DEBITAGE	64	383	41	516	549	1943
SUB-TOTAL: FLINT ARTEFACTS	76	455	49	613	785	2310

Table 4.5b. Typological and technological breakdown of flint artefacts in levels 6 to 3A-1.

SABI ABYAD: Classification Levels	3A-1	3B	3C	4	5	6
III Obsidian Tools						
POLISHED OR GROUND PIECE		1			1	1
"OUTIL DE ÇAYÖNÜ"						2
PRESSURE FLAKED PIECE						1
ARROWHEAD:						
1. Tanged				1		
2. Transverse		1		3		
3. Other						1
TRUNCATED PIECE	1			2	1	6
FINE RETOUCH:						
1. On blade, lateral/bilateral		5	2	11	6	26
2. On blade, inverse, alternate		2		4	9	11
3. On bladelet, lateral/bilateral		2		5		9
4. On bladelet, inverse, alternate				1	1	5
ABRUPT RETOUCH:						
1. Lateral/bilateral		1		5	2	1
2. Inverse; alternate				4	1	1
CORNER-THINNED BLADE:						
1. Single, with retouch		2		1	2	6
2. Single, unretouched						1
3. Multiple, retouched		1				4
4. Multiple, unretouched					1	1
SPLINTERED PIECE				1	1	
SCRAPER				1	1	
BURIN						4
BORER		1		2	2	5
NOTCH, DENTICULATE	2	4	1	7	6	13
CORE FOR SIDE-BLOW BLADE FLAKE		1			1	5
SIDE-BLOW BLADE FLAKE		2	2	2	2	25
COMPOSITE				1		2
SUB-TOTAL: OBSIDIAN TOOLS	3	23	5	51	37	130

Table 4.5c. Typological and technological breakdown of flint artefacts in levels 6 to 3A-1.

SABI ABYAD: Classification, Levels	3A-1	3B	3C	4	5	6
IV Obsidian Debitage						
CORE:						
1. Flat					1	1
2. Prismatic; pyramidal		3				1
BY-PRODUCT:						
1. Crested piece				3		4
2. Refreshment element		1		4	1	8
FLAKE	1	11	2	17	11	36
BLADE:						
1. With butt	3	27	2	28	18	66
2. Tip or Segment	11	36	1	62	27	88
BLADELET:						
1. With butt	3	8	2	7	11	12
2. Tip or Segment	2	9		18	12	19
FRAGMENT	3	10	1	12	5	16
SUB-TOTAL: OBSIDIAN DEBITAGE	23	105	8	151	86	251
Total Obsidian Artefacts	26	128	13	202	123	381
Total Artefacts in Levels 3A-1 to 6	**102**	**583**	**62**	**815**	**908**	**2691**

Table 4.5d. Typological and technological breakdown of flint artefacts in levels 6 to 3A-1.

seen that level 4 lithic traditions have carried on into level 3C. Only eight flint tools were recorded: sickle elements (one of which had denticulations) and scrapers, including a very thin Tile Knife (only 2 mm thick; fig. 4.18, no. 1) with fine retouch.

In the obsidian there were, nevertheless, two SBBFs, one very large, and a possible, although damaged, very atypical CTB. These may perhaps be re-used residuals.

Level 3B

Table 4.5 lists the sample of 455 flint and 128 obsidian artefacts (fig. 4.18). Raw material still consists of brown, beige or grey flint, and debitage traditions follow those of the levels below, although the specimens are somewhat more rough in spite of having several good blades (6%) with punctiform butts. The number of cores (3%) is almost the same as in level 4; so is the ratio of tools to debitage (16%) and the proportion of flakes (55%). There are only 72 flint tools, a number which

suggests that the percentages will be unreliable. Sickle elements are slightly fewer at 12%. However, there are certainly more scrapers, of which fully 5% are Tile Knives (mainly fragmentary). One of two possible arrowhead fragments is a tip with inverse retouch, the other a pointed blade with slightly shaped butt. The lack of variety in the sample may reflect a deterioration in flint-working traditions at this time.

The obsidian component remains, as in level 4, higher at 22% than that in the lower Transitional levels. The obsidian tool sample is also very small (23 pieces) and may be statistically aberrant (for example three SBBFs form 12% of the obsidian tools, as do the three poor CTBs; one arrowhead forms 4%). One of the SBBFs is atypical in having a possible negative truncation, another has a hinge fracture at one end. A CSBBF is atypically narrow. One of the CTBs is damaged or may be a splintered piece instead. These features suggest that CTBs are residuals in this phase.

Levels 3A-1

So far, small samples (only 102 pieces; cf. table 4.5) prevent a reliable assessment of the levels 3A to 1. Nevertheless, much the same, if now more coarsely carried out, debitage traditions seem to continue, and the same limited range of tool-types (including Tile Knives) is present. There are no CTBs or SBBFs this time among the 26 obsidian tools. Much the same features were observed in the material described in the first report (Copeland 1989).

Later levels

A number of artefacts occurred in post-Halaf, i.e. Late Bronze Age, contexts. Although the artefact types from these contexts appeared to be no different from those of the prehistoric phases, and included obsidian types regarded as characterising the latter phases (e.g. atypical CTBs and SBBFs, a minute flint transverse arrowhead; fig. 4.18, no. 17), it is possible that the Late Bronze Age layers were dug into earlier deposits. In addition, much of the material is said to be from mixed deposits in which late 2nd millennium sherds were also present. Thus it seems better to disregard this material here, and to confine comments to the following brief description. Of the approximately 250 artefacts involved, the raw material types are the same as before, as are the debitage and tool types. The latter include scrapers, notches and many fine or abruptly retouched pieces.

Conclusion

To sum up, from level 10 upwards, no major changes occur in the lithic industries, although Tile Knives become thinner and some obsidian forms disappear. Also, a slight decline in variability is discernable upwards. The assemblages seem to represent a long-lived and stable set of stone-working traditions, which changed slowly or not at all through time. Level 11 may belong to an earlier phase not yet well attested at Sabi Abyad although probably present at other sites in the valley.

The Balikh Phase Chronology

The lithic material of Sabi Abyad can now be viewed from a broader perspective; the inhabitants did not live in cultural isolation, as the presence of imported stone materials demonstrates. They did not procure, fashion and utilise their stone artefacts merely for pleasure, but as means towards ends: the acquiring of food and other resources and, ultimately, ensuring survival in a region with distinct climatic and other constraints. Evidently, contact with other populations was necessary.

Fortunately it is now possible, thanks to the discoveries in the Balikh valley and the results of new investigations in the Syrian Jezirah and Euphrates drainage areas, to re-evaluate earlier data and to construct a more reliable cultural chronology for the region. The Sabi Abyad lithics will now be viewed in the context of Balikh phases (for a detailed account on the Balikh chronological framework, see Akkermans 1993:110ff and Foreword, this volume).

The earliest phase: level 11

The analyses described above suggested to this writer that the level 11 lithic assemblage differs in several respects from that in the next levels 10-7 above. Earlier, levels 8-7 were assigned by Akkermans (1991, 1993) to the Balikh phase IIC and dated to ca. 5300-5200 B.C., this on the basis of the 1988 excavations. Levels 10 and 9, unearthed in later campaigns, seem to belong to this Balikh IIC period as well (see below). The question therefore arises: if level ll does not belong to the IIC phase, to which Balikh phase does it pertain? Could it belong to the Damishliyya/ Assouad culture of Balikh phase IIA?

This is a possibility since, as it now appears, we must regard the earliest pottery in the Balikh (e.g. in Damishliyya upper levels) as younger than previously (based on 7th millennium radiocarbon dates at Assouad) believed. Radiocarbon dates obtained by Akkermans (1991) indicate that it dates to 5900-5700 B.C., i.e. is broadly contemporary with Amuq A. The lithics indicate that a Balikh IIA dating for level 11 is unlikely. There are so many differences between the Damishliyya or Assouad flint and obsidian and that of level 11 that it is unlikely that the two phases are contemporary (in Balikh IIA). A careful study by Nishiaki (1992) of the excavated and surface survey material of Tell Damishliyya indicate that the raw material at Damishliyya contains much coarse-grain flint, in contrast to Sabi Abyad as a whole. Moreover, the debitage techniques were blade-oriented and the tool kit is dominated by burins and sickle elements, among which crescentic-backed types predominate, all features which differ from those of level 11 at Sabi Abyad. Even more significant is the presence of Byblos Points and early obsidian types such as corner-thinned blades at Damishliyya, in which there was a much higher proportion of obsidian than at Sabi Abyad.

In short, we see that by the time of level 11, PPNB and Amuq A traits such as Byblos/ Amuq Points, bipolar blade cores, end-of-blade scrapers, extensive pressure-flaking,

chipped axes or picks, etc., have been virtually abandoned. Instead, except for certain traits (e.g. in the obsidian), a more typologically limited and 'banal' flint industry is seen to be present. Thanks to the work of Nishiaki, it is now apparent that obsidian corner-thinned blades, so far disregarded in the literature (cf. Hole 1993), not noted (Moore 1975), or not yet fully published (M.-C. Cauvin 1972), are widely present in the Jezirah at Pre-Pottery Neolithic B and early Pottery Neolithic sites such as Tells Abu Hureyra, Assouad, Bouqras, Kashkashok, and many others. They seem to have virtually disappeared, or to form negligeable percentages, by Halaf times at Tell Kashkashok II and, as we now see, during the Balikh IIC-IIIA sequence at Sabi Abyad.

Thus, although the larger percentage of corner-thinned blades at Sabi Abyad level 11 links it to Balikh IIA sites, the other features of level 11 do not suggest contemporaneity with the latter phase. Instead, the presence of these link types supports the idea that occupation continued somewhere else on the tell or in the region during which time (Balikh IIB?) the early traditions were handed down.

Balikh IIC phase: levels 10-7

Very little technological or typological data separate the levels 10 to 7 from each other (cf. table 4.3; the lithics of levels 10, 9 and 8 have been considered together since 10 and 9 have small samples), and therefore the lithics of these levels are discussed as referring to the Balikh IIC phase. As noted above, levels 8-7 at Sabi Abyad were earlier dated at ca. 5300-5200 B.C.; the preceding levels 10 and 9 then may date around 5400-5300 B.C. Hence the Balikh IIC phase broadly equates with Amuq B (Akkermans 1991, 1993).

Up to now this period has not been well attested in the Jezirah, where, for decades, there have been no more than hints that such a phase existed, e.g. at Chagar Bazar, lower Tell Habesh and the *Altmonochrome* level at Tell Halaf (cf. Copeland and Hours 1987). The latter authors pointed out that, although comparisons can be made between the ceramics of the Amuq B (as evidenced at e.g. Ras Shamra VA, dated to about 5200 B.C.) and those of the Jezirah, the lithics of this phase had never been adequately dealt with.

The Balikh IIC material of Tell Sabi Abyad therefore fills a gap in our knowledge of the later 6th millennium B.C. in north-central Syria. As a result, comparisons can be extended to eastern Syria and northern Iraq, where the cultures known to be contemporary include the Samarran at sites such as Baghouz, Tell as-Sawwan (level III, dated to ca. 5350 B.C.) and Yarim Tepe I (level 7 with 'Hassuna/Samarra', less reliably dated to 5210 B.C.). Between the Balikh and the Sinjar remains the still enigmatic Khabur basin, an area of importance to our full understanding of the trade networks, since it is situated between the Balikh valley and the eastern obsidian sources. This area has only recently begun to reveal its Neolithic past (Nishiaki 1992; Hole 1993). Even now, however, although the levels 10-7 lithics of Tell Sabi

Abyad have clear links with the east in their obsidian imports, so far very little is known about the 6th millennium flint industries there.

Balikh IIIA phase: levels 6-4

Because of the many radiocarbon dates for this phase and the recovery of large artefact assemblages, the lithics of the Transitional phase of levels 6 to 4 can be quite precisely evaluated. One building phase (the level 6 'Burnt Village'), which was destroyed partially by fire, is thought to represent material in primary position. The villages of this Balikh IIIA phase as a whole are dated to 5200-5100 B.C. (Akkermans 1991; Akkermans and Verhoeven 1995), i.e. close to 5000 B.C., the conventional date for the start of Amuq C.

The statistics on table 4.3 show how similar the attributes of these levels are. Since the proportions are drawn from large samples, and since the Burnt Village is in situ, the similarity of the attributes in the other levels can be regarded as confirmed. Thus the lithics of the Transitional levels seem to be part of the unbroken occupation sequence which began in the Balikh IIC phase of the late Neolithic.

The appearance of Tile Knives may be significant, although it would have been expected that they appeared earlier. Comments have already been made on their late Neolithic appearance to the south and on their contemporaneity with bifacial knives and transverse arrowheads, for example in the late Neolithic of eastern Jordan (dated to ca. 5300 B.C., e.g. at Burqu; Betts 1993). Also noted, and discussed in the first report (Copeland 1989), was their presence in the Samarran at Baghouz (Braidwood et al. 1944). This type may represent part of the 'Samarran influence' indicated in the ceramics (cf. chapter 3).

Hunting with bow and arrow continued, as the presence of the various arrowheads proves, i.e. it was not wholly replaced by use of sling-bolts as was once assumed. However, the morphology changed, the projectiles becoming small and delicate in comparison with the earlier Byblos Points. One can only speculate as to why this occurred. Many authors (e.g. Gopher 1993) have suggested that such projectiles were used with poison, or that they were used for bringing down the game birds and water fowl which would have been attracted to the riverine areas of the valley.

The level 5 arrowhead cache is a unique occurrence in northern Syria. Such caches are rare in the Levant (cf. the group of 37 transverse arrowheads reported from the Negev by Rosen 1984). In addition, in that they are double-edged, their typology differs from that of other transverse arrowheads (even those in obsidian), which most often have only one *tranchet* edge. Some even have retouched tangs opposed to this edge.

Balikh IIIB phase: levels 3-1

Levels 3-1 at Sabi Abyad are assigned to the Balikh phase IIIB or Early Halaf period, which has radiocarbon dates of 5100-5000 B.C. (Akkermans 1991, 1993). At

other sites the Halafian lithic repertoire has been denigrated in the literature as being 'banal', 'miserable', 'impoverished', etc. This must refer to the tool kit which is indeed restricted to just a few types. At Shams-ed-Din Tannira, one of the few excavated Halafian sites whose flint industry (thought to be Late Halaf) has been published in detail (Azoury and Bergman 1980), we can see numerous similarities with the Halaf artefacts at Sabi Abyad. For example, many voluntarily broken blades are present (both in the obsidian and flint/chert), fractured by the same methods. Moreover, bifacial and pressure-flaked retouch is rare, as is re-use of older point fragments, and tools are restricted to the 'usual' forms of scrapers, burins, lustred sickle elements, borers, unstandardised truncated pieces, etc.

Considering the Sabi Abyad Halafian industry as a whole, it is difficult to recognise any differences in the attributes of the lithic assemblages from those of the Halafian's predecessors in the late Neolithic and Transitional (i.e. Balikh IIC-IIIA phases). This may be partly due to insufficient samples (much material which appeared to be mixed with Late Bronze Age deposits had to be omitted from the counts). Be that as it may, the assemblages appear to continue the sequence of the previous levels. Since we know that there were significant changes in the ceramics, it follows that the ceramics and the lithics developed independently of each other. This could mean that lifeways involving stone tools, which must represent the means by which food (as well as clothing and shelter) was procured and processed, hardly changed even if new pottery styles came into use. This in turn is suggestive of an in-situ development of the Halaf from the Balikh IIC-IIIA sequence at Sabi Abyad (for a discussion on Halaf origins, see e.g. Copeland and Hours 1987; Akkermans and Le Mière 1982:21; Akkermans 1993:293-98, in press).

We await more information on the lithic component of the eastern Halaf sites, particularly those in the Khabur recently studied, e.g. Umm Qseir, which is said to have very sparse lithics, 24% of which are in obsidian (Hole 1993). Will they resemble those at Sabi Abyad? Or will they reflect the position of the Khabur, which is closer to the region of Hassunan and Samarran traditions?

Conclusions

It has been suggested above that the lithics in the Sabi Abyad stratigraphic columns represent a long, virtually unbroken sequence of stone industrial traditions from the earlier 'Late Neolithic' through its Transitional and Early Halaf phases (i.e. from Balikh phases IIC to IIIA), with an earlier Neolithic phase, as yet unidentified elsewhere, in level 11, perhaps representing phase IIB.

Although we have yet to discover the true function of certain types, the impression gained is that the Balikh valley stone assemblages are just what one would expect to find in a domestic village situation and accord well with what would be anticipated in view of the site's geographic position: intermediate between two very different cultural zones, i.e. the Levant and Mesopotamia. Indeed, typologically, the

stone-tool repertoire seems to have a 'foot in both camps': it has obsidian types (CTBs; SBBFs) in its Neolithic phases which are known in northern Iraq but not seen in the west, and other types (bifacial knives and transverse arrowheads) typical of the Levant but rare to absent in the east. Southern types (tabular scrapers) are also present as are northern ones (Çayönü retouch and obsidian generally). Thus the inhabitants of Sabi Abyad seem to have been in touch with both zones, either directly or indirectly through trade networks. The subject of such networks was discussed in the first report (Copeland 1989), and need not be repeated here.

These features give a certain air of originality to the Balikh valley cultures, and seem to separate them from what we so far know of the northern, eastern or western Fertile Crescent areas, at least as far as the lithic component is concerned.

Catalogue

Abbreviations: CTB = corner-thinned blade; CSBBF = core for side-blow blade-flake; SBBF = side-blow blade-flake. The colours refer to the raw material. Numbers in parenthesis at the end of each description refer to the find spot. In figures 4.1, 4.2 and 4.4 this is the lot/locus in square P15. In Figs. 4.3, 4.5 and onwards, the order is: square, stratum, lot/locus.

Fig. 4.1 Level 11 (all from square P15)
(1) Minute pyramidal core, beige chert (56-74). (2) Prismatic core, beige matt (56-171). (3) Flat core, conical base, chestnut glossy (56-173). (4) Prismatic core, flat base, chestnut glossy (56-173). (5) Flat core, beige glossy (55-168). (6) Tablet (40-121). (7) Nose or steep-scraper, dark brown, glossy (56-174). (8) Tip of end-of-blade scraper, burnt, grey matt (56-174). (9) Obsidian single straight *racloir*, deliberate breaks, scratches (56-174). (10) Obsidian cortex-backed blade segment, scratched, grey mottled patina (56-173). (11) Flint borer on pebble, beige glossy (56-173). (12) Double *racloir* composite with corner borer made on a truncation (46-121).

Fig. 4.2 Level 11 (nos. 1-8) and level 10 (nos. 9-15) (all from square P15)
(1) Obsidian partly-backed blade, worn with PPNB scar on butt, utilised edge (56-174). (2) Obsidian CTB, double on same end (56-174). (3) Obsidian patinated blade segment with single CTB facet in newer patina (56-153). (4-5) Obsidian CTBs on blade segments (56-174). (6) Obsidian single atypical CTB with retouch (56-173). (7) Obsidian CTB, double on same end with one facet on the dorsal face. (8) Obsidian core for SBBF on wide blade segment (40-117). (9) Flint prismatic burin, rose matt (54-162). (10) Dihedral transverse burin with notches, brown flint (54-162). (11) Prismatic core on large brown flint pebble (aborted?), beige matt (54-162). (12) Obsidian SBBF (49-145). (13) Obsidian triple CTB (49-145). (14) Obsidian SBBF (54-166). (15) Prismatic flint core on globular pebble, brown glossy (49-163).

Fig. 4.3 Levels 10-8
(1) Byblos Point, tip missing, beige glossy (Q14, 9D/E/10A, 97-229). (2) Drill, tip missing, made on sickle element (sheen both faces), beige glossy (as 1; 97-229). (3) *Racloir/raclette* on thin (pressure-flaked?) flake (as 1; 97-229). (4) Borer/end-scraper composite, brown (as

1; 97-229). (5) End-scraper on cortex-backed piece (as 1; 97-229). (6) Obsidian transverse arrowhead, trapeze-type (P14, 9/10, 31-139). (7) Obsidian atypical core for SBBF (P15, 10A/B, 49-163). (8) Flint *racloir* with corner borer on truncation (cf. fig. 4.1, no. 12) (P15, 8D/B/7C, 40-121). (9) Flint dihedral burin, possibly double, grey chert (as 8; 40-121).

Fig. 4.4 Levels 8-7 (all from square P15)
(1) Pressure-flaked piece, unretouched on reverse; beige glossy (P15, 7B/7C, 40-115). (2) Denticulate, beige (as 1; 38-111). (3) Single *racloir* or backed knife? beige glossy (as 1, 8D/9, 43-40). (4) Sickle element on unretouched blade, brown glossy (as 3; 44-125). (5) Inverse *racloir* on large buttless flake, pink mottled (8A/B/7B/C, 40-118). (6) Nose-scaper or steep-scraper, chestnut glossy (as 1; 40-118). (7) Obsidian SBBF (as 1; 50-115). (8) Axial dihedral burin (as 5; 40-117). (9) Dihedral burin on core refreshment element (as 3; 49-163). (10) Inverse distal borer on wide blade segment (as 1; 40-115). (11) Possible CSBBF on wide blade segment (as 1; 40-114). (12) Large SBBF (as 1; 40-115).

Fig. 4.5 Level 6
(1) Flat discoid core, grey (R12, 3A/B, 23-46). (2) Flat discoid core (Q15, 5B, 82-344). (3) Minute prismatic core, brown mottled (Q15, 5B, 75-297). (4) Core reworked as a denticulate, black (Q15, 5B/C, 79-388). (5) Prismatic (blade?) core (R12, 3B, 56-90). (6) Pyramidal (bladelet?) core (Q15, 5A/B, 84-335).

Fig. 4.6 Level 6
(1) Heavy-duty tool, perhaps a rough-out, on pebble; beige glossy (R12, 3B/C/E, 52-170). 2) chopping-tool on pebble (P14, 10B/G, 112-275).

Fig. 4.7 Level 6 (except no. 3 which belongs to level 4)
(1) Pressure-flaked blade (knife?) with slight bifacial retouch (R12, 3A/2, 22-44). (2) Javelin fragment, cf. bifacial knife; on tabular dark-grey flint (R12, 3A, 27-56). (3) Bifacial knife variant, on dark-grey tabular flint with slight sheen (Q13, 7A, 123-325). (4) Either the butt of a Byblos Point arrowhead or a broken drill bit, grey flint (Q13, 42-152). (5) Tipless Byblos Point with distal impact fracture, dark-grey flint ((Q13, 7A, 85-256).

Fig. 4.8 Level 6
(1) Crescentic-backed sickle element and (2) sickle element on unretouched blade (both from Q15, 5B, 71-466). (3) Sickle element with the lustre on the retouched, slightly saw-toothed edge (Q15, 5B, 36-270). (4) Shape-defined sickle element, truncated with cortex back, beige (Q13, 7A/B, 90-26). (5) Lustred fragment, grey (Q13, 103-270). (6) Sickle element with natural back (Q13, 7B, 127-350). (7) Truncated and semi-backed sickle element with slight teeth, rose (Q13, 7A, 112-235). (8) Shape-defined sickle element or notched blade segment, rose-beige (Q15, 103-276). (9) Backed knife (Q15, 5B, 104-406). (10) 'Upsilon' blade (Q15, 5B, 106-406). (11) Robust chert blade with 'utilisation retouch' (R12, 3B, 42-74).

Fig. 4.9 Level 6
(1) 'Tile Knive' (tabular scraper) with transverse striations on one face (P15, 5C, 27-65). (2) 'Tabular Knive' with both striations and plaster coating (P15, 5B, 110-484). (3) 'Tabular Knive', rather thick specimen (Q13, 7A, 85-265). (4) Large 'Tabular Knive' with retouched base (Q15, 5A, 96-341). (5) Splintered piece? (Q13, 5B/C, 100-416). (6) Voluntarily snapped

blade segment with inverse retouch (Q13, 7A/B, 82-252). (7) Obsidian borer (?) with pressure-flaked retouch (Q15, 5A, 96-427).

Fig. 4.10 Level 6
(1) End-scraper on cortex-backed blade (R12, 3, 60-115). (2) End-scraper with lateral retouch (P14, l0B/G, 108-280). (3) *Racloir* on blade segment, brown (Q13, 5C, 107-282). (4) Nosed steep-scraper, burnt, mottled black (Q13,7A, 112-295). (5) Burin on truncation, brown glossy (Q15, 5A, 96-341). (6) Abrupt, slightly denticulated, bilateral retouch on heavy blade. (7) Drill (?; tip missing), with alternate lateral retouch (Q15, 5B, 97-425). (8) *Racloir* and denticulate, brownish red (Q13, lot 238).

Fig. 4.11 Level 6
(1) Double dihedral burin (R13, 3E, 67-226). (2) Dihedral burin on natural plane, burnt (pot lid) (Q13, 7A, 121-330). (3) Flake with alternate retouch (Q15, 5B/C, 79-488). (4) Flake scraper, cf. fan scraper on large cortex flake (R13, 3, 106-217). (5) Flint ball, probably a hammerstone (P15, 5A, 25-52). (6) Unretouched blade, unipolar debitage (R12, 3B, 62-105). (7) Unretouched flake, radial debitage (Q13, 7A, 112-313).

Fig. 4.12 Level 6 (all obsidian except no. 5)
(1) *Racloir* and end-scraper on flake with inverse flat cortex (R12, 3A, 57-99). (2) Short tanged arrowhead, Haparsa Point type (P15, 5A, 18-43). (3 and 9) Cores for SBBFs (Q13, 7A/B, 108-276 and P15, 5A/B, 96-375). (4) Flake scraper on tablet (P15, 23-56). (5) Flint short tanged arrowhead, Haparsa Point type, slightly winged (surface north of P11). (6-8 and 10-13) Various forms of SBBF (P15, 5C, 28-70; Q14, 10B, 105-230; P15, 5B, 100-416; P15, 5B/C/6, 100-416; R12, 3B, 44-76; P15, 96-375, respectively).

Fig. 4.13 Level 6 (all obsidian)
(1) Single CTB on long blade butt (R13, 3E, 58-209). (2) Double CTB, atypical in having a dorsal facet and 'burin' facet on other end (R13, 3C/E, 64-187). (3) Typical CTB (with lateral retouch), double on same end (R12, 3A/B, 24-47). (4) CTB, double on same end (Q15, 5B, 92-365). (5) Inverse retouch on long blade butt (P15, 5B, 122-468). (6-7) Abrupt/alternate retouch on blades (Q15, 5A, 96-427 and Q13, 7A, 112-302). (8) Long blade segment, deliberate breaks, 'utilised' (Q13, 7A, 85-256). (9-11) Examples of unretouched obsidian blades, no. 10 plunging (R12, 3A, 57-113, Q15, 38-308; Q13, 7A, 113-298, respectively). (12) Borer, with inverse retouch only (R13, 3E, 67-226). (13) Minute borer on bladelet (Q13, 7A, lot 260). (14) Minute prismatic core (Q13, 7A/B, 100-284).

Fig. 4.14 Level 6
(1) Long flint blade with semi-abrupt unilateral retouch (Q15, 5B, 82-39). (2) Unretouched flint blade with PPNB ventral scar (Q15, 5A, 75-297). (3) Very thin unretouched flint blade (R12, 3A, 27-52). (4) Composite racloir and flake scraper, one flat pressure-flaked edge, grey-brown (Q15, 5A, 121-486). (5) 'Utilised' flint blade, deliberate breaks (R12, 31-57). (6) Borer or drill with offset bit (R13, 58-185). (7) Obsidian CSBBF (P15, 5A, 23-58). (8) Sickle element with slight pressure-flaking (Q15, 5B, 78-477). (9) Naturally-backed knife (Q13, 7A, 110-288).

Fig. 4.15 Level 5 (the so-called 'concentration' from Q14, 9B/D, 63-181)
(1) Crested blade. (2) Double burin on truncation. (3-4) Borers. (5) Composite *racloir* and denticulate. (6) Composite corner borer with end-scraper. (7) Unretouched blade. (8) Notched

blade. (9) Composite *racloir* with inverse denticulate. (10) 'Utilised' blade from bipolar blade core. (11) Change-of-orientation core.

Fig. 4.16 Level 5
(1) Core-refreshment element (?) (Q15, 4F/5A, 39-300). (2) Exhausted prismatic blade core (Q15, 4C, 44-267). (3) Sickle element with cortex back (Q15, 4C, 55-273). (4) *Racloir or semi-circular scraper* (Q15, 4C, 38-151). (5) Sickle element, slightly backed (Q15, 4C, 60-24). (6) Corner borer, brown (Q15, 4B/D/F, 44-273). (7) Double dihedral burin, one end on break (Q15, 4C, 63-203). (8) Backed knife or partial *racloir* (Q15, 4B, 104-406). (9) Extremely thin 'Tile Knife' with striations on both faces (Q15, 4A/4C, 61-197).

Fig. 4.17 Levels 6-4
(1-10) Flint transverse arrowheads (Q15, 3B, 60-96). Nos. 1-4 have bifacial pressure-flaking, nos. 5-7 have only bilateral retouch on the ventral face, nos. 8-10 are trapeze-shaped with little or no obverse retouch. (11) Obsidian 'butterfly-shaped' CSBBS variant (Q15, 3B, 18-93). (12) Obsidian CTB, single (Q15, 4B/D/F, 83-301). (13) Obsidian CSBBF (R12, 3B, 27-52). (14) Obsidian transverse arrowhead, trapeze type, with slight dorsal pressure-flaking (P15, 3B, 10-13). (15) Obsidian trapeze type transverse arrowhead with abrupt lateral retouch (Q15, 3B, 18-30). (16) Obsidian blade segment (splintered?) with crushed, bifacial lateral edge (Q15, 3B, 18-93). (17) Minute transverse, triangular, beige flint arrowhead with abrupt alternate lateral retouch (Q12, LB3). (18) Obsidian transverse arrowhead, trapeze type, slight dorsal pressure-flaking (Q15, 3B, 17-73). (19) Unretouched, more or less intact, obsidian bladelet (P15, 3B/C/C/4A, 9-24).

Fig. 4.18 Levels 4-3 (except no. 11, which belongs to level 8 or 9)
(1) 'Tile Knife' fragment, thin, with plaster coating one face (Q15, 3C?, 17-79). (2) Nosed steep-scraper (P15, 3E/5A, 28-71). (3) Obsidian strangled blade segment (P15, 3A/B, 9-18). (4) Abruptly retouched blade butt (R13, 1A/3B/3C, 47-148). (5) CTB (atypical: with notch), single (R13, 1B/3B). (6) Sickle element, slight distal truncation, lustre on upper half only (P15, 3B/C/D.4A, 9-24). (7) Wide obsidian notched blade on core-refreshment element or tablet (P15, 3C/E/4A, 13-32). (8) Tip of obsidian arrowhead or borer (P15). (9) 'Tile Knife' fragment with deep score-marks on each face (perhaps for guiding the break?) (P15, 3D/E, 11-85). (10) CSBBF with crushed central ridge (Q15, LB/3A, 9-15). (11) Obsidian pendant fragment? both edges are ground to rounded shape (P15, 8D/9 (i.e. level 8-9), 43-140). (12) Thin 'Tile Knife' (P14, 3B, 8-22). (13) CSBBF (Q12, 7A, 30-22).

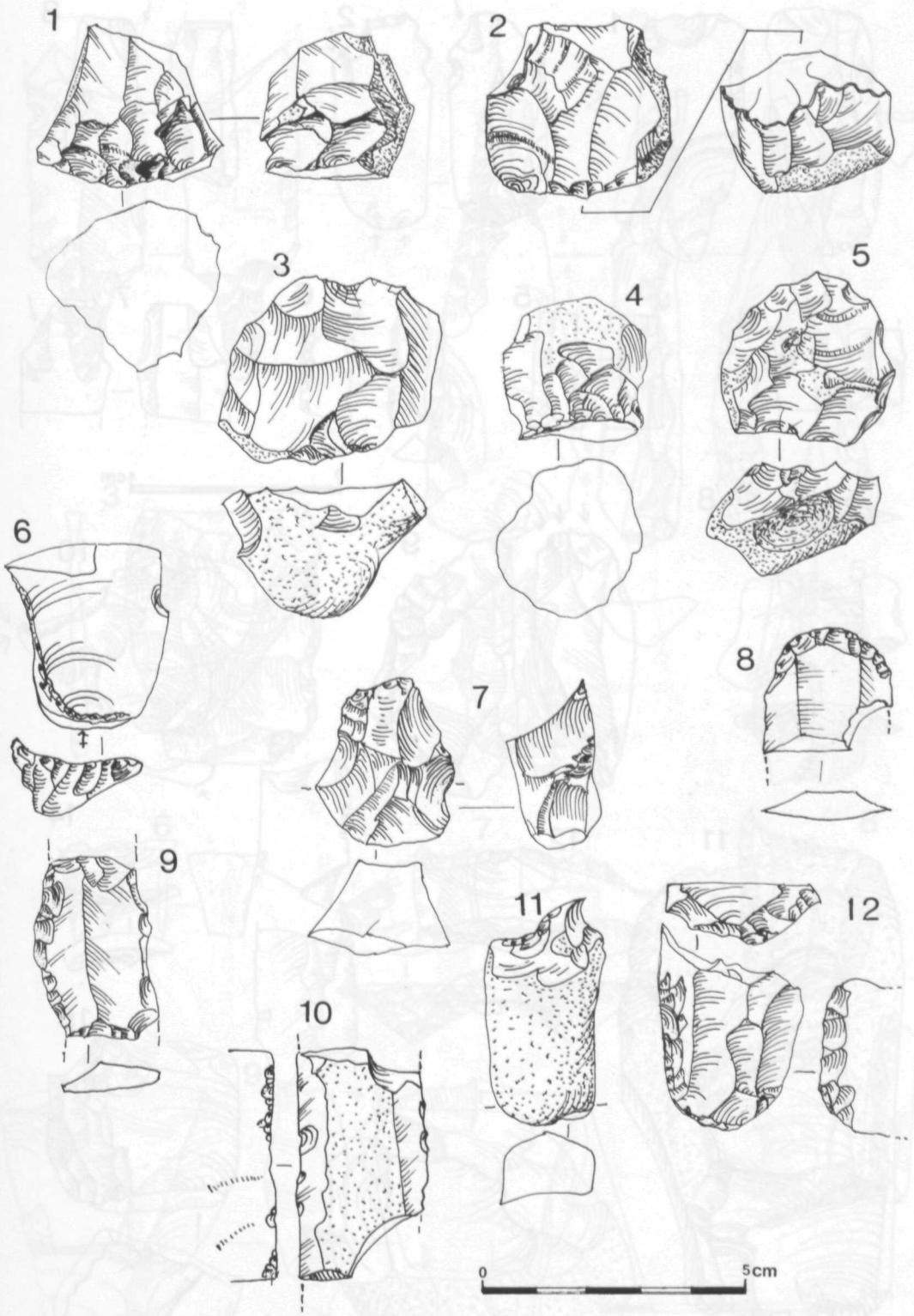


Figure 4.1. Flint and obsidian artefacts, level 11.

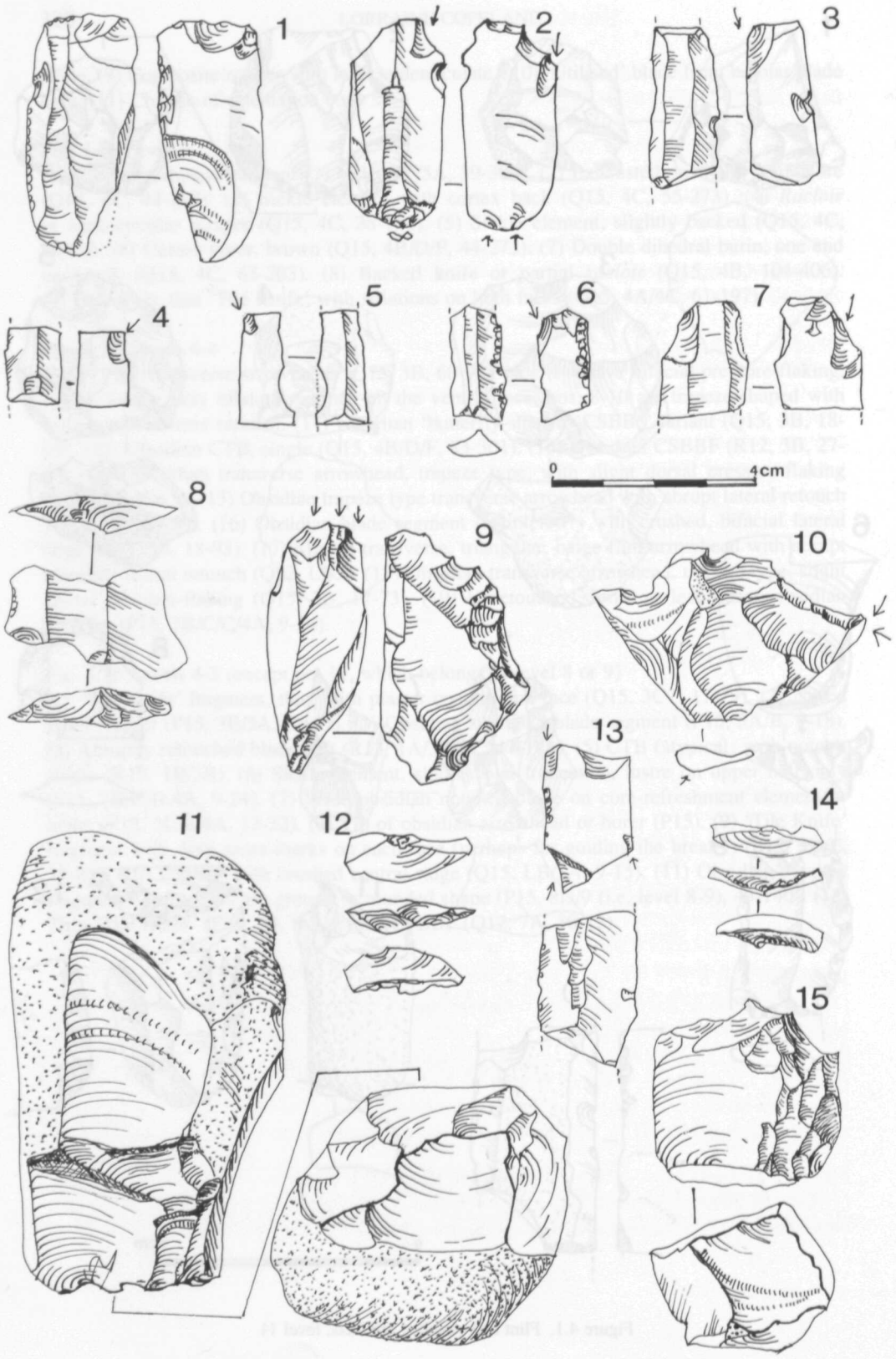


Figure 4.2. Flint and obsidian artefacts, level 11 (nos. 1-8) and level 10 (nos. 9-15).

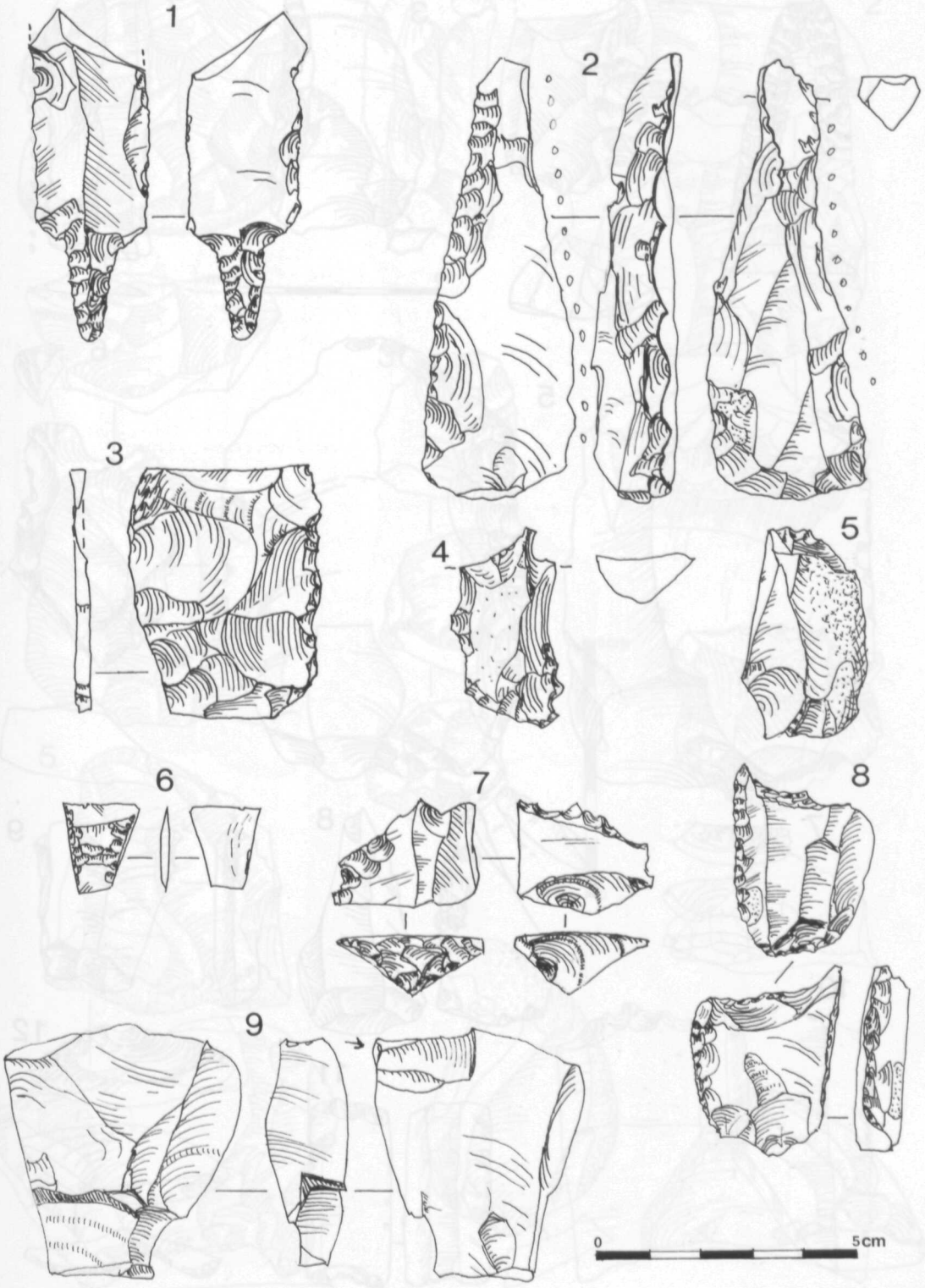


Figure 4.3. Flint and obsidian artefacts, levels 10-8.

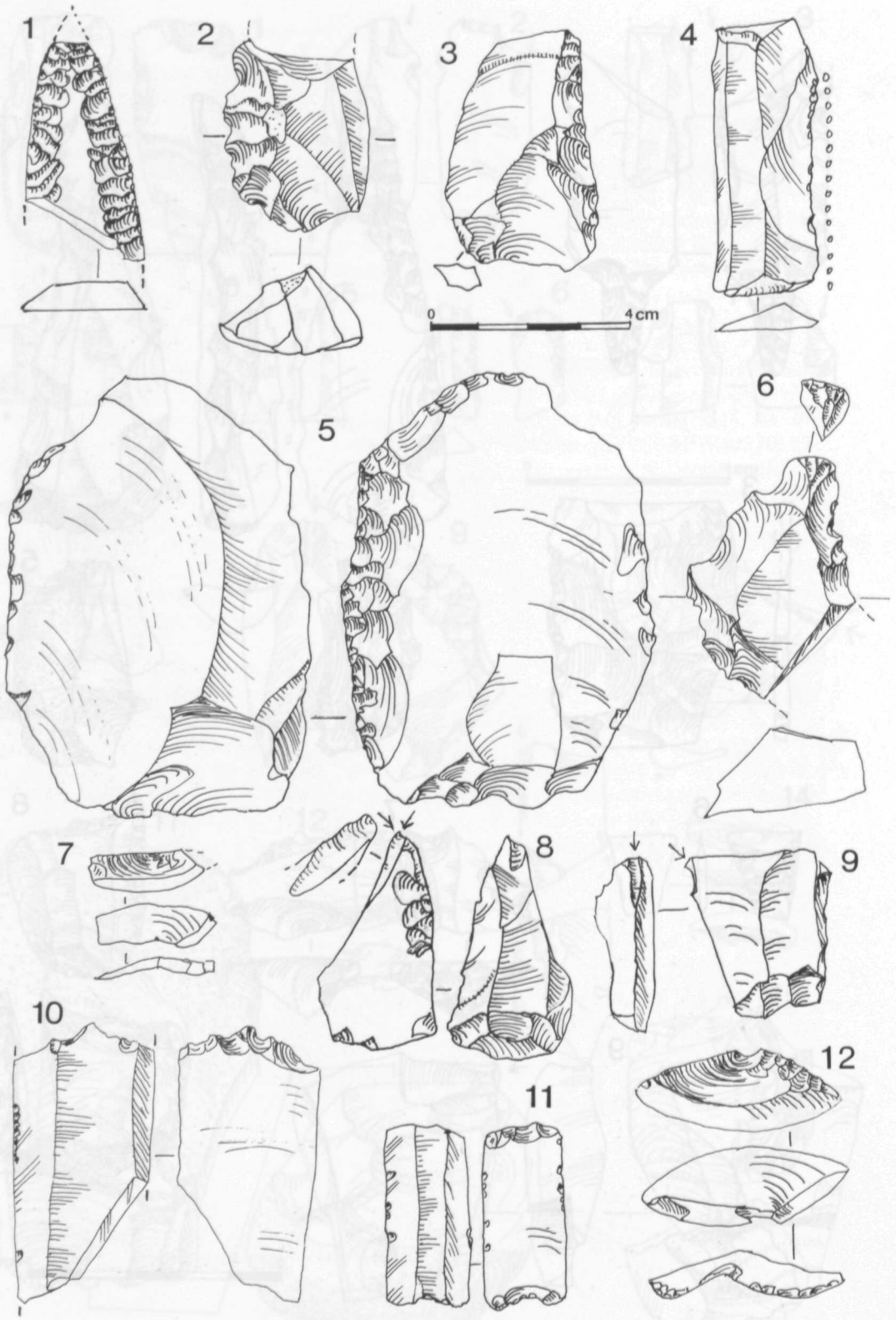


Figure 4.4. Flint and obsidian artefacts, levels 8-7.

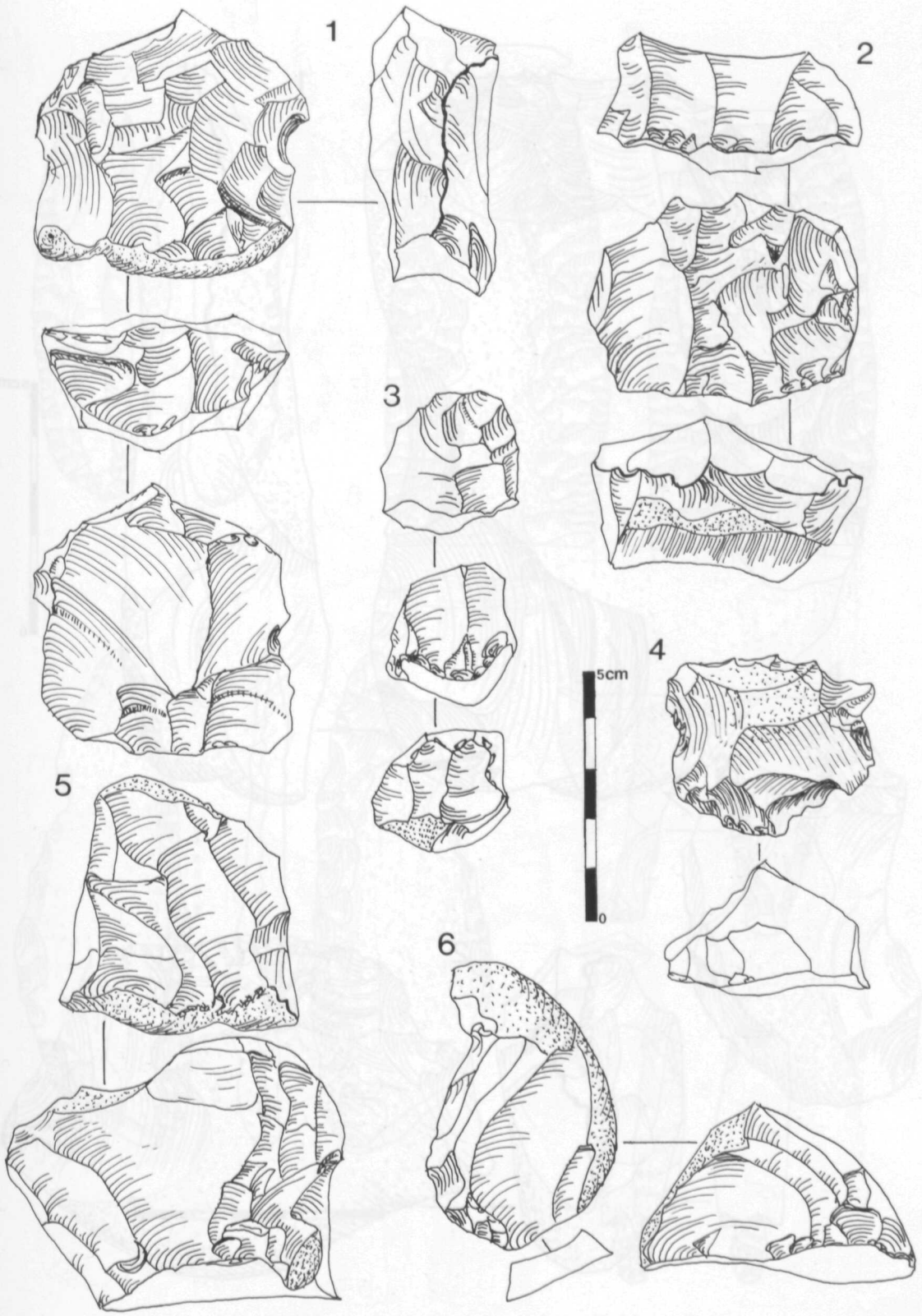


Figure 4.5. Flint artefacts, level 6.

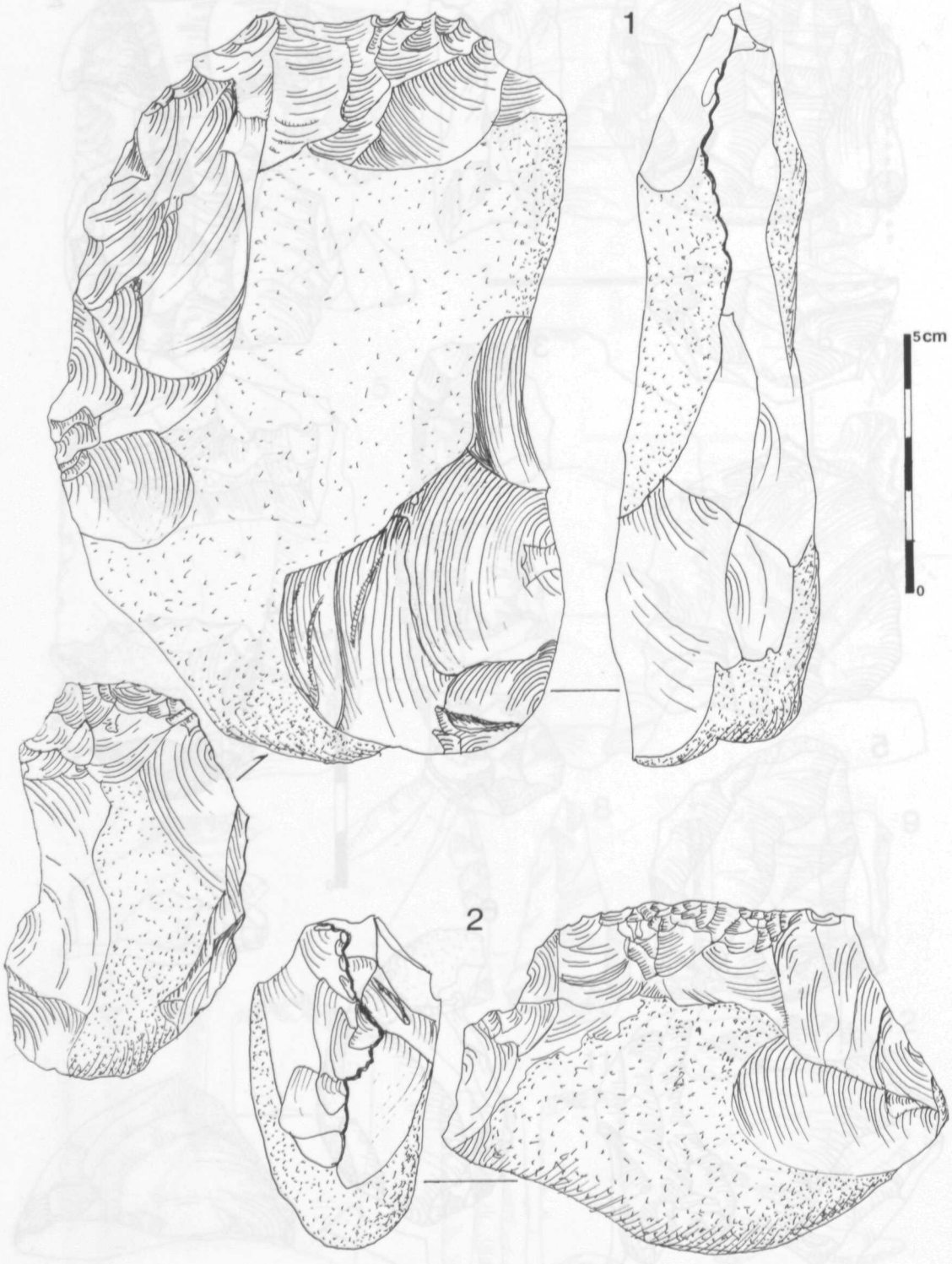


Figure 4.6. Heavy-duty and chopping tools on pebbles, level 6.

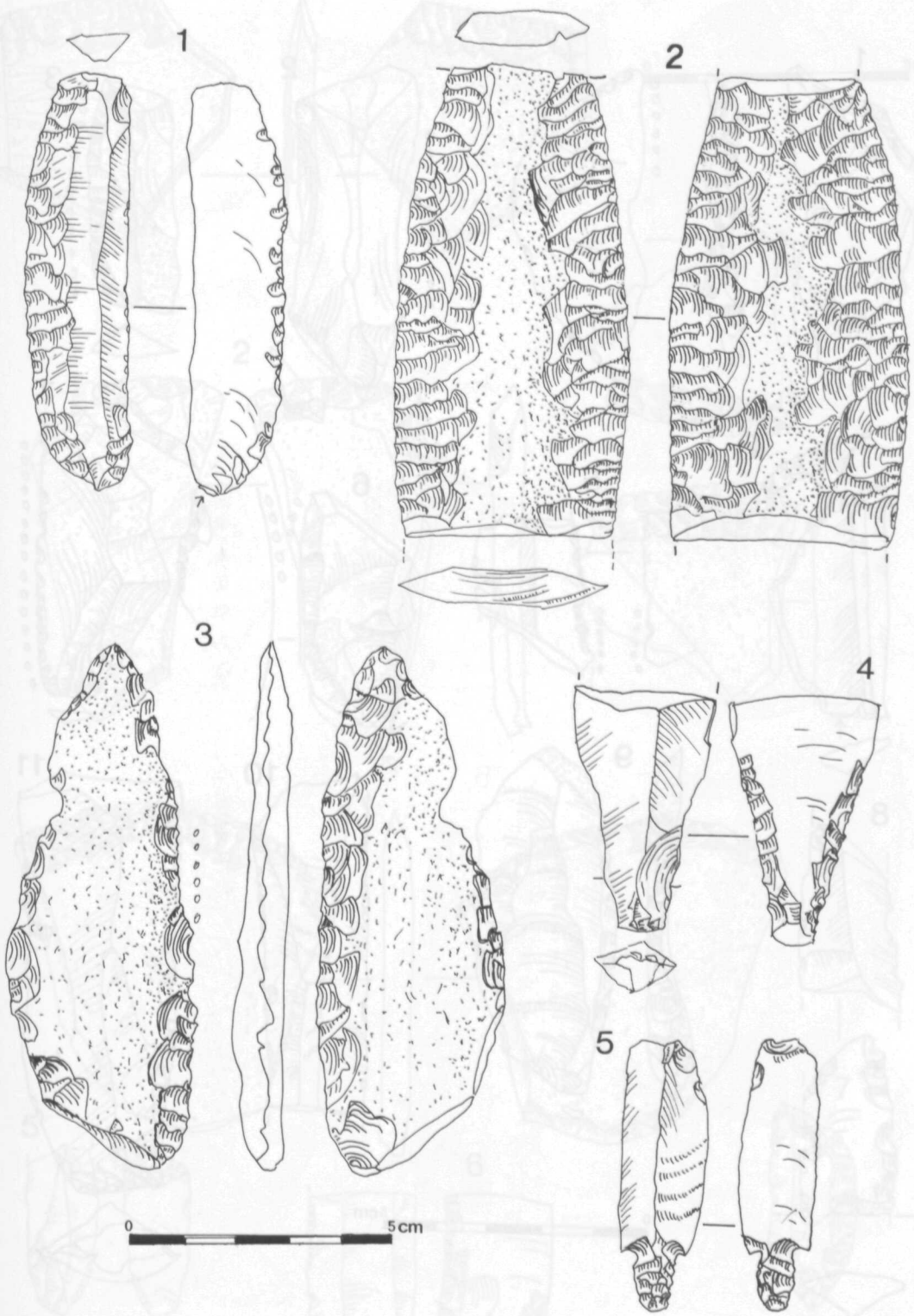


Figure 4.7. Flint artefacts, level 6.

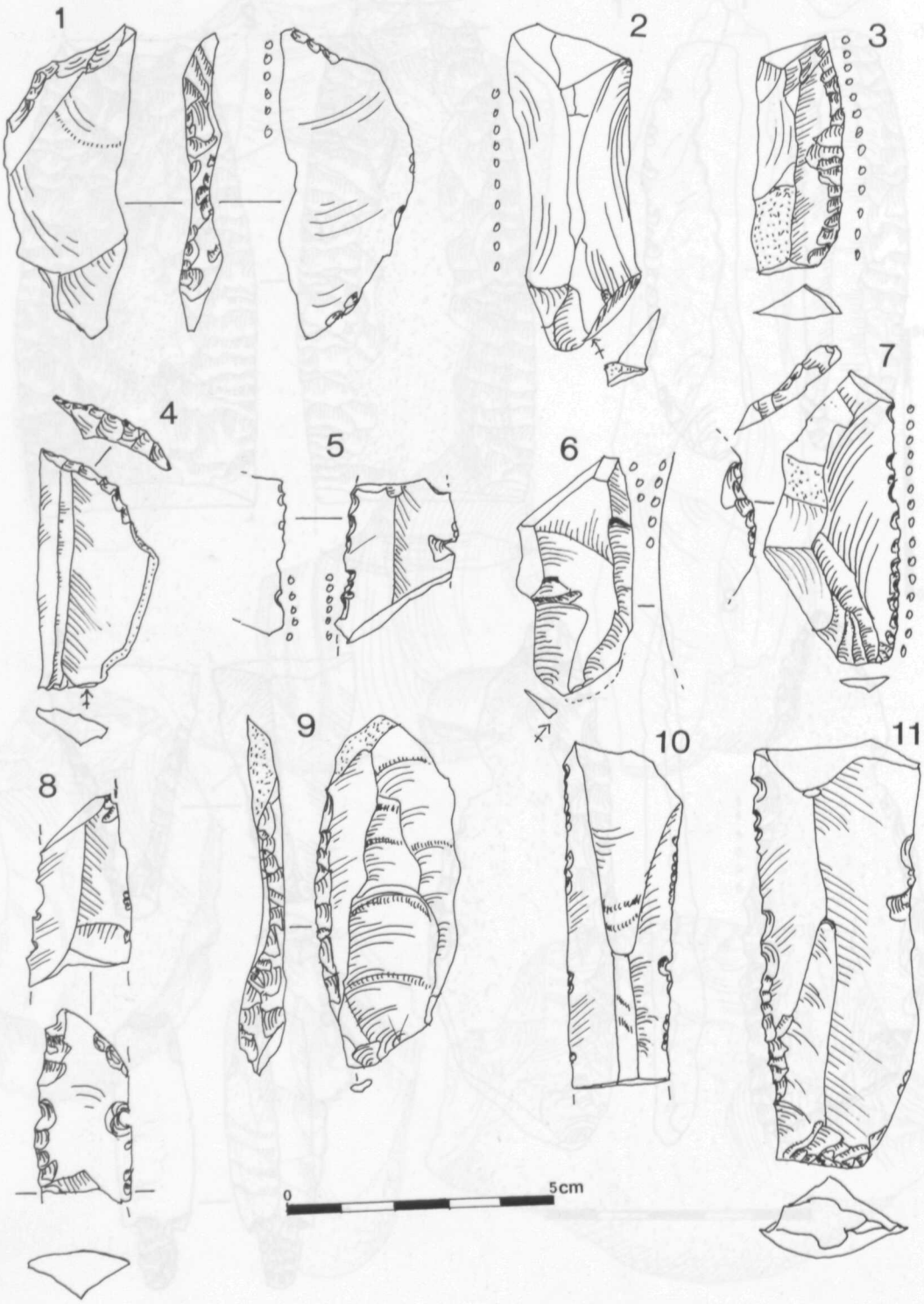


Figure 4.8. Flint artefacts, level 6.

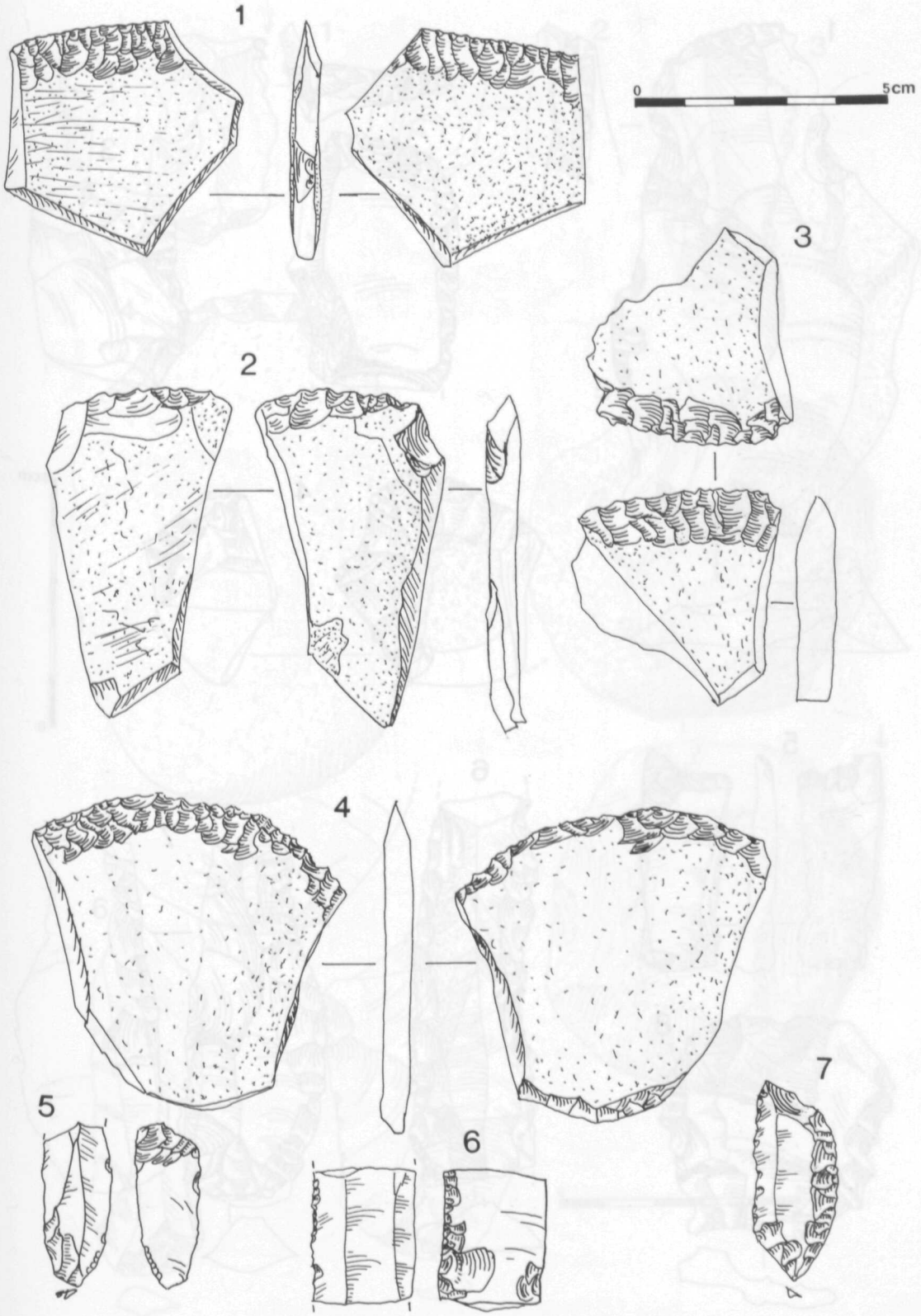


Figure 4.9. Flint and obsidian artefacts, level 6.

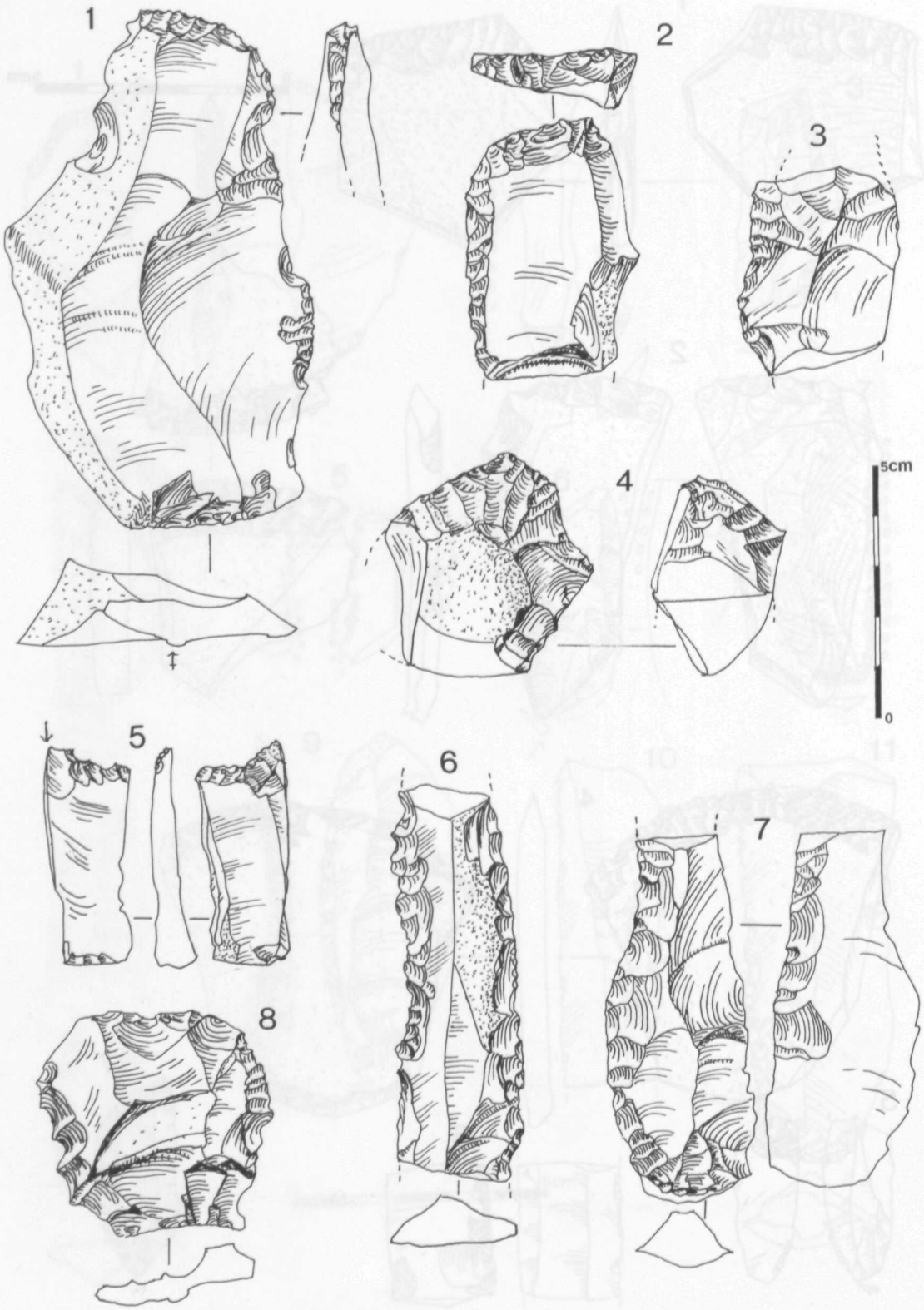


Figure 4.10. Flint artefacts, level 6.

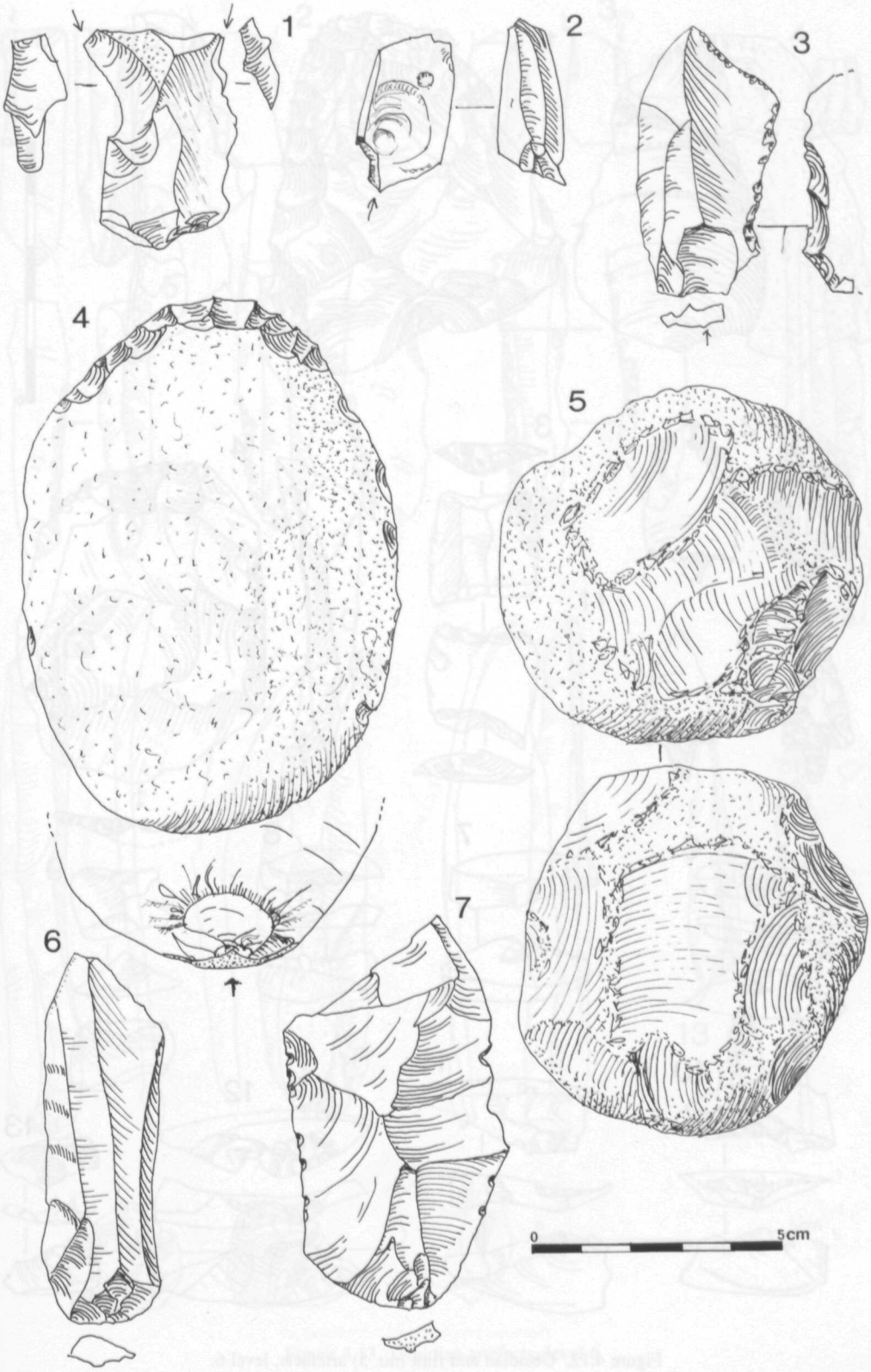


Figure 4.11. Flint artefacts, level 6.

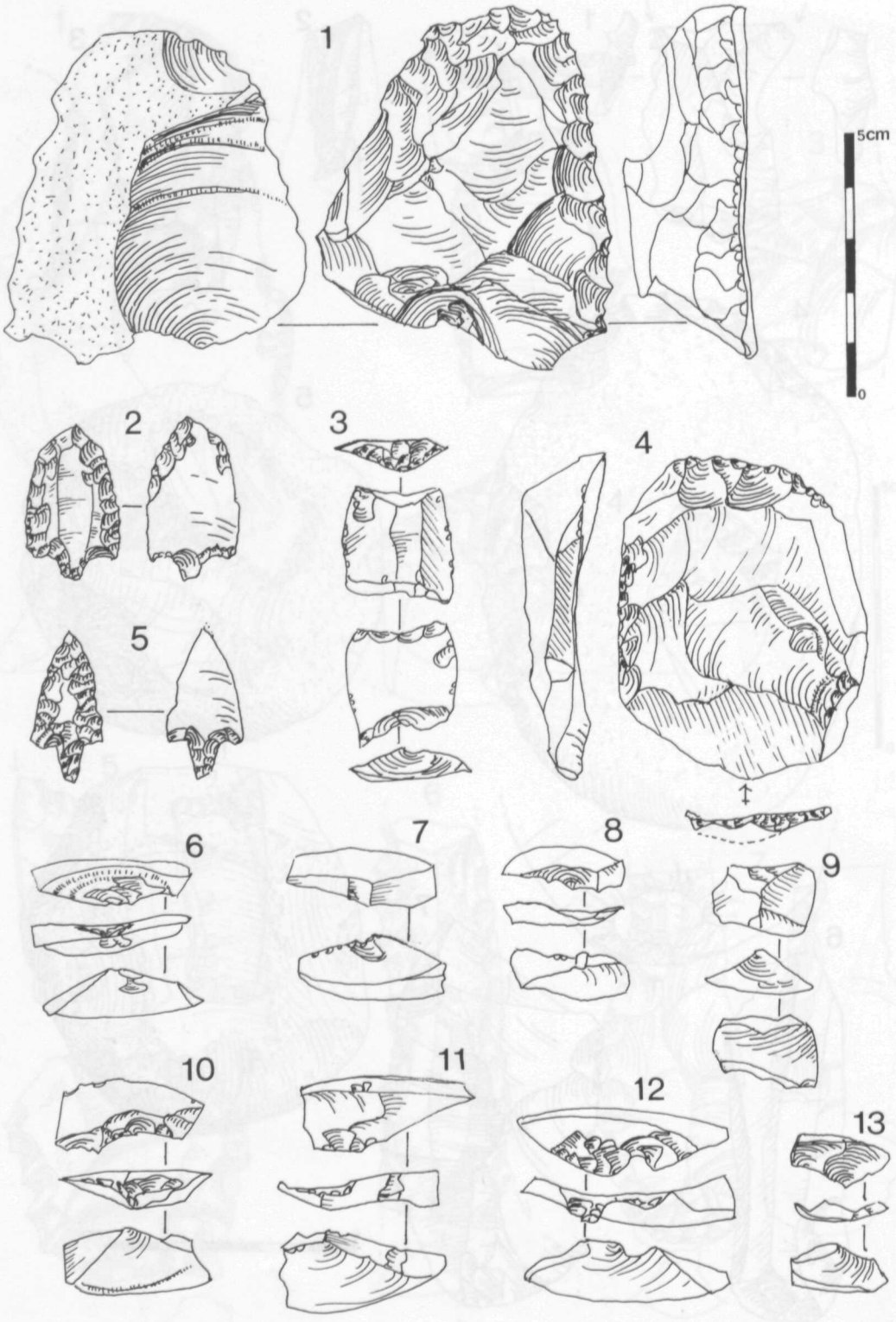


Figure 4.12. Obsidian and flint (no. 5) artefacts, level 6.

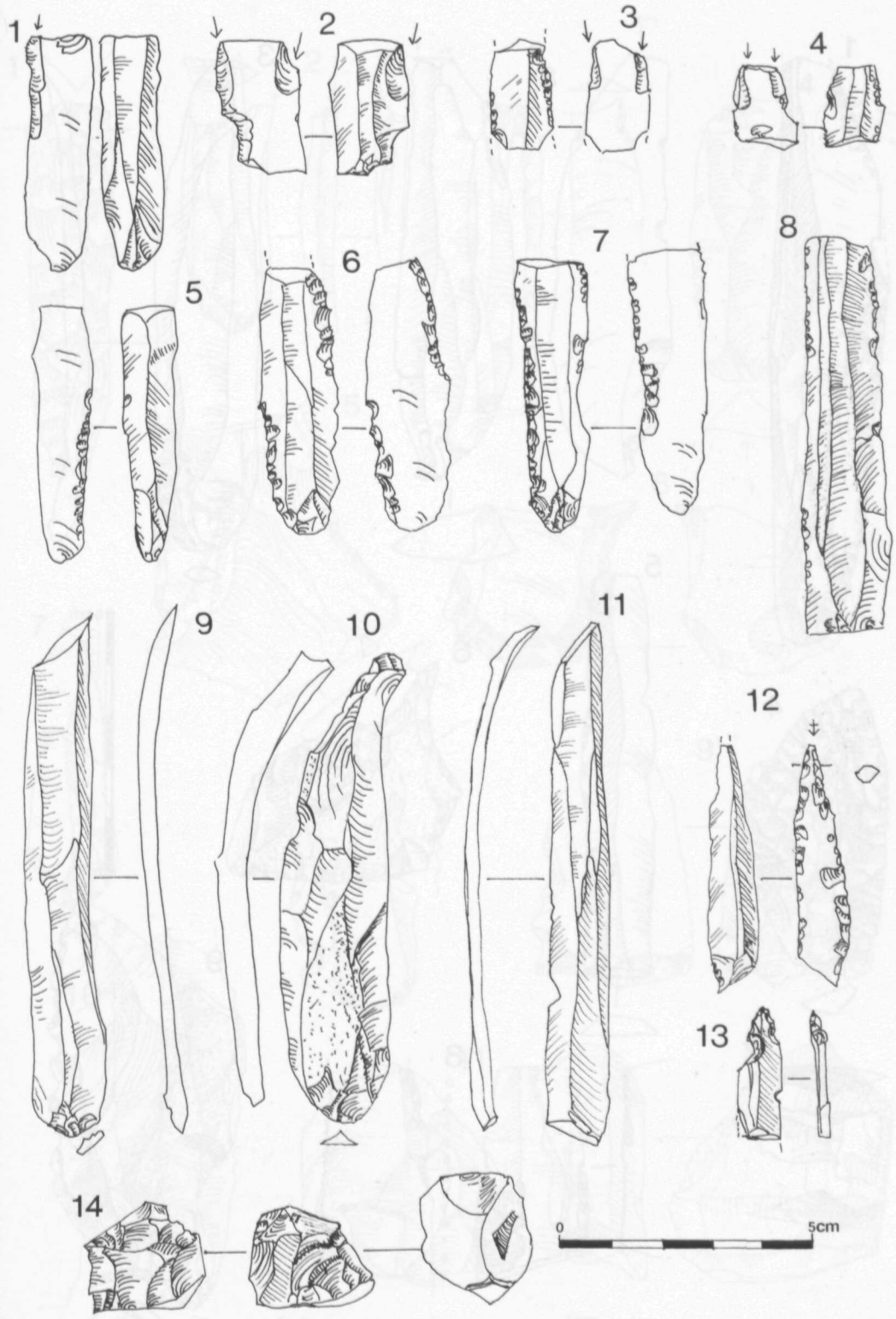


Figure 4.13. Obsidian artefacts, level 6.

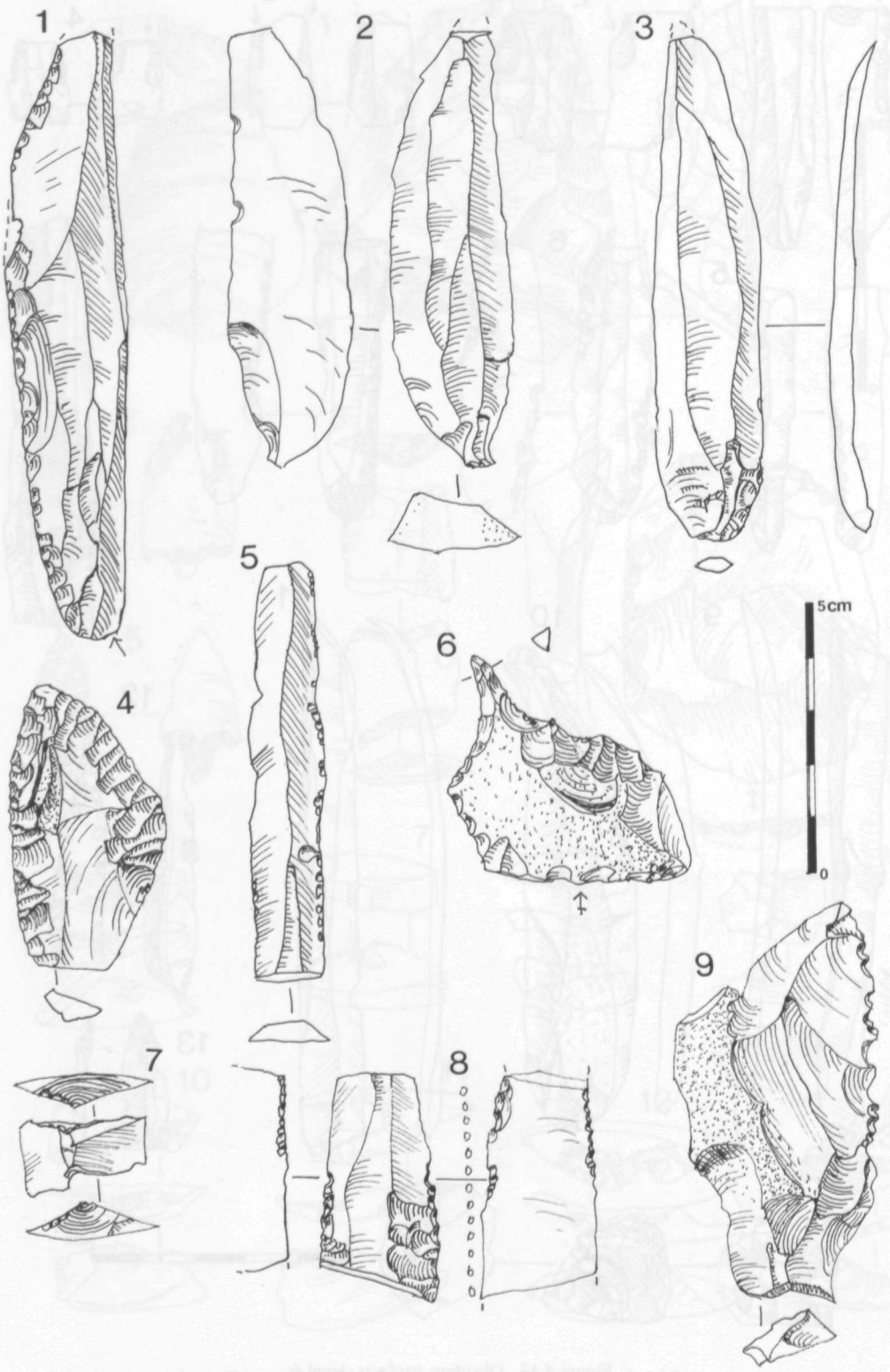


Figure 4.14. Flint artefacts, level 6.

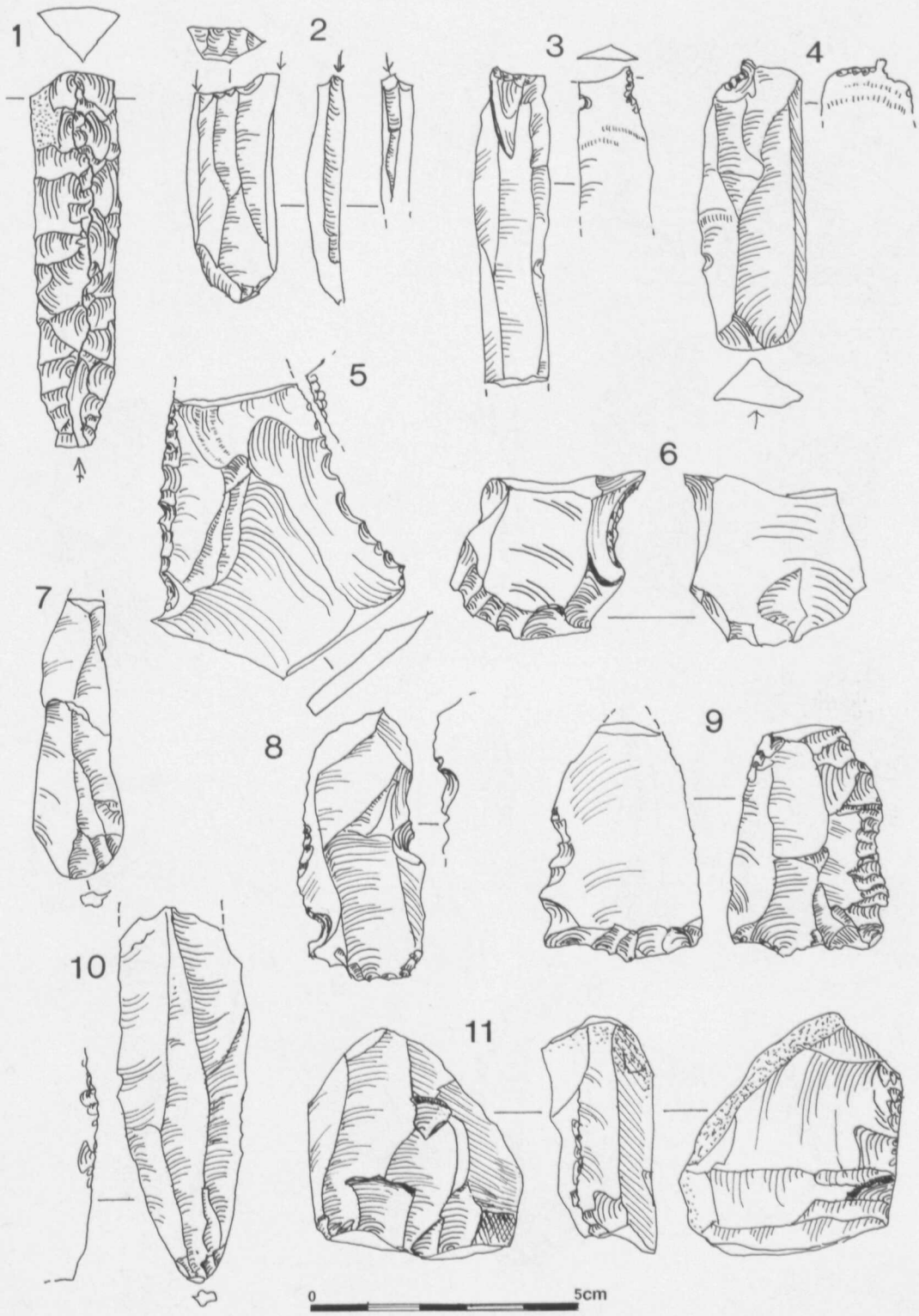


Figure 4.15. Flint artefacts, level 5.

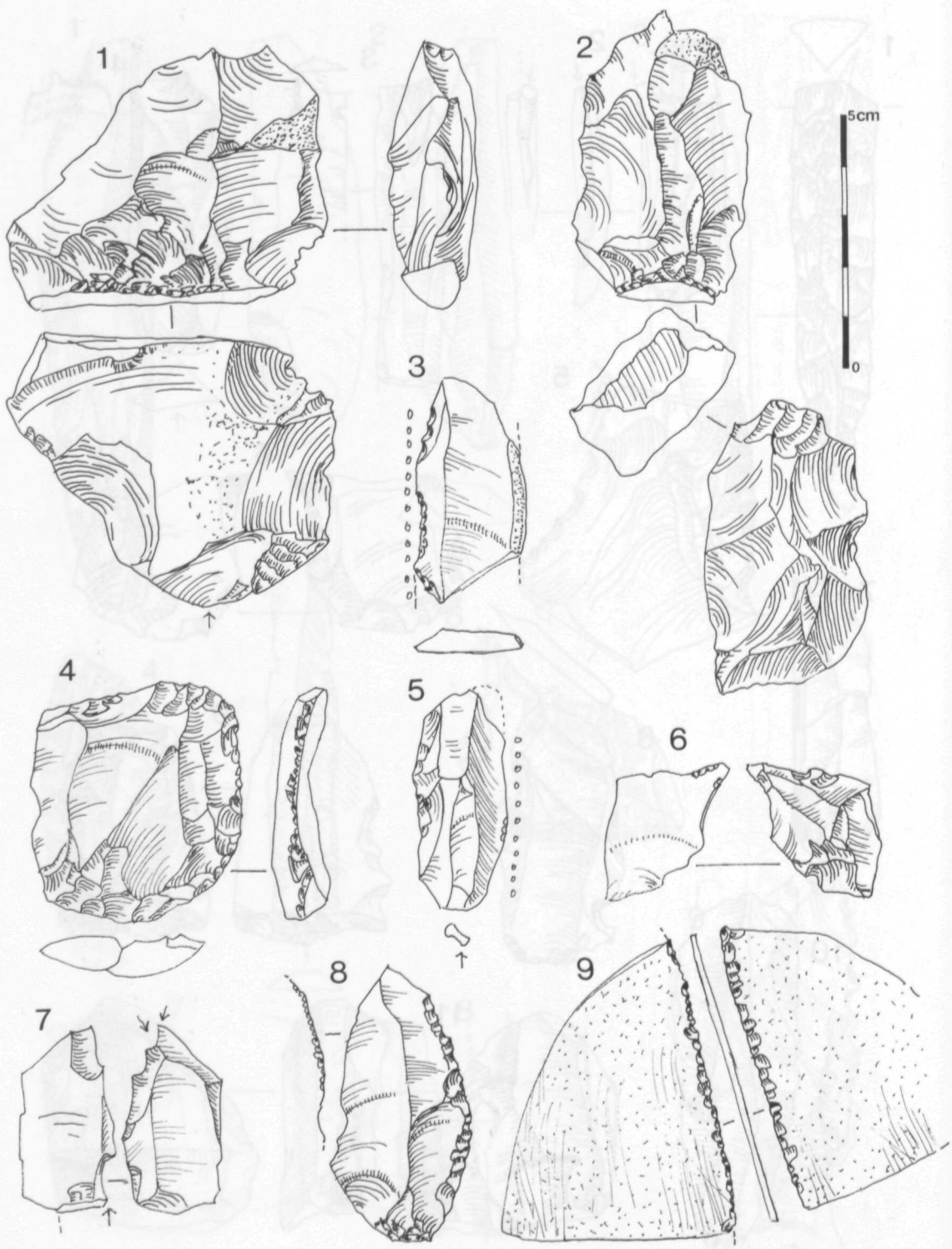


Figure 4.16. Flint artefacts, level 5.

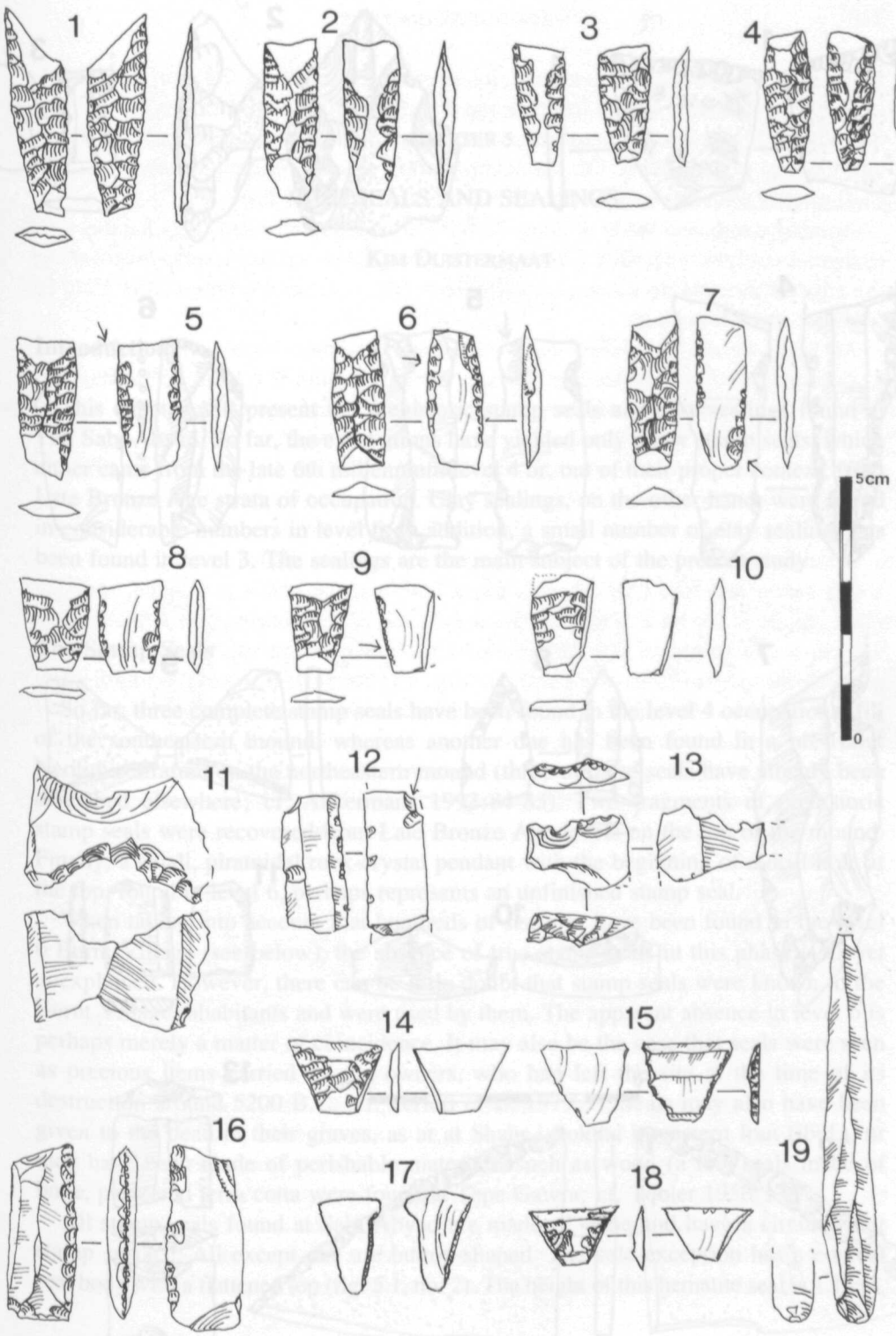


Figure 4.17. Flint and obsidian artefacts, levels 6 (no. 13), 5 (nos. 1-10) and 4 (nos. 14-16, 18-19).

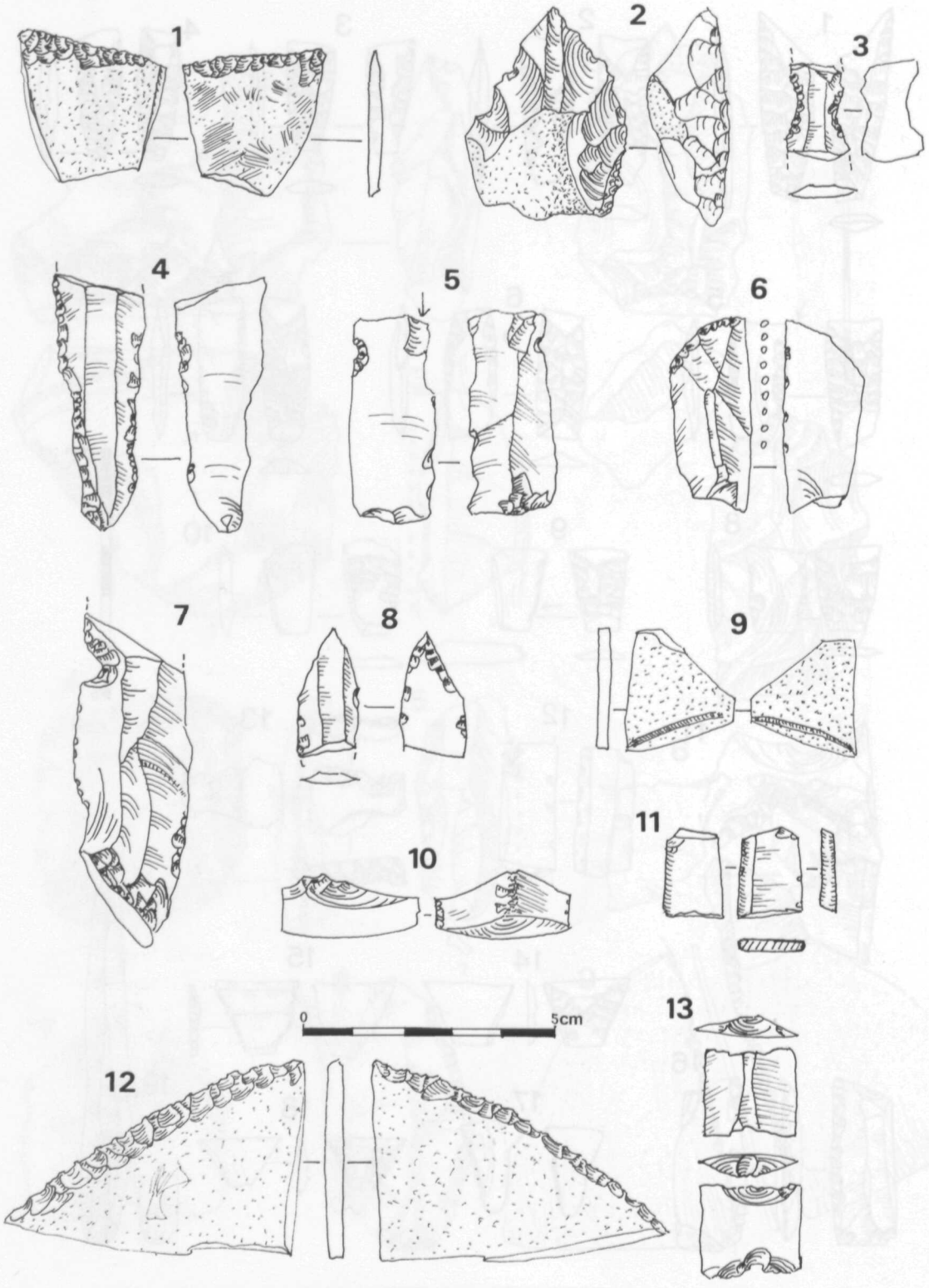


Figure 4.18. Flint and obsidian artefacts, levels 4 (nos. 1-3, 6-10, 13) and 3 (nos. 4-5, 12). No. 11: level 8 or 9

CHAPTER 5

THE SEALS AND SEALINGS

KIM DUISTERMAAT

Introduction

This chapter will present the prehistoric stamp seals and clay sealings found at Tell Sabi Abyad. So far, the excavations have yielded only a few stamp seals, which either came from the late 6th millennium level 4 or, out of their proper context, from Late Bronze Age strata of occupation. Clay sealings, on the other hand, were found in considerable numbers in level 6. In addition, a small number of clay sealings has been found in level 3. The sealings are the main subject of the present study.

The Stamp Seals

So far, three complete stamp seals have been found in the level 4 occupational fill of the southeastern mound, whereas another one has been found in a pre-Halaf Neolithic stratum on the northeastern mound (three of these seals have already been described elsewhere; cf. Akkermans 1993:84-85). Two fragments of prehistoric stamp seals were recovered from Late Bronze Age levels on the top of the mound. Finally, a small, piramidal rock-crystal pendant with the beginning of a drill-hole at the top, found in level 6, perhaps represents an unfinished stamp seal.

When taking into account that hundreds of *sealings* have been found in the level 6 Burnt Village (see below), the absence of true stamp seals in this phase is as yet unexplained. However, there can be little doubt that stamp seals were known to the Burnt Village inhabitants and were used by them. The apparent absence in level 6 is perhaps merely a matter of coincidence. It may also be the case that seals were seen as precious items carried by the owners, who had left the site at the time of its destruction around 5200 B.C. (cf. Ferioli et al. 1979:9). Seals may also have been given to the dead in their graves, as at at Shahr-i Sokhta in eastern Iran (ibid.), or may have been made of perishable materials, such as wood (a few seals made of bone, paste and terra cotta were found at Tepe Gawra; cf. Tobler 1950:178).

All stamp seals found at Sabi Abyad are made of stone and have a circular, flat stamp surface. All except one are button-shaped. The sole exception has a conical seal body with a flattened top (fig. 5.1, no. 2). The height of this hematite seal is 1.1 cm,

its largest diameter is 2.4 cm and its smallest diameter is 0.9 cm. A central, vertical perforation is drilled from the top down for suspension. Perhaps this drilling was made after another, horizontal perforation at the top of the cone had broken off and the seal was repaired. On the stamp surface this seal shows a design of three shallow drillings each surrounded by two circular engraved lines.

Another stamp seal made of hematite has a rounded, perforated ridge handle with triangular section, and shows a design of ten shallow drillings surrounded along the edge of the seal by a row of incised lines (fig. 5.1, no. 3). This seal is 2 cm in diameter and 0.8 cm high.

At Sabi Abyad, both seals were recovered in debris layers attributed to the Transitional level 4 and dated in the late 6th millennium B.C., but so far the best parallels have been found in early 5th millennium, Halaf glyptics (compare e.g. an amulet seal from Tepe Gawra and a stamp seal from Tell Halaf; Tobler 1950, fig. 172:31; Von Oppenheim and Schmidt 1943, Tafel 38:13 and 114:19). The use of the drill and, in one case, the conical shape, reminds one of late Halaf glyptics as well (cf. Von Wickede 1990:105, 254 and Tafel 197, 199).

A third seal from level 4, found in the fill of a keyhole-shaped oven (together with a clay token and four clay labrets), has a button shape and a perforated, rounded ridge handle at the back. The seal, possibly made of serpentinite, has a diameter of 1.8 cm and a height of 0.4 cm. It shows a regular design of crosshatching with parallel lines engraved in two directions (fig. 5.1, no. 5). It resembles a fourth completely preserved button seal, made of chlorite, which was found in a pre-Halaf Neolithic stratum in one of the test trenches on the northeastern mound (fig. 5.1, no. 1). This one, too, has a perforated and rounded ridge handle on the slightly raised back, and shows a design of crosshatching consisting of parallel lines incised in three directions. The seal is 3.6 cm in diameter and 1.3 cm high.

The latter two seals, with their simple but regular patterns of crosshatching, have clear parallels in seals of the Amuq A-B and the Hassuna-Samarra periods (cf. Braidwood and Braidwood 1960:94-95; Von Wickede 1990:91, Tafel 41-48). In this respect, one is reminded of the crosshatching design on one of the level 6 sealings at Sabi Abyad (design Z, see below).

Two fragments of stamp seals were recovered from Late Bronze Age levels at the mound. Both seal fragments undoubtedly belong to an early 5th millennium or late Halaf tradition of seal manufacture, and must be intrusive in the present levels (most likely due to quarrying for mud-brick production). One chlorite fragment (fig. 5.1, no. 6) belongs to a flat button-shaped seal with a small knob handle, and shows a regular design of crosshatching consisting of parallel lines engraved in four directions, thus forming a checkerboard pattern filled with crosses. At the crossings of the lines, the seal is perforated by means of drilling. The seal fragment measures 1.9x1.9x0.8 cm; originally, the seal must have been 3.5 cm in diameter. The other fragment (made of an as yet unknown kind of stone; fig. 5.1, no. 4) belongs to a flat

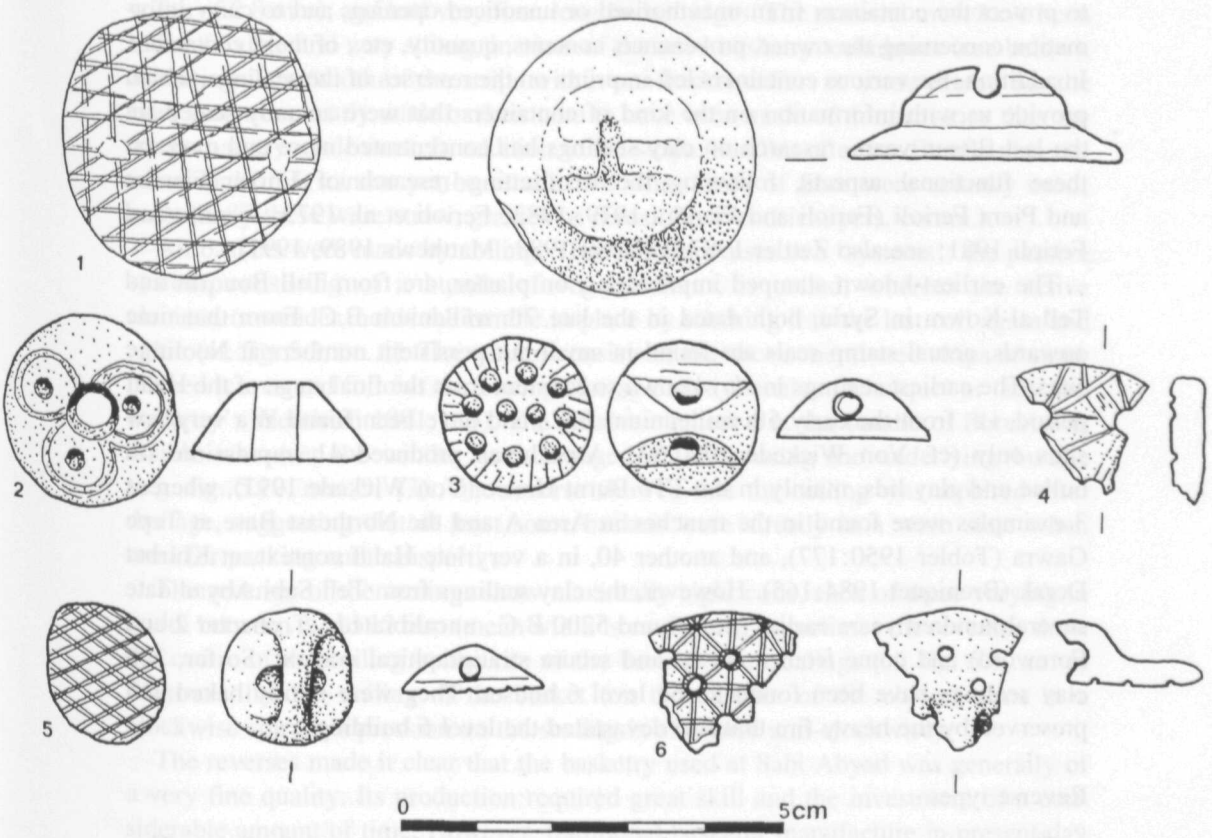


Figure 5.1. Stone stamp seals (see catalogue for description of objects).

seal, probably also button-shaped but no handle is preserved. The stamp surface shows irregular lines crossing each other in several directions. At some crossings, the seal is perforated. This fragment measures 1.6x1.6x0.4 cm. The designs found on both seals compare with those of, e.g., late Halaf Arpachiyah and Gird Banahilk (cf. Von Wickede 1990:96 and Tafel 71-72, 93, 140, 192 and 197).

The Level 6 Sealings

Introduction

Sealings are defined as lumps of clay either pressed on the fastening of a container or closing this container entirely, when the clay is still plastic. Most sealings are impressed with a stamp seal and have the ability, by means of these seal impressions,

to protect the containers from unauthorised or unnoticed opening, and to carry information concerning the owner, provenance, contents, quantity, etc., of these containers. In addition, the various containers left imprints on the reverses of the sealings, which provide us with information on the kind of containers that were actually sealed. In the last fifteen years, research on clay sealings has concentrated more and more on these functional aspects, following the trendsetting research of Enrica Fiandra and Piera Ferioli (Ferioli and Fiandra 1979, 1983; Ferioli et al. 1979; Fiandra and Ferioli 1981; see also Zettler 1987; Charvát 1988; Matthews 1989, 1991).

The earliest-known stamped impressions, on plaster, are from Tell Bouqras and Tell al-Kowm in Syria, both dated in the late 7th millenium B.C. From that time onwards, actual stamp seals are found in small but persistent numbers at Neolithic sites. The earliest sealings in *clay* known so far stem from the final stage of the Halaf period, i.e. from the early 5th millennium B.C., and have been found at a very few sites only (cf. Von Wickede 1990:93). Arpachiyah produced 41 impressions on bullae and clay lids, mainly in the TT6 Burnt House (Von Wickede 1991), whereas 3 examples were found in the trenches in Area A and the Northeast Base at Tepe Gawra (Tobler 1950:177), and another 40, in a very late Halaf context, at Khirbet Derak (Breniquet 1984:165). However, the clay sealings from Tell Sabi Abyad date several hundred years earlier (i.e. around 5200 B.C., uncalibrated; cf. chapter 2 and Foreword) and come from a closed and secure stratigraphical context. So far, 300 clay sealings have been found in the level 6 houses. They were lightly baked and preserved by the heavy fire that had devastated the level 6 buildings.

Reverse types

The sealing reverse usually carries the impression of the sealed object. This impression may allow (a) the determination of the way of sealing, (b) the identification of the sealed object and (c) the reconstruction of the shape of the sealed object (Ferioli and Fiandra 1983:469).

In the case of Sabi Abyad, 243 out of the 300 sealings provide clear clues about the sealed objects (table 5.1). The sealings all seem to have been used in association with transportable containers; no door sealings have been found. At least five kinds of containers can be recognised: baskets or basketry lids, plaited mats, ceramic vessels, a stone bowl and a leather bag. It appeared that mainly baskets and ceramics were sealed, in a variety of ways. So far, 18 different ways of sealing have been recognised. In the discussion below, each kind of sealing has been given a reverse type, which indicates the general shape and its use.

Coiled basketry (reverse types 1-2). In total, 112 sealings sealed coiled basketry (table 5.1). On their reverses these sealings show the regular impressions of coils with clear traces of fibrous material. The basketry was always made of the same basic material and with the same technique. The basic material consisted of long, narrow strips of vegetal fibres varying in width between 1 and 4 mm (with a mean

width of 2.8 mm), and had very fine, lengthwise ridges. The material must have been rather flexible and very strong, in view of the used basketry techniques (see below). Sometimes, the width of the strips within one basket differs to some extent, but the finer and more neatly made baskets tend to have been made of thinner strips than the more coarsely made ones. In addition to the strips, bundles of a fine fibrous material were applied. It cannot yet be established what kinds of fibre were actually used; most likely these were straw, grasses or reeds (W. Wendrich, pers. comm.).

All baskets were made by coiling. This technique uses two 'systems': the passive system, consisting of a bundle of vegetal fibres, is coiled, whereas the active element, or winder, holds the bundle in place by stitching it to the last coil again and again (cf. fig. 5.2, no. 1). The winder consists of the above-mentioned strips of straw or reed leaves and follows the coiling (the so-called 'beehive technique' or 'stitched basketry'; Wendrich 1991:136). The passive element (i.e. the bundle of fibres) was visible wherever the winder was damaged, thus exposing the underlying bundle (e.g. fig. 5.10, nos. 9, 13). One reverse showed that the coiling was repaired after damage, suggesting that at least some baskets were already in a worn state when used for packing and transport.

The reverses of the sealings show maximally eight coils, each of these varying in width between 3 and 12 mm (mean width is ca. 7 mm). Sometimes the reverses show the centre of the coiling or the rim of the basket. Two sealings (cf. fig. 5.8, no. 6) illustrate that the coiling of the basket (on the exterior of the object) turns in a clockwise spiral (impression on the sealing is of course anti-clockwise).

The reverses made it clear that the basketry used at Sabi Abyad was generally of a very fine quality. Its production required great skill and the investment of a considerable amount of time. However, traditional basketry manufacture in present-day Egypt shows that the production of baskets comparable to those originally in use at Sabi Abyad is not necessarily in the hands of specialists but may easily proceed at the household level (W. Wendrich, pers. comm.).

Little can be said about the shape of the baskets, since the sealings only show the topmost rim coils or the centre of the lid. Actually, coiled basketry can take almost every shape. On the basis of the sealing techniques (see below), it seems that there were at least two different shapes of baskets and lids, i.e. (a) baskets with a flat lid laid upon the container's opening and rim, and (b) baskets with a flat lid sunk into the container's opening. In most cases, the part of the basket visible on the sealings suggests that the containers had a circular mouth, although some evidence for an oval shape was found as well.

Traces of decoration or ornamental wickerwork (which changes the structure of the basket's surface) have not been found. If any decoration was originally present, it was probably by means of colouring.

The Sabi Abyad basketry was sealed in three different ways. The first method, i.e. reverse type 1, represented by 11 sealings, shows impressions of two different pieces

of coiled basketry set against each other in an angle of 90 degrees. Some sealings show the impression of the basket's rim, which most likely was more or less vertical in shape. A basketry lid was placed in the opening or mouth of the vessel (so the lid was not resting on the top of the rim but was sunk into the mouth). Probably a protruding coil was originally present on the inside of the basket's opening, two or three coils below the rim; this additional coil served to prevent the lid from falling into the vessel (actually, a similar feature is commonly found in the baskets of present-day Egypt; W. Wendrich, pers. comm.).

The clay used for sealing was pressed both on the edge of the lid and against the interior of the basket wall. In most cases, some clay was pressed between the lid and the basket wall as well, showing that the lids did not always fit precisely. In this way, one or two coils of the wall and some coils of the lid have left their impression on the reverse surface of the sealing. The section of the sealing is triangular, with the impressions of the lid and the basket wall on two sides and the seal impression(s) on the third side (e.g. fig. 5.2, no. 5, fig. 5.7, no. 6, fig. 5.9, no. 2 and fig. 5.14, no. 4). In five cases, the sealings allowed the measurement of the rim diameters of the sealed containers, which varied between 15 and 20 cm (the mean inner rim diameter was 16.5 cm). Evidently, the actual exterior rim diameter of the baskets must have been larger.

The second and most popular method of sealing is represented by reverse type 2, attested in 100 cases. Here the reverse shows that the sealing must have been on or near the centre of the coiling. Commonly, the clay is placed on a knot of one or more ropes tied across the centre; 79 sealings with reverse type 2 give evidence of rope impressions. The sealings show that the coiling must have formed a flat, or occasionally slightly convex or concave, surface. Most likely, the object carrying the sealing was a basketry lid covering the basket's opening and tied to the container with a rope (e.g. figs. 5.2, no. 4, 5.8, no. 4, 5.10, no. 16, 5.17, nos. 2, 5, 5.22, nos. 2, 5-6). The basketry lids may have been closing not only baskets but ceramic vessels as well (Ferioli et al. 1979:13 and fig. 2a-b; Ferioli and Fiandra 1983:488-490 and fig. 17). The dimensions of these lids cannot be determined with certainty, since the spiral coiling can be much larger than the part impressed on the sealing (which in many cases was placed near the centre of the spiral). However, the Sabi Abyad sealings have made it clear that at least some lids must have exceeded a diameter of 20 cm.

The third way of sealing a basketry object was an exceptional one, attested only once and resembling reverse type 8. The sealing (fig. 5.21, no. 2) represents an oval-shaped clay lid, about 2 cm thick. It was placed on an oval basketry container (the opening at the rim was 6.6 cm wide but of unknown length) while the clay was still wet. The basket's rim has left its impression on the reverse of the clay sealing. Perhaps the contents of the basket were initially protected by a basketry covering, since some faint basketry impressions are also visible on the reverse of the clay lid, next to the rim impression.

True baskets were not preserved in the archaeological record of Sabi Abyad or that of sites in adjacent regions, but basketry impressions on so-called 'white ware' of the 7th millennium B.C. (cf. Maréchal 1982, fig. 10) and on sealings found at fifth to second millennium sites, like Festòs (Ferioli et al. 1979, fig. 2a), Arslantepe VIA (Ferioli and Fiandra 1983:488 and fig. 17b), Değirmentepe (Esin 1985:260 and figs. 13-14) and Tepe Gawra (Rigillo 1991, figs. 33 and 35), have made it clear that coiled basketry was once widespread in the ancient Near East. Coiled baskets and discs used as work pads or wall decoration are still made in Syria, although the craft is dying out in favour of modern materials; present-day production is largely oriented towards the souvenir market (Kalter et al. 1991:108).

Plaited mats (reverse type 3). Six sealings were used to seal plaited mats (cf. table 5.1 and figs. 5.9, no. 11, 5.14, no. 5, and 5.22, no. 3). The reverses of the sealings show vegetal fibres varying in width between 1.0 and 1.5 cm, with a clear longitudinal structure. These strips were probably made of reed leaves or the like, perhaps the same material as was used for the coiled basketry. The coherence of a plaited piece of material is created by the 'shift' in plaiting: the horizontal strands go under and over the vertical strands. After one strand (or more), the next strand shifts one step (or more), thus creating a pattern. Three sealings show the common 'over two, under two, shift one' pattern (fig. 5.2, nos. 6-7; for details, see Wendrich 1991:65-66). Apart from Sabi Abyad, evidence for this kind of plaited basketry has also been found on the sealings of sites like Tepe Gawra (Rigillo 1991, figs. 30 and 31) and Fara (Matthews 1991, fig. 7). The mats visible on the Sabi Abyad sealings were apparently closed or tied with a piece of rope: three sealings show impressions of a rope 2 or 3 mm thick, and in one case the S-ply is visible. Mats may have been used for the production of baskets or bags, but they may also have served to pack products. Matthews (1991:9) suggests that mats contained bulky commodities such as textiles, wich can be wrapped, whereas Wright et al. (1980:278) point out that mats may have contained dates, as they do today near Susa in southwestern Iran.

Pottery (reverse types 4, 7-13, 15-16). In total, 93 sealings have been used to seal ceramic vessels (table 5.1). At present, ten different ways of sealing pottery are distinguished (fig. 5.2, nos. 8-17).

The 30 sealings with reverse type 4 (figs. 5.2, no. 8, 5.7, nos. 1, 3, 5.8, no. 7, and 5.9, no. 5) are the only pottery sealings who do not cover the mouth of the vessel completely; all other sealings close the vessel in a more or less airtight way. Sealings with reverse type 4 all show the impression of a jar neck; often, the vessel rim or a small part of the upper body of the jar is shown as well. In many cases, the sealing is broken at the exact place of the rim impression. The surface of the sealing reverse is smooth, concave and no rope impressions are visible.

In order to attach the sealings, the vessel first had to be closed with a clay lid or the like. Subsequently, the sealing was placed in position on both the jar and its lid,

and covering the interface between both. Only a small part of the jar and lid had to be sealed (cf. Zettler 1989:374).

The dimensions of the jars carrying sealings with reverse type 4 could be established in 21 cases. Neck diameters varied mainly between 5.5 and 17.5 cm, with only a few larger ones, up to 26 cm. The rim thickness could be measured only twice: 0.4 cm and 1.3 cm. The neck height did not exceed 3 cm in four cases, but most vessels seem to have had higher necks. These necks are either straight or slightly flaring.

Eight sealings carried reverse type 7 (figs. 5.2, no. 9, 5.18, no. 1, 3, 5.19, no. 3, 5.20, no. 1), characterised by a more or less flat top. Sometimes this top surface is highly irregular due to the pressure of the fingers originally attaching the sealing on the vessel. The clay lump was pressed thoroughly into the mouth of the vessel and over the vessel rim, resulting in a massive, bulging ball of clay on the reverse of the sealing. Most likely, the clay ball was somewhat pre-shaped before attachment. Generally, the sealing with reverse type 7 clearly shows the impression of the vessel rim. In some cases (fig. 5.18, no. 1), there are indications for a longitudinally shaped object (perhaps a wooden stick or a bunch of reeds) on the rim of the vessel, probably in order to prevent the clay from penetrating too deep into the vessel (cf. Ferioli and Fiandra 1983:480). The interior rim diameter of the vessels carrying sealings with reverse type 7 varied between 3.3 cm and 15 cm (mean diameter: 9 cm).

Sealings with reverse type 8 (figs. 5.2, no. 10, 5.8, nos. 1 and 3, 5.12, no. 9, 5.14, no. 2, 5.16, nos. 1-2, 5.20., nos. 2-3, 5.22, no. 1) are each 'mushroom'-shaped (Zettler 1989:373). A pre-shaped clay ball with one flattened side was pressed with this flat side onto the rim of a ceramic vessel. The resulting rim impression varies in depth, depending on the pressure exercised on the clay ball; in some cases, the rim impression is hardly visible, whereas in other cases it is up to 8 mm deep. Actually, it seems that some of the 31 sealings with reverse type 8 were removable; the faint rim impressions suggest that it was not necessary to break the sealings when opening the vessel. One sealing shows a considerable quantity of straw impressions on its reverse; possibly the contents of the vessel associated with this sealing had been covered with straw before the sealing was applied. Two other sealings (cf. fig. 5.16, no. 1) show the impression of a longitudinally shaped object in the vessel's mouth, as was the case with some sealings with reverse type 7 (see above). The rim diameter of the ceramics carrying sealings with reverse type 8 varied between 6 and 16 cm (mean diameter: 10.5 cm). The rim thickness could be established in nine cases and varied between 0.5 and 0.9 cm (mean thickness: 0.6 cm).

Reverse type 9 is represented by one sealing only (figs. 5.2, no. 11, and 5.13, no. 4). It is a convex clay slab, with an even thickness of ca. one centimetre, placed on the rim of the vessel. The vessel carrying this sealing had an oval shape, with a width of at least 7.4 cm but of unknown length. The rim of the vessel was at least one centimetre thick. Perhaps the contents of the vessel were originally bulging out, leading to the convex shape of the sealing.

The six sealings with reverse type 10 are each conical or slightly rounded lumps of clay, with a flat or concave back (figs. 5.2, no. 12, 5.11, no. 8, 5.21, no. 3). They have certainly been pre-formed, as appears from the prominent finger impressions on the reverse. The vessels left only slight impressions on the various sealings; their rim diameters varied between 6 and 10 cm (mean diameter: 8.6 cm). The rim thickness could be measured only once: 0.5 cm.

The sealings with reverse type 11 somewhat resemble those with reverse type 9, but in contrast with the latter the clay now hangs over the rim and partly covers the exterior vessel neck (figs. 5.2, no. 13, 5.21, no. 1). Three vessels were sealed this way, one with a rim diameter of 9 cm, the others oval in shape and at least 9.1 cm wide at the rim. The rim was 0.3, 0.4 and 0.5 cm thick, respectively.

The eight sealings with reverse type 12 each consist of a massive lump of clay pushed into the mouth of the ceramic container (figs. 5.2, no. 14 and 5.19, nos. 2, 4). The upper part is conical or slightly rounded. The clay does not cover the vessel rim but is wholly sunk into the container's opening. The sealing has a flat or concave reverse, and was pre-formed before being pressed into the vessel mouth. All sealings with this shape served to close vessels with a flaring neck and rim, varying between 3.5 and 10 cm in diameter (mean diameter is 6 cm).

The reverse type 13 sealing is an uncommon one, found only once. It consists of a lens-shaped lump of clay, half of which is preserved. The fracture shows a thick rope impression, whereas on the reverse hairy impressions are visible. Most likely, the vessel originally carrying this sealing was first covered with a piece of leather which still had some hair attached to it. The leather was fastened onto the vessel by means of a rope made of vegetal fibres, which was ca. 7 mm thick, S-spun and Z-plied (see below). Subsequently, clay was pushed on the leather and the rope, thus hiding both from view (figs. 5.2, no. 15, 5.19, no. 6). The clay sealing shows no rim impression, due to the leather covering. The diameter of the sealing is 7.8 cm, so the rim diameter of the container must have been larger.

The reconstruction of the sealing method in the case of the sealings with reverse type 15 is tentative. The two pieces each consist of a more or less circular sherd with a lump of clay attached to the concave side. The clay is smoothed on the top side and damaged at the edges. Possibly each sherd served as a lid; the clay used for sealing then covered the sherd or lid, and the vessel rim and the upper part of the vessel's neck, thus preventing the lid from being removed (fig. 5.2, no. 16; cf. Dohmann-Pfälzner, in press). The sherds have a diameter of 10 cm and 12.5, respectively; the rim diameter of the sealed vessels must have been somewhat smaller.

The three sealings with reverse type 16 each consist of a massive lump of clay with a flat reverse, pressed on the vessel's rim. The clay extends over the jar rim and covers the exterior of the vessel's neck (fig. 5.2, no. 17). The three sealings with reverse type 16 show rim impressions with a diameter of 4.1, 10.5 and 12.5 cm, respectively.

Stone bowl (reverse types 5-6). Four sealings originally sealed one or more stone vessels. Actualy, two sealings fitted a small and oval, grooved bowl made of gabbro (figs. 5.14, nos. 1-1a, 5.19, no. 1; the grooves and rim of the bowl clearly left their impressions on the reverse of the sealings). Both the sealings and the bowl were found in the same level 6 house II but in different rooms (the sealings were found in room 6, the bowl in room 12). It cannot yet be established with certainty whether the two remaining sealings fitted this bowl as well. The find of two sealings belonging to the same vessel suggests that the actual sealing took place at the site. However, only one of the sealings gave evidence of stamp-seal impressions. It may be the case that the bowl, when it first arrived at the site, carried a sealing with stamp-seal impressions; after inspection of the bowl's content, the vessel was re-sealed but without renewal of the seal impressions.

The thick sealings hid the larger part of the bowl from view (the clay entirely covered the vessel's opening and the larger part of its exterior). One sealing shows also an impression of a 2 mm thick, Z-spun and S-plied rope on the front side, apart from the bowl grooves on the reverse (fig. 5.19, no. 5). The reverses show rather smooth bulbs and dimples, perhaps due to the pre-forming of the clay lumps before attachment.

Leather bag (reverse type 14). One sealing (fig. 5.16, no. 3) shows a pleated hairy surface on its reverse, tied tightly with a piece of rope 2 mm thick and S-plied. The rope must have been wound at least four times around the sealed container. Most likely, this sealing originally sealed a leather bag, which was closed with a rope at its opening (fig. 5.2, no. 3). The leather must still have had some hairs attached to it.

Other bag sealings at Sabi Abyad are perhaps represented by the two cloth impressions found in the level 6 buildings II and V, rooms 6 and 7, respectively. These clay lumps have one smoothed, flattened side, whereas the opposite side shows the impression of a finely woven cloth ('over one, under one, shift one'), without wrinkles and made of thin fibres hardly 0.5 mm wide. No rope or other impressions are visible on the fragmentarily preserved clay lumps.

Prehistoric bag sealings have been rare so far; the sole bag sealing from the Halaf period, on a textile bag, comes from Arpachiyah and dates from around the middle of the 5th millennium B.C. (Mallowan and Rose 1935, Pl. IXa; Von Wickede 1990:97). In later times, sealings on leather and textile bags are found in large numbers, e.g. at the third and second millennium sites of Shahr-i Sokhta, Arslantepe, Fara and Sheikh Hamad (Ferioli et al. 1979:20; Ferioli and Fiandra 1983; Matthews 1991:2; Dohmann-Pfälzner, in press).

Unidentified objects (reverse types 17-18 and unknown). Reverse type 17 is associated with 20 sealings, each with an almost flat or slightly concave, smoothed back. Ocassionally, some slight bulbs or dimples are visible. In 11 cases a rope impression is perceptible (figs. 5.7, no. 4, 5.9, no. 3, 5.12, no. 7, 5.13, no. 6, and 5.22, no. 4). The nature of the sealed objects is not clear. Probably each of the sealings with reverse type 17 was used to seal a container closed with a piece of leather. The

leather must have been very smooth and clean, without any traces of hair. Some sealings have a somewhat more cylindrical, concave reverse, and may have sealed ceramics in one way or another.

The five sealings with reverse type 18 each have a triangular section and a convex reverse which shows a considerable quantity of straw impressions, all oriented in the same direction. A slightly larger straw fibre is visible between the other straws at intervals of about 1.7 cm (figs. 5.9, no. 1 and 5.18, no. 6). At present, it cannot be established what objects were actually sealed (perhaps basketry). Some sealings of late fifth millennium Değirmentepe in Turkey show reverses closely resembling those of Sabi Abyad and are said to have sealed wooden containers (cf. Esin 1985:255, pl. 1, no. 5, and pl. 2, no. 15).

A group of 49 sealings cannot be associated with any of the kinds of containers distinguished so far (these have been given a question mark in the tables). Some of these sealings show rough reverses with numerous straw impressions. Others show concave or convex surfaces, either smooth or rough, with bulbs and dimples and, sometimes, the impression of longitudinal ridges. Five sealings show rope impressions. Others have flattened surfaces positioned in angles to each other, as if the clay was pressed into a corner of some object (however, these are not doorsealings). One piece may have sealed a miniature bowl with a bead rim, whereas others perhaps were attached to leather or wood.

Eight sealings are too damaged to allow the designation of the proper reverse type (these have been indicated by a dash in the tables). Included is also a small clay ball with a convex reverse, which had been shaped in the hand (finger imprints are visible) and which carries a stamp-seal impression (fig. 5.13, no. 10). The meaning of this sealing is not yet clear; it may have served as a label hanging from a rope (see, e.g., Von Wickede 1990:35), as a kind of receipt for some transaction (Alizadeh 1988:23), as a 'message sealing' held by a person delegated by the seal owner to confirm his identity (Rigillo 1991:42-43) or as a 'test strip' for checking or testing the stamp seal (Matthews 1991:2).

Ropes and knots. So far, 104 sealings show the impression of one or more ropes or other fastenings on their reverse (e.g., figs. 5.8, nos. 4-5, 5.12, no. 6, 5.17, nos. 2, 5, 5.18, no. 5, and 5.19, no. 6). Remarkably, 79 sealings (i.e. 75.9%) are of the reverse-type-2 kind and have been sealing basketry lids. The impressions were made by different kinds of rope. The basic rope material cannot be determined with certainty; it may have been the hair of goats, sheep or other animals but vegetal fibres may have been used as well. Matthews (1989:20) suggested that flax threads are mainly S-spun, this in contrast with goat-hair threads which are mainly Z-spun. If so, the prevailance of Z-spun threads at Sabi Abyad may indicate that it is mainly animal fibres that account for the ropes impressed on the level 6 sealings.

It is clear from the various impressions that the ropes were spun and plied. Moreover, in one case the rope was cabled as well. In the present study, the direction of spin,

ply and cable is recorded in mirror-image of the rope impressions: when the impression shows a Z-direction, the actual rope had an S-direction, which is subsequently recorded (the letters Z and S are technical terms to describe direction in cordage and textile or basketry techniques; cf. fig. 5.2, no. 2, and Wendrich 1991:30-47). In the case of the 102 rope impressions found at Sabi Abyad, 63 impressions (i.e. 61.8 %) were Z-spun and S-plied (in most cases, only the S-ply or Z-direction is determinable but it is assumed that S-plied ropes were also Z-spun). In only six cases (5.9%), the impressions gave evidence of ropes which were S-spun and Z-plied. In addition, one of these ropes is cabled in S-direction as well. In the case of 33 rope impressions (32.4%), the direction of ply or spin was not determinable.

Most ropes (n= 71, or 69.6 %) were either 2 mm or, to a lesser extent, 1.5 mm wide (8.8 %). Other dimensions occur in minute numbers; occasionally, ropes with a width of 1 mm, 2.5 mm or 3 mm were found. Two ropes are extremely thick: one is made of vegetal fibres and 7 mm wide, S-spun and Z-plied and was probably used for the fastening of a piece of leather to the opening of a ceramic vessel (cf. reverse type 13), whereas the other is 8.5 mm wide and was used to seal a basketry lid (cf. reverse type 2). The latter impression, however, is not very clear and the direction of ply or spin is not determinable.

Almost half (n= 49) of the sealings with rope impressions also gave evidence of one or more knots. The sealings had been placed precisely on the knot, to prevent removal of the rope without cutting or breaking of the sealing. The knots are shaped, in the negative impression, as two or three parallel turns; most likely, they are normal reef knots (cf. Wendrich 1991:42). Sometimes loops are visible, like in the bows of shoe-laces. In some cases, unraveled, loose rope ends have left their impressions next to the rope impressions.

Finally, in addition to the ropes made of vegetal or animal fibres, leather strings seem to have been used in at least two cases to fasten basketry lids.

Summary. The reverses of the sealings have given an insight in (a) what kind of containers were actually sealed and (b) in what manner the sealing was carried out. At Sabi Abyad, mainly coiled baskets and ceramics were sealed but plaited mats, stone bowls and leather bags carried sealings as well.

The coiled baskets proved to be of fine quality, made of thin strands by skilled hands. According to the way these baskets were sealed, it seems that at least two different kinds of baskets and lids were in use. Most likely, the baskets were circular or oval in shape. Generally, the baskets were small; only in very few cases did the rim have a diameter over 20 cm.

In the case of the ceramic containers, too, it seems that mainly small vessels carried sealings. Rim diameters vary around 10 cm, and rim thickness varies mostly around 0.5 cm. It cannot be established as yet whether sealing was restricted to the so-called fine ware or affected other categories of ceramics as well (cf. chapter 3). It seems, however, clear that coarse-ware vessels had been sealed only once or twice.

The sealings associated with the carefully made stone bowl confirm the impression that mainly small containers were sealed. Apparently, the containers were all rather easily transportable. Most sealings give the impression that they were originally firmly attached to the containers and were strong enough to survive transport. Moreover, the wide variety of designs shown by the sealings (see below) suggests that the sealings (and consequently the containers with their sealed contents) came from a wide variety of sources outside of Tell Sabi Abyad (cf. Matthews 1991:7); apparently, they were brought to the site.

Impressions on the reverses of the sealings have made it clear that often thin rope was used to close the containers. In most cases, the rope was spun and plied in the same direction.

At present it cannot be established what products were actually stored in the sealed containers. The restricted size of most containers and the general physical properties of both the containers and the sealings, suggests that mainly solid, dry products were packed. Cereals are a likely candidate, which is supported by straw and true grain impressions on the reverses of many sealings. However, other food products, luxury items or products of craftsmanship are possibilities as well.

container type	(abb.)	n	%	revers numbers
basketry	(Bs)	112	37.3	1,2
pottery	(Pt)	93	31.0	4,7,8,9,10,11,12,13,15,16
plaited mat	(Mt)	6	2	3
stone vessel	(Sv)	4	1.3	5,6
leather bag	(Bg)	3	1.0	14
reverse number 17 (leather?)	(17)	20	6.7	17
reverse number 18 (straw cont.?)	(18)	5	1.7	18
unidentifiable	(?)	49	16.3	?
no reverse surface	(-)	8	2.7	–
Total	(Tt)	300	100	

Table 5.1. Number of sealings and percentage of total per container type.

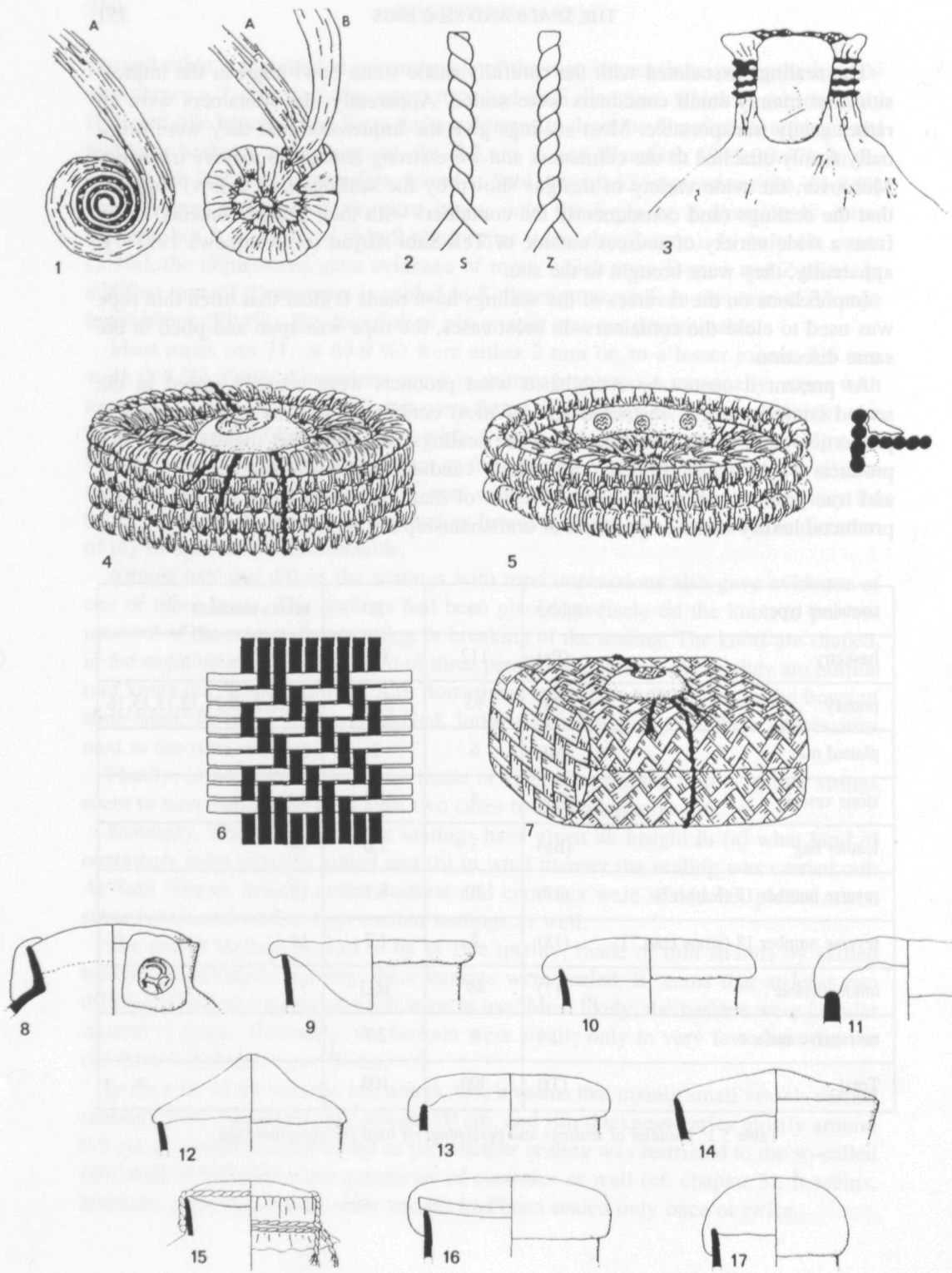


Figure 5.2. No. 1: coiled-basketry technique (after Wendrich 1991, fig. 50); no. 2: directions of spin or ply in ropes; nos. 3-17: reconstruction of sealing methods, reverse type 14 (bag), reverse types 1-3 (basketry) and reverse types 4, 7-13, 15-16 (pottery).

The stamp-seal impressions

Most sealings (n= 189, or 63%; see tables 5.2 and 5.3) at Sabi Abyad carried one or more stamp-seal impressions on the obverse. Below, the various designs are described with capitals for (a) general design, and numbers for (b) variations in the design and (c) differences in size, shape and cutting of the actual seal. It is evident that the absence of a seal impression on a sealing does not necessarily imply that the sealing never carried an impression; in many cases, the impression may simply not have been preserved. Therefore, it is argued that all sealings, including the so-called jar stoppers, with or without seal impressions, must be included in further analysis.

Design A. Seal design A (n= 51, or 17% of the total number of impressed sealings) shows a goat-like animal with long curved horns, bent hindlegs and stretched forelegs, each clearly depicted. The animal has a fairly long neck, a short tail and two ears. The forefeet are divided into two halves. The animal is always oriented with the head towards the right; in front of the animal, a lenticular motif fills in the stamp surface. Two main varieties can be distinguished on the basis of the posture of the forelegs: design A.1 with the legs stretched forward, and design A.2 with the legs in a straight, vertical position (figs. 5.3, 5.7, 5.8, 5.9, nos. 1-6, and 5.22, nos. 4, 6). In 13 cases, the design variety could not be established (design type A.? in tables 5.4 and 5.6). At present, design A is associated with at least eight different seals, each of which is circular or slightly oval but different in size and design configuration.

Design B. Design B (n= 15, 5%) is characterised by zigzag lines in combination with triangles along the edge of the impression (figs. 5.3, 5.9, nos. 7-13, 5.10, nos. 1-6). Three main varieties are distinguished, two of which have a circular stamp face (B.1 and B.2), the remaining one having a rectangular shape (B.3).

Design variety B.1 shows two zigzag lines and can be subdivided into B.1.1 and B.1.2. As pointed out above, the differences between the subvarieties are mainly found in the actual seal size and the irregularities in seal cutting (cf. fig. 5.9, nos. 7-8). Seal design B.2 has three zigzag lines. Five subvarieties are distinguished (B.2.1 to B.2.5; cf. figs. 5.3, 5.9, nos. 9-13, 5.10, nos. 1-3, and 5.22, nos. 3, 5). Seal design B.3 consists of a rectangular, slightly tapering stamp face and shows three V-shaped lines, one above the other. Two subvarieties can be distinguished (unfortunately, the B.3.2 impression is poorly preserved).

Occasionally, zigzag lines are used as an element in more elaborate design configurations, such as the designs L and Y (see below).

Design C. Thirty sealings (10%) showed impressions of an S-shaped or occasionally Z-shaped stamp seal, the extremities of which are square with smoothly rounded corners (figs. 5.3, 5.10, nos. 6-19, 5.11, nos. 1-9, and 5.22, no. 2). Nine design varieties can be distinguished on the basis of design and seal size.

The C.1.1 variety consists of two plain and smooth, S-shaped lines, one above the other and following the shape of the stamp surface.

Varieties C.2.1, C.2.2 and C.2.3 each show toothed horizontal strokes of the 'S'. Variety C.3.1 shows three S-shaped lines, each with plain ends. Varieties C.4.1 and C.4.2 show three S-shaped lines as well, but now the lines have toothed ends. Variety C.5.1 is exceptionally small and has a Z-shaped seal surface. Design C.6 has not been completely preserved or, perhaps, never been completely impressed on a sealing; it seems, however, that it is an S-shaped seal, too, with three plain, S-shaped lines as a motif. Two sealings showed S-shaped impressions of an undeterminable variant (C.?).

Design D. This design, used 14 times (4.7%) and associated with a circular stamp surface, consists of a Y-shaped motif or, possibly, a stylised bucranium (figs. 5.4, 5.10, nos. 10-13, 5.11, no. 10, 5.12, nos. 1-6, and 5.22, no. 5). Above the bucranium, a W-shaped or U-shaped line with a separate triangle is found, perhaps representing another bucranium, now without the vertical stroke. Below the main element, the area is filled in with triangles. The upper part is filled in with a slightly curved, horizontal line with one (D.2) or two (D.1) triangles attached to it.

Two design varieties can be recognised, represented by five different seals. Interestingly, the D.1.1 seal impression, occurring in six cases, is found *only* in combination with the C.1.1 variety. Similarly, the D.1.2 variety is once used in combination with the B.2.1 variety, although it occurs individually on three sealings. The D.2 impression differs from the D.1 type both in design and cutting: the W-shaped line above the main element has been replaced by a U-shaped line, and, moreover, the lines are wider and less sharply cut, with smoother angles.

Design E. Seal impressions with design E are each circular in shape and depict a tree or other plant-like motif (figs. 5.4 and 5.12, nos. 7-9, 11-12). Three varieties are recognised, represented by five different seals (1.7%). Design E.1.1 shows a vertical stem with three bent-down leaves on each side. The tree is standing on a striped ground surface, and above the tree two triangles with points down are visible, possibly depicting flowers or fruit. Design E.1.2 shows the same motif but the ground surface is not striped and the used seal seems to have been somewhat smaller. Motif E.1.3 is unfortunately fragmentarily preserved; only two bent-down leaves and the triangles are visible. This seal impression is slightly larger than the two other E.1 impressions. Variety E.2.1 shows a vertical stem with six leaves slightly curving upwards on each side. Above the tree, two triangles point downwards. The E.3.1 impression is very fragmentarily preserved and shows a stem with at least two bent-down leaves.

Design F. Design F, found in six cases (2%), consists of a circular arrangement of eight triangles, each with their point oriented towards the centre of the stamp face; occasionally, the triangles radiate around a central circle (figs. 5.4, 5.12, nos. 10, 13, and 5.13, nos. 1-2). The seal impressions are either circular (F.1.1, F.2.1) or slightly oval (F.1.2) in shape. Design F.3.1 (fig. 5.13, no. 3) is a rather curious one; actually, one may wonder whether it is truly part of a stamp-seal impression. It consists of the impressions of at least four different, small flowers of various sizes, found on a clay piece (which originally must have been placed in a right angle to another object).

The impression shows the flower bottom, with radiating lines, and a part of the stalk; in one case, even some flower petals are shown.

Design G. The complex design G is found in four cases (1.3%). Two varieties can be distinguished, each occurring twice. Design G.1.1 shows a central ellipse, with on both sides a horizontally placed ellipse bordered by two 'bow-tie' motifs. Both along the upper and lower edge of the design, another but toothed ellipse is found (figs. 5.4, 5.13, nos. 6-8, and 5.14, no. 1). The G.2.1 design resembles the former, but now both toothed ellipses are connected by means of a straight line, dividing the seal area in two parts. Each part carries one 'bow tie'. In addition, the G.2.1 seal is considerably smaller than its G.1.1. counterpart.

Design H. One sealing (0.3%) shows a series of cowrie-shell impressions, termed design H (figs. 5.4, 5.14, no. 2, and 5.22, no. 1). Originally, the shell must have been attached to a string of beads (i.e. a necklace or the like); next to each impression, the beads have left a row of small concave imprints. In addition to sealing purposes, the shell (and perhaps stamp seals in general) seems to have been used as a pendant or, possibly, an amulet as well, worn around the neck or wrist.

Cowrie shells can be found in the Mediterranean and the Red Sea, and were used as personal ornaments from very early times onwards.

Design I. The circular design I (n= 4, 1.3%) shows two varieties (figs. 5.4, 5.13, nos. 4-5, 12). The one (I.1) is divided into two halves by means of a rather deep groove. Both halves depict a curved, elliptical 'leaf' with toothed sides. The other variety (I.2), represented only once, consists of three toothed 'leaves'; the one in the centre is more or less straight, the others are curved and embrace the central 'leaf'.

Design J. The sole design J impression is only fragmentarily preserved (0.3%; figs. 5.4 and 5.13, no. 10). The impression is most likely oval or kidney-shaped, and shows two straight lines with flaring ends dividing the impression into two, or possibly three, oval areas; these areas are filled in with straight 'leaves' with toothed sides.

Design K. The two impressions with design K (0.7%) are fragmentarily preserved (figs. 5.4 and 5.13, nos. 11, 13). The shape of the actual seal cannot be established. The design consists of two opposite rows of numerous thin, pointed lines, with in the centre at least six alternating triangles. The impression was made by a (very) detailed and neatly cut seal.

Design L. The three impressions with design L (1%; figs. 5.5 and 5.15, nos. 1-2, 4) are among the largest and most puzzling seal representations found at Sabi Abyad. The impressions are up to 9.5 cm long and 6.2 cm wide, and have an irregular outline. Each impression shows a series of geometrical motifs, such as zigzags, rectangles encircling each other, triangles and straight or oblique lines. So far, no complete design L impression has been found, and consequently the exact outline and design configuration remains vague. At least two subvarieties can be distinguished on the basis of differences in motifs and overall shape of the impression.

Design M. The three seal impressions with design M (1%) are fragmentarily preserved and allow only a limited reconstruction of their shape and design configuration (figs. 5.4 and 5.13, no. 9). The impression seems to have had a curved outline, and is divided into two elongated halves, each with a row of alternating triangles.

Design N. Seal-design N (figs. 5.4 and 5.14, no. 6) occurs only once (0.3%) in a very framentarily state. Nothing can be said about the shape of the impression. The poorly preserved representation shows two rows of alternating triangles irregular in size.

Design O. The impressions with design O were poorly preserved as well. The two representations (0.7%; figs. 5.4 and 5.14, no. 7) each have a rectangular but stepped outline, with the actual stamp surface filled in with numerous short or long, thin lines and, in the corner, a lenticular motif. The stamp seal carrying this design O must have been extremely detailed and neatly cut.

Design P. Seal-design P, found only twice (0.7%), has not been completely preserved so far (cf. figs. 5.4 and 5.15, nos. 3, 5). The impressions have a rectangular outline with rounded corners, and the design consists of various long-drawn, alternating triangles.

Design Q. The impressions with design Q consist of two or more, elongated ovals (figs. 5.5 and 5.16, nos. 1-2, 5-5a). Design Q occurs in three cases (1%), each of which differs from the others to some extent. In the case of design Q.1.1, it is questionable whether this is a true seal impression. Its outline is formed by four ovals, like a small hand with three fingers and a thumb. The impression is very deep and rough, while the reverse is unclear. The other varieties, however, were definitely used in association with jar sealings. Design Q.2.1 consists of two ovals, with their interiors filled in with ovals as well. The Q.2.2 design also consists of two ovals, but now the interiors are left open. It is clear that the ovals formed part of a larger design configuration, which, however, was not completely impressed on the sealing.

Design R. The circular seal impression with design R (n= 2; 0.7%) is fragmentarily preserved (figs. 5.5 and 5.14, nos. 4-5). The design seems to consist of two ovals next to each other and embedded within two curved lines; a series of short lines is perpendicularly attached to the curved lines. The design somewhat resembles a human face with eyes and eyebrows.

Design S. The two impressions with design S (0.7%; fig. 5.5 and 5.16, no. 7) each have an oval shape. The centre of each impression shows a raised, drop-shaped motif, perhaps encircled by a thin line. Actually, it is not yet clear whether the representations are truly stamp-seal impressions. The reverses provide no clue in this respect neither.

Design T. The design T impressions are unquestionably the most intriguing representations found at Sabi Abyad (figs. 5.6, 5.16, nos. 3-4, 6, and 5.17, nos. 1-3). The impression, found on nine sealings (3%), is of considerable size, i.e. 9.2x4.2 cm, and depicts an anthropomorphic figure with schematically rendered legs, arms and head. The used stamp seal may have served as an anthropomorphic amulet as well.

Possible amulet-seals with human representations are repeatedly found at sixth and fifth millenium sites like Tell Ramad, Tell as-Sawwan and Arpachiyah (cf. Von Wickede 1990, Tafel 28, 53, 57).

The impression is hardly visible in most cases, suggesting that the cutting of the design on the seal must have been very shallow. Moreover, the various designs were fragmentarily preserved. However, the overall design configuration could be largely reconstructed by combining the various fragments (cf. fig. 5.17, no. 1). The representation shows an upright standing figure, characterised by a wide head and conical headgear or hairdress, rudimentarily depicted arms and straight legs showing a herringbone pattern (which closely resembles the decoration found on the back of two female figurines, one from Early Halaf Sabi Abyad, the other from Late Halaf Khirbet esh-Shenef; cf. Akkermans 1989c, Fig. VIII, no. 3; Akkermans and Wittmann 1993, Abb. 11c). Facial features are not rendered except for the elongated, sharply delineated eyes with pronounced eyebrows.

Design U. Design U, found only once (0.3%), consists of a zoomorphic representation (figs. 5.5 and 5.17, no. 4): a scorpion, crab or insect-like animal is shown within a circle. The animal has an oval body and six legs. Behind the animal there are (at least) two triangles, perhaps simply a filling motif. The impression has a circular or slightly oval outline. This design U is, apart from design A and perhaps D, the sole zoomorphic representation found at Sabi Abyad.

Design V. Sealings provided with the stamp-seal design V, found twice (0.7%), show a circular impression divided into quarters by a cross (figs. 5.6 and 5.18, nos. 1, 4). The branches of the cross are pointed, whereas the open areas between the branches are each filled with two triangles, with their points oriented towards the centre. Two varieties can be recognised, the one (V.1.2) distinguished from the other (V.1.1) by means of slight differences in the design and the size of the seal. In the case of design V.1.2, the central cross seems to have five instead of four branches.

Design W. The circular design W, found only once (0.3%), consists of a simple configuration of concentric circles (figs. 5.6 and 5.18, no. 3).

Design X. The impression with design X is diamond-shaped and fairly small when compared to the other seal impressions (figs. 5.6 and 5.18, no. 5). The design consists of two diamond-shaped lines, the larger embracing the smaller. Design X occurred only once (0.3%).

Design Y. Design Y, represented by one circular impression (0.3%), is divided into two halves, each composed (in mirror image) of a W-shaped line surrounded by three triangles (figs. 5.6 and 5.18, no. 7).

Design Z. The smallest seal impression found so far at the site is rectangular in shape and shows a pattern of crosshatching with thin lines (figs. 5.6 and 5.17, no. 5). Design Z is attested in one case only (0.3%).

Design AA. Five sealings (1.7%) show impressions with design AA (figs. 5.6 and 5.18, nos. 2, 6, 8). Each impression has a rectangular shape, with a small indentation

at the long sides. The seal design consists of three longitudinal lines in the centre, with eight short lines standing perpendicular to the long ones. The lines are each very thin and shallowly cut; sometimes they are hardly visible.

Design?. This category consists of unclear or highly fragmented impressions, which allow no precise determination of the seal design.

cont. type	Bs	Mt	Pt4	Pt	Bg	Sv	17	18	?	–	Tt
no impr.	18	3	15	47	2	3	5	0	18	0	111
scal impr.	94	3	15	16	1	1	15	5	31	8	189
Tt	112	6	30	63	3	4	20	5	49	8	300
% no impr.	16.0	50	50	74.6	66.7	75.0	25	0	36.7	0	37.0
% seal impr.	83.9	50	50	25.4	33.3	25.0	75	100	63.3	100	63.0

Table 5.2. Numbers and percentages of sealings with and without seal impressions, separated according to container type.

reverse nr.	7	8	9	10	11	12	13	15	16	Tt
seal impr.	3	10	1	1	0	0	1	0	0	16
no impr.	5	21	0	5	3	8	0	1	4	47
Tt sealing	8	31	1	6	3	8	1	1	4	63

Table 5.3. Number of sealings on pottery with and without seal impressions, separated according to reverse type.

Some iconographical comparisons

Some designs shown on the sealings from Sabi Abyad have iconographical parallels with seals or seal impressions from other prehistoric sites in Syria and northern Iraq. An illustrative example is design A, with its caprid representation, which closely resembles an impression on plaster of a caprid from late seventh millenium Tell Bouqras (Akkermans et al. 1983, Pl. 42c). Impressions from Tell Bouqras and Tell el-Kowm also provide parallels for some geometric seal designs from Sabi Abyad, like, for example, the zigzag-design B and the representations of rectangles, diamonds and ovals encircling each other as in the L, W and X designs (cf. Maréchal

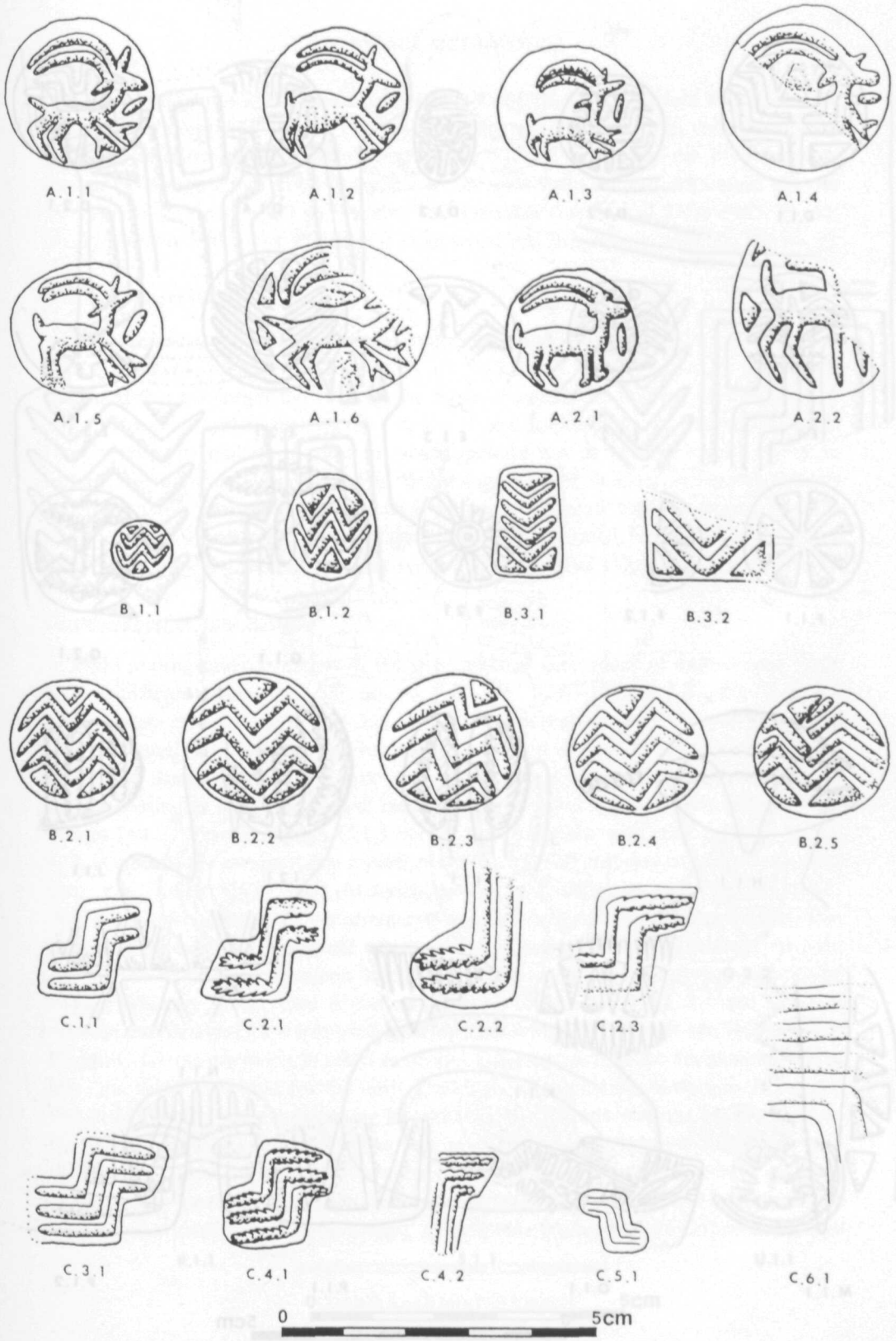


Figure 5.3. Level 6 seal designs.

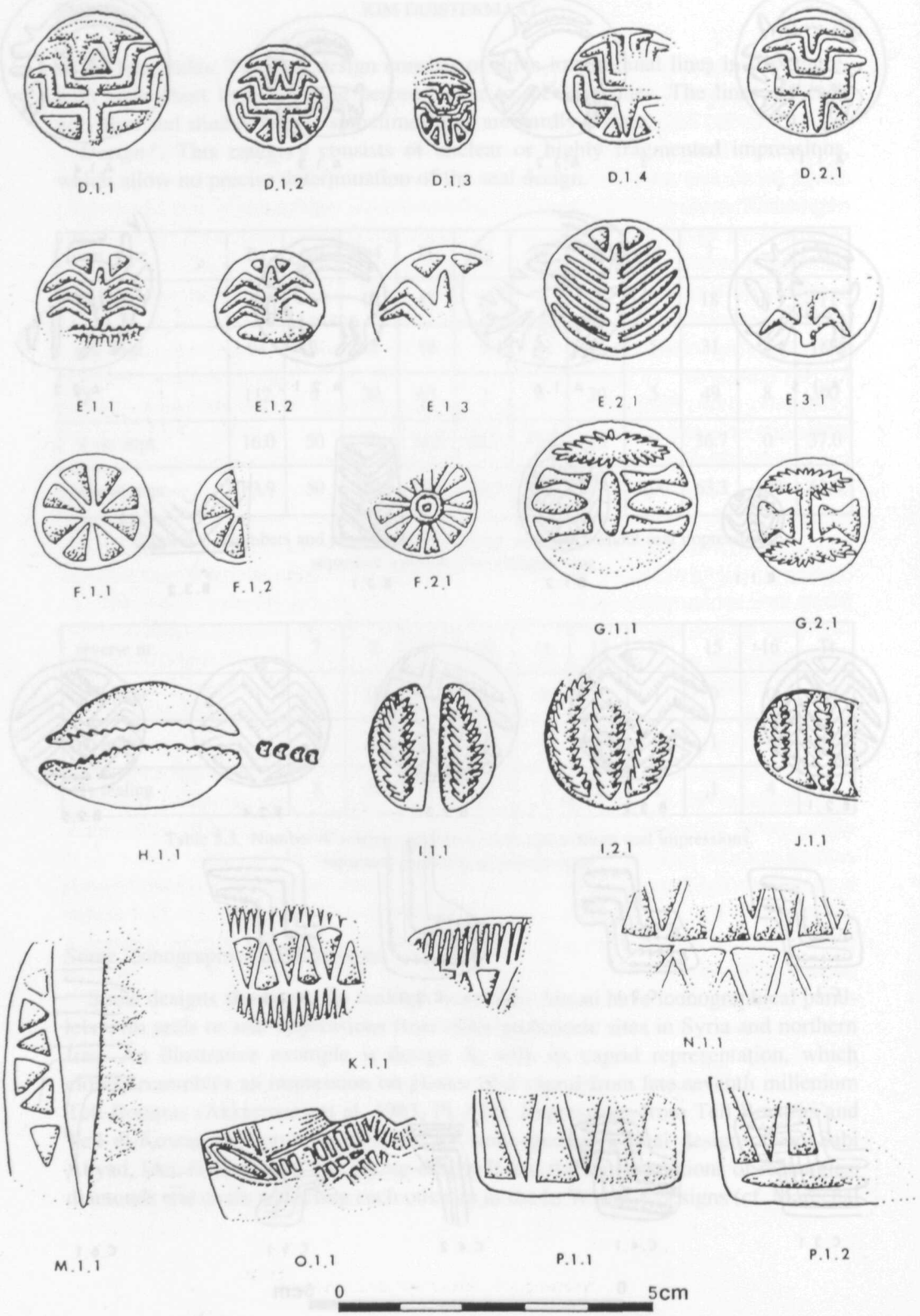


Figure 5.4. Level 6 seal designs.

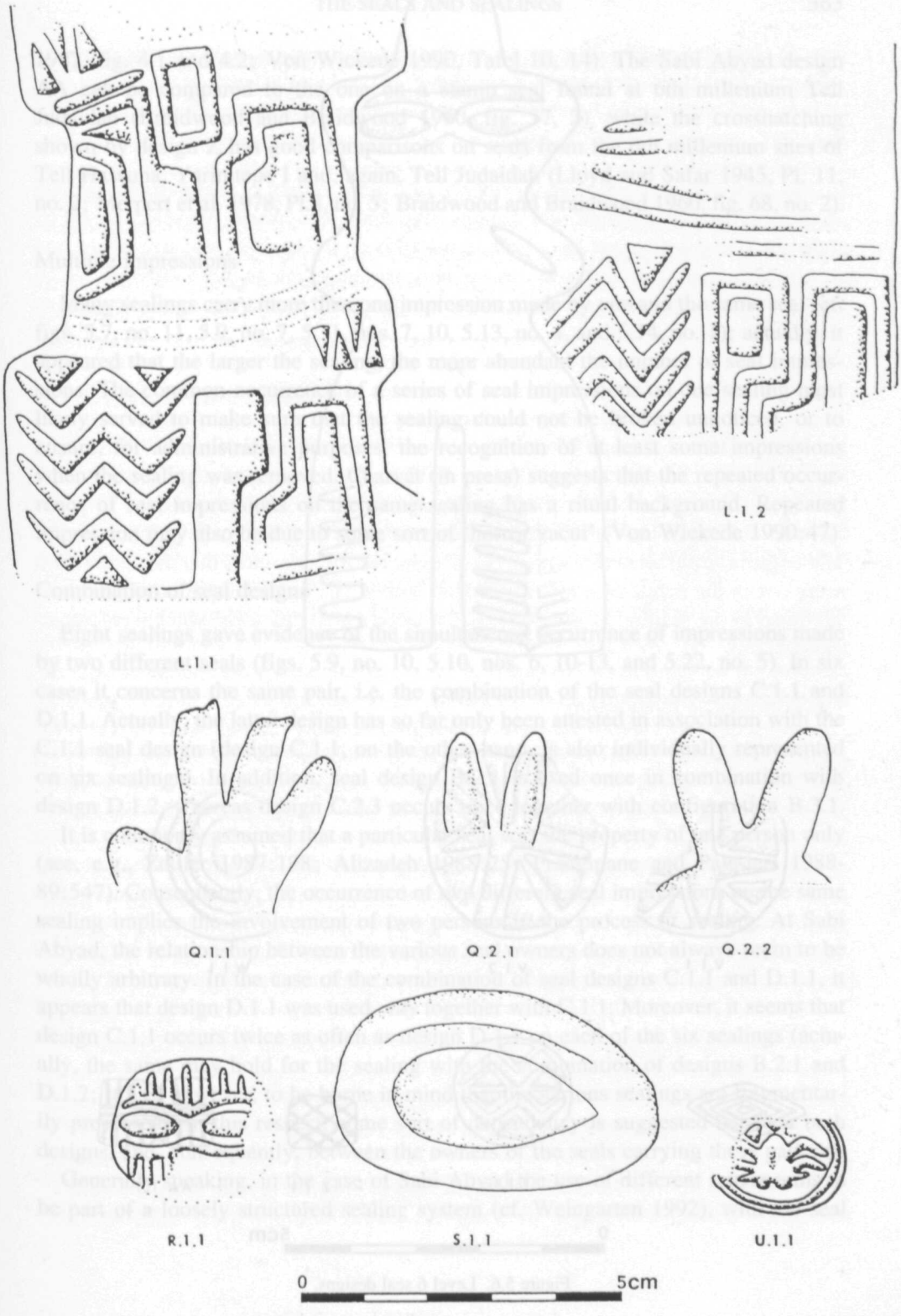


Figure 5.5. Level 6 seal designs.

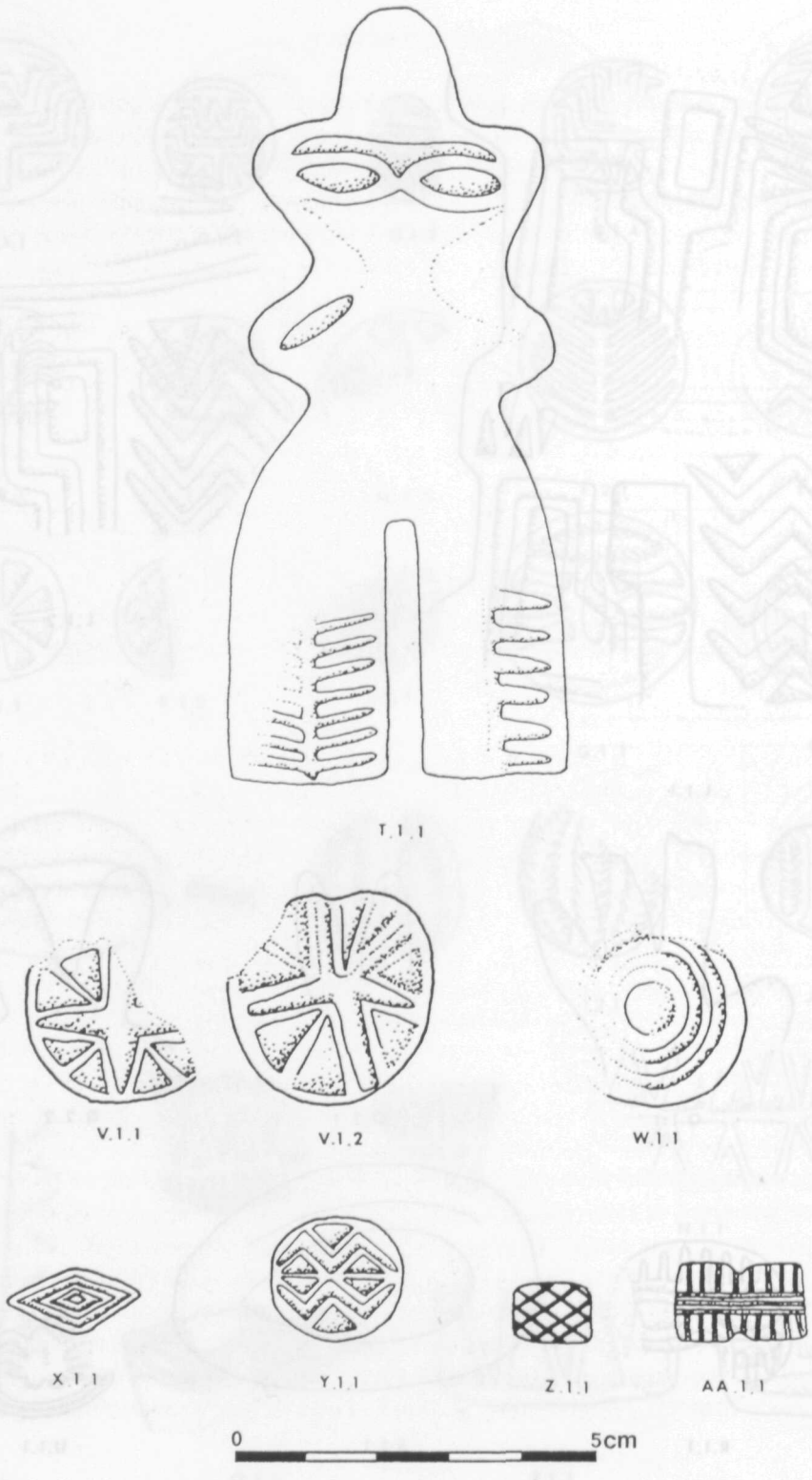


Figure 5.6. Level 6 seal designs.

1982, fig. 4.1 and 4.2; Von Wickede 1990, Tafel 10, 14). The Sabi Abyad design AA can be compared to the one on a stamp seal found at 6th millenium Tell Judaidah (Braidwood and Braidwood 1960, fig. 37, 2), while the crosshatching shown by design Z has good comparisons on seals from the 6th millenium sites of Tell Hassuna, Yarimtepe I and, again, Tell Judaidah (Lloyd and Safar 1945, Pl. 11, no. 2; Merpert et al. 1978, Pl.8, no. 5; Braidwood and Braidwood 1960, fig. 68, no. 2).

Multiple impressions

Many sealings carry more than one impression made by one and the same seal (cf. figs. 5.7, no. 11, 5.9, no. 7, 5.11, nos. 7, 10, 5.13, no. 4, and 5.14, no. 1); actually, it appeared that the larger the sealing, the more abundant the number of seal impressions. The common occurrence of a series of seal impressions on one sealing most likely served to make sure that the sealing could not be broken unnoticed, or to ensure, for administrative purposes, the recognition of at least some impressions when the sealing was removed. Charvát (in press) suggests that the repeated occurrence of seal impressions on the same sealing has a ritual background. Repeated impression may also be due to some sort of 'horror vacui' (Von Wickede 1990:47).

Combination of seal designs

Eight sealings gave evidence of the simultaneous occurrence of impressions made by two different seals (figs. 5.9, no. 10, 5.10, nos. 6, 10-13, and 5.22, no. 5). In six cases it concerns the same pair, i.e. the combination of the seal designs C.1.1 and D.1.1. Actually, the latter design has so far only been attested in association with the C.1.1 seal design (design C.1.1, on the other hand, is also individually represented on six sealings). In addition, seal design B.2.1 is used once in combination with design D.1.2, whereas design C.2.3 occurs once together with configuration B.3.1.

It is commonly assumed that a particular seal was the property of one person only (see, e.g., Zettler 1987:198; Alizadeh 1988:25; Frangipane and Palmieri 1988-89:547). Consequently, the occurrence of two different seal impressions on the same sealing implies the involvement of two persons in the process of sealing. At Sabi Abyad, the relationship between the various seal owners does not always seem to be wholly arbitrary. In the case of the combination of seal designs C.1.1 and D.1.1, it appears that design D.1.1 was used *only* together with C.1.1. Moreover, it seems that design C.1.1 occurs twice as often as design D.1.1 on each of the six sealings (actually, the same may hold for the sealing with the combination of designs B.2.1 and D.1.2; it has, however, to be borne in mind that the various sealings are fragmentarily preserved). In this respect, some sort of dependency is suggested between both designs, and, consequently, between the owners of the seals carrying these patterns.

Generally speaking, in the case of Sabi Abyad the use of different seals seems to be part of a loosely structured sealing system (cf. Weingarten 1992), with the seal

owners acting either individually or in association with others, according to their wishes and needs.

Design varieties

The Sabi Abyad sealings give evidence of a wide variety of seal designs and seal shapes. So far, 27 different seal designs have been recognised, whereas at least 67 different stamp seals must have been in use (this on the basis of seal size, shape and details in design). Virtually every major category shows one or more varieties, which appear to have been used simultaneously (i.e. the varieties did not simply replace an earlier but worn-out original).

Most of the varieties strongly resemble each other, and one may wonder what meaning underlies this similarity. Weingarten (1992:26) suggests that design varieties are intentionally alike, in order to display and exercise similar authority. On the basis of the sealings of Minoan Crete, she concludes that the owners of seals with variants of the same theme each belong to the same, closed and possiby kin-related group (e.g. families, clans or officials; Weingarten 1992:34). In the case of Tell Sabi Abyad, too, it is not excluded that the use of related seal designs served to emphasise and express social identities and group affiliations. It seems clear that the actual seals were not in the hands of a few, privileged individuals only; numerous people were involved in the sealing, as indicated by the large amount of seals which were apparently in use.

Obverse-reverse relationship

Above, the variability in sealing reverses and designs has been discussed separately, but one may wonder whether there is any direct connection between both features. Table 5.4 summarises the available data on the obverse-versus-reverse relationship.

It appears that the Sabi Abyad seal designs are not related to any particular sealing reverse, with the exception of designs D and F, which are found only on basket sealings, and design M, found only on sealings of ceramics. All other groups of designs were each used in association with a variety of containers. The choice of containers probably depended upon the needs and wishes of the seal's owners; the storage and transport of specific commodities may have required the use of particular kinds of containers. Consequently it seems clear that the seal designs did not act as indicators of the contents of the containers, since there is hardly any relation between specific designs and types of containers.

The vast majority (83.9%) of the sealings on basketry gave evidence of stamp-seal impressions. Sealings associated with ceramic vessels, however, carry seal impressions to a much lower extent (33.3%; it appeared that half of the sealings with reverse type 4 had seal impressions, whereas only a quarter of the other pottery sealings carried impressions; cf. table 5.2). Sealings without impressions seem to lack

the control properties commonly attributed to sealings with impressions (see above), and must have functioned in wholly different circumstances. In the case of ceramics, many of the sealings without impressions may have served as mere lids instead of as sealings in the true sense of the word (e.g. Ferioli et al. 1979:20; Dohmann-Pfälzner, in press). These so-called 'jar stoppers', consisting of lumps of clay completely closing the mouth of a vessel (cf. reverse types 7-13, 15-16), have the lowest number of seal imprints (tables 5.2 and 5.3). On the other hand, it is felt that the common practice of excluding jar stoppers from sealing analysis beforehand, simply on the basis of their shape, cannot be maintained. At Sabi Abyad, some jar stoppers did indeed carry seal impressions although the use of the stoppers as mere lids instead of as true sealings seems to be obvious at first sight (e.g. reverse types 7-10).

The distribution of the sealings

Two-thirds of the sealings (n= 201) found so far in the level 6 Burnt Village at Sabi Abyad stem from room 6 of building II. Apart from the sealings, this room contained a vast amount of other small finds. Almost half of the room 6 sealings (44.8%) appear to have sealed baskets, whereas another 27.8% of the sealings is associated with ceramics (see table 5.5). The sealings associated with the other kinds of containers were each found in restricted numbers.

About three-quarters (n= 151) of the sealings found in room 6 carried one or more stamp-seal impressions. The impressions gave evidence of a wide variety of designs; all representations except the designs J, X, Y, Z and AA were found on the sealings of room 6 (table 5.6). In the case of the sealings without impressions, it appears that over half of these (n= 27) were used in association with ceramic vessels.

In addition to the finds in room 6, the neighbouring room 1 yielded 7 sealings, whereas room 7 contained another 19 sealings (cf. table 5.5). In the case of room 7, it appears that most sealings were associated with baskets and, to a lesser extent, ceramic vessels (as in room 6; cf. table 5.5). The other kinds of containers are hardly represented. All sealings in room 1 and over two-thirds (68.4%) of the sealings in room 7 carried stamp-seal impressions. The seal designs found in room 7 were largely similar albeit not identical to the ones of room 6; different kinds of seals were used in the various rooms, often sharing the same general type of seal design. The designs of room 1 are wholly different from those found in the other rooms (cf. table 5.6).

Building II was not the sole level 6 structure containing clay sealings. Building V, located south of building II, yielded 61 sealings, whereas another six sealings came from the multi-roomed tholos VI. One more sealing was found in building IV, room 12, and another one in tholos IX. Finally, three sealings cannot be associated with any architectural feature.

In building V, most sealings (57) were found in rooms 6 and 7. In addition, a few sealings came from room 3 (three examples, of which two carried stamp-seal

impressions) and room 10 (one sealing only, without impression; cf. table 5.6). Room 6 contained 21 sealings, mainly found in the northern part of the room. The sealings were mainly used on baskets and, to a lesser extent, on ceramics (table 5.5). Remarkably, the vast majority (n= 18, or 85.7%) of the sealings carried no seal impressions at all (cf. table 5.6). Two out of the three sealings with impressions appear to have been used on baskets; the reverse of the remaining sealing is damaged and cannot be attributed to a particular kind of container.

Room 7 in building V contained 36 sealings, mainly found in the black-burnt fill in the northern and northeastern corners of the room. As in the neighbouring room 6, the majority of the sealings (27 pieces, or 75%) in room 7 do not carry any seal impressions. These sealings without impressions mainly served to seal ceramics (19 pieces) and containers of undeterminable type (due to damaged reverse). Only one sealing without impressions was used in association with basketry. It is possible that the sealings without impressions from rooms 6 and 7 served as lids instead of as true sealings. The few sealings *with* impressions in room 7 appear to have been used on baskets or on containers of uncertain type, and carry designs not found in any of the other rooms or buildings (with the exception of seal design C.6; cf. tables 5.5-5.6).

In the case of rooms 6 and 7, it appears that it was mainly baskets and ceramics that carried sealings. However, both kinds of containers are far from evenly distributed over both rooms. Almost half (42.9%) of the room 6 sealings were used in association with basketry, whereas only 23.8% was used in association with ceramics. In room 7, however, 58.3% of the sealings was used on ceramics, whereas baskets comprise a mere 8.3%. These figures may reflect a different use of both rooms.

In addition to the finds in buildings II and V, sealings were found in very small numbers in building IV and in the circular structures (tholoi) VI and IX (cf. table 5.5). Building IV and tholos IX each yielded only one sealing with impressions, whereas the large, multi-roomed tholos VI contained six sealings (three were found in room 2, two in room 3 and another one in room 4). Four sealings were used for sealing pottery; the remaining one may have been a 'test strip' (see above). Two sealings (including the 'test strip') carried a stamp-seal impression (table 5.6).

In short, it seems clear that the sealings found in building II differed from those of the other structures to a considerable extent. First, the distribution of reverse types made it clear that the sealings of building II mainly served to seal baskets, whereas the ones from the other structures were predominantly used in association with ceramics (it is, however, recalled that baskets were also predominant in room 6 of building V). The preference for a particular kind of container may be related to the storage and transport of specific commodities; if so, it seems that building II received and stored products different from those of the other structures (or, at least, it stored these products in much larger numbers).

Secondly, the majority of the sealings in building II bears stamp-seal impressions, while for the other buildings the opposite is the case. The sealings without impressions

may have acted as mere lids instead of as sealings in the true sense of the word. When furthermore taking into account that the sealing (including the application of impressions) probably did not take place at Sabi Abyad but was carried out elsewhere, and that the sealings themselves arrived at the site as parts of trade or exchange products (see below), it is clear that building II received 'foreign' commodities to a much larger extent than the other structures. The majority of the products stored in the other buildings may have had a local origin and perhaps circulated beyond the range of the sealing network.

Thirdly, it appears that the designs used in association with the impressed sealings of building II are different from the ones found in the other houses (although they sometimes show the same overall design types). For example, the often-found design A, with its caprid representation, appears only in building II. In this respect, it seems that the inhabitants of the various buildings at Sabi Abyad maintained contacts with different sealing agencies; some of these contacts appear to have been of an exclusive nature.

As shown above, the sealings were not randomly distributed but carefully stored in one or two rooms of the various level 6 buildings. It is beyond doubt that this storage took place *after* the removal of the sealings from the containers, because (1) virtually all sealings were broken and fragmentarily preserved, (2) the sealings appeared in other rooms than the vessels once sealed (as, e.g., in the case of the stone bowl), (3) the number of sealings exceeds the number of containers recovered per room by far (although the baskets may all have perished, this does not hold for the ceramics), and (4) some rooms must have been simply too small to contain the hundreds of containers once sealed with the sealings found in those rooms (e.g. room 6 in building II).

Interestingly, the sealings are virtually always found in the various rooms in association with other small finds, often broken and incomplete as well, such as clay discs, tokens, human and animal figurines and miniature vessels. Apparently, these rooms were not used for common domestic activities or storage in the usual sense, but instead served as some kind of 'archive'. For one reason or another, the sealings, usually preserved in a fragmentary state, were not simply discarded after removal from the containers but carefully stored and, perhaps, administered in these 'archive rooms'. It cannot be established as yet whether this storage was only temporarily or, in contrast, more or less permanent. At sites like Tepe Sarafabad, Nippur and Abu Salabikh, the occurrence of sealings in refuse pits suggests that the former was the case (Wright et al. 1980; Zettler 1987:208; Matthews 1989:93-95).

Actually, the above pattern of distribution is not restricted to level 6 at Sabi Abyad only. The same holds for the Early Halaf level 3; virtually all sealings were found in association with tokens, discs, figurines and miniature vessels of sun-dried clay in building I, room 11 (cf. Akkermans 1993:304). Elsewhere, the simultaneous occurrence of sealings and other small finds has been reported from the 4th and 3rd

container design	Bs	Mt	Pt4	Pt	Bg	Sv	17	18	?	-	Total	Total %
A.1.1	4	–	2	–	–	–	3	–	1	–	10	
A.1.2	2	–	–	–	–	–	–	–	–	–	2	
A.1.3	7	–	–	–	–	–	1	–	–	–	8	
A.1.4	1	–	–	–	–	–	–	–	–	–	1	
A.1.5	3	–	–	2	–	–	–	–	–	–	5	
A.1.6	1	–	–	–	–	–	–	–	–	–	1	
A.2.1	7	–	1	–	–	–	1	–	1	–	10	
A.2.2	–	–	–	–	–	–	–	1	–	–	1	
A.?	5	–	3	1	–	–	2	–	2	–	13	
A (total)	30	–	6	3	–	–	7	1	4	–	51	17.0
B.1.1	1	–	–	–	–	–	–	–	–	–	1	
B.1.2	–	–	–	–	–	–	1	–	–	–	1	
B.2.1	1	–	–	–	–	–	–	–	–	–	1	
B.2.2	1	–	–	–	–	–	–	–	–	–	1	
B.2.3	1	1	–	–	–	–	–	–	–	–	2	
B.2.4	3	1	–	–	–	–	–	–	–	–	4	
B.2.5	1	–	–	–	–	–	–	–	–	–	1	
B.3.1	2	–	–	–	–	–	–	–	–	–	2	
B.3.2	1	–	–	–	–	–	–	–	–	–	1	
B.?	1	–	–	–	–	–	–	–	–	–	1	
B (total)	12	2	–	–	–	–	1	–	–	–	15	5.0
C.1.1	12	–	–	–	–	–	–	–	–	–	12	
C.2.1	1	–	–	–	–	–	–	–	–	–	1	
C.2.2	1	–	–	–	–	–	–	–	–	–	1	
C.2.3	3	–	–	–	–	–	–	–	–	–	3	
C.3.1	–	–	–	–	–	–	2	–	–	–	2	
C.4.1	4	–	–	–	–	–	–	–	–	–	4	
C.4.2	1	–	–	–	–	–	–	–	–	–	1	
C.5.1	1	–	–	–	–	–	–	–	–	–	1	
C6.1	–	–	–	1	–	–	–	–	2	–	3	
C.?	1	–	1	–	–	–	–	–	–	–	2	
C (total)	24	–	1	1	–	–	2	–	2	–	30	10.0
D.1.1	6	–	–	–	–	–	–	–	–	–	6	
D.1.2	4	–	–	–	–	–	–	–	–	–	4	
D.1.3	1	–	–	–	–	–	–	–	–	–	1	
D.2.1	2	–	–	–	–	–	–	–	–	–	2	
D (total)	14	–	–	–	–	–	–	–	–	–	14	4.7
E.1.1	–	–	–	–	–	–	1	–	–	–	1	
E.1.2	–	–	–	1	–	–	–	–	–	–	1	
E.1.3	–	–	–	–	–	–	1	–	–	–	1	
E.2.1	1	–	–	–	–	–	–	–	–	–	1	
E.3.1	–	–	–	–	–	–	–	–	1	–	1	
E (total)	1	–	–	1	–	–	2	–	1	–	5	1.7

Table 5.4a. Tabulation of design varieties and container types.

container design	Bs	Mt	Pt4	Pt	Bg	Sv	17	18	?	-	Total	Total %
F.1.1	3	–	–	–	–	–	–	–	–	–	3	
F.1.2	1	–	–	–	–	–	–	–	–	–	1	
F.1.1	1	–	–	–	–	–	–	–	–	–	1	
F.3.1	–	–	–	–	–	–	–	–	1	–	1	
F (total)	5	–	–	–	–	–	–	–	1	–	6	2.0
G.1.1	1	–	–	–	–	1	–	–	–	–	2	
G.2.1	–	–	–	–	–	–	1	–	1	–	2	
G (total)	1	–	–	–	–	1	1	–	1	–	4	1.3
H.1.1	–	–	–	1	–	–	–	–	–	–	1	0.3
I.1.1	1	–	–	1	–	–	–	–	–	–	2	
I.1.2	–	–	–	–	–	–	–	–	–	1	1	
I.2.1	1	–	–	–	–	–	–	–	–	–	1	
I (total)	2	–	–	1	–	–	–	–	–	1	4	1.3
J.1.1	–	–	–	–	–	–	–	–	–	1	1	0.3
K.1.1	–	–	–	–	–	–	–	–	2	–	2	0.7
L.1.1	–	–	1	–	–	–	–	–	1	–	2	
L.1.2	–	–	1	–	–	–	–	–	–	–	1	
L (total)	–	–	2	–	–	–	–	–	1	–	3	1.0
M.1.1	–	–	3	–	–	–	–	–	–	–	3	1.0
N.1.1	–	–	–	–	–	–	1	–	–	–	1	0.3
O.1.1	2	–	–	–	–	–	–	–	–	–	2	0.7
P.1.1	–	–	–	–	–	–	–	–	1	–	1	
P.1.2	–	–	–	1	–	–	–	–	–	–	1	
P (total)	–	–	–	1	–	–	–	–	1	–	2	0.7
Q.11	–	–	–	–	–	–	–	–	1	–	1	
Q.21	–	–	–	1	–	–	–	–	–	–	1	
Q.2.2	–	–	–	1	–	–	–	–	–	–	1	
Q (total)	–	–	–	2	–	–	–	–	–	–	3	1.0
R.1.1	1	1	–	–	–	–	–	–	–	–	2	0.7
S.1.1	–	–	–	–	–	–	–	–	2	–	2	0.7
T.1.1	3	–	1	–	1	–	–	–	3	1	9	3.0
U.1.1	1	–	–	–	–	–	–	–	–	–	1	0.3
V.1.1	–	–	–	–	–	–	–	–	1	–	1	
V.1.2	–	–	–	1	–	–	–	–	–	–	1	
V (total)	–	–	–	1	–	–	–	–	1	–	2	0.7
W.1.1	–	–	–	1	–	–	–	–	–	–	1	0.3
X.1.1	1	–	–	–	–	–	–	–	–	–	1	0.3
Y.1.1	–	–	–	–	–	–	–	–	1	–	1	0.3
Z.1.1	1	–	–	–	–	–	–	–	–	–	1	0.3
AA.1.1	–	–	–	–	–	–	–	3	1	1	5	1.7
?	4	–	2	4	–	–	1	1	9	4	25	8.3
–	18	3	15	47	2	3	5	–	18	–	111	37.0
Total	112	6	30	63	3	4	20	5	49	8	300	100.0
%	37.3	2.0	10.0	21.0	1.0	1.3	6.7	1.7	16.3	2.7	100	

Table 5.4b. Tabulation of design varieties and container types.

millennium sites of Tall-i Bakun (Alizadeh 1988:23) and Sarafabad (Wright et al. 1980:277-278) in Iran and Abu Salabikh in lower Mesopotamia (Matthews 1989:94-95). At Arslantepe, sealings have been reported to occur in association with 'counters' (Ferioli and Fiandra 1983).

It is not yet clear what reasons underly this striking pattern in small-find distribution. The simultaneous occurrence of sealings and tokens is, indeed, according to expectation; both are considered to act as devices of administration and control (see below). Matthews (1989:94-95) argues that the figurines perhaps symbolise animal products or services circulating within the sealing system. However, the common occurrence of sealings in association with figurines, miniature vessels, etc., may also suggest that sealings are not only administrative features but have another, symbolic meaning as well. Figurines and the like may refer to the ritual, spiritual world, and perhaps the sealings, carrying seal impressions with often complex design configurations, acted within this ritual framework as well (Ferioli et al. 1979; Charvát 1991).

The role of sealings

Sealings are commonly associated with the recognition and administration of property, the organization of storage and the rise of exchange networks, either on a local, intra-regional or interregional level. Sealings served to mark properties, secured containers against unauthorised opening and, consequently, allowed a certain degree of control over the exchange networks (e.g. Ferioli and Fiandra 1983; Zettler 1987; Alizadeh 1988).

The Sabi Abyad sealings suggest that it was mainly small, transportable containers that had been sealed. Large storage vessels hardly carry sealings, and no doorsealings have been found at the site. In this respect, it appears that the role of sealings as devices of control was restricted; they referred only to individual items, not to entire storage rooms or the like.

Stamp seals must have been well-known to the Sabi Abyad inhabitants and must have been used by them, despite the fact that as yet no seal has been found in the houses of the Burnt Village. Actually, some of the sealings found at the site may indeed have been locally made (e.g. some of the sealings associated with the stone bowl found in building II), but it is most unlikely that the hundreds of sealings found so far *all* had a local origin. Sealings may represent, on the one hand, a mode of communication and information exchange (e.g. origin, destination, contents) and, on the other hand, a control device in a stylised, symbolic manner. Evidently, within small communities, such as the site of Sabi Abyad, this information exchange or control proceeded more effectively through other, individual modes of communication (e.g. simple verbal agreements or personal supervision). It therefore seems that the sealing of goods was mainly of importance if these goods were transferred beyond the local community (cf. Charvát 1988:57). It is suggested that in the case of

container type / building		Bs	Mt	Pt4	Pt	Bg	Sv	17	18	?	–	Tt
II (room 1)	n	–	–	–	–	–	–	–	4	1	2	7
% per context	%	–	–	–	–	–	–	–	57.1	14.3	28.6	100
% of total (per container type)	%	–	–	–	–	–	–	–	80.0	2.0	25.0	2.3
II (room 6)	n	90	3	21	35	2	4	16	1	27	2	201
% per context	%	44.8	1.5	10.4	17.4	0.9	2.0	7.9	0.5	13.4	1.0	100
% of total (per container type)	%	80.3	50.0	70.0	55.5	66.7	100	80.0	20.0	55.1	25.0	67.0
II (room 7)	n	7	3	1	2	–	–	2	–	3	1	19
% per context	%	36.8	15.8	5.3	10.5	–	–	10.5	–	15.8	5.3	100
% of total (per container type)	%	6.2	50.0	3.3	3.2	–	–	10.0	–	6.1	1.3	6.3
II (room 10)	n	–	–	–	1	–	–	–	–	–	–	1
% per context	%	–	–	–	100	–	–	–	–	–	–	100
% of total (per container type)	%	–	–	–	1.6	–	–	–	–	–	–	0.3
II (all rooms)	n	97	6	22	38	2	4	18	5	31	5	228
% per context	%	42.5	2.6	9.6	16.7	0.9	1.7	7.9	2.2	13.6	2.2	100
% of total (per container type)	%	86.6	100	73.3	60.3	66.7	100	90.0	100	63.3	62.5	76.0
IV (room 12)	n	–	–	–	–	–	–	–	–	1	–	1
% per context	%	–	–	–	–	–	–	–	–	100	–	100
% of total (per container type)	%	–	–	–	–	–	–	–	–	2.0	–	0.3
V (rooms 3,10)	n	–	–	–	1	–	–	–	–	2	1	4
% per context	%	–	–	–	25.0	–	–	–	–	50.0	25.0	100
% of total (per container type)	%	–	–	–	1.6	–	–	–	–	4.1	12.5	1.3
V (room 6)	n	9	–	4	1	–	–	2	–	5	–	21
% per context	%	42.9	–	19.0	4.8	–	–	9.5	–	23.5	–	100
% of total (per container type)	%	8.0	–	13.3	1.6	–	–	10.0	–	10.2	–	7.0
V (room 7)	n	3	–	2	19	1	–	–	–	10	1	36
% per context	%	8.3	–	5.5	52.8	2.7	–	–	–	27.8	2.8	100
% of total (per container type)	%	2.7	–	6.7	30.2	33.3	–	–	–	20.4	12.5	12.0
V (all rooms)	n	12	–	6	21	1	–	2	–	17	2	61
% per context	%	19.7	–	9.8	34.4	1.6	–	3.3	–	27.9	3.8	100
% of total (per container type)	%	10.7	–	20.0	33.3	33.3	–	10.0	–	34.7	25.0	20.3
VI	n	–	–	2	3	–	–	–	–	–	1	6
% per context	%	–	–	33.3	50.0	–	–	–	–	–	16.7	100
% of total (per container type)	%	–	–	6.7	4.8	–	–	–	–	–	12.5	1.7
IX	n	1	–	–	–	–	–	–	–	–	–	1
% per context	%	100	–	–	–	–	–	–	–	–	–	100
% of total (per container type)	%	0.1	–	–	–	–	–	–	–	–	–	0.3
Uncertain provenance	n	1	–	1	1	–	–	–	–	–	–	3
TOTAL	n	112	6	30	63	3	4	20	5	49	8	300
% per context	%	37.3	2.0	10.0	21.0	1.0	1.3	6.7	1.7	16.3	2.7	100
% of total (per container type)	%	100	100	100	100	100	100	100	100	100	100	100

Table 5.5. The distribution of sealings over buildings and rooms, according to container types.

building design	II/1	II/6	II/7	II/10	II	IV	V/3,10	V/6	V/7	V	VI	IX	unc.	Total n	Total %
A.1.1	–	10	–	–	10	–	–	–	–	–	–	–	–	10	
A.1.2	–	2	–	–	2	–	–	–	–	–	–	–	–	2	
A.1.3	–	8	–	–	8	–	–	–	–	–	–	–	–	8	
A.1.4	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
A.1.5	–	5	–	–	5	–	–	–	–	–	–	–	–	5	
A.1.6	–	–	1	–	1	–	–	–	–	–	–	–	–	1	
A.2.1	–	10	–	–	10	–	–	–	–	–	–	–	–	10	
A.2.2	1	–	–	–	1	–	–	–	–	–	–	–	–	1	
A.?	–	11	1	–	12	–	–	–	–	–	–	1	–	13	
A (total)	1	47	2	–	50	–	–	–	–	–	–	1	–	51	17.0
B.1.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
B.1.2	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
B.2.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
B.2.2	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
B.2.3	–	2	–	–	2	–	–	–	–	–	–	–	–	2	
B.2.4	–	4	–	–	4	–	–	–	–	–	–	–	–	4	
B.2.5	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
B.3.1	–	1	1	–	2	–	–	–	–	–	–	–	–	2	
B.3.2.	–	–	–	–	–	–	–	–	1	1	–	–	–	1	
B.?	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
B (total)	–	13	1	–	14	–	–	–	1	1	–	–	–	15	5.0
C.1.1	–	12	–	–	12	–	–	–	–	–	–	–	–	12	
C.2.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
C.2.2	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
C.2.3	–	–	3	–	3	–	–	–	–	–	–	–	–	3	
C.3.1	–	2	–	–	2	–	–	–	–	–	–	–	–	2	
C.4.1	–	4	–	–	4	–	–	–	–	–	–	–	–	4	
C.4.2	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
C.5.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
C.6.1	–	–	–	–	–	–	1	–	1	2	1	–	–	3	
C.?	–	2	–	–	2	–	–	–	–	–	–	–	–	2	
C (total)	–	24	3	–	27	–	1	–	1	2	1	–	–	30	10.0
D.1.1	–	6	–	–	6	–	–	–	–	–	–	–	–	6	
D.1.2	–	4	–	–	4	–	–	–	–	–	–	–	–	4	
D.1.3	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
D.1.4	–	–	–	–	–	–	–	1	–	1	–	–	–	1	
D.2.1	–	2	–	–	2	–	–	–	–	–	–	–	–	2	
D (total)	–	13	–	–	13	–	–	1	–	1	–	–	–	14	4.7
E.1.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
E.1.2	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
E.1.3	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
E.2.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
E.3.1	–	–	–	–	–	–	–	–	1	1	–	–	–	1	
E (total)	–	4	–	–	4	–	–	–	1	1	–	–	–	5	1.7

Table 5.6a. Tabulation of design varieties and buildings or rooms.

building design	II/1	II/6	II/7	II/10	II	IV	V/3,10	V/6	V/7	V	VI	IX	unc.	Total n	Total %
F.1.1	–	3	–	–	3	–	–	–	–	–	–	–	–	3	
F.1.2	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
F.2.1	–	–	1	–	1	–	–	–	–	–	–	–	–	1	
F.3.1	–	–	–	–	–	–	–	–	1	1	–	–	–	1	
F (total)	–	4	1	–	5	–	–	–	1	1	–	–	–	6	2.0
G.1.1	–	2	–	–	2	–	–	–	–	–	–	–	–	2	
G.2.1	–	2	–	–	2	–	–	–	–	–	–	–	–	2	
G (total)	–	4	–	–	4	–	–	–	–	–	–	–	–	4	1.3
H.1.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	0.3
I.1.1	–	2	–	–	2	–	–	–	–	–	–	–	–	2	
I.1.2	–	–	–	–	–	–	1	–	–	1	–	–	–	1	
I.2.1	–	–	–	–	–	–	–	–	1	1	–	–	–	1	
I (total)	–	2	–	–	2	–	1	–	1	2	–	–	–	4	1.3
J.1.	–	–	–	–	–	–	–	–	–	–	1	–	–	1	0.3
K.1.1	–	1	1	–	2	–	–	–	–	–	–	–	–	2	0.7
L.1.1	–	2	–	–	2	–	–	–	–	–	–	–	–	2	
L.1.2	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
L (total)	–	3	–	–	3	–	–	–	–	–	–	–	–	3	1.0
M.1.1	–	3	–	–	3	–	–	–	–	–	–	–	–	3	1.0
N.1.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	0.3
O.1.1	–	2	–	–	2	–	–	–	–	–	–	–	–	2	0.7
P.1.1	–	–	–	–	–	–	–	–	1	1	–	–	–	1	
P.1.2	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
P (total)	–	1	–	–	1	–	–	–	1	1	–	–	–	2	0.7
Q.1.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
Q.2.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
Q.2.2	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
Q (total)	–	3	–	–	3	–	–	–	–	–	–	–	–	3	1.0
R.1.1	–	1	1	–	2	–	–	–	–	–	–	–	–	2	0.7
S.1.1	–	2	–	–	2	–	–	–	–	–	–	–	–	2	0.7
T.1.1	–	9	–	–	9	–	–	–	–	–	–	–	–	9	3.0
U.1.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	0.3
V.1.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	
V.1.2	–	–	–	–	–	–	–	–	1	1	–	–	–	1	
V (total)	–	1	–	–	1	–	–	–	1	1	–	–	–	2	0.7
W.1.1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	0.3
X.1.1	–	–	–	–	–	–	–	1	–	1	–	–	–	1	0.3
Y.1.1	–	–	–	–	–	1	–	–	–	–	–	–	–	1	0.3
Z.1.1	–	–	–	–	–	–	–	–	1	1	–	–	–	1	0.3
AA.1.1	5	–	–	–	–	–	–	–	—	–	–	–	–	5	1.7
?	1	17	5	–	23	–	–	1	1	2	–	–	–	25	8.3
–	–	50	6	1	57	–	2	18	27	47	4	–	3	111	37.0
Total	7	201	19	1	228	1	4	21	36	61	6	1	3	300	100
% impr.	100	75.1	68.4	0.0	74.6	100	50.0	14.3	25.0	22.9	33.3	100	0.0	–	63.0
% no impr.	0.0	24.9	31.6	100	25.4	0.0	50.0	85.7	75.0	77.0	66.7	0.0	100	–	37.0

Table 5.6b. Tabulation of design varieties and buildings or rooms.

Sabi Abyad the actual sealing did not take place at the site itself but was carried out somewhere else, and that the sealings themselves arrived at Sabi Abyad as parts of trade or exchange products (actually, an extensive programme of clay analyses is planned to test this assumption; see also Rothman and Blackman 1990). The existence of extensive exchange networks in the late 6th millennium B.C. seems to be beyond doubt: in the case of Sabi Abyad it appeared that, apart from various products locally won, Samarra and Hassuna-like pottery was brought in from eastern Syria or north-central Iraq, that so-called Dark-Faced Burnished Ware and cedar wood came from western Syria or the Levant, and that copper ore, obsidian, basalt and other stones were obtained from Turkey (e.g. Le Mière and Picon 1987; Le Mière 1989; Akkermans 1993:269ff; see also the various contributions in the present volume).

The numerous clay tokens found in association with the sealings seem to support this view. The tokens (cf. Spoor and Collet, this volume) are all very small and have simple geometric shapes, e.g. balls, cylinders, discs and cones. Most likely they acted as counting devices expressing the quantities of objects exchanged or otherwise (re)distributed (see, e.g., Schmandt-Besserat 1977, 1986, 1992; Jasim and Oates 1986; Matthews 1989).

The abundant occurrence of sealings at late Neolithic Sabi Abyad and their careful, deliberate storage in 'archive rooms' suggests that these objects were part of a widely accepted, standardised system of administration and recognition, involving well-developed concepts of ownership and the presence of means to control it. Many of the sealings showed impressions made by one and the same seal and, most likely, the same person or institution. It therefore seems that each sealing agency repeatedly sent goods marked with its seal to Sabi Abyad.

At Sabi Abyad, the distribution of sealings in general was not restricted to a particular building but included a series of structures. In this respect, it may very well be that access to the trade network was not restricted to a few individuals only but was open to the community as a whole. In other words: receipt of the sealed goods or objects at Sabi Abyad seems not to have been centrally organized but seems, on the contrary, to have been in the hands of many persons. It is, however, recalled that the distribution of numbers of sealings, kinds of containers, seal designs, etc., is not wholly arbitrary and may, indeed, reflect inequal access to commodities to some extent. This inequal distribution may simply be due to more or less exclusive exchange relationships, but it may also result from the functioning of sealings in systems of gift-giving or tribute-paying to some sort of authority, or from their use in redistribution networks by the persons in charge of both the storage and the control of the sealed goods (cf. Charvát 1988:60; Frangipane and Palmieri 1988-89:546-47).

Apart from the possibly large number of people which may have been involved in the receipt of the sealings (or, more precisely, the sealed commodities), numerous

persons must have been involved in the sealing and the associated consignment of the products, as indicated by the wide variety of seals which were apparently in use. The abundant occurrence of some kinds of seal impressions and the rare presence of others suggest that the intensity of contact between the various sealing agencies and the Sabi Abyad inhabitants varied to a considerable extent. Although the sealings from Sabi Abyad point towards a system of control in exchange relations, it is unlikely that the sealings served in exclusive prestige contexts or were used by a central authority.

The Level 3 Sealings

The level 3 or Early Halaf building I, room 11, has yielded a concentration of various kinds of clay objects, such as figurines, tokens, miniature jar models and discs. Also included were fragments of seven clay sealings and jar stoppers (in two cases, the identification as sealings is tentative). One of the sealings carries a rectangular seal impression with a geometric (?) design (fig. 5.21, no. 5; see also Akkermans 1993:82). The reverse shows the impression of a plaited mat made of vegetal fibres. The impression closely compares with the level 6 sealings with reverse type 3.

Another level 3 sealing has a smooth obverse without seal impressions. The reverse is smooth and slightly concave, and shows an impression of a 5 mm wide, Z-spun and S-plied rope made of coarse fibres. It resembles the level 6 sealings with reverse type 17 (see above).

Three sealings served to seal ceramics. No seal impressions are present. In shape one of these sealings resembles the level 6 sealings with reverse type 16. The obverse shows a finger impression. The clay was placed on top of the rim and against the exterior wall surface of a vessel; this vessel must have been ca. 17 cm in rim diameter. The second sealing seems to have been attached to the neck of a small vessel; the vessel's rim diameter is ca. 7 cm. The shape of the sealing is comparable to the level 6 sealings with reverse type 4. The obverse shows many straw impressions. The third jar sealing (fig. 5.21, no. 4) has a conical shape with a flat reverse, resembling the level 6 sealings with reverse type 10. Actually, it may have been used as a jar lid rather than as a sealing. The conical obverse shows five oval impressions each ca. 2 cm deep, most likely made by the fingers of the left hand and used to hold or lift the lid easily.

Two sealings have reverses of undeterminable shapes; their identification as true sealings is tentative. One of them shows two concavities on the reverse, one longitudinal, the other spherical, and seems to have been attached to an object with a 'hairy' surface, i.e. textile or leather. Perhaps it represents a bag sealing. The other sealing shows a flat reverse and straw impressions on the obverse.

Catalogue

Fig. 5.1

1. Z88-5. Stamp seal. Found in a pre-Halaf Neolithic stratum on the northeastern mound. Chlorite. D: 3.6 cm, H: 1.3 cm.
2. Z88-4. Level 4. Stamp seal. Hematite. D: 2.4 cm, H: 0.9 cm.
3. Z88-1. Level 4. Stamp seal. Hematite. D: 2.0 cm, H: 0.8 cm.
4. Z93-5. Fragment of a stamp seal. Intrusive in Late Bronze Age levels. Unknown stone. L: 1.6 cm, W: 1.6 cm, Th: 0.4 cm.
5. Z93-4. Level 4. Stamp seal. Serpentinite. D: 1.8 cm, H: 0.4 cm.
6. Z93-2. Fragment of a stamp seal. Intrusive in Late Bronze Age levels. Chlorite. L: 1.9 cm, W: 1.9 cm, H: 0.8 cm.

Fig. 5.7

1. O91-85. Level 6. Sealing with two stamp-seal impressions. Seal design A.1.1. Reverse type 4. L: 4.8 cm, W: 4.4 cm, H: 1.7 cm. Found in building II, room 6.
2. O91-92. Level 6. Sealing with one stamp-seal impression. Seal design A.1.1. Reverse type 17. L: 3.0 cm, W: 2.4 cm, H: 0.7 cm. Found in building II, room 6.
3. O91-331. Level 6. Sealing with one stamp-seal impression. Seal design A.1.1. Reverse type 4. L: 3.6 cm, W: 3.1 cm, H: 0.6 cm. Found in building II, room 6.
4. O91-238. Level 6. Sealing with one stamp-seal impression. Seal design A.1.1. Reverse type 17. Reverse shows the impression of S-plied, 2 mm thick rope. L: 4.3 cm, W: 3.2 cm, H: 0.9 cm. Found in building II, room 6.
5. O91-108. Level 6. Sealing with one stamp-seal impression. Seal design A.1.1. Reverse type 2. Reverse shows the impression of S-plied, 2 mm thick rope. L: 3.8 cm, W: 3.6 cm, H: 1.0 cm. Found in building II, room 6.
6. O91-115. Level 6. Sealing with three stamp-seal impressions. Seal design A.1.1. Reverse type 1. Seal impressions are partly damaged by fingerprints. L: 10.3 cm, W: 3.2 cm, H: 1.5 cm. Found in building II, room 6.
7. O91-257. Level 6. Sealing with one stamp-seal impression. Seal design A.1.2. Reverse type 2. L: 4.3 cm, W: 2.3 cm, H: 1.6 cm. Found in building II, room 6.
8. O91-296. Level 6. Sealing with one stamp-seal impression. Seal design A.1.2. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied rope 2 mm thick. L: 3.3 cm, W: 2.6 cm, H: 1.4 cm. Found in building II, room 6.
9. O91-322. Level 6. Sealing with two stamp-seal impressions. Seal design A.1.3. Reverse type 2. L: 4.1 cm, W: 3.2 cm, H: 1.3 cm. Found in building II, room 6.
10. O91-209. Level 6. Sealing with one stamp-seal impression. Seal design A.1.3. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.0 cm, W: 1.7 cm, H: 1.1 cm. Found in building II, room 6.
11. O91-243. Level 6. Sealing with three stamp-seal impressions. Seal design A.1.3. Reverse type 2. Two seal impressions are deformed due to the impression of the third one. Reverse shows the impression of an S-plied rope. L: 4.2 cm, W: 4.1 cm, H: 1.7 cm. Found in building II, room 6.
12. O91-294. Level 6. Sealing with one stamp-seal impression. Seal design A.1.4. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 4.7 cm, W: 2.7 cm, H: 1.3 cm. Found in building II, room 6.

Fig. 5.8

1. O91-107. Level 6. Sealing with two stamp-seal impressions. Seal design A.1.5. Reverse type 8. L: 6.1 cm, W: 4.7 cm, H: 4.0 cm. Found in building II, room 6.
2. O91-347. Level 6. Sealing with two stamp-seal impressions. Seal design A.1.5. Design on one of the impressions not visible. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 4.0 cm, W: 3.0 cm, H: 1.5 cm. Found in building II, room 6.
3. O91-121. Level 6. Sealing with two stamp-seal impressions. Seal design A.1.5 (legs of animal damaged). Reverse type 8. L: 4.4 cm, W: 4.0 cm, H: 3.7 cm. Found in building II, room 6.
4. O93-102. Level 6. Sealing with two stamp-seal impressions. Seal design A.1.6. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 4.2 cm, W: 3.2 cm, H: 1.4 cm. Found in building II, room 7.
5. O91-210. Level 6. Sealing with two stamp-seal impressions. Seal design A.2.1. Reverse type 2. Reverse shows the impression of a Z-spun, 2 mm thick rope. L: 4.3 cm, W: 3.2 cm, H: 1.2 cm. Found in building II, room 6.
6. O91-260. Level 6. Sealing with two stamp-seal impressions. Seal design A.2.1. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.8 cm, W: 3.1 cm, H: 1.6 cm. Found in building II, room 6.
7. O91-256. Level 6. Sealing with four stamp-seal impressions. Seal design A.2.1. Reverse type 4. L: 9.2 cm, W: 3.7 cm, H: 1.8 cm. Found in building II, room 6.
8. O91-302. Level 6. Sealing with three stamp-seal impressions. Seal design A.2.1. Two of the seal impressions are deformed due to the impression of the third one. Reverse type 2. Reverse shows damaged coiled basketry and the impression of a Z-spun, 2 mm thick rope. L: 4.2 cm, W: 3.5 cm, H: 1.4 cm. Found in building II, room 6.
9. O91-311. Level 6. Sealing with three stamp-seal impressions. Seal design A.2.1. Reverse type 2. Reverse shows the impression of an 8.5 mm thick rope. L: 6.2 cm, W: 5.4 cm, H: 2.4 cm. Found in building II, room 6.
10. O91-319. Level 6. Sealing with three stamp-seal impressions. Seal design A.2.1. Reverse type 2. Reverse shows the impressions of a Z-spun, S-plied rope 2 mm thick and two S-plied ropes 4 and 5 mm thick, respectively. L: 4.4 cm, W: 3.6 cm, H: 1.5 cm. Found in building II, room 6.
11. O91-477. Level 6. Sealing with one stamp-seal impression. Seal design A.2.1. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.5 cm, W: 2.3 cm, H: 1.7 cm. Found in building II, room 6.

Fig. 5.9

1. O93-142. Level 6. Sealing with one stamp-seal impression. Seal design A.2.2. Reverse type 18. L: 4.2 cm, W: 3.2 cm, H: 2.3 cm. Found in building II, room 1.
2. O91-212. Level 6. Sealing with two stamp-seal impressions. Seal design is an undeterminable variant of type A. Reverse type 1. L: 2.7 cm, W: 2.7 cm, H: 1.0 cm. Found in building II, room 6.
3. O93-128. Level 6. Sealing with one stamp-seal impression. Seal design A.1.3. Reverse type 17. Reverse shows the impression of an S-plied, 3 mm thick rope. L: 2.9 cm, W: 2.3 cm, H: 1.0 cm. Found in building II, room 7.
4. O91-64. Level 6. Sealing with one stamp-seal impression. Seal design is an undeterminable variant of type A. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.3 cm, W: 2.0 cm, H: 0.9 cm. Found in building II, room 6.

5. O91-227. Level 6. Sealing with two stamp-seal impressions. Seal design is an undeterminable variant of type A. Reverse type 4. L: 5.0 cm, W: 3.3 cm, H: 1.3 cm. Found in building II, room 6.
6. O91-217. Level 6. Sealing with two stamp-seal impressions. Seal design is an undeterminable variant of type A. The reverse is damaged except for the impression of an S-plied, 2 mm thick rope. L: 3.7 cm, W: 2.2 cm, H: 1.5 cm. Found in building II, room 6.
7. O91-307. Level 6. Sealing with four stamp-seal impressions. Seal design B.1.1. Reverse number 2. Reverse shows the impression of an S-plied, 1.5 mm thick rope. L: 5.4 cm, W: 4.5 cm, H: 2.6 cm. Found in building II, room 6.
8. O91-96. Level 6. Sealing with two stamp-seal impressions. Seal design B.1.2. Reverse type 17. L: 3.5 cm, W: 2.9 cm, H: 1.7 cm. Found in building II, room 6.
9. O91-222. Level 6. Sealing with two stamp-seal impressions. Seal design B.2.2. Reverse type 2. L: 3.6 cm, W: 2.9 cm, H: 1.0 cm. Found in building II, room 6.
10. O91-242. Level 6. Sealing with three stamp-seal impressions made with two different seals. Seal design B.2.1 (two impressions) and D.1.2 (one impression). Reverse type 2. Reverse shows the impression of an S-plied, 1.5 mm thick rope. L: 4.1 cm, W: 3.2 cm, H: 1.8 cm. Found in building II, room 6.
11. O91-70. Level 6. Sealing with one stamp-seal impression. Seal design B.2.3. Reverse type 3. Reverse shows the impression of a 2 mm thick rope. L: 4.2 cm, W: 3.8 cm, H: 2.4 cm. Found in building II, room 6.
12. O91-118. Level 6. Sealing with one stamp-seal impression. Seal design B.2.4. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.5 cm, W: 2.6 cm, H: 1.2 cm. Found in building II, room 6.
13. O91-95. Level 6. Sealing with one stamp-seal impression. Seal design B.2.3. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 3 mm thick rope. L: 2.7 cm, W: 2.4 cm, H: 1.1 cm. Found in building II, room 6.

Fig. 5.10

1. O91-234. Level 6. Sealing with two stamp-seal impressions. Seal design B.2.4. Reverse type 3. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 2.7 cm, W: 2.5 cm, H: 1.1 cm. Found in building II, room 6.
2. O91-330. Level 6. Sealing with three stamp-seal impressions. Seal design B.2.4. Reverse type 2. Reverse shows very damaged coiled-basketry impressions and the impression of an S-plied, 2 mm thick rope. L: 3.4 cm, W: 3.3 cm, H: 1.6 cm. Found in building II, room 6.
3. O91-318. Level 6. Sealing with one stamp-seal impression. Seal design B.2.5. Reverse type 2. Reverse shows the impression of a 2 mm thick rope. L: 2.6 cm, W: 1.9 cm, H: 0.9 cm. Found in building II, room 6.
4. O91-225. Level 6. Sealing with four stamp-seal impressions. Seal design B.3.1. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.5 cm, W: 3.0 cm, H: 1.5 cm. Found in building II, room 6.
5. O92-180. Level 6. Sealing with two stamp-seal impressions. Seal design B.3.2. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.2 cm, W: 2.5 cm H: 1.0 cm. Found in building V, room 7.
6. O93-131. Level 6. Sealing with two stamp-seal impressions, made with two different seals. Seal designs C.2.3 (one impression) and B.3.1 (one impression). Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.1 cm, W: 2.7 cm, H: 1.2 cm. Found in building II, room 7.

7. O91-252. Level 6. Sealing with one stamp-seal impression. Seal design C.1.1. Reverse type 2. Reverse shows the impression of a 2 mm thick rope. L: 2.9 cm, W: 1.9 cm, H: 1.2 cm. Found in building II, room 6.
8. O91-346. Level 6. Sealing with two stamp-seal impressions. Seal design C.1.1. Reverse type 2. Reverse shows the impression of a 2 mm thick rope. Near the centre of the coiling, the impression of a curved piece of cloth is visible. L: 4.7 cm, W: 2.7 cm, H: 1.4 cm. Found in building II, room 6.
9. O91-317. Level 6. Sealing with three stamp-seal impressions. Seal design C.1.1. Reverse type 2. The coiled basketry was damaged near the centre. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 4.2 cm, W: 4.1 cm, H: 1.9 cm. Found in building II, room 6.
10. O91-253. Level 6. Sealing with three stamp-seal impressions, made with two different seals. Seal designs C.1.1 (two impressions) and D.1.1 (one impression). Reverse type 2. Reverse shows the impression of a 1.5 mm thick rope. L: 3.2 cm, W: 3.0 cm, H: 1.7 cm. Found in building II, room 6.
11. O91-254. Level 6. Sealing with three stamp-seal impressions, made with two different seals. Seal designs C.1.1 (two impressions) and D.1.1 (one impression). Reverse type 2. Reverse shows the impression of a 2 mm thick rope. L: 3.9 cm, W: 3.0 cm, H: 1.6 cm. Found in building II, room 6.
12. O91-337. Level 6. Sealing with three stamp-seal impressions, made with two different seals. Seal designs C.1.1 (two impressions) and D.1.1 (one impression). Reverse type 2. Reverse shows the impression of a 2 mm thick rope. L: 4.4 cm, W: 3.7 cm, H: 1.7 cm. Found in building II, room 6.
13. O91-484. Level 6. Sealing with three stamp-seal impressions, made with two different seals. Seal designs C.1.1 (two impressions) and D.1.1 (one impression). Reverse type 2. Reverse shows the impression of a rope. L: 3.7 cm, W: 2.3 cm, H: 3.0 cm. Found in building II, room 6.
14. O93-125. Level 6. Sealing with two stamp-seal impressions. Seal design C.2.3. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 3.4 cm, W: 2.2 cm, H: 1.1 cm. Found in building II, room 7.
15. O93-99. Level 6. Sealing with one stamp-seal impression. Seal design C.2.3. Reverse type 2. L: 2.9 cm, W: 2.4 cm, H: 1.0 cm. Found in building II, room 7.
16. O91-320. Level 6. Sealing with four stamp-seal impressions. Seal design C.2.1. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 5.0 cm, W: 3.7 cm, H: 1.7 cm. Found in building II, room 6.
17. O91-105. Level 6. Sealing with one stamp-seal impression. Seal design C.3.1. Reverse type 17. Reverse shows the impression of a 2 mm thick rope. L: 3.3 cm, W: 1.8 cm, H: 1.0 cm. Found in building II, room 6.
18. O91-239. Level 6. Sealing with two stamp-seal impressions. Seal design C.4.1. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 2.7 cm, W: 2.6 cm, H: 1.1 cm. Found in building II, room 6.
19. O91-129. Level 6. Sealing with two stamp-seal impressions. Seal design C.2.2. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 4.3 cm, W: 2.9 cm, H: 1.4 cm. Found in building II, room 6.

Fig. 5.11

1. O91-240. Level 6. Sealing with two stamp-seal impressions. Seal design C.3.1. Reverse type 17. L: 5.2 cm, W: 4.8 cm, H: 1.6 cm. Found in building II, room 6.

2. O91-132. Level 6. Sealing with one stamp-seal impression. Seal design C.4.1. Reverse type 2. Reverse shows the impression of a Z-plied, 2 mm thick rope. L: 4.4 cm, W: 2.0 cm, H: 1.0 cm. Found in building II, room 6.
3. O91-259. Level 6. Sealing with two stamp-seal impressions. Seal design C.4.1. Reverse type 2. Reverse shows the impression of an S-plied, 1 mm thick rope. L: 4.0 cm, W: 2.7 cm, H: 1.8 cm. Found in building II, room 6.
4. O91-99. Level 6. Sealing with one stamp-seal impression. Seal design C.4.2. Reverse type 2. L: 3.4 cm, W: 2.1 cm, H: 1.4 cm. Found in building II, room 6.
5. O92-277. Level 6. Sealing with one stamp-seal impression. Seal design C.6.1. Seal impression is deformed. Reverse is convex and rough; most of the surface is damaged. L: 5.8 cm, W: 3.9 cm, H: 2.7 cm. Found in building V, room 3.
6. O92-269. Level 6. Sealing with one stamp-seal impression. Seal design C.6.1. Reverse is flat and rough; most of the surface is damaged. L: 3.8 cm, W: 3.5 cm, H: 3.0 cm. Found in building V, room 7.
7. O91-301. Level 6. Sealing with six stamp-seal impressions. Seal design C.5.1. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 5.4 cm, W: 3.5 cm, H: 2.0 cm. Found in building II, room 6.
8. O91-447. Level 6. Sealing with four stamp-seal impressions. Seal design C.6.1. Reverse type 10. H: 3.8 cm, D: 8.3 cm. Found in building VI, room 3.
9. O91-208. Level 6. Sealing with five stamp-seal impressions. Seal design is an undeterminable variant of type C. Reverse type 4. L: 8.4 cm, W: 5.4 cm, H: 1.3 cm. Found in building II, room 6.
10. O91-223. Level 6. Sealing with three stamp-seal impressions. Seal design D.1.2. Two seal impressions are deformed due to the impression of the third one. Reverse type 2. Reverse shows the impression of a rope. L: 4.5 cm, W: 3.1 cm, H: 1.6 cm. Found in building II, room 6.

Fig. 5.12

1. O91-339. Level 6. Sealing with one stamp-seal impression. Seal design D.1.2. Reverse type 2. Reverse shows the impression of an S-plied rope. L: 4.0 cm, W: 1.9 cm, H: 0.9 cm. Found in building II, room 6.
2. O91-323. Level 6. Sealing with one stamp-seal impression. Seal design D.2.1. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 4.3 cm, W: 3.5 cm, H: 2.0 cm. Found in building II, room 6.
3. O91-306. Level 6. Sealing with two stamp-seal impressions. Seal design D.1.2. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 4.5 cm, W: 3.0 cm, H: 1.5 cm. Found in building II, room 6.
4. O92-60. Level 6. Sealing with one stamp-seal impression. Seal design D.1.4. Reverse type 2. Reverse shows the impression of an S-plied, 0.8 mm thick rope. L: 2.6 cm, W: 2.2 cm, H: 0.9 cm. Found in building V, room 6.
5. O91-303. Level 6. Sealing with four stamp-seal impressions. Seal design D.1.3. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 3.8 cm, W: 3.4 cm, H: 1.2 cm. Found in building II, room 6.
6. O91-255. Level 6. Sealing with four stamp-seal impressions. Seal design D.2.1. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 4.5 cm, W: 3.9 cm, H: 2.0 cm. Found in building II, room 6.

7. O91-106. Level 6. Sealing with two stamp-seal impressions. Seal design E.1.1. Reverse type 17. Reverse shows the impression of a 2 mm thick rope and has a smooth surface with shallow dents. L: 3.6 cm, W: 2.8 cm, H: 1.2 cm. Found in building II, room 6.
8. O91-67. Level 6. Sealing with one stamp-seal impression. Seal design E.1.3. Reverse type 17. Reverse shows the impression of an S-plied, 1.5 mm thick rope. L: 3.0 cm, W: 2.0 cm, H: 1.8 cm. Found in building II, room 6.
9. O91-207. Level 6. Sealing with four stamp-seal impressions. Seal design E.1.2. Reverse type 8. Reverse shows the impression of an oval vessel rim. L: 6.6 cm, W: 6.7 cm, H: 3.6 cm. Found in building II, room 6.
10. O91-248. Level 6. Sealing with two stamp-seal impressions. Seal design F.1.1. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 3.3 cm, W: 2.8 cm, H: 1.2 cm. Found in building II, room 6.
11. O91-476. Level 6. Sealing with two stamp-seal impressions. Seal design E.2.1. Reverse type 2. Reverse shows the impression of 2 mm thick rope and 4 mm thick cloth strip. L: 5.3 cm, W: 4.0 cm, H: 1.7 cm. Found in building II, room 6.
12. O92-120. Level 6. Sealing with two stamp-seal impressions. Seal design E.3.1. Reverse type indeterminable. On the reverse, a semi-circular concave part is bordered by a curved 'rim' impression. Along the edge of the sealing there is a straight groove. The sealed object remains unknown (vessel with thick rim?). L: 8.6 cm, W: 6.7 cm, H: 2.7 cm. Found in building V, room 7.
13. O93-110. Level 6. Sealing with one stamp-seal impression. Seal design F.2.1. Reverse type 2. L: 1.9 cm, W: 1.4 cm, H: 1.7 cm. Found in building II, room 7.

Fig. 5.13

1. O91-246. Level 6. Sealing with two stamp-seal impressions. Seal design F.1.1. Reverse type 2. L: 5.8 cm, W: 3.2 cm, H: 1.8 cm. Found in building II, room 6.
2. O91-338. Level 6. Sealing with two stamp-seal impressions. Seal design F.1.2. Reverse type 2. Obverse shows basketry impressions as well. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 4.7 cm, W: 3.5 cm, H: 1.8 cm. Found in building II, room 6.
3. O92-239. Level 6. Fragment of clay piece (sealing?) with four impressions made with small flowers, type F.3.1. Sealed object indeterminable. L: 5.4 cm, W: 3.5 cm, H: 3.4 cm. Found in building V, room 7.
4. O91-321. Level 6. Sealing with seven stamp-seal impressions. Seal design I.1.1. Reverse type 9. L: 7.7 cm, W: 6.6 cm, H: 1.5 cm. Found in building II, room 6.
5. O91-325. Level 6. Sealing with two stamp-seal impressions. Seal design I.1.1. Reverse type 2. Reverse shows the impression of a 2 mm thick rope. L: 3.8 cm, W: 2.8 cm, H: 1.2 cm. Found in building II, room 6.
6. O91-299. Level 6. Sealing with three stamp-seal impressions. Seal design G.2.1. Reverse type 17. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 4.6 cm, W: 3.1 cm, H: 1.7 cm. Found in building II, room 6.
7. O91-314. Level 6. Sealing with five stamp-seal impression. Seal design G.2.1. Reverse is rough and shows a circular concavity. Sealed object indeterminable. L: 4.6 cm, W: 3.6 cm, H: 2.0 cm. Found in building II, room 6.
8. O91-310. Level 6. Sealing with one stamp-seal impression. Seal design G.1.1. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 5.4 cm, W: 3.4 cm, H: 2.1 cm. Found in building II, room 6.

9. O91-315. Level 6. Sealing with one stamp-seal impression. Seal design M.1.1. Reverse type 4. L: 3.8 cm, W: 3.3 cm, H: 1.8 cm. Found in building II, room 6.
10. O91-353. Level 6. Sealing with one stamp-seal impression. Seal design J.1.1. Reverse is convex and smoothed. Label or test strip? L: 2.5 cm, W: 2.0 cm, H: 1.2 cm. Found in building VI, room 2.
11. O91-205. Level 6. Sealing with one stamp-seal impression. Seal design K.1.1. Reverse largely damaged except for the impression of an S-plied, 1.5 mm thick rope. L: 3.5 cm, W: 2.0 cm, H: 0.8 cm. Found in building II, room 6.
12. O92-179. Level 6. Sealing with one stamp-seal impression. Seal design I.2.1. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.6 cm, W: 2.8 cm, H: 1.3 cm. Found in building V, room 7.
13. O93-120. Level 6. Sealing with one stamp-seal impression. Seal design K.1.1. Reverse is partly smooth and flat, and partly damaged. Possible rope impression. Sealed object indeterminable. L: 2.1 cm, W: 1.9 cm, H: 1.0 cm. Found in building II, room 7.

Fig 5.14

1. O91-329. Level 6. Sealing with seven stamp-seal impressions. Seal design G.1.1. Reverse type 5. This sealing fitted an oval stone bowl (S91-55) found in the same building. L: 14.8 cm, W: 9.0 cm, H: 1.9 cm. Found in building II, room 6.

1a. O91-329 together with stone bowl S91-55.

2. O91-244. Level 6. Sealing with seven impressions of a cowrie shell, type H.1.1. The shell was attached to a string of beads which left their impressions next to those of the shell. Reverse type 8. L: 7.7 cm, W: 6.6 cm, H: 2.8 cm. Found in building II, room 6.
3. O91-345. Level 6. Sealing with two stamp-seal impressions. Seal design M.1.1. Reverse type 4. L: 6.9 cm, W: 5.1 cm, H: 2.1 cm. Found in building II, room 6.
4. O91-224. Level 6. Sealing with one stamp-seal impression. Seal design R.1.1. Reverse type 1. L: 2.7 cm, W: 2.4 cm, H: 1.4 cm. Found in building II, room 6.
5. O93-121. Level 6. Sealing with one stamp-seal impression. Seal design R.1.1. Reverse type 3. Reverse shows the impression of a 3 mm thick rope. L: 3.8 cm, W: 2.4 cm, H: 1.5 cm. Found in building II, room 7.
6. O91-86. Level 6. Sealing with one stamp-seal impression. Seal design N.1.1. Reverse type 17. Reverse shows the impression of a Z-plied, 2 mm thick rope. L: 3.9 cm, W: 2.7 cm, H: 1.0 cm. Found in building II, room 6.
7. O91-110. Level 6. Sealing with one stamp-seal impression. Seal design O.1.1. Reverse type 1. L: 3.9 cm, W: 2.0 cm, H: 0.8 cm. Found in building II, room 6.

Fig. 5.15

1. O91-232. Level 6. Sealing with two stamp-seal impressions. Seal design L.1.1. Reverse type 4. Reverse shows the impression of a very thick (1.3 cm) vessel rim with large diameter (25 cm). L: 17.0 cm, W: 10.5 cm, H: 3.0 cm. Found in building II, room 6.
2. O91-221. Level 6. Sealing with one stamp-seal impression. Seal design L.1.2. Reverse type 4. Sealed vessel must have been about 26 cm in diameter. L: 9.3 cm, W: 6.9 cm, H: 2.1 cm. Found in building II, room 6.
3. O91-350. Level 6. Sealing with one stamp-seal impression. Seal design P.1.2. Reverse type 8. L: 6.6 cm, W: 3.7 cm, H: 3.1 cm. Found in building II, room 6.
4. O91-415. Level 6. Sealing with one stamp-seal impression. Seal design L.1.1. Reverse is convex, with at the side a straight concavity. Sealed object indeterminable. L: 14.0 cm, W: 10.5 cm, H: 5.1 cm. Found in building II, room 6.

5. O92-181. Level 6. Sealing with one stamp-seal impression. Seal design P.1.1. Reverse surface is flat and rough with straw and grain impressions. L: 6.2 cm, W: 5.1 cm, H: 2.2 cm. Found in building V, room 7.

Fig. 5.16

1. O91-180. Level 6. Sealing with four stamp-seal impressions. Seal design Q.2.2. Seal impressions are all placed on the edge of the sealing. Reverse type 8. A longitudinal object has left its impression on the reverse. H: 2.6 cm, D: 13.7 cm. Found in building II, room 6.
2. O91-292. Level 6. Sealing with one stamp-seal impression. Seal design Q.2.1. Reverse type 8. L: 7.2 cm, W: 4.3 cm, H: 3.2 cm. Found in building II, room 6.
3. O91-473. Level 6. Sealing with one stamp-seal impression. Seal design T.1.1. Reverse type 14. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 7.8 cm, W: 6.0 cm, H: 3.6 cm. Found in building II, room 6.
4. O91-219. Level 6. Sealing with one stamp-seal impression. Seal design T.1.1. Reverse type 2. L: 2.7 cm, W: 2.5 cm, H: 1.1 cm. Found in building II, room 6.
5. O91-285. Level 6. Fragment of rough clay piece with one impression, type Q.1.1. Perhaps not a true seal impression. L: 9.2 cm, W: 6.8 cm, H: 2.3 cm. Found in building II, room 6.
6. O91-313. Level 6. Sealing with one stamp-seal impression. Seal design T.1.1. Reverse type 2. Reverse shows the impression of an S-spun, Z-plied, S-cabled 2 mm thick rope. L: 3.5 cm, W: 2.5 cm, H: 1.2 cm. Found in building II, room 6.
7. O91-357. Level 6. Sealing with two stamp-seal impressions. Seal design S.1.1. Reverse is slightly concave and shows some shallow dents. L: 10.0 cm, W: 6.2 cm, H: 3.8 cm. Found in building II, room 6.

Fig. 5.17

1. O91-370. Level 6. Fragmentary preserved clay piece with six stamp-seal impressions. Seal design T.1.1. Both sides of the object show seal impressions. Obverse is convex and smoothed. Reverse is concave and shows faint impressions of wood (?). H: 5.0 cm, D: 17.5 cm. Found in building II, room 6.
2. O91-218. Level 6. Sealing with one stamp-seal impression. Seal design T.1.1. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 5.6 cm, W: 4.8 cm, H: 1.7 cm. Found in building II, room 6.
3. O91-373. Level 6. Sealing with one stamp-seal impression. Seal design T. Reverse damaged. L: 13.5 cm, W: 7.8 cm, H: 4.2 cm. Found in building II, room 6.
4. O91-226. Level 6. Sealing with one stamp-seal impression. Seal design U.1.1. Reverse type 2. Reverse shows the impression of a 2 mm thick rope. L: 3.2 cm, W: 2.3 cm, H: 1.0 cm. Found in building II, room 6.
5. O92-268. Level 6. Sealing with one stamp-seal impression. Seal design Z.1.1. Reverse type 2. Reverse shows the impression of an S-plied, 2 mm thick rope. L: 3.4 cm, W: 2.5 cm, H: 1.0 cm. Found in building V, room 7.

Fig. 5.18

1. O92-241. Level 6. Sealing with three stamp-seal impressions. Seal design V.1.2. Reverse type 7. L: 10.2 cm, W: 9.5 cm, H: 4.9 cm. Found in building V, room 7.
2. O93-141. Level 6. Sealing with one stamp-seal impression. Seal design AA.1.1. Reverse damaged. L: 3.0 cm, W: 2.2 cm, H: 1.7 cm. Found in building II, room 1.

3. O91-344. Level 6. Sealing with three stamp-seal impressions. Seal design W.1.1. Reverse type 7. Obverse largely damaged by fingers, while the clay was still wet. L: 9.5 cm, W: 6.9 cm, H: 3.8 cm. Found in building II, room 6.
4. O91-335. Level 6. Sealing with one stamp-seal impression. Seal design V.1.1. Reverse is irregular, with some dents and two longitudinal ridges. L: 5.1 cm, W: 4.4 cm, H: 2.2 cm. Found in building II, room 6.
5. O92-51. Level 6. Sealing with two stamp-seal impressions. Seal design X.1.1. Reverse type 2. Reverse shows the impression of a Z-spun, S-plied, 2 mm thick rope. L: 3.4 cm, W: 3.2 cm, H: 1.2 cm. Found in building V, room 6.
6. O93-94. Level 6. Sealing with two stamp-seal impressions. Seal design AA.1.1. Reverse type 18. L: 6.5 cm, W: 3.7 cm, H: 2.5 cm. Found in building II, room 1.
7. O92-175. Level 6. Sealing with one stamp-seal impression. Seal design Y.1.1. Reverse is partly flat with a small ridge and partly concave. Sealed object indeterminable. L: 5.3 cm, W: 2.5 cm, H: 1.5 cm. Found in building IV, room 12.
8. O93-138. Level 6. Sealing with one stamp-seal impression. Seal design AA.1.1. Reverse is irregular and shows numerous straw impressions. L: 5.0 cm, W: 4.0 cm, H: 2.3 cm. Found in building II, room 1.
9. O91-80. Level 6. Sealing without stamp-seal impression. Reverse type 3. L: 2.6 cm, W: 1.7 cm, H: 1.1 cm. Found in building II, room 6.

Fig. 5.19

1. O91-271. Level 6. Sealing without stamp-seal impression. Reverse type 5. This sealing may have sealed stone bowl S91-55, like sealing no. O91-329 (cf. fig. 5.14, nos. 1-1a) L: 8.8 cm, W: 4.4 cm, H: 1.6 cm. Found in building II, room 6.
2. O91-174. Level 6. Jar lid without stamp-seal impression. Reverse type 12. H: 3.5 cm, D: 8.5 cm. Found in building II, room 6.
3. O91-87. Level 6. Miniature jar lid without stamp-seal impression. Reverse type 7. H: 2.5 cm, D: 3.7 cm. Found in building II, room 6.
4. O91-136. Level 6. Jar lid without stamp-seal impression. Reverse type 12. H: 1.7 cm, D: 5.2 cm. Found in building II, room 6.
5. O91-104. Level 6. Sealing without stamp-seal impression. Reverse type 6. Reverse shows impressions of grooves like the ones on stone bowl S91-55 (but does not fit). Obverse shows impressions of a Z-spun, S-plied 2 mm thick rope. L: 4.3 cm, W: 2.5 cm, H: 0.9 cm. Found in building II, room 6.
6. O91-284. Level 6. Sealing with three stamp-seal impressions. Seal design indeterminable. Reverse type 13. Reverse shows the impression of an S-spun, Z-plied, 7 mm thick rope. L: 7.8 cm, W: 4.8 cm, H: 4.5 cm. Found in building II, room 6.

Fig. 5.20

1. O91-91. Level 6. Jar lid without stamp-seal impression. Reverse type 7. Reverse shows straw impressions. L: 11.6 cm, W: 8.6 cm, H: 4.0 cm. Found in building II, room 6.
2. O91-372. Level 6. Jar lid without stamp-seal impression. Reverse type 8. H: 3.4 cm, D: 13.4 cm. Found in building II, room 6.
3. O91-430. Level 6. Jar lid without stamp-seal impression. Reverse type 8. H: 2.4 cm, D: 7.5 cm. Found in building VI, room 2.

Fig. 5.21

1. O91-456. Level 6. Jar lid without stamp-seal impression. Reverse type 11. Reverse shows the impression of an oval vessel rim. L: 11.8 cm, W: 6.5 cm, H: 1.5 cm. Found in building II, room 6.
2. O92-283. Level 6. Lid without stamp-seal impression. Reverse type 8. Reverse shows the impression of a coiled basket rim. L: 10.2 cm, W: 7.2 cm, H: 2.1 cm. Found in building V, room 7.
3. O91-147. Level 6. Jar lid without stamp-seal impression. Reverse type 10. Reverse shows clear finger traces. L: 11.1 cm, W: 10.2 cm, H: 5.5 cm. Found in building II, room 6.
4. SAB 88 O-9. Level 3. Jar lid without stamp-seal impression. Reverse type 10. Obverse shows 2 cm deep impressions, made with the fingers of the left hand and providing a firm grip. H: 8.0 cm, D: 15.0 cm. Found in building I, room 11.
5. SAB 88 O-86. Level 3. Sealing with one stamp-seal impression. Geometrical seal design of unknown type. Reverse type 3. L: 1.9 cm, W: 1.7 cm, H: 0.9 cm. Found in building I, room 11.

Fig. 5.22

1. O91-244 (see description fig. 5.14, no. 2).
2. O91-259 (see description fig. 5.11, no. 3).
3. O91-70 (see description fig. 5.9, no. 11).
4. O91-238 (see description fig. 5.7, no. 4).
5. O91-242 (see description fig. 5.9, no. 10).
6. O91-243 (see description fig. 5.7, no. 11).

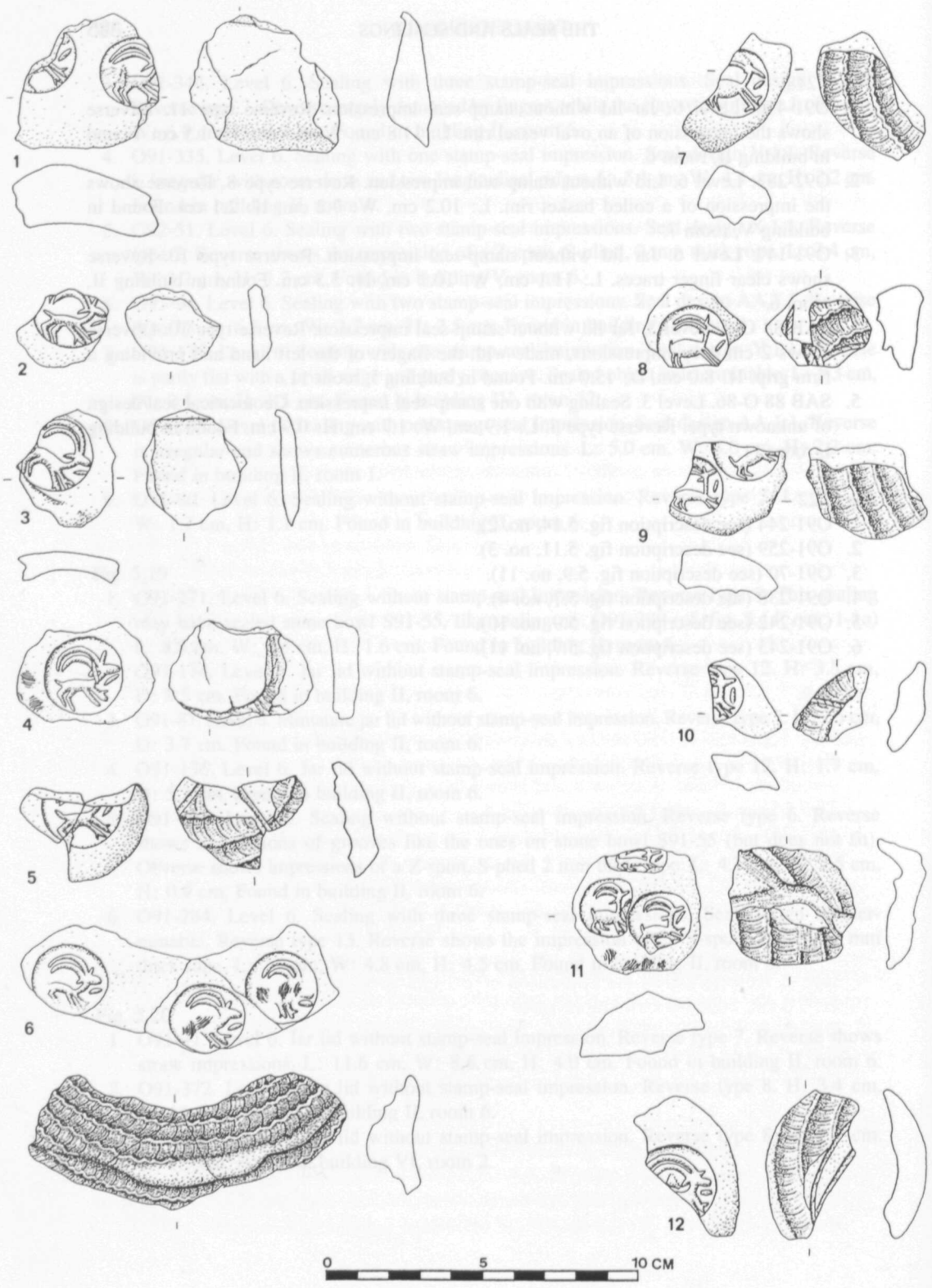


Figure 5.7. Level 6 sealings.

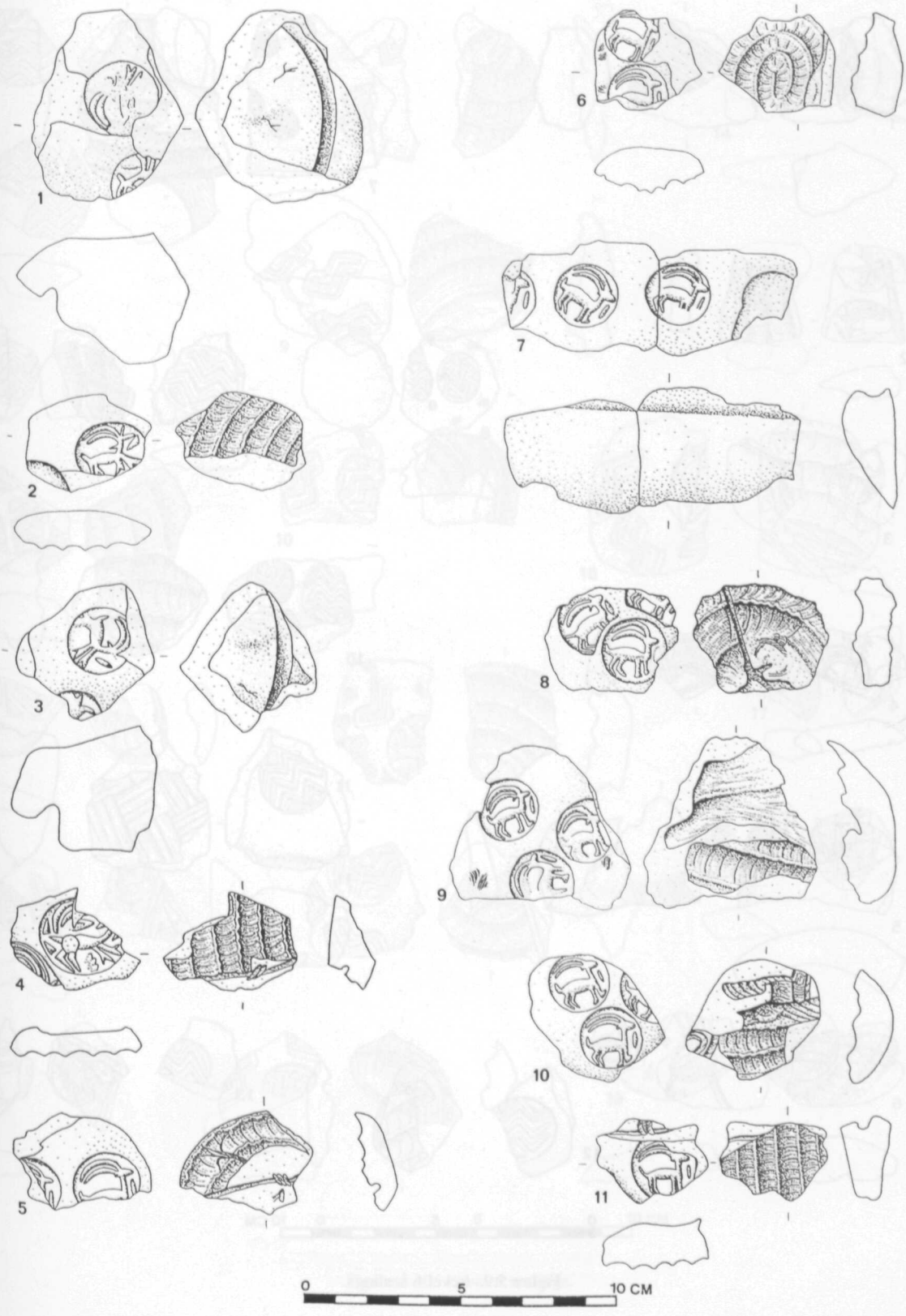


Figure 5.8. Level 6 sealings.

Figure 5.9. Level 6 sealings.

Figure 5.10. Level 6 sealings.

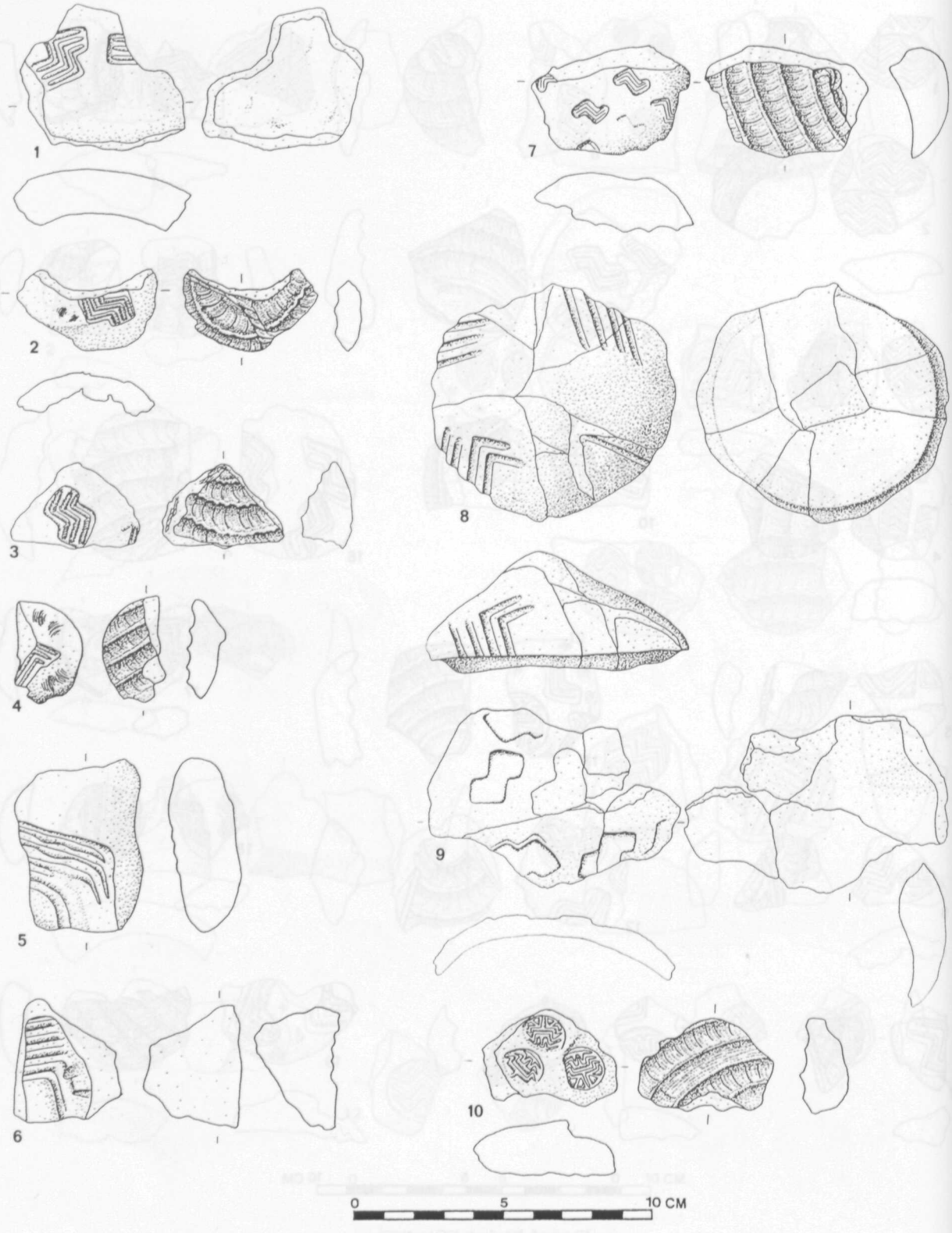


Figure 5.11. Level 6 sealings.

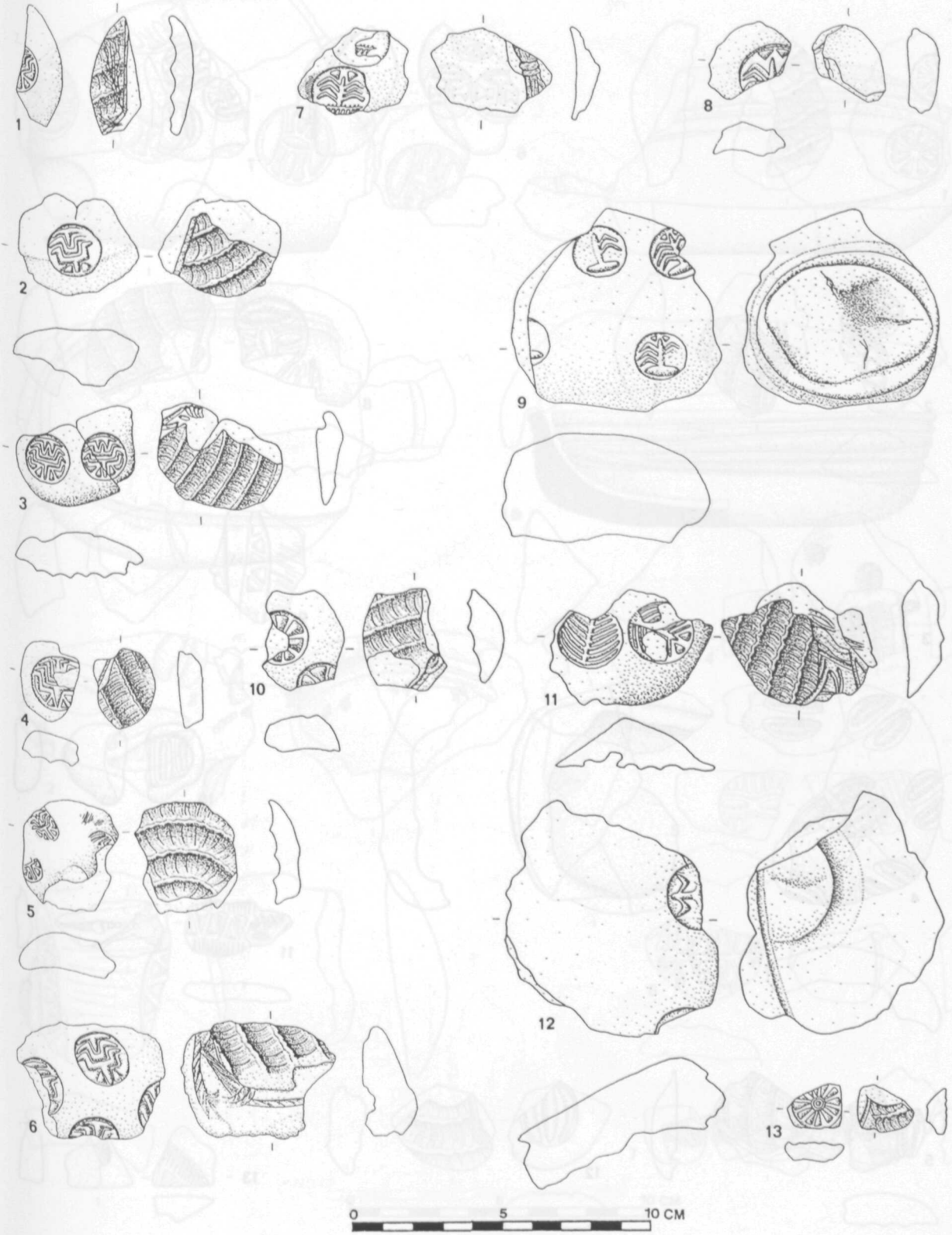


Figure 5.12. Level 6 sealings.

Figure 5.13. Level 6 sealings.

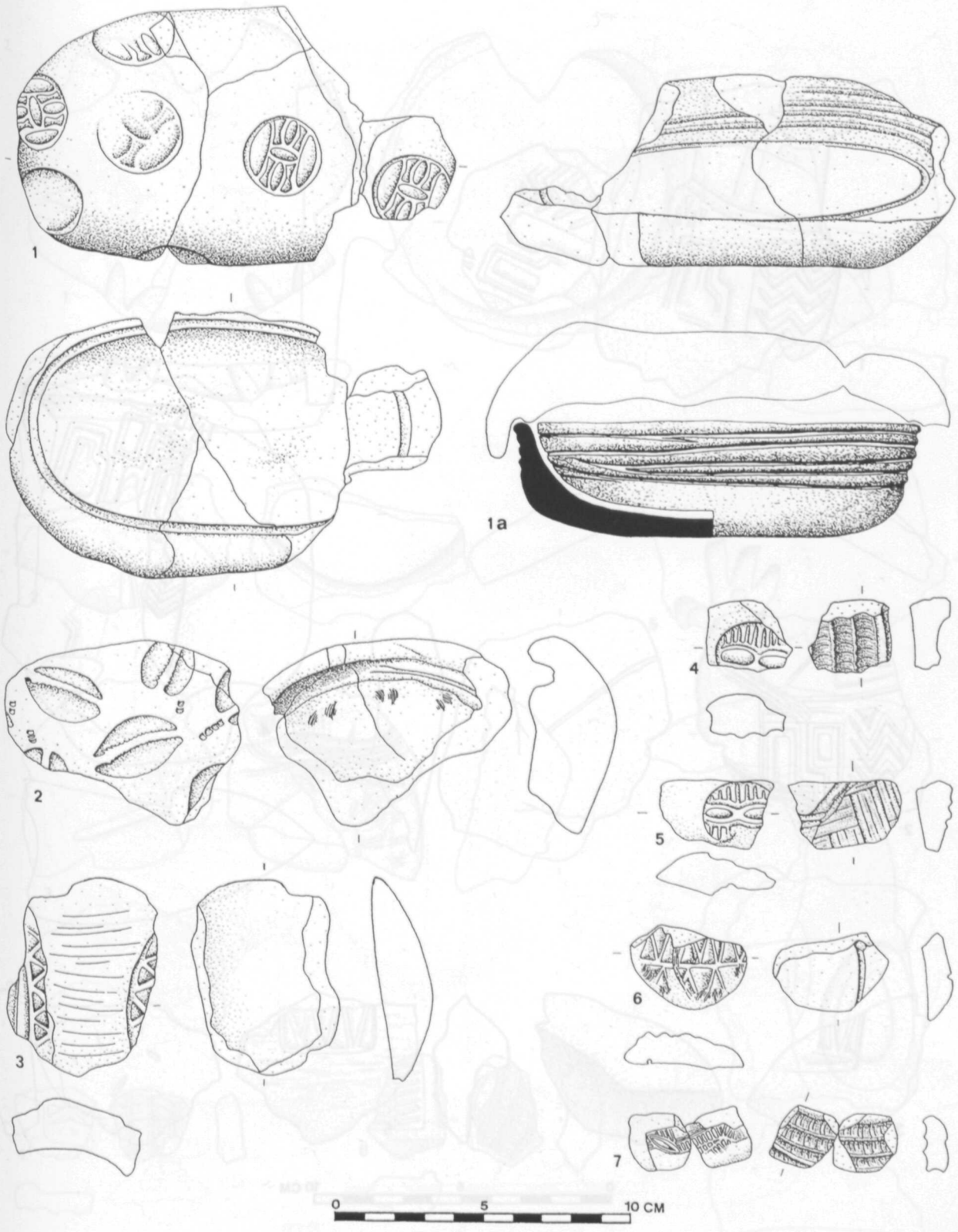


Figure 5.14. Level 6 sealings.

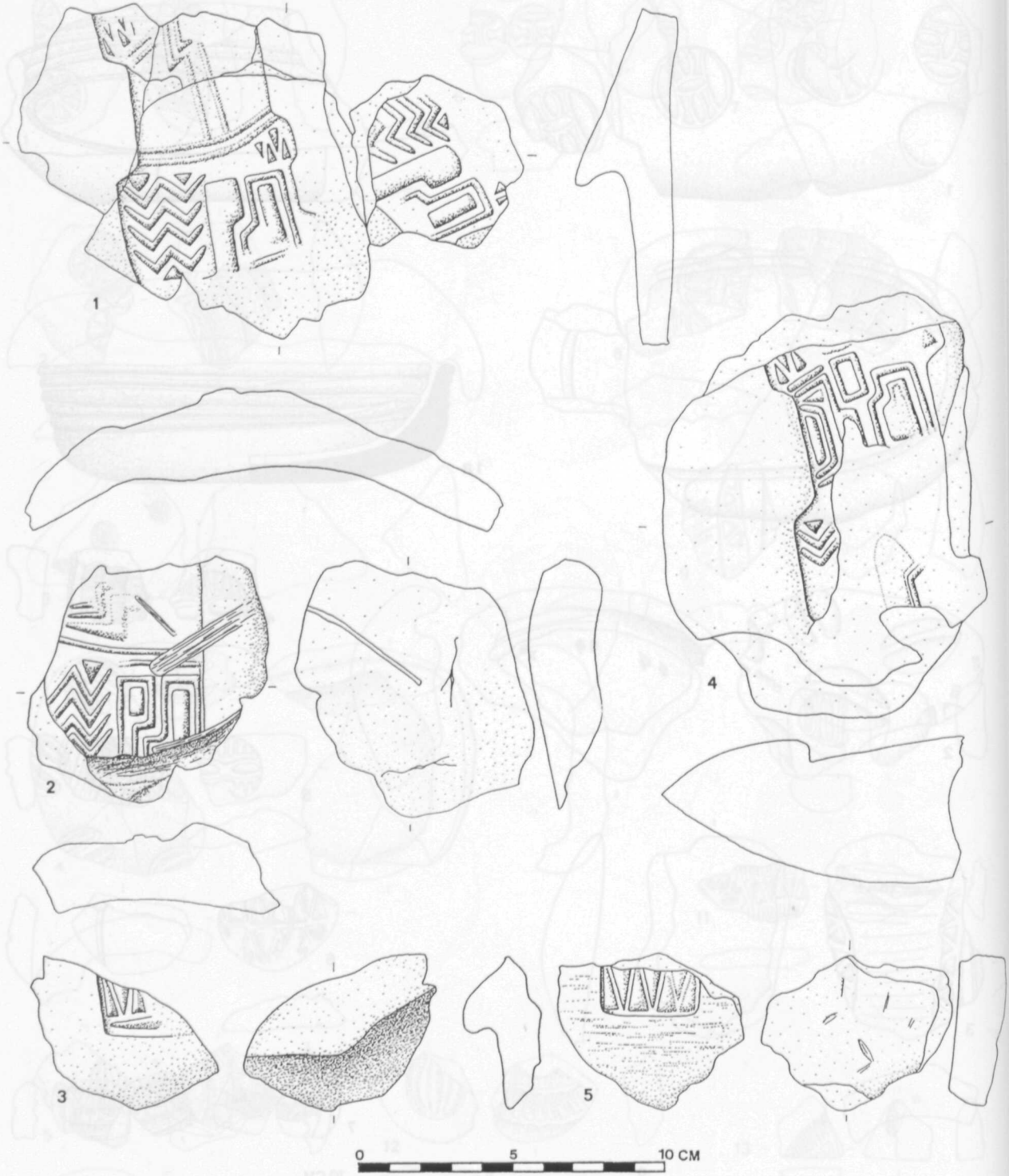


Figure 5.15. Level 6 sealings.

Figure 5.16. Level 6 sealings.

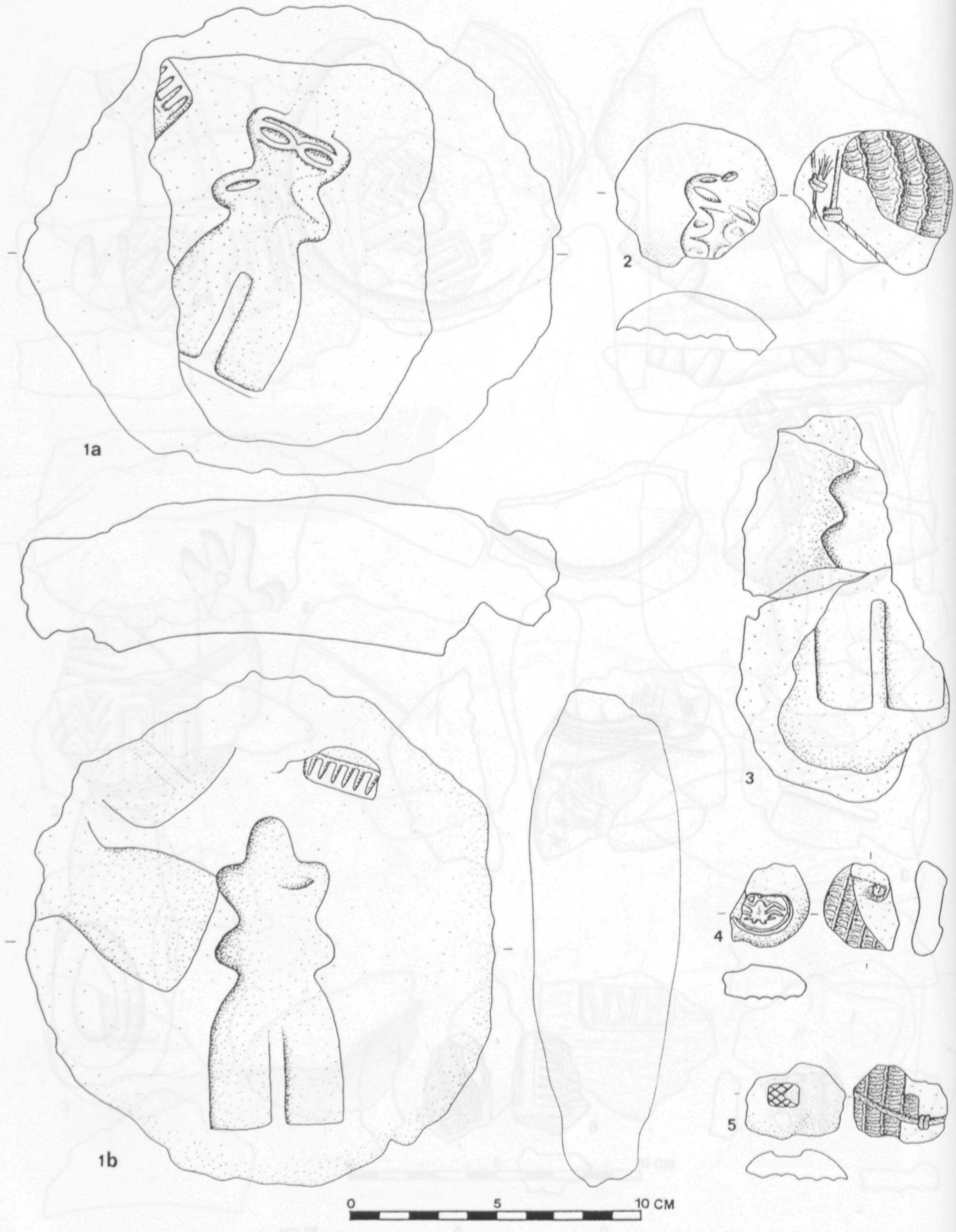


Figure 5.17. Level 6 sealings.

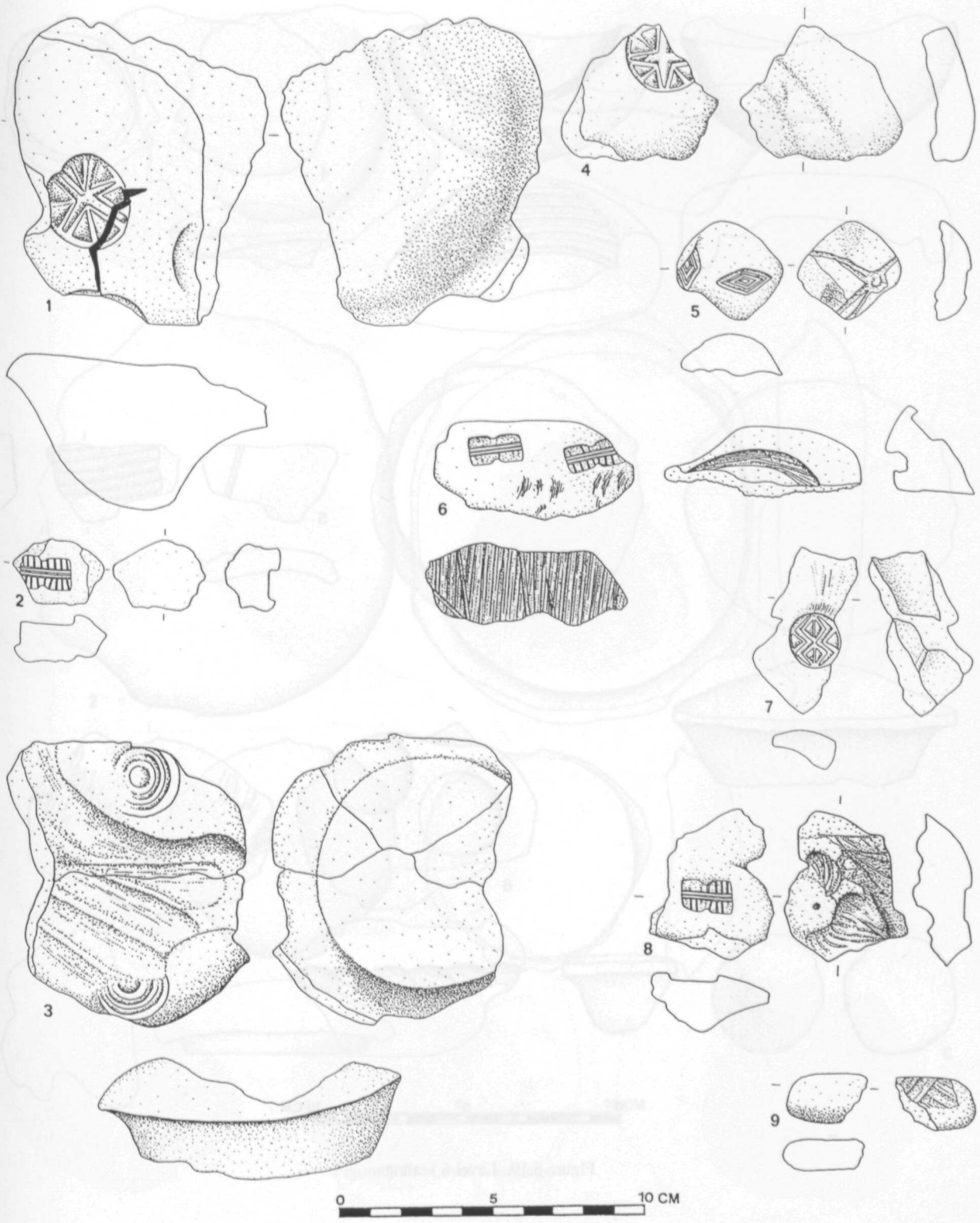


Figure 5.18. Level 6 sealings.

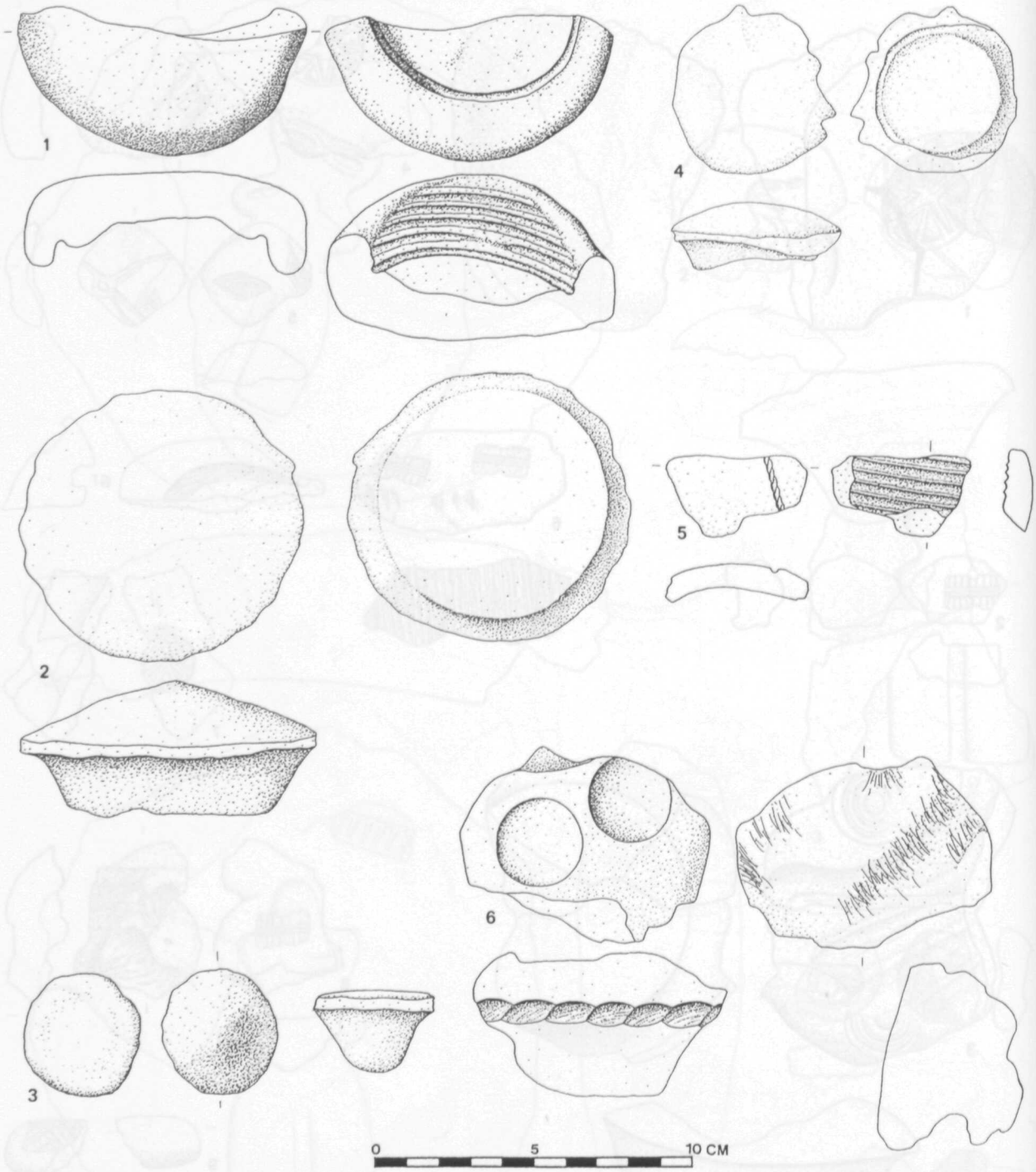


Figure 5.19. Level 6 sealings.

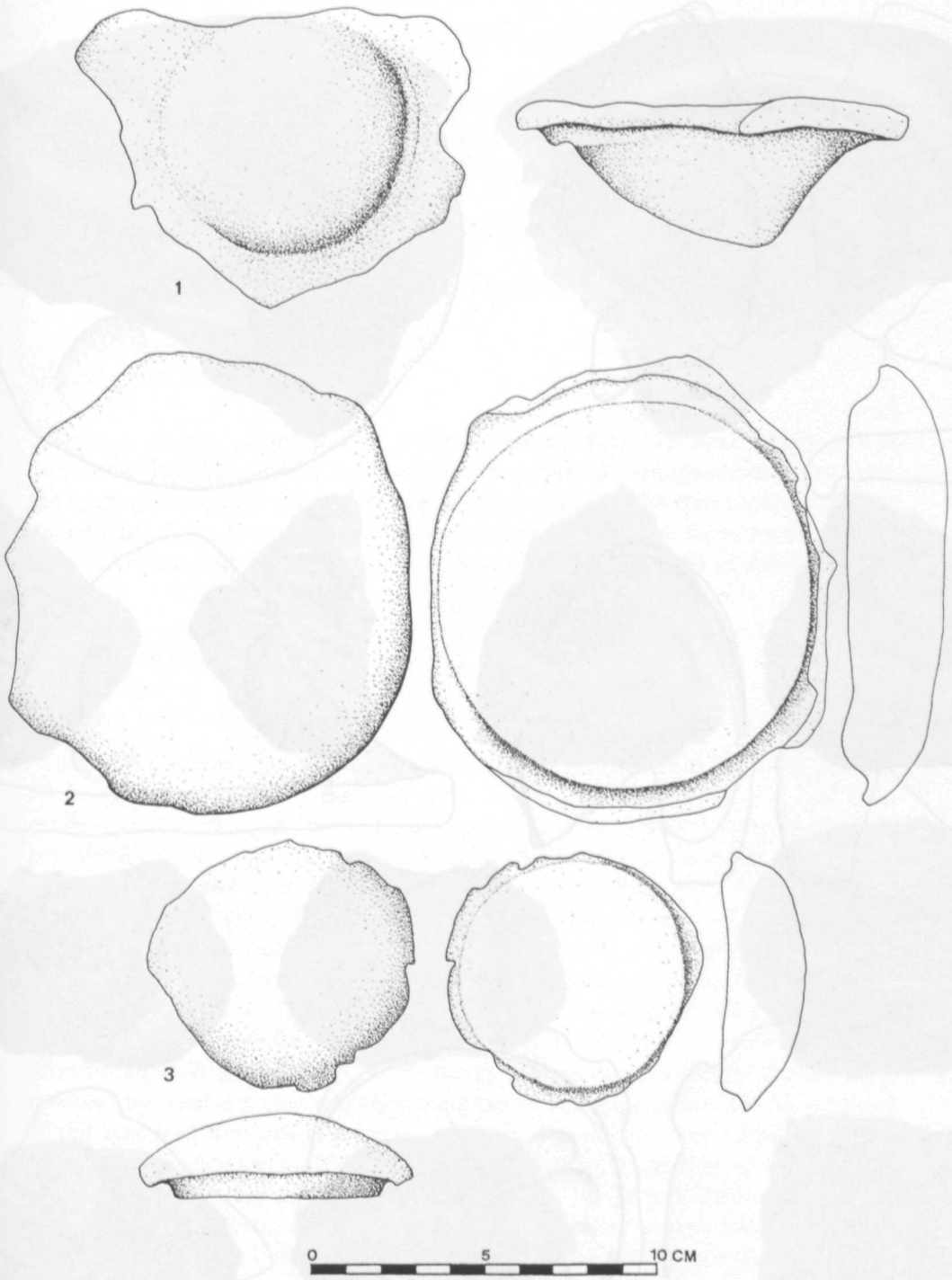


Figure 5.20. Level 6 sealings.

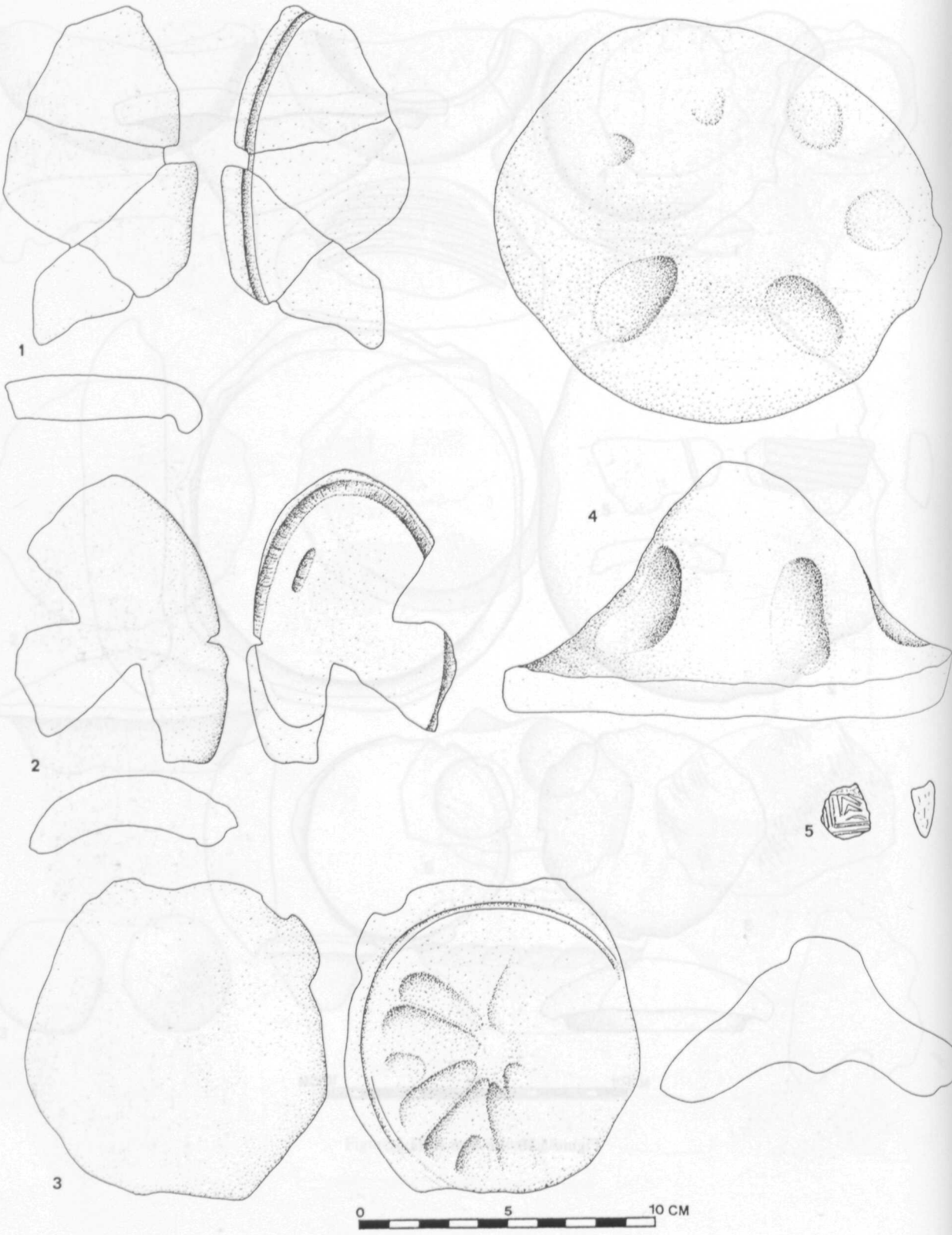


Figure 5.21. Level 6 sealings (nos. 1-3) and level 3 sealings (nos. 4-5).

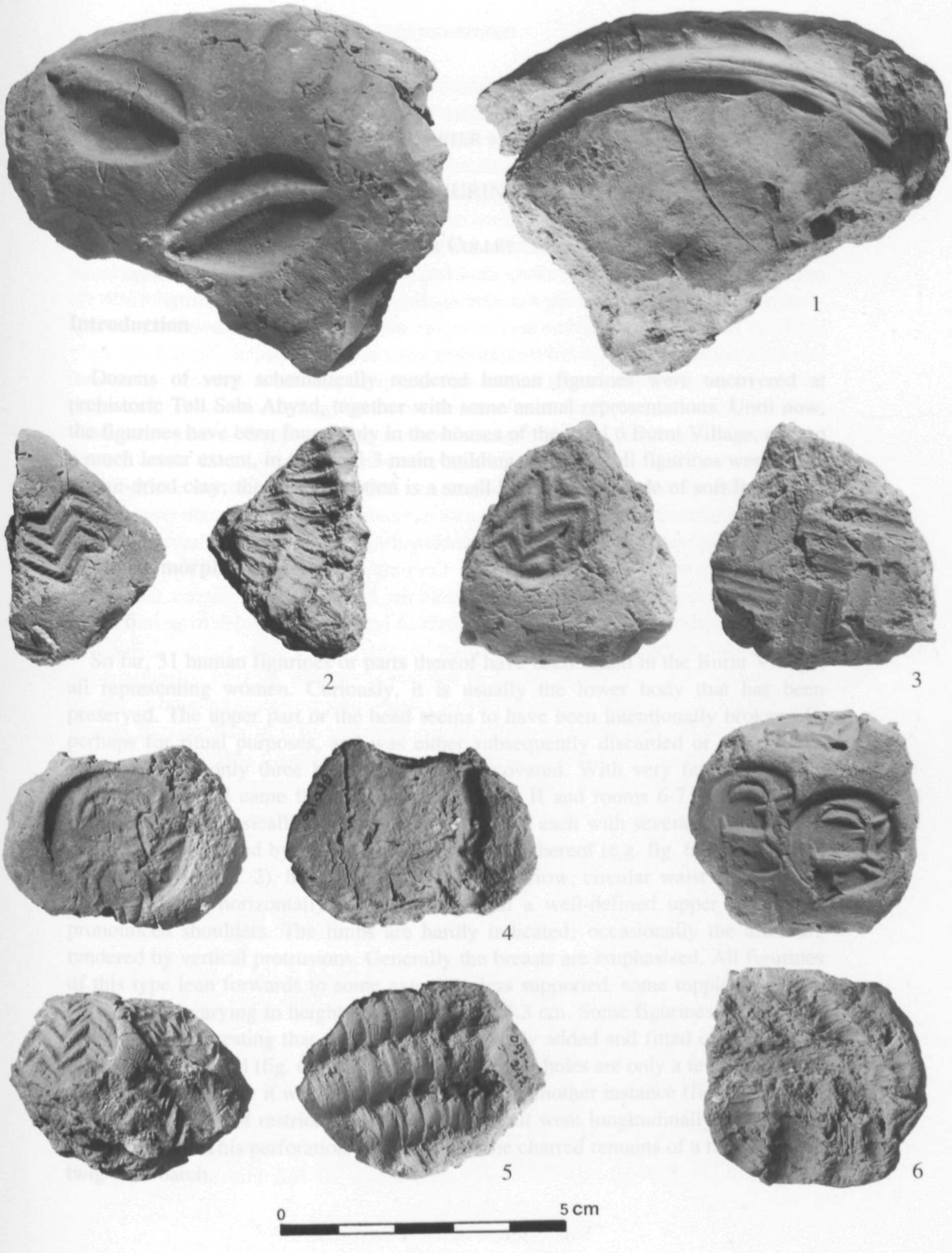


Figure 5.22. Level 6 sealings.

CHAPTER 6

THE FIGURINES

PIETER COLLET

Introduction

Dozens of very schematically rendered human figurines were uncovered at prehistoric Tell Sabi Abyad, together with some animal representations. Until now, the figurines have been found only in the houses of the level 6 Burnt Village, and, to a much lesser extent, in the level 3 main building. Virtually all figurines were made of sun-dried clay; the sole exception is a small human head made of soft limestone.

Anthropomorphic Figurines

Level 6

So far, 31 human figurines or parts thereof have been found in the Burnt Village, all representing women. Curiously, it is usually the lower body that has been preserved. The upper part or the head seems to have been intentionally broken off, perhaps for ritual purposes, and was either subsequently discarded or stored elsewhere. So far, only three heads have been recovered. With very few exceptions, these figurines all came from room 6 in building II and rooms 6-7 in building V.

The statuettes basically come in two main types, each with several varieties. The first type, represented by 16 figurines or fragments thereof (e.g. fig. 6.1, nos. 1, 5-7, 10 and fig. 6.2, no. 2), has a triangular base, a narrow, circular waist which occasionally carries horizontally incised bands, and a well-defined upper body with pronounced shoulders. The limbs are hardly indicated; occasionally the arms are rendered by vertical protrusions. Generally the breasts are emphasised. All figurines of this type lean forwards to some extent (unless supported, some topple over) and all are small, varying in height between 2.8 and 5.3 cm. Some figurines have a hole in the neck, suggesting that the head was separately added and fitted onto the body by means of a dowel (fig. 6.1, no. 7). Generally, these holes are only a few millimetres wide, but in one case it was 10 mm in diameter. In another instance (fig. 6.1, no. 1), the piercing was not restricted to the neck only but went longitudinally through the entire figurine. This perforation still contained the charred remains of a thin, crooked twig with barch.

Special attention is drawn to the figurine F91-11 (fig. 6.1, no. 5), found in the burnt fill of the large tholos VI. This figurine has a rigidly straight posture; the triangular base does not taper to a thin waist (as is the case with the other type 1 figurines) but instead rises more or less straight to the rounded protrusions forming the shoulders. The head has been broken off, as shown by the fracture marks on the neck. The left breast is damaged but originally seems to have been cupped in the right hand. The right arm supports the right breast in the crook of the arm. Immediately below the arm an incision is found, spiralling downwards along the anterior side. A series of vertical incisions is found along the base, whereas the back shows one row of vertical incisions between the shoulders and two rows of incisions on the lower body. These incisions perhaps served to indicate clothes.

When compared with the above, the second type, represented by seven specimens, shows a much more stylised female representation (fig. 6.2, nos. 6-12). The wide, triangular base evolves in a narrow, tubular waist and upper body, without any indication of shoulders or breasts. Interestingly, with these figurines it the vulva instead of the breasts that is emphasised to indicate the female gender. The vulva is indicated by a single vertical incision or one large incision amongst several smaller ones along the base. The heads (now missing) seem almost all to have been permanently fixed to the body, without a dowel or the like. Only one figurine (fig. 6.2, no. 7) yielded the impression of a hollow tube on which the head had been placed. The tube, probably a piece of straw or reed, was pressed into the clay and left an imprint of semi-circular shape with a solid interior.

In contrast with the former group of statuettes, virtually all type 2 figurines are decorated. The triangular lower body often carries three or four horizontal incisions, with a series of vertical incisions along the base line. These patterns are largely restricted to the front side; continuous incised lines are found only on the waist or neck. Commonly, the back is left blank but occasionally it carries nail impressions (e.g. fig. 6.2, nos. 11-12) or triangular and rectangular impressions placed in rows (e.g. fig. 6.2, no. 10).

Generally, the type 2 figurines are smaller than the type 1 statuettes and vary in length between 1.8 and 3 cm. An obvious exception is figurine F92-10 (fig. 6.2, no.7), which, with its present length of 6.0 cm, is not only the largest type 2 figurine but the largest in general.

Close parallels for this kind of figurine have been found in the Hassunan levels 3-5 at Yarim Tepe I in northern Iraq (see e.g. Merpert and Munchaev 1969:128 and pl. III; 1971, pl. 6; 1973:106 and pl. XLIII).

In addition to the above, a number of figurine fragments were found which do not fit the two main categories and are therefore treated separately.

Five fragments have a rounded or oval, cylindrical body, widened at the base. These figurines resemble the coarsely made Early Halaf or level 3 statuettes to some extent (see below). The cylindrical body of one figurine (fig. 6.3, no. 6) is covered

with nail imprints in oblique rows on one side and randomly on the other side. In another instance (fig. 6.3, no. 8) the fracture at the top shows a semicircular, tubular impression, perhaps due to the insert of a piece of straw or reed for attachment of the head.

One figurine has a more or less rectangular base, decorated by means of two horizontally incised bands (fig. 6.3, no. 7).

Another figurine (fig. 6.3, no. 4) has a spherical lower body with a slightly flattened base. The upper body is cylindrical but it has, unfortunately, largely broken off. This figurine resembles our type 2 statuettes, with the distinction that it has a spherical rather than a triangular base.

So far, figurine heads have been extremely rare. Building V yielded one example, long-drawn and conical in shape (fig. 6.3, no. 2). The nose is recognisable in the angle formed by the junction of the neck and forehead. Nail impressions indicate the oblong eyes set obliquely. Close comparisons to this head are found at Hassunan Yarim Tepe I (see, e.g., Merpert and Munchaev 1971, pl. 6, no. 7; 1973:106 and pl. XLIII, nos. 1 and 4). Another possible head appeared in the fill of tholos IX (fig. 6.3, no. 3). It shows a certain likeness to the former head, although it is much cruder in appearance and fabric. A large tapering forehead towers over slight impressions possibly representing the eyes and eyebrows.

A rather surprising find is the small human head made of soft limestone (fig. 6.3, no. 1), found in the fill of building IX. The spherical head has a wholly flat face and a rounded, conical neck with a flattened base. The head leans slightly forward. The eyes, indicated by two shallow holes, are the only facial features rendered. Two similar specimens were recently found in a test trench on the small mound of Sabi Abyad II, west of the main excavation site, albeit in a solid late 7th millennium, Pre-Pottery Neolithic B context (Verhoeven and Akkermans, in prep.). Earlier a similar figurine was uncovered at nearby Tell Assouad, likewise in a PPNB context (Cauvin 1972:88 and Fig. 4, no. 6). It may be the case that our level 6 head was kept as an heirloom since earlier times.

Level 3

The level 3 or Early Halaf human figurines are entirely different from the ones of the lower level 6. These simple figurines (e.g. fig. 6.3, nos. 9 and 13) have a roughly cylindrical body, with occasionally some restricted protrusions very schematically rendering the arms and neck (or possibly the head). The base is usually flat but sometimes seems to be slightly widened at the front, forming feet. One figurine has a small pinched protrusion in the middle of the upper body, perhaps an attempt to indicate the breasts. Interestingly, this statuette also has a small hole in the neck, suggesting that the head was separately added to the body, comparable with some of the level 6 figurines. Actually, a baked and painted Early Halaf figurine, found during the 1986 campaign (cf. Akkermans 1989c:287 and fig. VIII.3), adds to the

continuance and importance of figurines with detachable heads at Tell Sabi Abyad. In height the level 3 figurines seem to vary between 4.1 and 10.7 cm.

So far, only seven human figurines have been ascribed to level 3. All except one were found together in the level 3 main building: here a pile of unbaked clay objects of all sorts was found on the floor of room 11, including (apart from the figurines) some miniature vessels, small spheres, discs, cones, rectangular plaques and a stamp-seal impression. One other figurine (fig. 6.3, no. 15) was found in the burnt fill of oven CC.

Zoomorphic Figurines

Level 6

Most zoomorphic figurines or fragments thereof found at Sabi Abyad come from the houses of the level 6 Burnt Village. Virtually all animal figurines were found in room 6 of building II or in tholos IX. In addition, one statuette appeared in building V, room 5 (fig. 6.4, no. 5). In total, 16 zoomorphic representations have been found: 11 torsos, 2 heads and 3 (possible) horns. Most objects are coarse products and in a poor state of preservation. Often, the horns, the thick and stubby legs, the small tail and the snout of the animal have all (partly) broken off.

Most figurines are considered to represent bovines, this on the basis of the presence of horns, the considerable thickness of the neck and the body, and the folds of flesh depicted between front and hind quarters and dangling down from the neck between the front legs. Generally, the thick neck rises perpendicularly from the body.

One of these bull representations (fig. 6.4, no. 10) was very crudely made, with one of the front legs three times as thick as the other. The torso is extremely thick near the neck and tapers off towards the rear. It misses parts of the horns, snout and tail. The stubby rear legs are fractured and a single ear is visible under a damaged horn. Interestingly, a small and slightly protruding, triangular stone has been inserted in the animals' left flank, while the clay was still wet. Next to the stone, and above the left hind leg, a shallow depression is visible, possibly the result of an attempt to insert another object into the figurine. This figurine closely resembles the "ritually killed" cattle figurines found at PPNB 'Ain Ghazal in Jordan (Rollefson 1986:50 and Pl. II:4). Each of the 'Ain Ghazal figurines had been "killed" at least twice by flint bladelets entering the rib cage from the side and the heart area from the front of the chest. Most likely, these figurines had some magic implications to ensure luck in hunting wild cattle.

One torso (fig. 6.4, no. 2) is of an animal with a strong arched back and a head pointed straight forward. The back is formed by a ridge leading to a bulky body. Again the head, the tail and one leg have broken off. The broken right front leg is very thick and pointed straight down, the complete left one is thinner and extends

slightly forwards. The right hind leg is fractured and is solid, the left one is complete and very much slimmer. Both hind legs are stretched to the back. What remains of the tail is much thinner than that of the other figurines. The thin tail and strongly arched back perhaps indicate that this particular representation is that of a wild boar or pig rather than a bovine. To some extent this figurine resembles some animal representations assumed to be pigs found at Sarab and Çayönü (Broman-Morales 1990:5ff.).

In addition to the torsos, two animal heads were found. One head (fig. 6.4, no. 8) depicts a rounded conical snout perpendicularly placed on the neck with one horn broken off and one horn slightly damaged, pointed downwards on the end. The other head (fig. 6.4, no. 9) perhaps represents a ram rather than a bull in view of the rounded snout with the beginnings of horns and the graceful neck with only slight signs of loose, fleshy folds.

Three small finds may represent horns. Each consisted of a curved clay cone with fracture marks at the thicker end. Two of them have broken off at the thinner end as well.

Level 3

The level 3 building I yielded only one animal figurine (fig. 6.4, no. 7) in the fill of room 11, amidst a number of human figurines and other unbaked clay objects. The torso was only 3.8 cm long and probably had a lifted snout, now broken off. Next to the damaged snout two vertical ridges were visible, possibly representations of ears. No indications of horns were found. The legs and tail are missing.

Catalogue

Fig. 6.1

1. F92-1. Level 6. Clay human figurine. L: 4.3 cm, W: 2.5 cm, Th: 2.5 cm. Worn breasts, broken in half, charred twig remains in hole for head. Found in open area southeast of building V.
2. F91-3. Level 6. Clay torso fragment of human figurine. L: 2.6 cm, W: 2.7 cm, Th: 1.7 cm. Broken off at neck and waist, damaged along right side. Found in building II, room 6.
3. F92-14. Level 6. Clay torso fragment of human figurine. L: 5.7 cm, W: 3.6 cm, Th: 2.0 cm. Broken off at waist and neck, badly preserved, both breasts damaged. Found in building V, room 7.
4. F92-6. Level 6. Clay torso fragment of human figurine. L: 3.4 cm, W: 1.9 cm, Th: 3.1 cm. Broken in half lengthwise and at waist, two horizontal incisions at waist, large pierced hole (1.0 cm in diameter) through torso. Found in building V, room 7.
5. F91-11. Level 6. Clay human figurine. L: 4.2 cm, W: 2.1 cm, Th: 1.9 cm. Damaged head and left breast, right arm supporting breasts, spiral incisions along anterior side, vertical incisions along base, between shoulders and along lower back. Found in tholos VI, room 1.

6. F93-8. Level 6. Clay human figurine. L: 5.3 cm, W: 3.8 cm, Th: 3.3 cm. Complete except for the head and slight damage at base, three horizontal incisions in the middle. Found in tholos IX.
7. F91-9. Level 6. Clay human figurine. L: 4.5 cm, W: 3.1 cm, Th: 2.1 cm. One damaged breast, hole for head. Found in building II, room 6.
8. F92-4. Level 6. Clay base fragment of human figurine. L: 3.0 cm, W: 2.6 cm, Th: 2.2 cm. Broken at waist, one vertical incision in base representing vulva. Found in building V, room 6.
9. F91-17. Level 6. Clay base fragment of human figurine. L: 3.9 cm, W: 3.8 cm, Th: 2.8 cm. Broken at waist. Found in building II, room 6.
10. F92-15. Level 6. Clay human figurine. L: 4.0 cm, W: 2.3 cm, Th: 2.1 cm. One damaged breast, head and part of neck broken off. Found in building V, room 3.

Fig. 6.2

1. F92-5. Level 6. Clay base fragment of human figurine. L: 3.1 cm, W: 2.5 cm, Th: 2.2 cm. Broken at waist, damaged surface on base. Found in building V, room 7.
2. F92-16. Level 6. Clay human figurine. L: 2.8 cm, W: 1.3 cm, Th: 1.3 cm. Damaged head and base. Found in building V, room 2.
3. F91-12. Level 6. Clay base fragment with part of waist of human figurine. L: 2.7 cm, W: 2.0 cm, Th: 1.7 cm. Broken at waist. Found in building II, room 6.
4. O91-102. Level 6. Clay base fragment of human figurine. L: 2.4 cm, W: 1.6 cm, H: 1.4 cm. Broken at waist. Found in building II, room 6.
5. F91-6. Level 6. Clay base fragment of human figurine. L: 2.8 cm, W: 3.3 cm, Th: 2.3 cm. Broken at waist. Found in building II, room 6.
6. F92-3. Level 6. Clay base of small human figurine. L: 2.0 cm, W: 1.7 cm, Th: 1.3 cm. Broken at neck, one vertical incision in front at base line. Found in building V, room 6.
7. F92-10. Level 6. Clay base fragment of large human figurine. L: 6.0 cm, W: 6.3 cm, Th: 4.0 cm. Incision on base, hole for head. Found in building V, room 7.
8. F93-17. Level 6. Clay base of human figurine. L: 3.0 cm, W: 2.3 cm, Th: 1.8 cm. Broken neck, horizontal incisions along base and middle. Found below level 3 stone wall and belonging to the level 6 building II.
9. F91-1. Level 6. Clay base of human figurine. L: 2.6 cm, W: 1.5 cm, Th: 1.4 cm. Rectangular impressions over entire body, incised bands on (broken) neck. Found in building II, room 6.
10. F91-2. Level 6. Clay base of human figurine. L: 2.8 cm, W: 2.4 cm, Th: 1.7 cm. Broken neck, incisions along base, horizontal bands over anterior side of body, rectangular impressions on the back. Found in building II, room 6.
11. F91-5. Level 6. Clay base of human figurine. L: 2.6 cm, W: 2.6 cm, Th: 2.4 cm. Broken at neck, two short bands over body, one vertical incision on base. Found in building II, room 6.
12. F91-8. Level 6. Clay base of human figurine. L: 1.8 cm, W: 2.1 cm, Th: 1.6 cm. Broken at neck, nail impressions on the back, vertical incisions along base line. Found in building II, room 6.

Fig. 6.3

1. F93-11. Level 6. Complete human head made of soft limestone. L: 3.0 cm, diameter; 2.2 cm. Found in building XII, room 1.

2. F92-2. Level 6. Clay human head. L: 3.0 cm, W: 1.4 cm, Th: 2.0 cm. Oblong head (broken off) with nail-impressed eyes. Found in upper fill of building V (northwest part).
3. O93-52. Level 6. Probably clay head of human figurine. L: 5.2 cm, diameter: 2.0 cm. Elongated oval head, fractured at base, faint impressions of eyebrows. Found in tholos IX.
4. F92-11. Level 6. Clay base of figurine, probably human. L: 2.1 cm, diameter: 2.3 cm. Spherical base with cylindrical protrusion, damaged. Found in building V, room 7.
5. F93-20. Level 6. Clay base of figurine, probably human. L: 1.7 cm, diameter 1.7 cm. Damaged conical base. Found in open area.
6. F91-15. Level 6. Fragment of clay figurine, probably human. L: 4.1 cm, diameter: 3.0 cm. Damaged top and base, nail impressions. Found in building II, room 6.
7. F92-9. Level 6. Fragment of clay figurine, probably human. L: 2.8 cm, W: 2.0 cm, Th: 1.9 cm. Elongated four-sided, pyramidical base with two incised bands. Damaged along one side from top to base. Found in building IV, room 12.
8. F93-10. Level 6. Clay base of clay figurine, probably human. L: 1.6 cm, diameter: 2.2 cm. Conical base with semi-circular hole in fractured top. Found in open area.
9. F93-12. Level 3. Clay human figurine, headless. L: 4.1 cm, W: 1.5 cm, Th: 1.4 cm. Cylindrical torso with slight protrusion in middle of chest, hole in the top. Found in oven CC.
10. SAB88 O-89d. Level 3. Clay human figurine. L: 4.5 cm, W: 3.1 cm, Th: 1.9 cm. Flattened, cylindrical torso, damaged. Found in building I, room 11.
11. SAB88 O-89e. Level 3. Clay base of human figurine. L: 4.0 cm, W: 2.8 cm, Th: 1.4 cm. Found in building I, room 11.
12. SAB88 O-89b. Level 3. Clay human figurine. L: 6.9 cm, W: 3.2 cm, Th: 1.8 cm. Cylindrical torso with pinched shoulders, damaged neck. Found in building I, room 11.
13. SAB88 O-89a. Level 3. Complete clay human figurine. L: 10.7 cm, diameter: 3.3 cm. Cylindrical torso with slightly protruding neck/head and shoulders. Found in building I, room 11.
14. SAB88 O-89c. Level 3. Clay human figurine. L: 3.3 cm, W: 4.3 cm, Th: 2.2 cm. Damaged torso and neck. Found in building I, room 11.
15. F93-2. Level 3. Clay base of human figurine. L: 2.9 cm, base diameter: 2.4 cm. Upper body broken off, base widens. Found in ashpit DC.

Fig. 6.4

1. F91-14. Level 6. Clay animal figurine, bull. L: 9.0 cm, W: 3.5 cm, H: 6.5 cm. Damaged head, legs and tail. Found in building II, room 6.
2. F91-13. Level 6. Clay animal figurine, boar or pig. L: 6.8 cm, W: 3.5 cm, H: 5.1 cm. Damaged right legs, head and tail. Found in building II, room 6.
3. F93-7. Level 6. Clay animal figurine, bull. L: 5.0 cm, H: 4.5 cm, W: 2.0 cm. Damaged head and hind legs. Found in tholos IX.
4. F91-10. Level 6. Clay animal figurine, bull or boar. L: 3.9 cm, W: 1.9 cm, H: 2.5 cm. Damaged head and leg. Found in building II, room 6.
5. F92-8. Level 6. Torso of quadruped. L: 3.5 cm, W: 1.6 cm, H: 2.4 cm. Damaged head, tail and legs. Found in building V, room 5.

6. F93-19. Level 6. Clay animal figurine, bull. L: 7.3 cm, H: 6.0 cm, W: 2.5 cm. Damaged head and right foreleg. Found in open area north of building II.
7. SAB88 O-86. Level 3. Clay animal figurine. L: 3.8 cm, W: 1.4 cm, H: 3.2 cm. Damaged head, tail and legs. Found in building I, room 11.
8. F91-18. Level 6. Clay animal head, bull. L: 3.8 cm, W: 3.2 cm, H: 3.1 cm. Broken off at the neck with one damaged horn. Found in building II, room 6.
9. F93-3. Level 6. Clay animal head, probably ram. L: 4.0 cm, H: 2.5 cm, W: 1.9 cm. Found in tholos IX.
10. F93-18. Level 6. Clay animal figurine, bull. L: 4.8 cm, H: 4.5 cm, W: 2.2 cm. Damaged snout and horns. Found in open area north of building II.

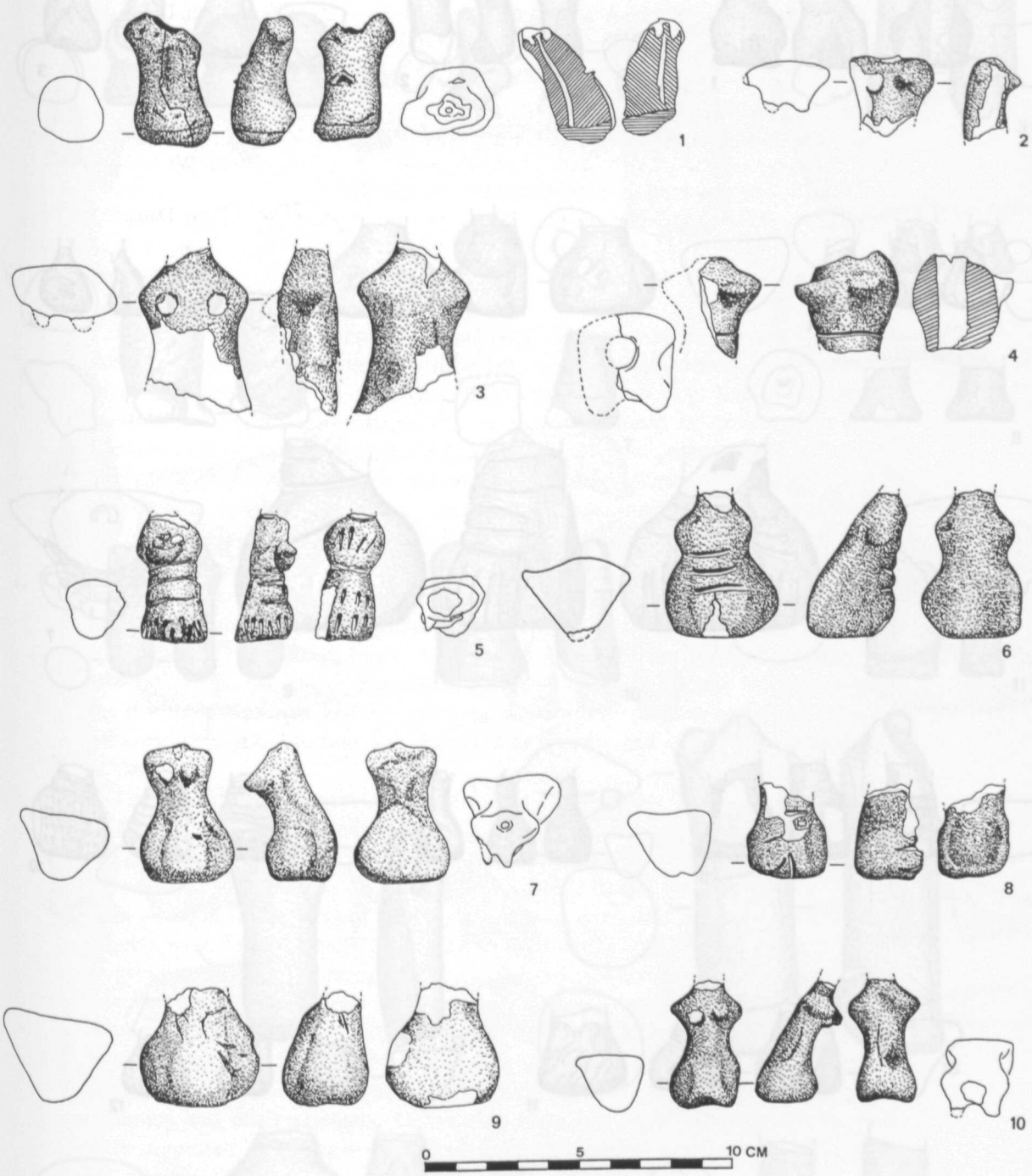


Figure 6.1. Human figurines.

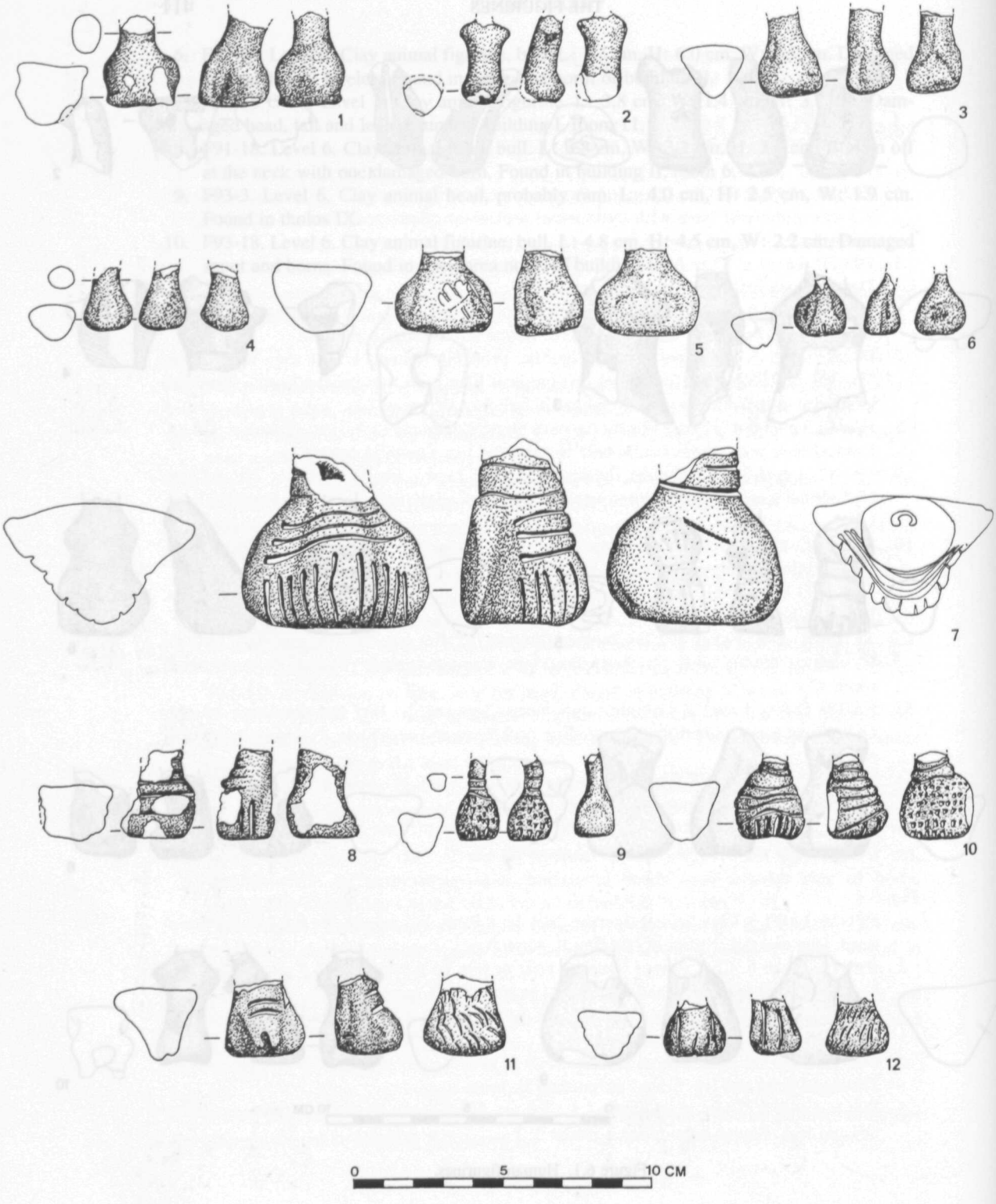


Figure 6.2. Human figurines.

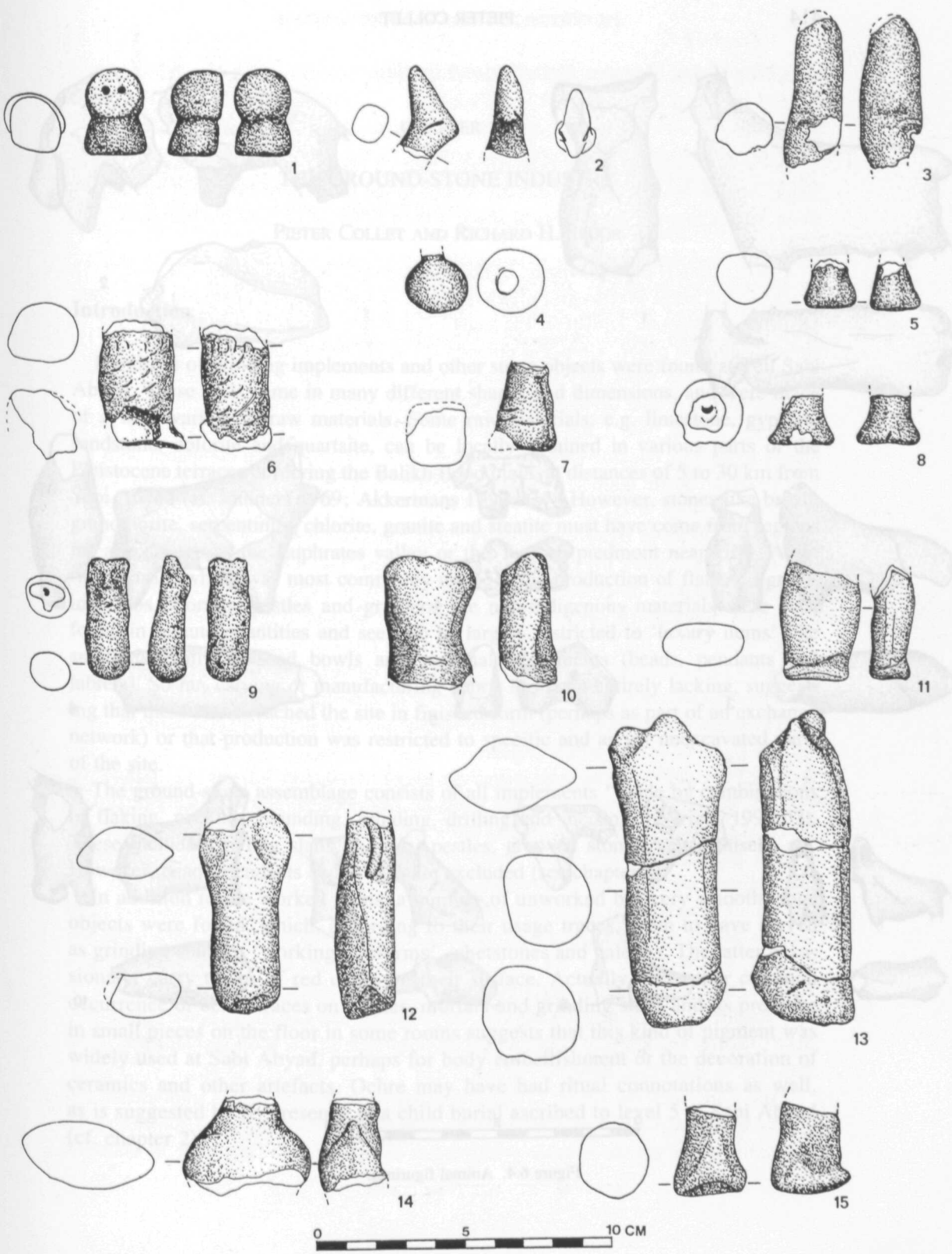


Figure 6.3. Human figurines.

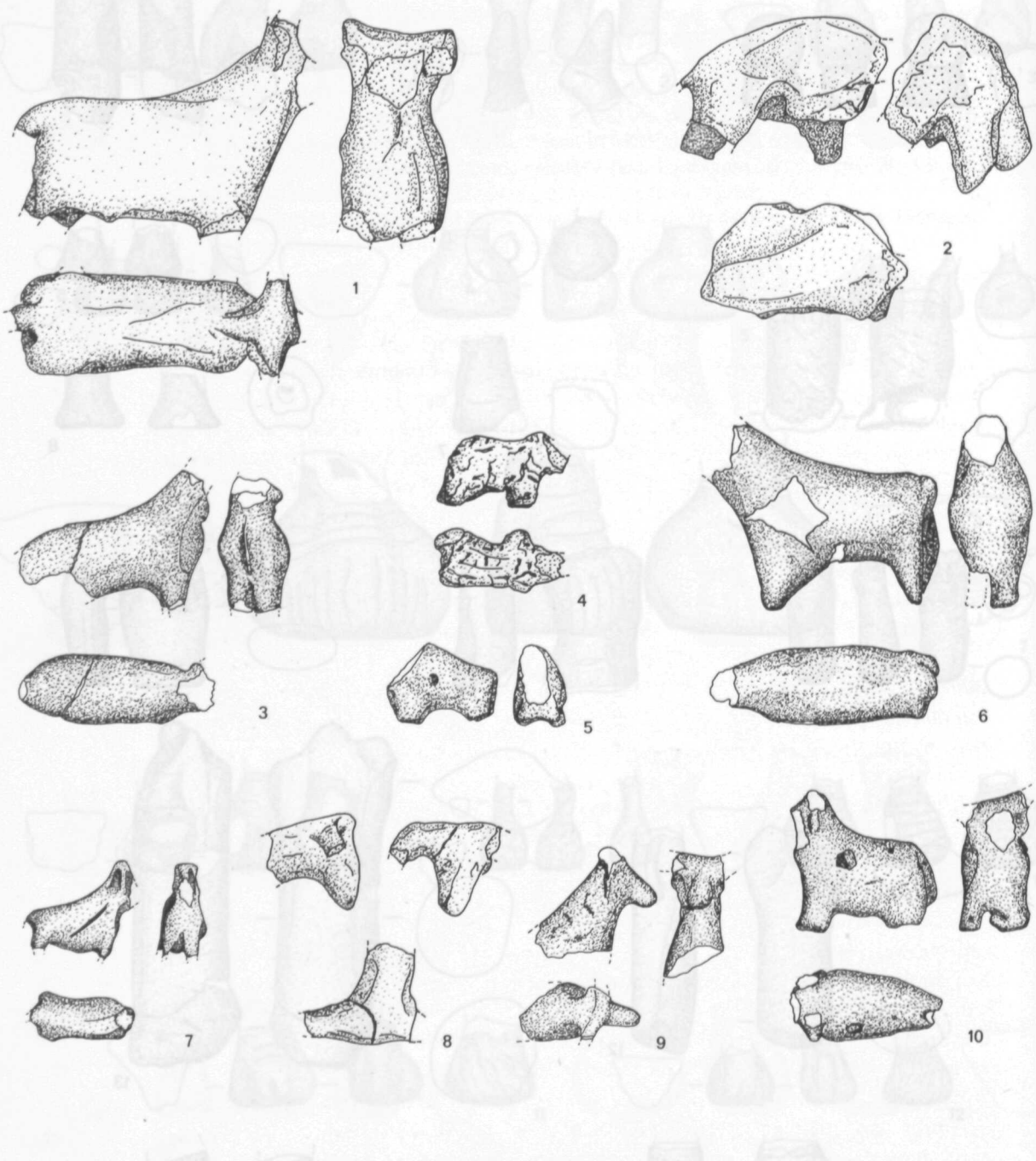


Figure 6.4. Animal figurines.

CHAPTER 7

THE GROUND-STONE INDUSTRY

PIETER COLLET AND RICHARD H. SPOOR

Introduction

Hundreds of grinding implements and other stone objects were found at Tell Sabi Abyad. These tools came in many different shapes and dimensions, and were made of a wide variety of raw materials. Some raw materials, e.g. limestone, gypsum, sandstone, dolorite and quartsite, can be locally obtained in various parts of the Pleistocene terraces bordering the Balikh flood plain, at distances of 5 to 30 km from Sabi Abyad (cf. Mulders 1969; Akkermans 1993:274). However, stones like basalt, granodiorite, serpentinite, chlorite, granite and steatite must have come from regions far away, such as the Euphrates valley or the Turkish piedmont near Urfa. Apart from basalt, which was most commonly used for the production of flattened grinding slabs, mortars, pestles and grinders, the non-indigenous materials were each found in minute quantities and seem to be largely restricted to 'luxury items' like small, carefully finished bowls and personal adornments (beads, pendants and labrets). So far, carving or manufacturing debris has been entirely lacking, suggesting that these items reached the site in finished form (perhaps as part of an exchange network) or that production was restricted to specific and as yet unexcavated parts of the site.

The ground-stone assemblage consists of all implements "made by combinations of flaking, pecking, pounding, grinding, drilling and incising" (Wright 1992:53). These include grinding slabs, mortars, pestles, grooved stones, celts, chisels, etc. However, beads, pendants and labrets are excluded (see chapter 8).

In addition to the worked items, a number of unworked but very smooth stone objects were found, which, according to their usage traces, seem to have served as grinding slabs or 'working platforms', whetstones and palettes. The latter occasionally carry traces of red ochre on their surface. Actually, the rather common occurrence of ochre traces on pestles, mortars and grinding slabs and its presence in small pieces on the floor in some rooms suggests that this kind of pigment was widely used at Sabi Abyad, perhaps for body embellishment or the decoration of ceramics and other artefacts. Ochre may have had ritual connotations as well, as is suggested by its presence in a child burial ascribed to level 5 at Sabi Abyad (cf. chapter 2).

Grinding Slabs, Mortars, Grinders and Pestles

Typology

The various artefacts have been divided into 13 classes or types, mainly based on shape. Sometimes the shape is directly related to the function of the object but usually items with a more or less identical shape served different or multiple purposes.

Type 1 consists of rather large, cylindrical grinders or pestles (fig. 7.1, nos. 1-3). Most objects seem to represent grinders and have traces of use along the long sides, suggesting abrasion. However, the ends occasionally show traces of pounding or grinding as well (often, a piece is chipped off at the base), suggesting additional use as pestles. These tools vary in diameter between 5.0 and 8.2 cm (mean diameter: 6.8 cm) and in length between 11.0 and 24.5 cm (mean length: 15.1 cm).

Type 2 is like type 1 but with a conical shape (figs. 7.1, nos. 4-8). This group seems to include considerably more pestles than grinders, when compared with the former type. Their diameter ranges from 4.9 to 8.2 cm, while the length varies between 12.4 and 40.0 cm.

Type 3 consists of tools broadly resembling either our type 1 or type 2 implements, but with a much more irregular shape (fig. 7.2, nos. 1-4). Often, the basic shape has been considerably modified due to frequent re-use. Type 3 also includes natural stones not worked (or shaped) by man but used in their original state as abrasion tools.

Type 4 consists of small, spherical (type 4a) or cubical (type 4b) tools, which were used as pounders, hammerstones, grinders and/or pestles (fig. 7.2, nos. 5-11). The type 4a tools were mainly made of flint nodules, whereas their 4b counterparts were usually made of other kinds of stone.

Type 5 comprises the mortars, usually made of basalt (fig. 7.2, nos. 12-15, and fig. 7.3, no. 1). Mortars appeared in two varieties, one portable and consisting of simple bowls with thick and straight, flaring sides and flat bases, the other more irregularly shaped and sunk into the floor. These grinding tools often show very smoothened and polished surfaces due to intensive use.

Type 6 includes the flattened grinding slabs (type 6a; fig. 7.3, nos. 2-3, and fig. 7.4, no. 2) and the flattened grinders used in association with the slabs (type 6b; fig. 7.3, nos. 4-5, and fig. 7.4, no. 1). The slabs have an oval or rounded shape, a convex base and a flat or slightly concave working surface. The oval, rounded or loaf-shaped grinders closely resemble the grinding slabs in shape but are generally much smaller (actually, it is not excluded that some of the tools termed type 6b in fact represent type 6a slabs).

Type 7 includes the small, cylindrical grinders or pestles with a smoothened top and/or base (only the ends were used for grinding or pounding; fig. 7.4, nos. 3-4). Basically, these are the smaller counterparts of our type 1. They vary in diameter

between 4.5 and 6.0 cm (mean diameter: 5.2 cm) and in length between 6.0 and 10.3 cm (mean length: 7.8 cm).

Type 8 consists of the small, conical pestles (fig. 7.4, nos. 5-10). These are the smaller counterparts of our type 2, varying in diameter between 4.3 and 6.4 cm (mean diameter: 5.5 cm) and between 6.0 and 13.0 cm in length (mean length: 8.6 cm).

Type 9 comprises all unidentifiable pieces.

Type 10 consists of more or less rectangular grinders (fig. 7.5, nos. 1-4).

Type 11 consists of flat, more or less rectangular or slightly rounded objects made of extremely light and porous basalt (fig. 7.5, no. 6). Occasionally, one side is square, whereas the opposite side is rounded. Traces of use were hard to recognise on the irregular, rough surface but, considering the porous nature of the stone, it is likely that these tools were used for scraping, rasping or grinding of rather soft materials. Similar pieces were found e.g. at Çayönü in southeastern Turkey, where these objects were not regarded as abrasion tools due to the lack of sheen or wear (cf. Davis 1982:109-110).

Type 12 consists of large spheres, smooth on one or more sides (fig. 7.5, no. 5).

Type 13 includes the large, bulbous or pear-shaped tools with often roughly hewn or, perhaps more likely, damaged (due to use) working ends (fig. 7.5, nos. 7-9). Most likely, these objects were used as pestles.

Chronological distribution[1]

Levels 11-7. The lower levels 11-7 yielded rather few ground-stone tools. Some fragments of type 6a grinding slabs made of vesicular or, occasionally, compact basalt were found, in association with some type 6b hand grinders. Interestingly, the convex sides of some of these grinders have considerably more sheen than their flat counterparts which are supposed to be the working surfaces.

Three basalt mortar fragments appeared: one in level 8, two in level 7. These vessels are between 15 and 20 cm in diameter, and about 7 cm high. Their interiors are smoothened by use and carry traces of use-polish.

Pestles or hand grinders are rare, and do not fit within a well-defined type. In level 7 a small type 4b flint nodule was found, measuring 4.7×5.2×5.2 cm and covered with cortex. This object seems to be naturally shaped rather than man-made. The only traces of use are the battering traces damaging the cortex. This tool must have been used as a pounder or hammer.

Finally, two type 11 'grinders' were found, both made of very light, porous basalt.

Level 6. A rather large number of grinding-slab fragments (type 6a; fig. 7.3, nos. 2-3) were found in and around the buildings of the level 6 Burnt Village. Most slabs were made of vesicular or, to a much lesser extent, compact basalt (n = 50).

[1] All objects lacking an unequivocal stratigraphic assignment have been excluded from the discussion below.

Generally, these grinding slabs have a long-drawn, oval shape and a flat working surface which is often considerably polished due to use. In some cases, however, the working surface is highly concave. A pair of grinding tools was found together in building II, oven area III (fig. 7.4, no. 2).

Interestingly, the majority of the grinding slabs found in the level 6 buildings are fragmented, despite the apparent in-situ context of most finds (cf. chapter 2). One may wonder whether the Sabi Abyad inhabitants were perhaps able to remove part of the original inventory before destruction, on the whole leaving only the least valuable items behind (actually, this may hold for some other categories of material, particularly luxurious items such as personal adornments, seals and finely painted pottery, as well; we have the impression that these objects are present in much smaller quantities than one would expect in the case of a fully preserved domestic context).

In addition to the basalt grinding slabs, some slabs were made of sandstone (n= 17) or, occasionally very porous, limestone (n= 5). The sandstone slabs come in various shapes: some are more or less rectangular or trapezial, others are circular or oval. One complete sandstone slab is triangular in shape, measuring 26.0×20.0×2.7 cm. Both working surfaces are partly hollowed out, probably due to use, and show traces of red ochre. Apart from abrasion, indications of battering were found as well.

So far, 22 objects have been classified as type 6b grinders (e.g. fig. 7.3, no. 5, and fig. 7.4, no. 1). These tools were mainly made of compact or, rarely, vesicular basalt. In addition, one specimen was made of gypsum, and another one was made of rather porous limestone. Most grinders are oval or loaf-shaped with a flat working surface, often partly polished, and a convex base, which, occasionally, also carries traces of polishing due to use. One specimen has a plane but facetted working surface, due to grinding in two different angles. The slightly convex base carries a third, flattened abrasion area with use polish. The few complete, loaf-shaped grinders measure 13.5×11.5×4.9 cm, 16.5×13.5×3.5 cm and 19.0×15.0×3.0 cm, respectively. A rounded specimen with a planoconvex, transverse section is 17.2 cm in diameter and 2.6 cm thick (fig. 7.4, no. 1). A circular handtool (fig. 7.3, no. 5) with flattened sides (both with abrasion traces and sheen) measures 18-20 cm in diameter and 3.8 cm in thickness.

Mortars (type 5; e.g. fig. 7.2, nos. 12-14, and fig. 7.3, no. 1) were found in restricted numbers in the Burnt Village. Most were made of basalt (n= 8) but limestone (n= 4), gypsum (n= 1) and sandstone (n= 1) were used as well. The basalt mortars were mainly bowls with thick and flaring, straight sides and flat bases. They varied in diameter between ca. 11 and 19 cm, and were up to 9.3 cm high. In addition, fragments of a rectangular mortar and some mortars with rounded walls or pronounced, outward-turned rims were found. One circular base fragment indicates the presence of four large, rounded protrusions which must have served as legs. One very low mortar (its height is only 4.1 cm) has an extremely well-smoothened interior and

(exterior) base; apparently, this tool was used as a grinding instrument as well, with the flat base as the abrasion area (fig. 7.2, no. 14). One mortar carries traces of ochre on the interior (fig. 7.3, no. 1).

A large and complete, limestone mortar was partly sunk into the floor of the level 6 building V, room 5. This 'boulder mortar' (Wright 1992:66) has a roughly triangular shape, with in the centre a rounded abrasion surface ground out of the stone. The object measures 33.6×32.0×13.2 cm; the central concavity is 12.7 cm in diameter and 6.2 cm deep.

Finally, attention is drawn to the small group of so-called 'disc mortars' made of compact gypsum or limestone (fig. 7.2, nos. 12-13). These tools consist of flattened, circular or oval discs with a slightly convex base and a concave working surface carrying a shallow concavity. These discs vary between 11.5 and 14.6 cm in diameter and between 2.3 and 6.2 cm in height.

Cylindrical and conical pestles or grinders (types 1-2, 7-8) were found in considerable quantities. The cylindrical type 1 tools with flattened or slightly convex ends were mainly made of compact basalt (n= 18), with an incidental use of other kinds of stone such as gabbro (n= 1), limestone (n= 1) and sandstone (n= 1). These tools seem to have been used mainly as grinders; generally, the ends have no traces of use, whereas the lateral sides are smoothened and often polished due to abrasion (fig. 7.1, no. 2). Some specimens carry battering marks near the ends. Only four implements were additionally used as pestles (e.g. fig. 7.1, no. 1). One grinder was damaged at one end and then used as a pestle; the fractured areas show polishing. One implement showed no traces of use at all; perhaps it remained unused (fig. 7.1, no. 3). The level 6 type 1 tools vary in diameter between 5.0 and 11.0 cm (mean diameter: 6.9 cm), while their length varies between 12.0 and 24.5 cm (mean length: 15.4 cm).

Our type 7 tools (n= 14) are the smaller counterparts of the type 1 implements. These objects vary between 4.5 and 6.0 cm in diameter (mean diameter: 5.2) and between 6.0 and 10.3 cm in length (mean length: 7.8). Virtually all were made of compact basalt, except one specimen made of greyish limestone (fig. 7.4, no. 3). These tools mainly served both as grinders and pestles. Traces of abrasion were found along one of the long sides (resulting in the flattening of that side) and on the ends. Only a few specimens were used exclusively either as a grinder or a pestle.

The conical type 2 tools, made of compact basalt (n= 26) and, to a much lesser extent, vesicular basalt (n= 4) and granodorite (n= 1), closely resemble the former group in use. These objects were mainly used as grinders, having usually one strip of worn surface lengthwise along the lateral side (fig. 7.1, no. 7), or gave evidence of a combined use as grinder and pestle (fig. 7.1, no. 4). Battering marks on one or both ends suggest that some of these combined tools served as pounders as well (e.g. fig. 7.1, no. 6). One implement carries traces of red ochre on its tip. Only a few type 2 tools were used exclusively as pestles (fig. 7.1, no. 8). Some pestles show traces of

battering or grinding on both ends, whereas in other cases these traces of use are restricted to either the broad base or the narrower top. The conical type 2 tools vary in diameter between 4.9 and 8.2 cm, and range in length from 12.4 up to 40.0 cm (fig. 7.1, no. 5).

The type 8 grinders and pestles (n= 15) are the smaller counterparts of the level 2 implements. They vary between 4.1 and 6.4 cm in diameter (mean diameter: 5.4 cm) and range from 6.0 to 12.3 cm in length (mean length: 8.5 cm). All were made of compact or, rarely, vesicular basalt (fig. 7.4, nos. 5-7, 9-10).

In addition to the above, a series of irregularly shaped grinders and pestles were found (representing our type 3 tools; e.g. fig. 7.2, nos. 1, 4). These nine implements were made of a wide variety of stones, including basalt, limestone, granodorite, gypsum, sandstone, quartsite and dolorite. Some simply consists of natural, unworked cobbles, only modified due to their use as grinders and/or pestles.

The small type 4a-b spheres and cubes were commonly found in level 6. These objects (fig. 7.2, nos. 5-11) were mainly made of flint nodules (n= 12) and, rarely, of compact basalt (n= 3), limestone (n= 1), granite (n= 1) or an iron-hydroxite concretion (n= 1). In many cases the cortex is still present. Six flint spheres, varying in diameter between 4.4 and 5.8 cm, were found together in building IV, room 2. They show no traces of use other than pecking marks over the entire surface. Some nodules have one or more flattened sides, or are wholly cubical (e.g. fig. 7.2, no. 9-11), and carry traces of grinding and battering on all sides; these stones may have been used both as grinders and hammers. The spherical implements vary between 3.0 and 7.4 cm in diameter, while the cubes measure between 3.6×3.6×3.6 cm and 6.2×6.0×5.6 cm.

Larger spheres or ovoids, varying in diameter between about 9 and 12 cm (e.g. fig. 7.5, no. 5), were found in the level 6 settlement as well, albeit in very small quantities (n= 3). These type 12 tools were made of both worked basalt and unworked limestone or marble. One or more sides are flattened owing to extensive abrasion or show evidence of battering.

Rectangular grinders, varying in size between 5.0×3.3×3.3 cm and 15.5×9.5×7.0 cm, have been found in a small amount only in level 6 so far. These objects (representing our type 10; fig. 7.5, nos. 1-4) were made of compact basalt (n= 6), limestone, sandstone and quartsite (each found only once). Some were used on one side only, others show extensive traces of wear on both flattened sides, whereas a third group carries traces of abrasion on adjacent sides: one large and one narrow surface were used for grinding. Occasionally, even the ends seem to have been used for grinding purposes.

Our type 11 tools were found in small quantities only (n= 6). These more or less rectangular or oval implements were made of very light, porous basalt and measure between 8.0×4.5×2.5 cm and 9.3×7.8×2.5 cm (e.g. fig. 7.5, no. 6). The more or less flat surfaces do not show visible traces of use.

Finally, four bulbous or collared tools were found, all made of compact basalt (type 13; fig. 7.5, nos. 7-9). These objects, ca. 8 cm in diameter and varying in

length between 15.2 and 20.5 cm, have an oblong or conical body and a more or less conical grip. The long sides carry traces of abrasion and were used for grinding purposes, whereas the base served as a pestle.

Levels 5-4. The levels 5 and 4 yielded only a few ground-stone tools when compared with the lower level 6. Moreover, most items were fragmentarily preserved.

The sparse grinding slabs (type 6a) found in level 5 were made of basalt, limestone and sandstone, with each raw material found only once or twice. One fragment actually may have served as a palette for pigments (the yellowish sandstone slab has a red-coloured working surface). The type 6b, basalt grinders, used in association with the slabs, appeared three times in level 5 (fig. 7.3, no. 4). Only one basalt mortar (type 5) was found, with a rim diameter of 11.5 cm and a height of 6.2 cm. The interior was extremely smoothened, in contrast with the rather roughly finished exterior. Two grinders appeared, one ascribed to our type 2 and made of basalt, the other assigned to type 3 and made of black-blue dolorite. The latter specimen has an elongated, oval shape and shows numerous tiny striations and an intensive polishing along one of the long sides. Finally, a fragment of a small, rectangular grinder or scraper made of very porous basalt (type 11) was found.

The level 4 tools mainly occurred in and around the large tholos and the associated oven area. One fragment of a basalt type 6a grinding slab was found, together with two pieces of flattened, type 6b grinders. One was made of basalt, the other of black-grey gabbro. An unworked sandstone or quartsite cobble with a shallow concavity seems to have been used as a mortar. The interior shows a reddish discolouring, possibly due to the grinding of pigments. The conical type 2 grinders up to 17.7 cm long and the smaller type 7-8 objects appeared in small numbers. These basalt objects were mainly used as grinders; in addition, some were used as pestles, as well. One large specimen shows signs of use as a pounder or hammer; large flakes had been chipped off the base on opposing faces. A singular basalt spherical grinder (type 4a) ca. 4 cm in diameter was found inside the tholos.

The Early Halaf levels 3-1. The type 6a grinding-slab fragments, made of compact or vesicular basalt (n= 12), were the most common kind of ground-stone tool in level 3. Originally, these tools seem to have had a rounded or oval shape and a flattened or slightly convex working surface with traces of smoothening and polishing. Three type 6b grinder fragments of vesicular basalt were found, each with the characteristic convex abrasion surface. Only one cylindrical type 1 grinder appeared, as well as one small, type 7 pestle. The latter object is 11 cm long, 5 cm in diameter, and was made of compact basalt with both ends smoothened by use (fig. 7.4, no. 4). Three type 4a-b spheres and cubes were found, two made of flint and partly covered with cortex, the third made of basalt. These objects show signs of pecking and abrasion, and are between 3.5 and 6.0 cm in diameter. The cubical specimen may originally have had a spherical shape but regular use ground the shape down to a cube. Finally, one type 11 tool appeared, made of very porous basalt without any traces of abrasion, grinding or pecking.

The topmost Early Halaf levels 2-1 yielded only a few ground-stone implements (see also Akkermans 1989c:285-86). Only one small, conical pestle made of granodorite (fig. 7.4, no. 8) has been ascribed to level 2. The subsequent level 1 contained seven tools or fragments thereof, including one basalt grinding-slab fragment (type 6a), two rounded, basalt type 6b grinders and some type 3 tools used both as grinders and pestles (e.g. fig. 7.2, nos. 2-3). These objects were made of basalt, gabbro and dolorite, respectively. The latter two stones had not been reduced before but were modified by abrasion and battering during use. Finally, a single mortar of compact basalt (fig. 7.2, no. 15) was found in level 1. This bowl is 11.8 cm in diameter and 5.6 cm high. Both the exterior and interior are extremely smoothened and polished.

Stone Vessels

So far, 80 stone vessels have been found (fig. 7.6, nos. 1-13, and fig. 7.7, nos. 1-8). All except one (fig. 7.6, no. 3) were in a fragmented state. Three-quarters of these (n= 63) were made of stones found in the close vicinity of Tell Sabi Abyad, such as gypsum (n= 26), limestone (n= 27), gabbro (n= 4), alabaster (n= 4) and dolorite (n= 2). Only eight vessels were made of non-indigenous stones, like chlorite (n= 4), basalt (n= 2), serpentinite (n= 1) and steatite (n= 1). In nine cases the exact kind of stone could not be recognised.

The lowest levels 11 to 7 yielded each only one or two stone-bowl fragments, made of limestone and gypsum (e.g. fig. 7.7, no. 4). The small vessels each have a slightly curving wall with a plain or, in one case, slightly flattened rim. Wall thickness varies between 0.9 and 2.2 cm. The vessel height and the rim diameter could be established in one case: 3.0 cm and 5.9 cm, respectively.

The majority of the stone bowls was found in Level 6 (n= 40). These vessels were mainly made of gypsum (n= 13) and limestone (n= 11) but gabbro (n= 4), alabaster (n= 2) and dolorite (n= 1) were used, as well. A few vessels were made of the non-local chlorite (n= 3), serpentinite (n= 1) and steatite (n= 1).

Three main groups or types of bowls can be distinguished. The first type (n= 13) consists of circular or oval vessels with rounded walls and slightly everted, plain or, incidentally, flattened or beaded rims (e.g. fig. 7.6, no. 4). The bases are concave or flat. The rim diameter generally varies between 5.0 and 15.0 cm, with only one specimen having a larger diameter, i.e. 21 cm. The vessels are between 2.2 and about 6.9 cm high. The wall thickness ranges from 0.3 to 1.1 cm, whereas the base thickness varies between 0.7 and 0.9 cm. Eight bowls are polished both on the interior and exterior, whereas three others are polished either on the exterior or the interior. In the case of three bowls, the natural, horizontal banding of the stone was used as a decoration (e.g. fig. 7.6, no. 4). Three other bowls carried an incised decoration, showing simple geometric patterns (cf. fig. 7.6, nos. 1, 3) and a horned animal (fig. 7.6, no. 2).

The latter vessel (made of the non-local chlorite) has a biconically drilled repair hole just above the base and carries traces of bitumen. Similar repair holes were recognised in two other instances (fig. 7.6, nos. 9, 11).

Interestingly, one of the bowls (fig. 7.6, no. 3) was oval in shape and fitted to a clay sealing with stamp-seal impressions; both were found in the same building (II) but in different rooms (cf. chapter 5).

The second type (n= 9) comprises vessels with rounded walls, slightly curving inwards at the rim (fig. 7.6, no. 5). Most vessels are circular but two specimens (fig. 7.6, no. 7) seem to have had a rectangular or square shape. The bases are rounded or flat. The rims are plain or, rarely, flattened. One small and low bowl has a flattened, worked rim which originally may have carried a lid (fig. 7.7, no. 1). Another vessel (fig. 7.6, no. 6) carries a small, horizontally pierced lug. One bowl has an overall polish, while three vessels are only polished on the outside. The wall thickness of these type 2 vessels ranges from 0.6 to 0.9 cm (in one case 2.4 cm). The rim diameter varies between 4.0 and 14.0 cm.

The third group consists of bowls with a straight wall (n= 4). One vessel has a plain, rounded rim, the others have simple flattened rims. Two bowls are polished. The rim diameter varies between 6.5 and 15.0 cm. Interestingly, a sharply-carinated vessel fragment (fig. 7.7, no. 7) seems to have stood on a pedestal base originally.

In addition, some stone-bowl fragments (small body and rim pieces, flat bases and one vessel leg) were found which could not be included with any certainty in one of the above groups. A large but shallow bowl (fig. 7.6, no. 13), 26 cm in diameter and made of gypsum, has a rounded wall which becomes slightly thicker towards the rim.

The upper Transitional levels 5-4 have yielded six and seven stone-vessel fragments, respectively. In shape these vessels are largely comparable with those found earlier. Most common are bowls with plain rims varying in thickness between 0.5 and 0.8 cm, and ranging in diameter from 8.0 to 13.0 cm. One vessel (fig. 7.7, no. 12), ca. 20 cm in diameter, has a rounded rim and an overall polish. Bases are rounded or flat, and occasionally very large (up to 23 cm in diameter and 3.2 cm thick). One base was repaired in antiquity: it shows traces of bitumen along a break. Almost all vessels were made of local materials; only two specimens (one from level 5, the other from level 4) were made of the non-indigenous chlorite and fine-grained basalt. The latter vessel (fig. 7.6, no. 10) is wholly reconstructable and shows a straight wall, slightly turning outwards at the rounded rim. The exterior carries a groove below the rim. The base is flat. The exterior and interior are polished. The vessel is 8.0 cm high, and is 23.0 cm in diameter. The wall thickness varies between 1.3 and 3.0 cm.

The topmost Early Halaf levels 3-1 yielded only a few stone-bowl fragments (eight pieces in level 3, one fragment in level 1). Generally, the vessels have plain, rounded or slightly everted rims up to 24 cm in diameter. Occasionally, a narrow groove is found below the rim (fig. 7.7, no. 5). Bases are flat or rounded. The small,

carinated bowl, made of gypsum or alabaster and found in the level 3B main building I, has a unique shape not represented before (fig. 7.7, no. 6). Most vessels vary between 5.2 and 9.0 cm, except one which has a diameter of 24 cm. The wall thickness varies between 0.35 and 0.65 cm. All stone vessels from the Early Halaf levels were made of locally available stones, such as gypsum, limestone or marble.

Celts, Chisels and Maceheads

Celts, chisels and maceheads were found in restricted numbers, and only in the Transitional levels 6 to 4. The absence of these items in the lower levels 11 to 7 is perhaps related to the limited area of exposure. However, this can hardly be the case for the topmost Early Halaf levels 3 to 1, each unearthed over a large area; apparently other functional or depositional variables define the absence of celts, chisels and maceheads in these strata of occupation.

Celts were found only in the houses of the level 6 Burnt Village (in addition, one was found in an uncertain context, ascribed to either level 6, 5 or 4). Two groups can be distinguished (following Wright 1992:72-73). The first group consists of seven miniature celts, each trapezial in shape and less than 7.0 cm long (e.g. fig. 7.7, no. 10). Some have a lens-shaped section, whereas others show a rectangular section. The cutting edges of these miniatures are straight or slightly rounded, and all except two show traces of use (damages, flaking). The two exceptions are the smallest celts found so far, one measuring 3.2×1.6×1.0 cm (L×W×Th), the other 3.4×1.8×1.1 cm. Both are carefully finished and in an almost perfect condition. It is not excluded that these miniatures served in luxury or ritual contexts instead of domestic activities. All celts except one were polished. The non-polished specimen has a damaged base, perhaps due to hafting. The miniature celts vary in dimensions from 3.2×1.6×1.0 cm to 6.8×4.5×1.5 cm. The maximum thickness is 2.3 cm. Most celts were made of local limestone (n= 4) and gabbro (n= 1). In addition, one was made of the non-indigenous serpentinite, whereas in one case the proper stone sort could not yet be identified.

The second group, consisting of four trapezial celts, is largely identical in shape to the former group but they are all larger (figs. 7.7, nos. 9, 11). The smallest specimen measures 7.1×4.9×1.2 cm, while the largest one is 11.5×7.5×3.2 cm. The cutting edges, and occasionally the sides as well, show traces of damage, probably due to usage. In one case the cutting edge seems to have been resharpened. Three celts show damaged bases, perhaps due to hammering to allow hafting. The type 2 celts are made of locally available dolorite and limestone (in one case the stone sort has not yet been identified).

Three celt fragments, one made of quartsite, the others made of dolorite, cannot be attributed to one of the above groups with certainty. One object might represent an

unfinished celt. It is made of greenish, fine-grained quartsite and is more or less rectangular with rounded sides.

So far, only three *chisels* have been found, one in level 6, the others in level 5. The chisels are elongated in shape with slightly rounded ends. The level 5 chisels show one flattened and one convex side in section, while the level 6 specimen is oval in section. Two chisels are complete and measure 9.9×5.3×2.8 cm and 11.6×4.8×2.5 cm, respectively. Both items show damaged ends, perhaps due to usage. The fragmentarily preserved chisel is retouched at the convex cutting edge. In addition, it carries traces of bitumen, probably used for hafting. This fragmented chisel is made of limestone. The kind of stone used for the manufacture of the others remains unknown.

Two fragments of spheroidal *maceheads* were found, one in level 6, the other in level 4. The former was carefully made of orangey-pink, fine-grained gypsum and 6.0 cm in diameter. It carries a central, biconically pierced perforation ca. 1.0-1.4 cm in diameter (fig. 7.7, no. 15). The level 4 macehead, made of compact, greyish gypsum is virtually identical in shape but is in a much poorer state of preservation.

Miscellaneous Stone Tools

Circular or oval discs with smoothened surfaces and, occasionally, traces of use-polish were repeatedly found in the prehistoric levels. The discs were made of a wide variety of stones, such as sandstone (n= 2), limestone (n= 5), gypsum (n= 2), dolorite (n= 2), gabbro (n= 2) and basalt (n= 2). These stones are all locally available in the Balikh basin, except basalt which most likely came from the hilly region near Urfa in southeastern Turkey. The discs vary in diameter between 4.5 and 14.0 cm (mean diameter: 8 cm) and range in thickness from 0.9 to 3.7 cm (mean thickness: 1.9 cm). One disc shows two perforations and the beginning of a third perforation along the edge (fig. 7.7, no. 12). Some specimens carry numerous tiny striations, scratches or traces of red ochre. Most likely, these discs were used as palettes or pigment grinders. Others may have been used as polishing stones or vessel lids.

Flattened pebbles with one or more, shallow concavities and either circular, oval or more rectangular in shape were commonly found, particularly in level 6. Virtually all carry traces of polishing. These objects were all used in their natural state; any modification resulted from their use. Most were made of sandstone or quartsite, but in addition granodorite and greenish-blue gabbro were used. The smallest specimen is ca. 10 in diameter and 1.1 cm thick, while the largest item is about 15 cm in diameter and 3.5 cm thick. Most likely these objects originally served as palettes. Actually, one of these 'palettes' was found in association with a small, spherical (type 4a) grinding stone. Others carry traces of red ochre.

Some sandstone and gabbro pebbles carry tiny scratches at one of the ends (fig. 7.7, no. 13). One specimen showed traces of bitumen on its tip. It was found near a fragmented ceramic vessel re-used as the base and wall of a hearth. These thin and oblong, unworked objects perhaps served as spatulas.

A large number of limestone, sandstone, quartsite and dolorite cobbles up to 21 cm in length seem to have been used as polishing stones or, perhaps, grinders. The unworked shapes are irregularly oblong to almost cylindrical, and all have at least one flattened working surface (often highly polished due to use). Some specimens carry striations or parallel scratches, while the edges give evidence of slight flaking.

Fragments of small, oval or rectangular 'whetstones' appeared once or twice in the various levels. These objects are made of tabular sandstone or limestone. Some fragments carry tiny striations, others have flat and highly polished surfaces due to use.

Levels 6 and 3 yielded some rough, tubular pieces of porous limestone, up to 13.3 cm long and over 6 cm wide. These objects all seem to be unworked and used in their natural state, perhaps as weights.

The burnt level 6 houses contained a series of flat and irregularly shaped 'working platforms', made of limestone and gypsum. All were in a fragmented state but must originally have been of considerable size (over 28 cm in length and up to 9 cm in thickness).

Some irregularly shaped and perforated objects found in the levels 6-5 may have served as weights. These limestone items are rather coarsely finished, with numerous cutting marks, and are up to 9 cm in diameter. Two large, re-used grinding-slab fragments, each ca. 17 cm in diameter and carrying a ca. 7 cm wide, central perforation, were possibly used as pivot stones. Both objects were found in the level 6 Burnt Village.

The level 6 building IV yielded a large hammerstone or axe with a central perforation and a roughly hewn working edge (fig. 7.7, no. 14).

Some stone objects occurred only once or twice, such as the re-used basalt grinding-slab fragments carrying a rather wide but shallow groove. In the case of a level 6 specimen, the groove was surrounded on both sides by finely incised linear and arrow-like patterns (schematic human representation?; fig. 7.7, no. 17). A somewhat similar grooved object but made of soft gypsum and displaying a deeply incised crosshatched pattern came from level 5 at Sabi Abyad (fig. 7.7, no. 16). Elsewhere, too, such grooved stones with or without decoration have been found, e.g. at 6th millennium Tell Judaidah in the Amuq or, from a much earlier time, at 8th millennium Çayönü in Anatolia (Braidwood and Braidwood 1960:90 and Fig. 66, no. 2; Davis 1982:110-11 and Figs. 3.12-3.13). Perhaps these objects served for the production of some kinds of stone or bone tools or for the straightening of arrowshafts.

Catalogue

Figure 7.1

1. S91-194. Level 6. Cylindrical grinder (type 1). Fine-grained basalt. L: 13.5 cm, D: 6.6 cm. In building II, room 6.
2. S91-48. Level 6. Cylindrical grinder (type 1). Polished sides. Fine-grained basalt. L: 15.5 cm, D: 6.5 cm. In building I, area 3.
3. SAB88 S-58. Level 6. Cylindrical grinder or pestle (type 1). Fine-grained basalt. L: 11.9 cm, D: 7.7 cm. In open area.
4. S92-115. Level 6. Conical pestle (type 2). Pointed end and part of side smoothened by use. Fine-grained basalt. L: 12.8 cm, D: 6.6 cm. In building V, room 6.
5. S91-205. Level 6. Conical pestle (type 2). Thickest end polished by use. Fine-grained basalt. L: 40.0 cm, D: 7.4 cm. In building II, room 6.
6. S92-36. Level 6. Conical pestle (type 2). Thickest end and side show traces of use-wear. Fine-grained basalt. L: 18.3 cm, D: 6.3 cm. In oven area III, room 3.
7. S91-76. Level 6. Conical pestle or grinder (type 2). One side polished by use. Fine-grained basalt. L: 15.5 cm, D: 4.9 cm. In fill in western half of square Q13.
8. S91-187. Level 6. Conical pestle (type 2). Damaged at one side. Thickest end polished by use. Damaged part shows traces of use as well. Fine-grained basalt. L: 28.5 cm, D: 7.3 cm. In building II, room 10.

Figure 7.2

1. S91-106. Level 6. Irregularly shaped pestle or grinder (type 3). Compact gypsum. L: 18.0 cm, W: 13.0 cm, Th: 5.9 cm. In building II, room 6.
2. SAB88 S-7. Level 1. Irregularly shaped pestle or grinder (type 3). Fine-grained basalt. L: 9.6 cm, D: 3.6-5.9 cm. In oven area III.
3. SAB88 S-6. Level 1. Irregularly shaped pestle or grinder (type 3). Traces of use-polish on flat sides. Gabbro. L: 10.0 cm, D: 5.2 cm. In oven area III.
4. S91-105. Level 6. Irregularly shaped pestle or grinder (type 3). Rounded end smoothened and four sides flattened by use. Fine-grained basalt. L: 6.7 cm, D: 4.5 cm. In building II, room 6.
5. S92-264. Level 6. Small spherical tool (type 4a). Battered surfaces. Chalcedone. D: 4.8 cm. In building IV, room 2.
6. S92-219. Level 6. Small spherical tool (type 4a). Heavily chipped surface. Chalcedone. D: 4.4 cm. In oven area III, room 3.
7. S92-266. Level 6. Small spherical tool with flattened surfaces (type 4a). Battered sides. Chalcedone. L: 7.4 cm, W: 7.1 cm, H: 4.7 cm. In Building IV, room 2.
8. S92-237. Level 6. Small spherical tool with flattened surfaces (type 4a). Surfaces smoothened by use. Limestone. D: 6.5 cm, Th: 4.6 cm. In Building IV, room 5.
9. S93-348. Level 6. Cubical tool (type 4b). Sides flattened by use. Chalcedone. L: 5.4 cm, W: 5.4 cm. In Building XI, room 6.
10. S91-46. Level 6. Cubical tool (type 4b). Fine-grained basalt. L: 3.6 cm, W: 3.6 cm, H: 3.6 cm. In Building I, area 3.
11. S92-70. Level 6. Cubical tool (type 4b). Fine-grained basalt. L: 4.2 cm, W: 4.1 cm. In oven area III, room 3.

12. S91-140. Level 6. Flattened, oval mortar (type 5). Porous limestone. D: 12 cm, H: 4.6 cm. In building II, room 6.
13. S92-205. Level 6. Flattened, circular mortar (type 5). Working surface shows a very shallow concavity. Limestone. D: 14.6 cm, H: 6.2 cm. In building IV, room 2.
14. S91-136. Level 6. Mortar (type 5). Interior smoothened by use. Exterior base smoothened and polished (possibly due to use as a grinder). Fine-grained basalt. D: 11 cm, H: 4.1 cm. In building II, room 6.
15. SAB88 S-2. Level 1. Mortar (type 5). Interior smoothened by use. Exterior very smoothened/polished. Fine-grained basalt. D: 10.2-11.8 cm, H: 5.6 cm. In alley between building II and oven area III.

Figure 7.3

1. S91-298. Level 6. Mortar (type 5). Interior carries traces of red ochre. Vesicular basalt. D: 19 cm, H: 9.3 cm In building II, room 7.
2. S91-104. Level 6. Grinding slab (type 6a; damaged on both ends). Very concave working surface, smoothened by use. Fine-grained basalt. L: 20 cm, W: 19 cm, Th: 3.6 cm. In building II, room 6.
3. S91-44. Level 6. Grinding slab (type 6a). Fine-grained basalt. L: 24 cm, W: 15 cm, Th: 3.5 cm. In fill of building II, northwestern part.
4. S92-6. Level 5. Oval grinder (type 6b). Fine-grained basalt. L: 7.5 cm, W: 6.4 cm, Th: 2.6 cm. In building I, area 16.
5. S91-103. Level 6. Circular grinder (type 6b). Vesicular basalt. D: 18.0-20.0 cm, Th: 3.8 cm. In building II, room 7.

Figure 7.4

1. S91-252. Level 6. Circular grinder with flattened sides (type 6b). Vesicular basalt. D: 17.2 cm, Th: 2.6 cm. In building IV, room 2.
2. S92-196. Level 6. Grinding slab or grinder (type 6a/b). Parts of working surface and base polished. Fine-grained basalt. L: 18.3, W: 11.6, Th: 4.0 cm. In oven area III.
   S92-197. Level 6. Grinding slab or grinder (type 6a/b). Convex base polished. Fine-grained basalt. L: 18.4 cm, W: 11.4 cm, Th: 4.0 cm. In oven area III. Both objects were found together.
3. S92-263. Level 6. Cylindrical pestle (type 7). Surface smoothened by use. Limestone (?). L: 10.3 cm, D: 5.1 cm, Th: 4.0 cm. In building IV, room 2.
4. SAB88 S-95. Level 3C. Cylindrical pestle (type 7). Both ends polished due to use. Fine-grained basalt. L: 11.0 cm, D: 5.0 cm. In open area north of stone wall in square P12.
5. S91-3. Level 6 (?). Small conical pestle (type 8). Both ends polished by use. Fine-grained basalt. L: 6.0 cm, D: 4.2-5.0 cm. In open area east of buildings I and VIII.
6. S92-88. Level 6. Small conical pestle (type 8). Flat end smoothened by use. Fine-grained basalt. L: 6.8 cm, D: 6.0 cm. In oven area III, room 2.
7. S91-191. Level 6. Small conical pestle and/or grinder (type 8). One end and part of long side polished by use. Fine-grained basalt. L: 8.6 cm, D: 5.7 cm. In building I, area 3.
8. SAB88 S-93. Level 2. Small conical pestle (type 8). Lower end polished by use. Granodorite. L: 10.1 cm, D: 5.8 cm. In area south of oven O.

9. S92-177. Level 6. Small pestle and/or grinder (type 8). Granodorite. L: 9.1 cm, D: 5.0 cm. In building IV, room 12.
10. S91-39. Level 6. Small pestle and/or grinder (type 8). Rounded ends. One end and part of long side polished by use. Fine-grained basalt. L: 12.3 cm, D: 6.0 cm. In building I, room 6.

Figure 7.5

1. S92-133. Level 6. Rectangular grinder (type 10). Sides smoothened by use. Fine-grained basalt. L: 10.0 cm, W: 7.6 cm, Th: 5.8 cm. In building V, room 7.
2. S92-169. Level 6. Rectangular grinder (type 10). Flattened sides smoothened by use. Fine-grained basalt. L: 8.4 cm, W: 6.1 cm, Th: 4.6 cm. In building IV, room 5.
3. S91-32. Level 6. Rectangular grinder and/or pestle (type 10). Polished sides and scratches on surface, probably due to use. Limestone. L: 5.0 cm, W: 3.3 cm, Th: 3.3 cm. In building I, room 5.
4. S93-171. Level 6. Rectangular grinder (type 10). Flat side smoothened by use. Vesicular basalt. L: 15.5 cm, W: 9.5 cm, Th: 7.0 cm. In building XII, room 2.
5. S92-145. Level 6. Sphere with one smoothened side (type 12). Basalt. L: 12.4 cm, W: 11.0 cm, Th: 9.6 cm. In building V, room 10.
6. S93-112. Level 6. Oval rubbing stone (?; type 11). Highly vesicular basalt. L: 8.0 cm, W:4.5 cm, Th: 2.5 cm. In tholos IX.
7. S92-240. Level 6. Pear-shaped pestle (type 13). Sides and thickest end smoothened by use. Fine-grained basalt. L: 20.5 cm, D: 8.0 cm. In open area around oven S.
8. S93-233. Level 6. Pear-shaped pestle (type 13). Fine-grained basalt. L: 18.0 cm, D: 8.0 cm. In building XII, room 3.
9. S92-122. Level 6. Pear-shaped pestle (type 13). Sides smoothened, thickest end damaged by use. Fine-grained basalt. L: 19.7 cm, D: 8.3 cm. In building IV, room 7.

Figure 7.6

1. S92-30. Level 6. Low bowl. Striations on exterior and interior. Exterior carries geometric incisions in the shape of a cross. Serpentinite (?). D: 11 cm. In open area between oven area III and building IV.
2. S92-74. Level 6. Bowl with incised horned animal on exterior. Traces of repair: perforation in wall above base and traces of bitumen. Chlorite. D: 8 cm, H: 5.1 cm, Th: 0.5-0.9 cm. In building V, room 8.
3. S91-55. Level 6. Oval bowl (complete) with parallel incised lines on exterior. Gabbro. L: 13 cm, W: 7 cm, H: 4 cm. In building II, room 12.
4. S93-361. level 6. Bowl with rounded wall and outwards-curving rim. Interior and exterior polished. Natural banding used as decoration. Gypsum. D: 15 cm, H: 5.4 cm. In building XII, room 9.
5. S93-70. Level 6 (?). Bowl with rounded, inwards-curving wall. Striations on interior. Limestone. D: 14 cm. In open area north of tholos IX.
6. S91-235. Level 6. Bowl with biconically perforated lug handle. Limestone. D: 10-11 cm. In building II, room 6.
7. S92-250. Level 6. Rectangular vessel with straight wall. Gypsum. L: 8.8 cm, W: 5.5 cm, H: 8.8 cm. In building IV, room 2.

8. S93-275. Level 4. Bowl with rounded, inwards-curving wall. Gypsum. D: 12 cm. In open area in southern part of square R14.
9. S92-92. level 6. Bowl with perforation below rim. Interior (except base) and exterior polished. Gypsum. D: 11 cm, H: 6.9 cm. In open area east of building V, room 7.
10. S93-298/328. Level 4. Bowl with straight, flaring wall and groove below rim. Interior polished. Fine-grained basalt. D: 23 cm, H: 8 cm. In fill of oven O.
11. S91-300. level 6. Low bowl with rounded wall and outwards-curving rim. Polished exterior. Several biconically drilled repair holes. Gypsum. D: 14 cm, H: 6.5 cm. In building I, room 1.
12. S92-8. Level 5. Bowl with straight flaring wall and square rim. Interior and exterior polished. Unidentified stone. D: 20 cm, H: 8.4 cm. In building I, room 10.
13. S93-368. Level 6. Shallow bowl or plate. Gypsum. D: 26 cm. In building XI, room 6.

Figure 7.7

1. S92-141. Level 6. Low bowl with rounded, inwards-curving wall. Gypsum. D: 5 cm, H: 1.4 cm. In open area between oven area III and building IV.
2. S91-61. Level 6. Low bowl. Interior polished. Gabbro. D: 8 cm, H: 2.7 cm. In building I, room 8.
3. S93-321. Level 6. Low bowl with straight wall, slightly outwards-curving near the rim. Natural banding used as decoration. Gypsum. D: 5 cm, H: 2.2 cm, Th: 0.3-1 cm. In open area north of building X.
4. S91-170. Level 11. Bowl with rounded, inwards-curving wall. Exterior and interior polished. Natural banding used as decoration. Gypsum. D: 5.9 cm, H: 3.0 cm. In open area.
5. SAB88 S-43. Level 3B. Hemispherical bowl with groove below rim. Interior and exterior polished. Gypsum. D: 5.2 cm, H: 2.7. In area between main building and stone terrace wall.
6. S93-27/29. Level 3B. Beaker-like vessel with carinated wall. Gypsum/alabaster. D: 7 cm, H: 5 cm. In main building, room 21.
7. S93-99. Level 6. Sharply carinated bowl with straight wall and protruding rim. Pedestal base? Interior and exterior polished. Gypsum. D: 6.5 cm. In open area in square P12.
8. SAB88 S-52. Level 3A. Vessel neck. Gypsum or limestone. D: 7 cm. In basin R in square Q13.
9. S91-236. Level 6. Trapezial celt. Polished. Top and cutting edge damaged. Limestone. L: 7.2 cm, W: 2.4 cm, Th: 1.5 cm. In building II, room 6.
10. S91-94. Level 6. Wedge-shaped miniature celt. Polished. Slightly damaged cutting edge. Serpentinite. L: 3.2 cm, W: 1.6 cm, W: 1.0 cm. In fill of building II, northwestern part.
11. S91-77. Level 6. Trapezial celt. Polished. Fine-grained dolorite. L: 11.5 cm, W: 7.5 cm, Th: 3.2 cm. In fill of building II, northwestern part.
12. S93-267. Level 6. Flat disc; palette? Limestone. D: 9.7 cm, Th: 1.3 cm. In building II, room 13.
13. S91-51. Level 6. Flat oblong spatula. Traces of use at tip. Marl. L: 9.6 cm, W: 2.1 cm, Th: 0.7 cm. In building VII.

14. S92-203. Level 6. Hammerstone or axe, with roughly hewn working edge. Biconically perforated. Fine-grained basalt. L: 14.2 cm, W: 7.6 cm, Th: 5.5 cm. In building IV, room 2.
15. S92-221. Level 6. Spherical macehead, centrally perforated. Gypsum. D: 6 cm. In building IV, room 2.
16. S92-19. Level 5. Fragment of grooved and incised stone; shaft straightener? Gypsum. L: 6.5 cm, W: 6 cm, Th: 2.6 cm. In building I, room 10.
17. S92-246. Level 6. Grinding-slab fragment with shallow groove and incised decoration. Shaft straightener? Fine-grained basalt. L: 13 cm, W: 10.5 cm, Th: 4.8 cm. In building IV, room 2.

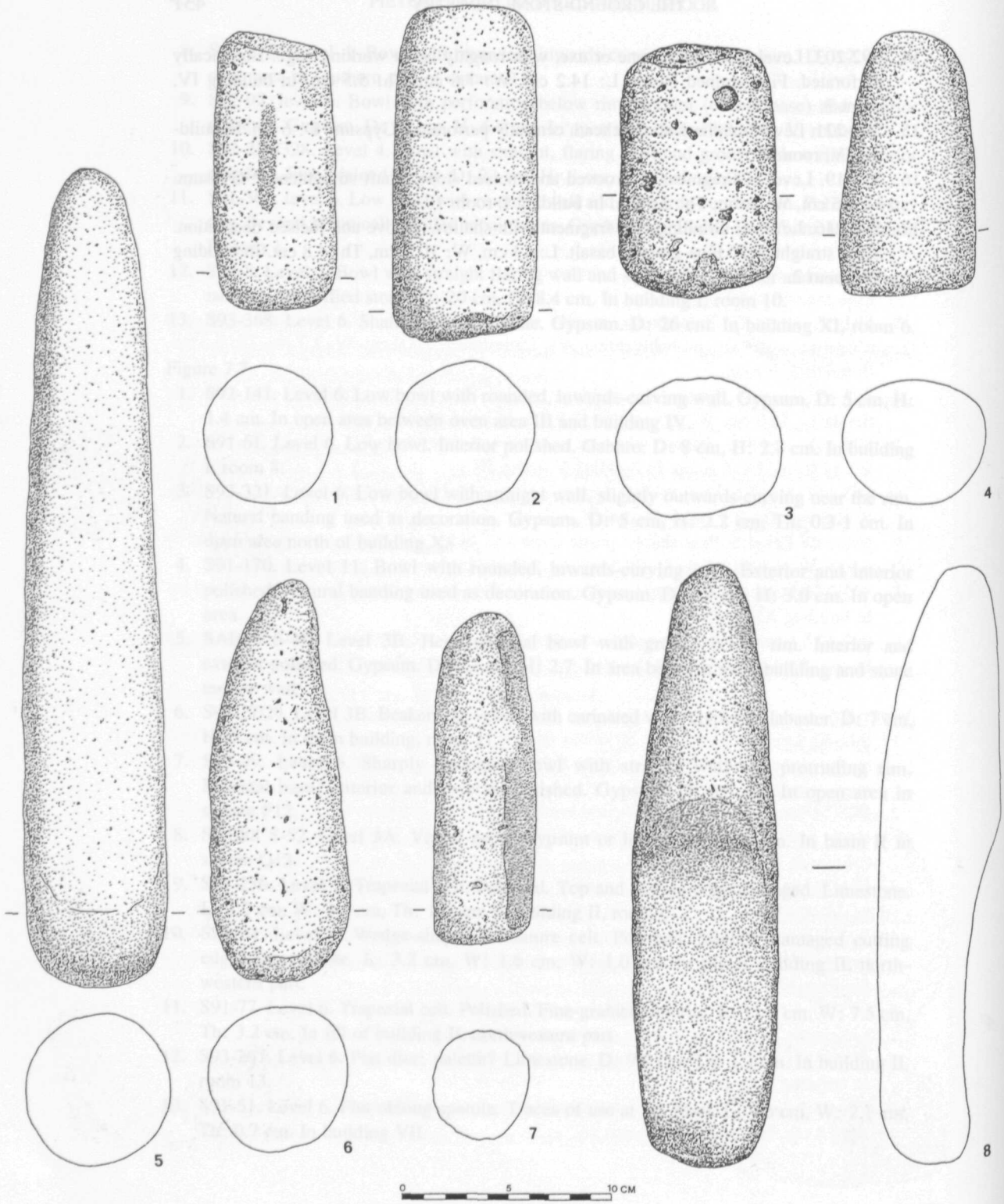


Figure 7.1. Handstones and pestles.

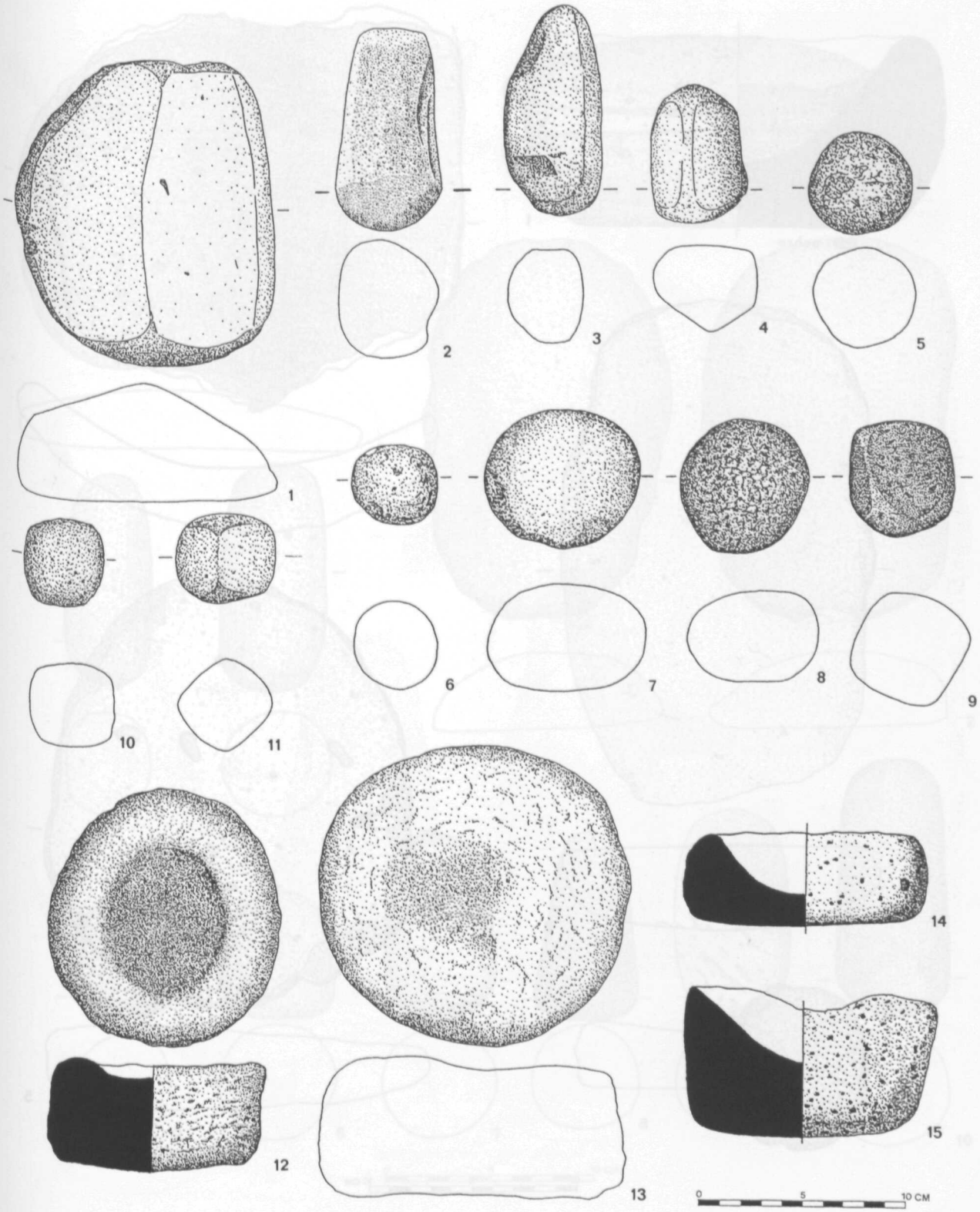


Figure 7.2. Pestles, grinders, spherical and cubical tools, and mortars.

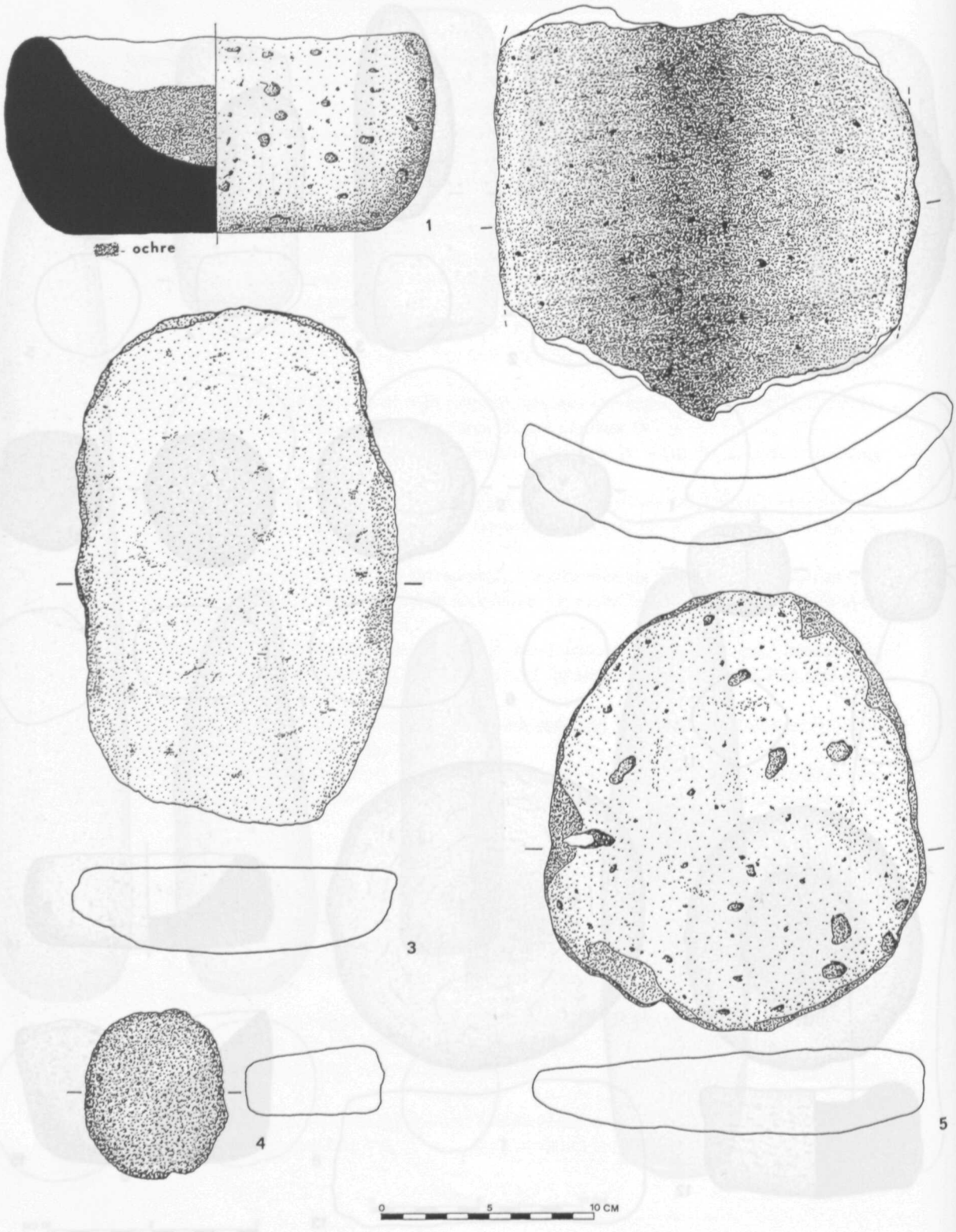


Figure 7.3. Mortar, grinding slabs and grinders.

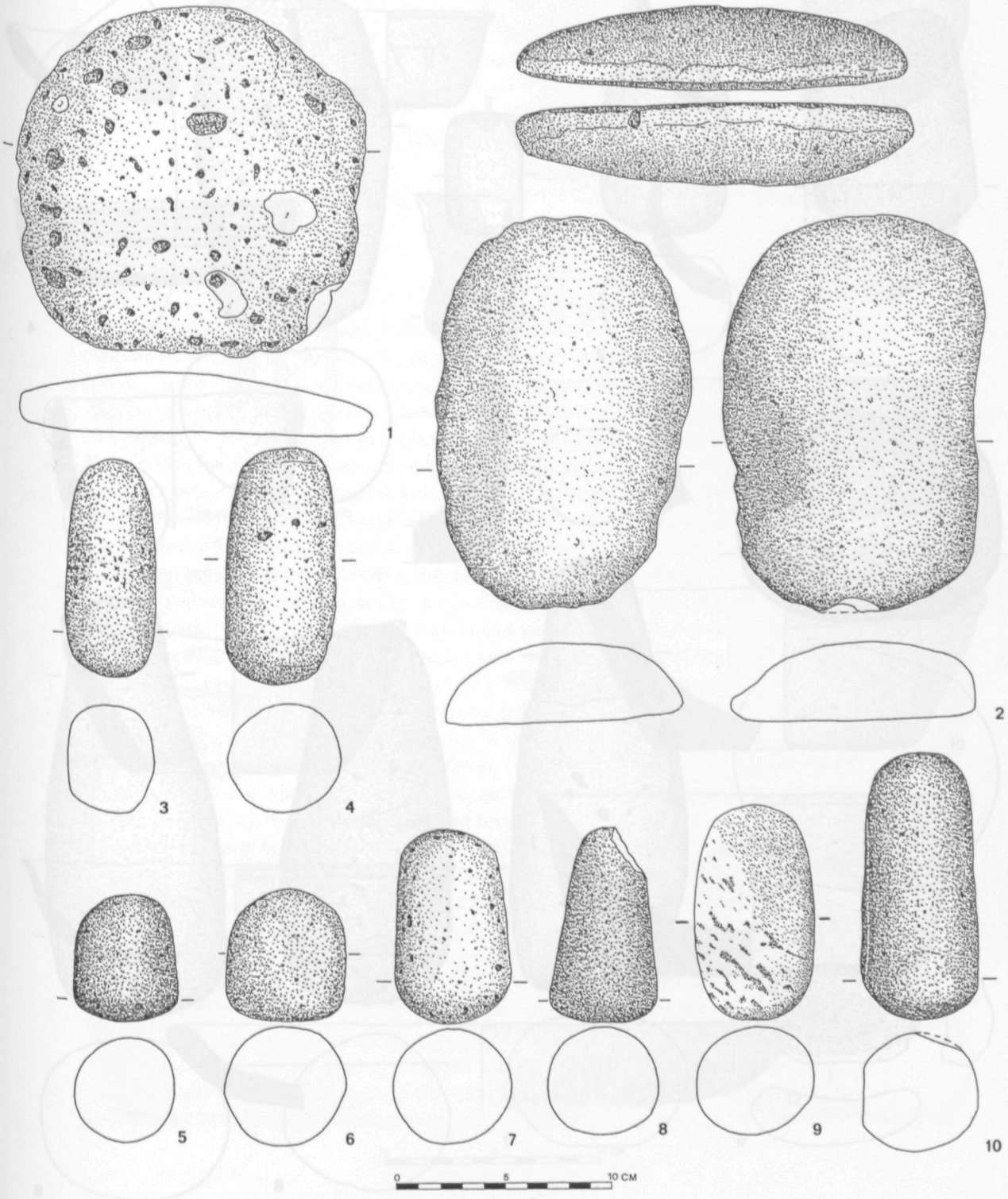


Figure 7.4. Grinders and pestles.

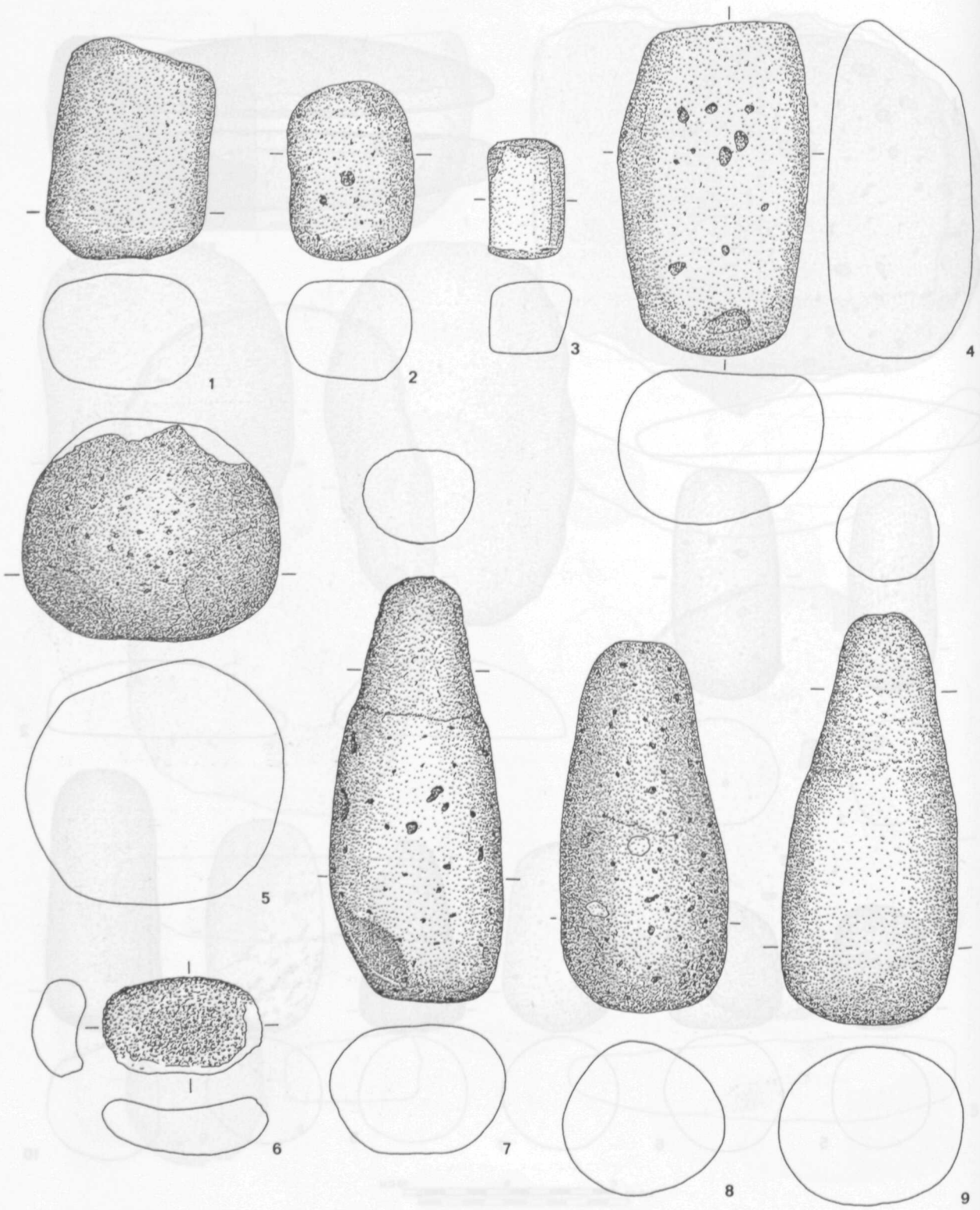


Figure 7.5. Grinders and pestles.

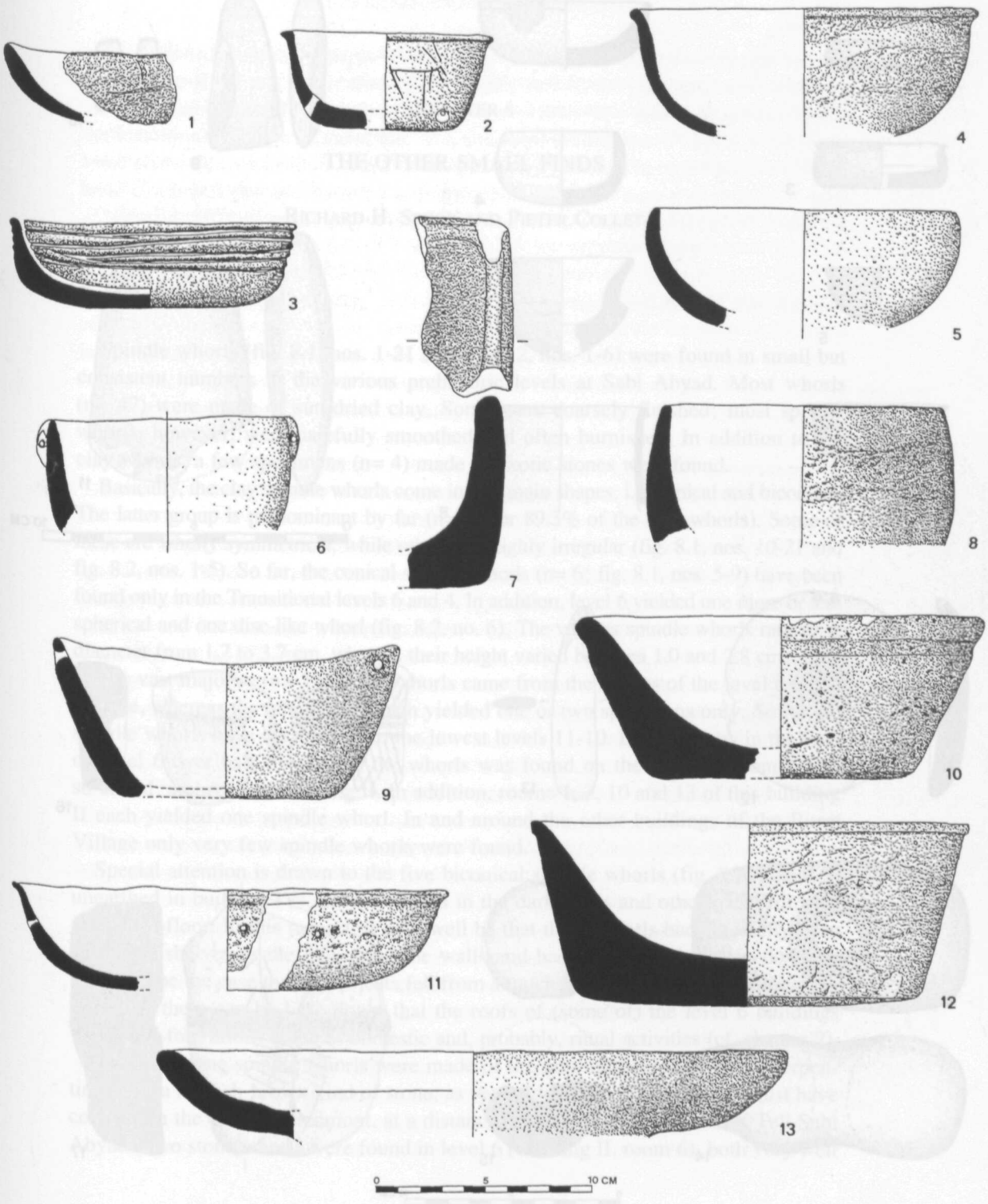


Figure 7.6. Stone bowls.

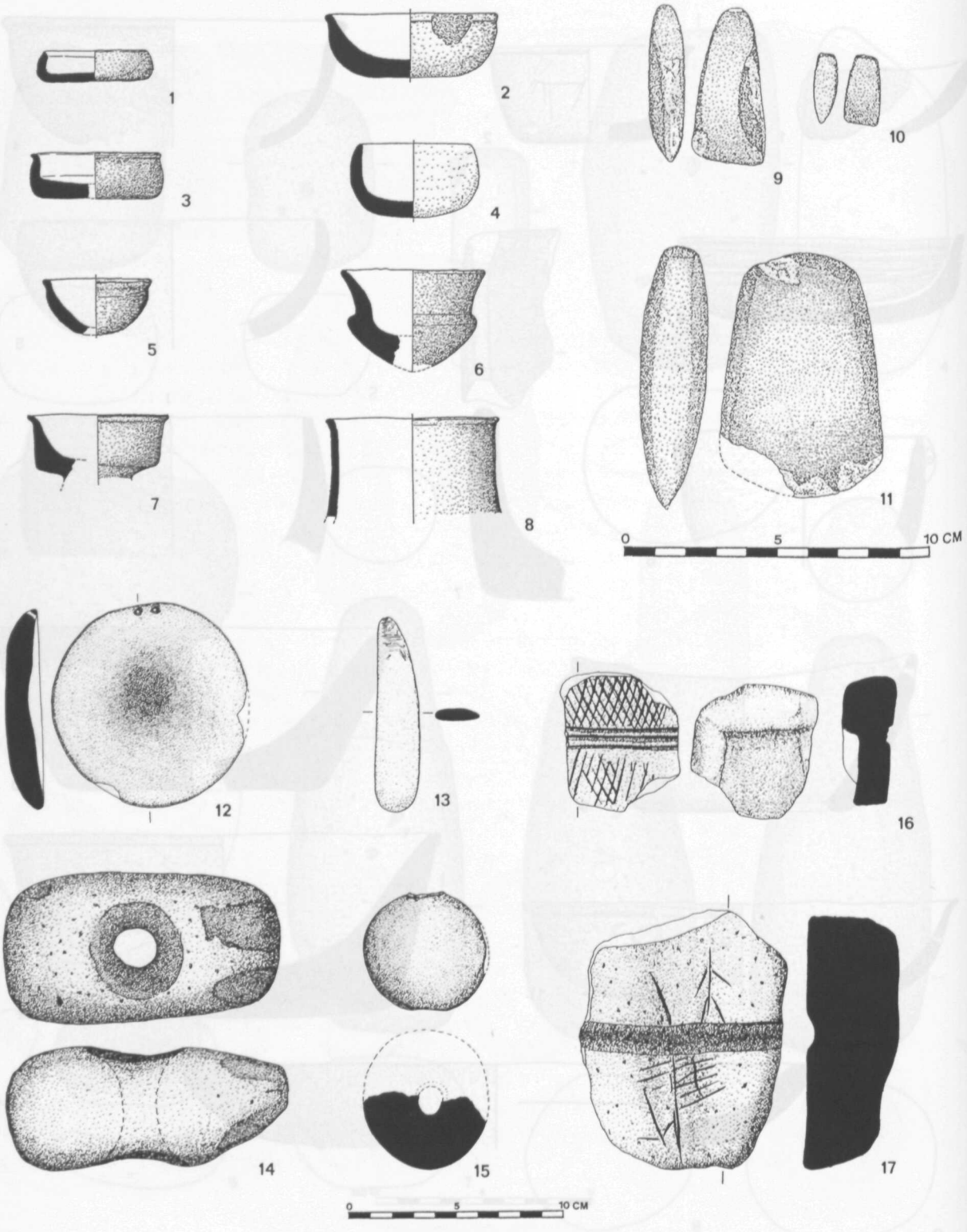


Figure 7.7. Stone bowls, celts and other stone tools.

CHAPTER 8

THE OTHER SMALL FINDS

RICHARD H. SPOOR AND PIETER COLLET

Spindle Whorls

Spindle whorls (fig. 8.1, nos. 1-21 and fig. 8.2, nos. 1-6) were found in small but consistent numbers in the various prehistoric levels at Sabi Abyad. Most whorls (n= 47) were made of sun-dried clay. Some were coarsely finished; most spindle whorls, however, were carefully smoothed and often burnished. In addition to the clay whorls, a few specimens (n= 4) made of exotic stones were found.

Basically, the clay spindle whorls come in two main shapes, i.e. conical and biconical. The latter group is predominant by far (n= 42, or 89.3% of the clay whorls). Some of these are wholly symmetrical, while others are highly irregular (fig. 8.1, nos. 10-21 and fig. 8.2, nos. 1-5). So far, the conical spindle whorls (n= 6; fig. 8.1, nos. 5-9) have been found only in the Transitional levels 6 and 4. In addition, level 6 yielded one more or less spherical and one disc-like whorl (fig. 8.2, no. 6). The various spindle whorls ranged in diameter from 1.7 to 3.7 cm, whereas their height varied between 1.0 and 2.8 cm.

The vast majority (n= 39) of the whorls came from the houses of the level 6 Burnt Village, whereas the other levels each yielded one or two specimens only. So far, no spindle whorls have been found in the lowest levels 11-10. Interestingly, in the case of level 6 over half (n= 21) of the whorls was found on the floor of room 6 (the so-called 'archive') of building II. In addition, rooms 1, 3, 10 and 13 of this building II each yielded one spindle whorl. In and around the other buildings of the Burnt Village only very few spindle whorls were found.

Special attention is drawn to the five biconical spindle whorls (fig. 8.2, nos. 4-5) unearthed in building IV: all were found in the dark ashes and other room fill high above the floor. In this respect, it may well be that these whorls had originally been stored on shelves or the like along the walls and had subsequently fallen down. It may also be the case that the objects fell from a much higher level, i.e. from the roof. Actually, there can be little doubt that the roofs of (some of) the level 6 buildings were used for various kinds of domestic and, probably, ritual activities (cf. chapter 2).

The four stone spindle whorls were made of the non-indigenous dolorite, serpentinite and a reddish-brown kind of stone, as yet unidentified. These stones must have come from the Turkish piedmont, at a distance of at least 150 km north of Tell Sabi Abyad. Two stone whorls were found in level 6 (building II, room 6), both very well

finished and extremely smoothed. One was made of serpentinite, the other of dolorite. The latter one (fig. 8.1, no. 3) was pierced from both sides with drills of different size, resulting in a hole with two inversed, stepped funnels. The serpentinite specimen (fig. 8.1, no. 4) was drilled from one side and had a straight perforation. Both whorls had the shape of a cut-off cone. Another dolorite, conical spindle whorl came from a level 4 open area (fig. 8.1, no. 1), whereas the final one was found in a level 3B debris layer. This whorl was conical as well, and very smoothed (fig. 8.1, no. 2).

Pierced and Unpierced Discs

Pottery sherds ground into more or less round discs and usually pierced at the centre are among the most commonly occurring artefacts at late Neolithic Sabi Abyad (n= 128). The vast majority (n= 80; in addition 15 stone discs appeared) was found in or around the houses of the level 6 Burnt Village (mainly in building II, room 6, and in building IV, room 2); the other levels (8-1) each yielded about half a dozen pierced discs, mainly in debris contexts. The function of these discs is not yet clear; perhaps they were used as spindle whorls.

The pierced discs varied in diameter between 2.5 and 4.9 cm, whereas their thickness ranged from 0.4 to 1.0 cm. Most discs were pierced from two sides; single piercings occurred only occasionally (e.g. fig. 8.2, no. 15). The diameter of the perforations varied between 5 and 8 mm (more or less similar to those of the clay spindle whorls). Some discs were in an unfinished state: they showed the beginnings of drillings on both sides which did not yet connect (fig. 8.2, nos. 7, 10). The edges of the discs were sometimes ragged and hardly worked at all, but generally they were finely ground in flat or bevelled surfaces. Occasionally the edges were simply broken into shape rather than ground, leaving a roughly circular shape with jagged sides.

The discs were made of a wide variety of ceramic wares (Grey-Black Ware, Dark-Faced Burnished Ware, Coarse Ware, Fine Ware; cf. chapter 3). In the lower levels 8-7, mainly Grey-Black Ware or Coarse-Ware sherds were used for the manufacture of pierced discs. However, painted or unpainted Fine-Ware fragments predominated from level 6 onwards. When decorated sherds were used, these sherds were often worked in such a way that the original painted patterns or other decorative effects (burnishing, incision) served as decoration on the final disc (fig. 8.2, nos. 7, 12-14).

In addition to the pierced discs made of clay, a number of stone discs were found. So far, these stone items have appeared only in the Transitional levels 6 to 4. Various kinds of stone were in use; limestone was the most often used raw material but sandstone, gypsum, gabbro and dolorite were occasionally applied as well. These stones are all locally available, except dolorite which may have come from mountaineous southeastern Anatolia. Sometimes natural, flattened stones were used, which were not further worked apart from the perforation.

Most stone discs had a central, biconical perforation. Others showed evidence of piercing from one side only or had traces of attempted piercing on one side (fig. 8.3, nos. 8, 11). One had a stepped, biconical funnel piercing, caused by using drilling implements of decreasing size (fig. 8.3, no. 10). Generally, the stone discs seem somewhat larger than their clay counterparts, with diameters varying between 2.9 and 5.7 cm and thicknesses varying between 0.4 and 0.8 cm.

Not all pottery discs were pierced. In some cases it seems that piercing had simply not been attempted yet (fig. 8.3, nos. 5-7). However, most of the unpierced discs were larger (i.e. between 7.5 and 12.5 cm in diameter) and more roughly finished than their pierced counterparts; most likely, they served as loamers or lids. A group of eight of these circular lids or loamers were found together on the floor in the level 6 building IV (fig. 8.3, no. 14).

Tokens

Tokens are small objects with simple geometric shapes, which most likely acted as counting devices expressing the quantities of objects exchanged or otherwise deployed (see, e.g., Schmandt-Besserat 1977, 1986, 1992; Jasim and Oates 1986; Matthews 1989; see also chapter 5, this volume). Most tokens are made of sun-dried clay but some stone specimens appear as well (fig. 8.4, no. 1 and fig. 8.5, no. 5).

So far, 197 tokens have been recognised, the majority of which (n= 167) was found in level 6. The other levels have yielded only a handful of tokens (table 8.1), mainly in debris areas. The few level 4 tokens were mainly found in the keyhole-shaped kilns in square R14. This level held a few of the rare stone tokens that were found. The level 3 tokens all appeared in the fill of building I. Most level 6 tokens were found in building II, room 6, and in building V, room 7, in association with clay sealings, ceramics, figurines, spindle whorls, pierced discs, etc.

The Sabi Abyad tokens present nine main forms or types: spheres, hemispheres, discs, cones, biconoids, cylinders, tetrahedrons, triangles and miniature vessels. In addition, some 'complex' tokens were found.

The spherical tokens (fig. 8.4, nos. 1-11) were predominant by far (cf. table 8.1). These small clay balls, occasionally having one or two flattened sides, varied in diameter between 0.9 and 3 cm, with only very few larger ones (up to 3.9 cm in diameter). Three spheres (two from level 6, one from level 4) carried nail impressions. One specimen had two nail impressions next to each other on one end of the sphere and one on the other end (fig. 8.4, no. 3). Another specimen had eight impressions in a row (fig. 8.4, no. 2).

Hemispheres (fig. 8.4, nos. 12-15) varied in diameter between 0.9 and 2.5 cm, with only a few specimens ranging from 3.3 to 4.4 cm in diameter. Some of these tokens were perfectly hemispherical, with a smooth convex and straight plane surface, but others were

Shape \ Level	8	6	5	4	3B	Total
Spheres	–	74	2	–	4	80
Discs	–	27	–	1	4	32
Hemispheres	–	22	–	2	–	24
Cones	1	9	–	–	–	10
Cylinders	–	16	1	–	–	17
Triangles	–	3	–	3	–	6
Bicones	–	1	–	2	–	3
Tetrahydrons	–	2	–	–	–	2
Vessels	–	10	–	–	9	19
"Complex"	–	3	1	–	–	4
Total	1	167	4	8	17	197

Table 8.1. Distribution of tokens.

more irregularly finished. One hemispherical carried two parallel nail impressions on the convex side (fig. 8.4, no. 13). Three tokens gave evidence of wood (?) impressions on the plane side; in addition, one of these carried a curved groove on the convex side (fig. 8.4, no. 12). Another hemisphere showed faint reed (?) impressions on the convex surface.

The disc-shaped tokens (fig. 8.4, nos. 16-22) were mainly flattened, round or oval balls with thin edges and thick central parts. In some case, the obverse was roughly convex, whereas the reverse was wholly flat. These discs varied in diameter between 1.4 and 2.8 cm, and in thickness between 0.4 and 1.0 cm. Some oval discs were much larger, with diameters up to 6.6 cm. One of these large discs seemed to have a rope (?) impression on one of the sides. Another disc carried grooves (fig. 8.4, no. 16).

Cones (fig. 8.4, nos. 23-26) were found in small numbers. The base diameters varied between 1.4 and 3.1 cm, while the heights ranged from 1.2 to 3.2 cm. One cone showed a series of finger impressions.

Only a few tokens were biconical (like miniature sling missiles; cf. fig. 8.5, no. 1). These objects were between 1.2 and 2.0 cm in diameter and up to 2.5 cm long.

Seventeen tokens were more or less cylindrical but with tapering ends (fig. 8.5, nos. 2-3). They were between 1.3 and 2.4 cm in diameter and between 2 and 4.3 cm long.

Two tetrahedrons were found in level 6, one made of clay (fig. 8.5, no. 4), the other made of transparent white stone (either gypsum or rock crystal) and with the beginning of a drill-hole at the top (fig. 8.5, no. 5). It is not excluded that the latter one actually represents an unfinished pendant or even stamp seal.

Three flat, triangular tokens, all made of the same but as yet unidentified stone, were found in level 4. One was found in the fill of kiln S, together with a stamp seal and some clay labrets (fig. 8.5, no. 6). In addition, three fragments of triangular tokens made of clay were found in the level 6 building II (fig. 8.5, no. 7).

Finally, four tokens had rather complex shapes, i.e. that of a cone with the top part pinched into two round protrusions. They were 1.7 cm, 2.1 cm and 3.0 cm long, respectively (fig. 8.5, nos. 8-9). Three of these tokens were found in the level 6 building II, room 6, while another one appeared in the level 5 main building I.

In addition to the geometrically shaped tokens, several miniature vessels of unbaked clay were found (fig. 8.5, nos. 10-24). Most vessels were massive, with only a shallow opening near the pinched or rolled rim, unsuited to hold any content. Possibly these tiny objects were tokens, too (cf. Schmandt-Besserat 1992:17 and fig. 20.3). Level 6 yielded 10 miniature vessels made of unbaked clay. Two items seemed to represent jarlets with pointed bases and were hardly 2 cm in diameter (fig. 8.5, nos. 17-18). One was found in the remains of building V and had been crushed by fallen debris. Five other miniatures represented irregularly-shaped and coarsely finished bowls with straight or slightly incurving walls and flat or rounded bases (fig. 8.5, nos. 20-22, 24). The vessels varied in diameter between 3.0 and 7.7 cm. Their height varied between 1.6 and 4.5 cm.

Miniature vessels of unbaked clay were also found in the Early Halaf level 3A. Seven jarlets came from the floor of room 11 of building I (fig. 8.5, nos. 10-16). In addition, two irregularly shaped miniature bowls were found (fig. 8.5, nos. 19, 23). Two of these vessels had flat bases, the remainder rounded ones. The vessels varied in diameter between 1.4 and 2.8 cm, while their height ranged from 1.2 to 5.5 cm.

Ritual (?) Objects

Undoubtedly, these are the most enigmatic objects found at Sabi Abyad. Eleven large and rather curiously-shaped clay objects ((figs. 8.6-8.7) were found in the level 6 building V, room 3 (n= 3), room 6 (n= 2) and room 7 (n= 4); in addition, two were found in building IV, along and on the southernmost wall of rooms 11 and 13, respectively. The objects appeared in the fill of the various rooms, sometimes high above the floor and amidst the charred roof beams and the impressions of reed mats; in view of their position, these heavy objects must originally have stood on the roof along the northern and eastern facades of building V and must have fallen down when the building collapsed.

Virtually all were oval in shape and had a flat base and a rounded, convex body. These objects were all rather large; the complete specimens measured (L×W×H) 45×36×24 cm, 51×35×21 cm, 52×41×24 cm, 58×56×27 cm and 62×41×24 cm, respectively. All had one or two shallow, elongated holes (9-10 cm long, 3-4 cm

wide and 5-6 cm deep) along each of the long sides, whereas another hole was often found on the top. In at least two cases it appeared that this hole on the top carried the horn of a wild sheep, the larger part of which was hidden from view (fig. 8.8). Another of these objects carried the lower leg bone of a bovid, again largely hidden in the clay (cf. Cavallo, in press). These animal remains were placed in position while the clay was still wet.

The various objects were virtually identical in shape, except for the one found on the southern wall of building IV, room 13 (fig. 8.6, no. 4). This object was rather small (28.5×28×16 cm) and more or less rectangular in shape with a saddle-like top. It had a flattened base on which it could stand upright. An angular second surface made it possible for the object to tilt slightly backwards. The back was a flat surface whereas the front was strongly convex. Near the base two 'grips' were placed lengthwise.

The precise meaning of these objects remains puzzling but should most likely be looked for in a ritual context, particularly when taking into account the presence of horns and bones. The fact that they were placed on the roof of the building for adornment or protection only adds to this. Possibly these objects represent animals in a very stylised manner. If so, the shallow holes along the sides may originally have carried some wooden sticks or the like, representing the legs, or, alternatively, served as grips to allow transport. Interestingly, in the fill of room 7 and amidst some of these clay 'animals', the skeletal remains were found of two adults, with the bones completely crushed and burnt. These persons, too, must have fallen down from the roof (see chapter 2).

Beads and Pendants

Objects serving for personal adornment, such as beads and pendants, were often found in isolation and in rather limited numbers, despite the generally rather large area of excavation; most likely, most of these items were worn on the body and left the site at the time of destruction together with their owners. So far, 41 loose beads and 18 pendants have been recovered, mostly from level 6. In addition, a necklace and an bracelet came from a level 5 burial (see chapter 2 for a description).

Over half of the beads (n= 26) were made of fine-grained stones and varied in colour from black to red-brown, green and white. Various kinds of stone were used, some of which must have been of local origin, whereas others most likely came from the Turkish piedmont.

The stone *beads* can be divided into five categories. Most common (n= 10) were the simply flattened, rounded beads which varied in diameter between 0.9 and 2.0 cm, and which varied in thickness between 0.1 and 1.1 cm. Most of these beads had a central, biconical perforation. Occasionally, this piercing was slightly oblique.

In one instance, the bead was not pierced in the centre but along the edge, which made it look like a pendant. The beads were either made of local gypsum or the non-indigenous rock crystal, serpentinite and obsidian. Virtually all of these type 1 beads were found in or around the level 6 houses; an additional one appeared in a level 5 debris context.

The second type (n= 5) consisted of flat, circular beads with bevelled edges on both sides and very smoothed surfaces (fig. 8.9, no. 1). Generally, the facets were sharply cut, although some were slightly rounded. Diameters varied between 0.8 and 1.3 cm, and the thickness ranged from 0.3 to 0.5 cm. In two cases, the central perforation had been drilled from one side only, whereas the others were biconically pierced. Four beads were made of obsidian, whereas the remaining one was made of a white, almost transparent and fine-grained stone stone which has not yet been identified (gypsum or rock crystal). Three beads were found in level 6 and and one in level 3C; the final one appeared just below the topsoil and has been ascribed to either level 2 or level 1.

The third type (n= 6) consisted of straight, cylindrical beads, which were longitudinally perforated (fig. 8.9, no. 2). The short ends were usually straight; however, in one case it had been cut obliquely, whereas another had one straight and one oblique short side. The beads varied in length between 0.8 and 2.6 cm, with diameters ranging from 0.7 to 1.2 cm. The beads were made of serpentinite (n= 3), red schali (n= 1), grey-green gabbro (n= 1) and a jasper-like, clayey stone (n= 1). These raw materials are not locally available in the Balikh basin. The type 3 beads were found in levels 6 (n= 3), 4 (n= 1) and 3B (n= 2).

The fourth type (n= 4) consisted of flattened, oval beads which were biconical or, occasionally, triangular in section and laterally pierced (fig. 8.9, nos. 3-4). The beads were between 1.3 and 2.1 cm long, between 0.8 and 1.5 cm wide and between 0.4 and 1.1 cm thick. They were made of rock crystal, serpentinite, breccia and an as yet unidentified kind of stone. All type 4 beads were found in the level 6 building remains.

The fifth category is represented by only one bead so far, found in level 10 (fig. 8.9, no. 7). This gabbro bead was diamond-shape, biconical in section and longitudinally pierced. The bead was 3.5 cm long, 2.3 cm wide and 0.8 cm thick.

In addition to the beads made of stone, a small number of beads made of bone and shell appeared. So far, only two bone beads have been found, both long-drawn and cylindrical in shape with straight-cut extremes (fig. 8.9, no. 5). These beads were 1.8 cm and 1.3 cm long, respectively. One was found in the level 6 burnt roomfill, the other appeared in a level 4 debris layer.

Four beads were made of the shells of land snails. They were found in the Transitional levels 6 to 4. Two shells were simply pierced (fig. 8.9, no. 6), whereas in the case of the others part of the shell had been removed to allow attachment to a string.

Pendants were found in restricted numbers, and only in the Transitional levels 6 to 4. Most of them were made of stone. They varied considerably in shape and size.

Most remarkable were the two carefully finished pendants found near the level 6 buildings I and IX (fig. 8.9, no. 8). A third one was found in level 5 but in a debris layer. These truncated cones had holes ca. 2 mm wide drilled from the top and the side, meeting at a perpendicular angle. The cones varied in length between 2 and 2.5 cm, whereas the diameter at the base varied between 1.2 and 1.8 cm. The pendants were made of gypsum, dolorite and a sandy limestone-like stone, all locally found.

Two pendants, one found in level 6, the other in level 4, were more or less rectangular in shape with a rounded, protruding top, carrying two tiny perforations for a piece of string or leather. The level 6 specimen was made of *Unio* shell (fig. 8.9, no. 10), the level 4 specimen was made of chlorite (fig. 8.9, no. 9).

Another pendant was made of a flat, more or less round stone, 5.7 cm in diameter. The stone (greyish-green gabbro) was hardly worked except for the biconical perforation ca. 1 cm wide. It was found in a level 4 debris layer.

A level 6 pendant was made of a severely damaged but re-used butterfly-bead. Only a minor part of the original bead had been preserved, which was subsequently biconically perforated. The pendant was 1.8 cm long and 1.1 cm wide.

Labrets

So far 52 labrets have been recovered, made from a variety of raw materials. Most labrets were made of locally available materials viz. clay (n= 31), dolorite (n= 4), calcite (n= 2) and gabbro (n= 1). In addition, some were made of the non-indigenous serpentinite (n= 4) and chlorite (n= 1). In nine cases, the kind of stone could not be identified. Commonly, these objects are said to be ornaments inserted into the lower lip (cf. Hole et al. 1969:235-237); however, it seems doubtful that all indeed served as lip ornaments, this in view of the predominant use of sun-dried clay for their manufacture.

The Sabi Abyad labrets can be divided into four types. The first type has a conical shape with a slightly protruding or flaring top (fig. 8.9, nos. 12-13). The second type is represented by slim but tall, nail-shaped specimens with a slightly protruding flat or conical top (fig. 8.9, nos. 11,14-16). The type 3 labrets have a squat, cylindrical body with a pointed end and a protruding, flattened top (fig. 8.9, nos. 17-18). Sometimes the body of this type tapers towards the top, giving it a rather biconical appearance (fig. 8.9, no. 19). Others, however, show a both convex top and base, while the body has concave sides (fig. 8.9, no. 20). Finally, the fourth type has a squat, cylindrical shape with a somewhat protruding flat or convex top as well, but with a flat or slightly convex base (fig. 8.9, nos. 21-23).

So far, the distribution of labrets seems to have been restricted to levels 6 to 3C at Sabi Abyad. The majority was found in level 6: 34 specimens. These labrets appeared mainly on the floor in various rooms of building I, II and IV. In addition, some specimens were found in debris layers in the open areas between the various

buildings. The subsequent levels 5 and 4 yielded seven and ten labrets, respectively. These appeared mainly in debris layers in or around the various structures. The level 4 oven S contained four labrets. Finally, level 3C yielded one labret.

Level 6. Two-thirds (n= 23) of the labrets found in level 6 were made of clay, whereas another four specimens were made of the locally available dolorite and one of calcite. Non-indigenous materials were used in limited quantities: three labrets were made of serpentinite, another of chlorite. In two cases the kind of stone remains to be identified.

Ten labrets belong to our type 1. Nine specimens were made of sun-dried clay, although half of them gave evidence of secondary firing (probably as a result of the fire that destroyed the level 6 village). The remaining one was made of dark-grey serpentinite and possibly unfinished. Some clay labrets had a burnished surface. Three specimens had a concave top, probably due to a finger impression during manufacture. The length of the type 1 labrets varied between 1.6 and 3.9 cm, while the diameter of the top ranged from 1.1 to 2.1 cm. The type 1 labrets were found only in level 6.

Seven type 2 labrets were found, all made of clay. Their length was up to 4.0 cm, while the diameter of the top varied between 0.6 and 1.3 cm. Two labrets had originally been baked, whereas the others were smoothed and burnished. Three labrets showed a concave top. One had a flat point.

Type 3 was represented by only two specimens: one made of baked clay, the other made of stone (dolorite). These labrets tapered towards the top. Their length varied between 1.5 and 1.8 cm, while the head diameter ranged between 1.2 and 1.4 cm.

Fifteen labrets have been ascribed to our type 4. Seven labrets were made of clay. One specimen was fired, while another was secondarily fired. Four pieces were burnished. The remaining specimens were made of dolorite (n= 3), calcite (n= 1), serpentinite (n= 2), chlorite (n= 1) and an as yet unidentified stone (n= 1). The length of these type 4 labrets ranged between 0.9 and 1.9 cm, while the top diameter varied between 1.0 and 1.6 cm.

Level 5. So far, level 5 has yielded seven labrets, made of clay (n= 3), gabbro (n= 1), calcite (n= 1), serpentinite (?, n= 1) and an unidentified stone (n= 1).

The nail-shaped type 2 labrets were represented by three specimens, two made of clay, one made of gabbro. Their height varied between 1.8 and 3.4 cm. The top diameter ranged from 0.8 to 1.5 cm, while the shaft had a diameter of 0.5 cm. The stone labret had been polished, while one clay labret showed traces of burnishing.

Only one type 3 labret appeared in level 5. This labret was made of an unidentified transparent stone, perhaps rock crystal. It was 2.4 cm long. The diameter of the top was 1.5 cm, while that of the body was 1.1 cm.

Three cylindrical type 4 labrets were found, made of baked clay, rock crystal and serpentinite, respectively. The protruding tops had a diameter ranging from 1.6 to 2.4 cm, while the body diameter varied between 1.3 and 1.8 cm. The length of these labrets varied between 0.8 and 2.3 cm.

Level 4. This level yielded ten labrets, most of which (n= 7) belong to our type 2. Four of these tall, nail-like labrets were made of clay, the three others were made of as yet unidentified stones. Their length varied between 2.7 and 4.3 cm. The top diameter ranged from 0.6 to 1.3 cm, while that of the body varied between 0.3 and 0.6 cm. Two of the stone labrets had a conical top, while two of the clay labrets had a concave top. Two stone labrets had been polished.

The remaining three labrets were of type 3. All were made of (unidentified) stones. In one case the body tapered towards the top. The labrets were 1.5, 1.6 and 2.2 cm tall, respectively. The head diameter measured 1.1 and twicely 1.2 cm, the body diameter measured 0.8 and twicely 0.9 cm, respectively.

Level 3C. Only one type 3 labret was found in the terrace fill north of the stone wall (in view of its location, it is not excluded that this specimen actually belongs to one of the lower levels). It was made of clay and 1.8 cm high.

Sling Missiles

So far, levels 9 to 3A at Sabi Abyad have yielded 1756 sling missiles, all made of sun-dried clay, except for one stone specimen. No sling missiles have yet been found in the lower levels 11-10 or in the topmost levels 2-1. Their absence from the latter levels is probably merely a matter of coincidence, for sling missiles definitely remained in use in the later Halaf and subsequent periods.

Four types of sling missiles can be distinguished. The first group consists of bullets with an ovoid or biconical shape, probably made by simply squeezing a lump of clay in one hand (fig. 8.10, no. 1). This type is the most common (n= 788, or 44.9% of the total) and was found in virtually all levels.

The second type consists of sling missiles in the shape of a flattened cylinder produced by squeezing a lump of clay in the hand and flattening both ends (fig. 8.10, no. 2). These bullets (n= 248, or 14.1%) were found in levels 6 to 3B, with one specimen in either a level 9 or a level 8 context.

The third type of bullet had a long-drawn, cylindrical shape, probably due to the rolling of a piece of clay between both hands or on a flat surface (fig. 8.10, no. 3). These objects (n= 543, 30.9%) were found only in level 3B.

Finally, the fourth group consists of spheroidal sling missiles, kneaded with both hands out of a lump of clay (fig. 8.10, no. 4). Only 13 specimens (0.7%) were found, all in level 3B.

The proper type could not be distinguished in 164 cases, due to the fractured state of preservation of these bullets.

The slings themselves and their use can be reconstructed on the basis of ethnographic analogies. In western Iran slings were made by plaiting yarn and strands of goat hair for the straps and by winding the yarn several times in a loop around big

toe and finger for knotting the pocket. Subsequently, a series of half-hitches was made with the end of the yarn across this loop, knotting it to each end of the loop strands. The half-hitches were continued back and forth until the pocket was complete, with eyes left at either end for attachment to the straps (Watson 1979:186-87). A strap with a length of 1 m and a width of 3 cm could be used as a sling (Korfmann 1972:4). One end of the sling was tied around the little finger or held between this finger and the ringfinger, while the other end was held between the thumb and the forefinger. The projectile was placed on the strap, which was then swung above the head. After three or four circles, the end between the thumb and forefinger was let go and the sling missile would leave its circle tangentially. The surfaces of the sling missiles were carefully smoothed when used in battle or hunt, in order to obtain a higher velocity, larger range and higher precision (ibid.). According to Korfmann, size and weight seemed to be rather standardised for a higher precision.

The lowest levels yielded only very few, biconical or type 1 sling missiles: two specimens in level 9, three in level 8 and only one in level 7. Undoubtedly, these low figures are, at least partially, related to the restricted area of excavation.

So far, the level 6 Burnt Village has yielded 106 sling missiles, the vast majority of which (n= 100) fitted our type 1 bullets. The smallest type 1 sling missile was 3 cm long and 2 cm in diameter, while the largest one was 5.6 cm long and 3.9 cm in diameter. The mean length was 4.5 cm, the mean diameter 3 cm (n= 54). The remaining six sling missiles belonged to our type 2. These flattened, cylindrical sling missiles varied in length between 4.0 and 4.9 cm, whereas their diameter ranged from 2.5 to 3.2 cm.

The subsequent levels 5 and 4 each yielded only very few sling missiles, despite the rather large area of excavation. So far, five type 1 bullets and one type 2 bullet have been ascribed to level 5, whereas three type 1 sling missiles have been found in level 4.

The use of sling missiles seems to have been extremely popular in the Early Halaf period. Level 3B yielded the largest number of sling missiles by far: 1632 specimens. In contrast, only two specimens (both type 1) were found in the subsequent level 3A. Most common in level 3B were the type 1 sling missiles (n= 672, or 41.2% of the level 3B sample),[1] which varied in length between 4.8 and 7.2 cm (mean length: 6.5 cm) and ranged in diameter from 2.9 to 4.9 cm (mean: 3.6 cm). When compared with the earlier levels (particularly level 6), it seems that the Sabi Abyad sling missiles increased in size with the beginning of the Early Halaf period. The minimum weight of the type 1 bullets was 49.3 gr., while the maximum was 131.3 gr. The average weight was 74.4 gr. (n= 118).

[1] So far, 163 sling missiles could not be assigned with certainty to any of our four types. Most likely, however, these are fragments of type 1 sling missiles, thus increasing the type 1 sample to 835 specimens.

The type 2 sling missiles found in level 3B (n= 241, 14.8%) varied in length between 4.5 and 7.9 cm (mean length: 6.1 cm) and in diameter between 3.1 and 5.5 cm (mean diameter: 3.9). In weight these objects ranged from 53.7 gr. to 136.4 gr., with a mean of 86.4 gr.

New in level 3B is the appearance of our cylindrical type 3 sling missiles, of which 543 specimens (33.3%) were found. The length varies between 7.4 and 17.4 cm (mean: 8.8 cm), whereas the diameter ranges from 2.2 and 3.2 cm (mean: 2.8 cm). The weight varies between 60.1 gr. and to 101.0 gr. (mean weight: 88.70 gr.). Despite the somewhat curious shape of these type 3 objects, there can be little doubt about their role as sling missiles: they were found together with the 'traditional' type 1 and type 2 sling missiles in the same storage pits (see below).

New were also the spheroidal type 4 sling missiles, found in very limited numbers only (n= 13, 0.8% of the level 3B sample). These bullets varied in diameter between 5.0 and 5.5 cm. One specimen could be weighed: 70.6 gr. (the others were all in a fragmentary state).

Interestingly, the level 3B sling missiles were virtually all stored in circular or oval pits varying in diameter between 0.65 and 1.50 m, with a depth ranging from 0.26 to 0.74 m. Some of these pits contained a few dozens of sling missiles, but others contained hundreds of bullets (up to 682 missiles in one pit). Nine pits were found in the open area between building I and building V, mainly along the wall of building V. In addition, one pit was sunk into the floor of the southernmost room of building V, while two other pits were situated to the north of building V. In one of the latter pits, two alternate layers of sling missiles were recognised: the upper part of this pit contained almost exclusively the cylindrical type 3 missiles, whereas the lower half, separated from the upper part by a layer of small stones, consisted almost entirely of type 2 bullets.

So far, this practice of storing sling missiles in pits has only been recognised in level 3B at Sabi Abyad. The concentration of pits in and around building V suggests some sort of communal storage of weaponry in an 'arsenal'; apparently, there was an obvious threat to the well-being of the Sabi Abyad inhabitants.

Miscellaneous Clay Objects

The levels 8, 6 and 5 yielded a large number of small cones and cone fragments of unclear meaning. Perhaps these objects are parts of 'stud figurines', tokens or gaming pieces. A complete specimen from the level 6 building IX (fig. 8.11, no. 7) was 2.5 cm high and 3.5 cm in diameter. It had a sagging base and two small holes in its top.

Three large conical objects were found in the level 6 buildings II and V. Two complete specimens were 9 and 11.3 cm high, respectively, and measured 13 and ca. 15 cm in base diameter, respectively (fig. 8.10, nos. 5, 7). Both objects were rather coarsely finished, and showed a central perforation. One specimen was pierced axially (and, in

addition, showed the beginning of another hole on its side), the other was only partly perforated. The function of these objects is not clear; perhaps they served as stands.

Level 6 yielded 42 disc fragments of unbaked clay, the majority of which was found in building V (n= 38). The flattened discs have a circular or oval shape, with rounded or straight edges. The discs vary in diameter between about 6 and 11 cm, whereas the thickness varies between 2.0 and 3.7 cm. The function of these discs is unknown. Likewise, it is still puzzling why their spatial distribution is largely limited to building V.

The level 6 building II and the associated oven area III yielded two small, flattened plaque fragments, more or less rectangular in shape. One specimen carried shallow linear incisions on one side and oblong depressions on the other side. Their function is unknown.

Other curious objects include the few 'mushroom'-shaped items found in the level 6 buildings V, VI and IX (fig. 8.11, nos. 2-4). In addition, one specimen was found in the level 4 oven AT. These objects are up to 5.8 cm high.

A unique find was the small clay 'whistle' fragment found in the upper fill of the level 6 building V (fig. 8.11, no. 6). This hollow and cylindrical object, with at least one small, circular hole, is somewhat comparable to the cigar-shaped item found at Hassunan Yarim Tepe I and interpreted by its excavators as a whistle (Merpert and Munchaev 1971:16-17 and pl. V, fig. 5b).

Building V also yielded a small ring fragment, which was originally 2.5 cm in diameter (fig. 8.11, no. 5).

Fragments of possible house representations were found in levels 6 and 3. Level 6 yielded a small, rectangular 'house' with a gabled roof (fig. 8.11, no. 1). It was made of solid unbaked clay and measured 4.5×3.9×3.0 cm. This object closely resembled a steatite amulet found at Halafian Arpachiyah, probably depicting a gabled roof with a bending roof pole (Mallowan and Rose 1935:30 and fig. 15), or a Tell al-'Ubaid terracotta in the form of a gabled house (ibid., fig. 17).

The level 3 main building yielded 42 small, unbaked-clay fragments of flat, rectangular slabs, some of which form angles. They were found on the floor of the same room in which the miniature jars were found (tokens; see above). These parts, up to 3.2 cm thick and 23 cm long, may originally have been part of a house model. There can be little doubt that the various fragments belong together, but so far none fitted.

Another house (?) model consisted of a small and flat, triangular base carrying three low walls, thus forming an enclosure. Two other walls (seriously fragmented) were placed along the converging sides.

White Ware

The occurence of so-called 'white ware' seems to be restricted to the lower levels 7 and 6. The former level yielded three body fragments, varying in thickness

between 1.2 and 1.7 cm. Two fragments had a slightly curved appearance, and may actually have been the interior coating of rather large ceramic vessels. The third fragment was more or less rectangular in section.

Five pieces of 'white ware' were found in level 6, on the floor of various buildings. One plain rim belonged to a bowl with a rounded wall slightly curving inwards. The bowl had a diameter of 10 cm, whereas its wall was 2 cm thick. A second, more or less similar rim fragment showed parallel striations on one side, whereas the opposite side had a rather irregular surface. In addition to the rims, three body fragments were found. One piece was slightly rounded and 1.9 cm thick. One side showed striations, the other was rather smooth. The second body fragment, also 1.9 cm thick, had irregular surfaces. The third fragment was rather thick in comparison to the others: 3.6 cm. It had irregular surfaces.

Copper Ore

Most interesting was the find in level 6 of two small pieces of copper ore (malachite), which must have come from mountainous southeastern Anatolia. One of these fragments was found in the fill of room 3 of oven area III, the other in a debris layer east of this room. These finds may indicate that copper was processed at Sabi Abyad as early as 5200 B.C., albeit on a very modest scale.

Bone Implements

So far, 124 pieces of worked bone have been recovered from the prehistoric levels at Sabi Abyad. Awls and needles predominate by far (n= 94). In addition, some spatulas (n= 13), gouges (n= 4) and notched 'talley sticks' (n= 6) were found. Seven worked bone objects could not be identified.

The awls and needles (fig. 8.11, nos. 8-11 and fig. 8.12, nos. 1-6) were usually made of the long bones of sheep and goats, like metapodia, tibiae, metacarpals and metatarsals. The epiphysis was virtually completely removed in most cases. The implements were between 5.7 and 15.3 cm long, and between 1.0 and 2.7 cm wide. Virtually all piercing tools were smoothened and polished by use, and were pointed at one end. Often only the tip was preserved. Some of these pointed fragments were pitted at the butt and seemed to have been hafted originally (fig. 8.12, no. 5; similar hafted points were found at, e.g., Hajji Firuz Tepe, Matarrah and Umm Dabaghiyah; cf. Voigt 1983:207-208 and fig. 107f-h). In one case (level 6), the awl was made out of a longitudinally cut and subsequently pointed tooth of an (as yet unidentified) animal.

Most piercing tools (n= 52) were found in the various structures of the level 6 Burnt Village, particularly in building II, room 6, and in building I, area 3 (the small

central courtyard with the oven M; cf. chapter 2). The other levels each yielded only a handful (between two and seven specimens) of awls and/or needles, mainly in debris contexts. Interestingly, in level 5 most piercing tools were found in the fill in and around the various ovens.

The rather long, thin and flat tools commonly referred to as spatulas appeared in restricted numbers and mainly in a fragmented state at Sabi Abyad (n= 13; over half came from level 6). So far, only one complete specimen 11.5 cm long, 1.5 cm wide and 0.4 cm thick has been found (fig. 8.12, no. 10). Most spatulas were made of the, occasionally longitudinally cut, ribs of large mammals. The working end was either straight, slightly rounded or pointed (fig. 8.12, nos. 9-10 and fig. 8.13, no. 1). One of the flattened sides usually showed traces of polishing due to use. One spatula fragment showed traces of a perforation ca. 0.2 cm in diameter at its end (fig. 8.12, no. 3). Most spatula fragments came from debris layers. In the case of the level 6 Burnt Village, some were found on floors, while one specimen lay in a bowl standing on the floor in building V, room 10. Watson (1983:354-356 and fig. 144:23-27) considers these tools to represent burnishers (*lissoirs*) or hide smoothers.

The four gouges (fig. 8.12, nos. 7-8) from Sabi Abyad were all made by obliquely cutting off one end from a long bone (e.g. tibia). This working end was highly polished due to use. The implements were between 11.5 and 18.3 cm long and between 1.3-1.6 cm in diameter. The gouges were all found in level 6, except for one which appeared in an either level 5 or level 4 context.

Six worked-bone objects showed cut marks of varying length at small intervals (fig. 8.13, nos. 4-8). In one case, the object was made on the radius of a small herbivore, while two other specimens were made out of the scapula of a large mammal. The incisions were found either along one of the long sides or on the central part of the bone. These incisions were between 1.1 and 1.5 cm long, and were closely but not evenly spaced. The incised part of the bone was worked and smoothed; the other parts were hardly touched. Three specimens were found in level 8 debris layers, the others on the floor of the level 6 houses II, IV and XII. Earlier, a similar object was reported from an Early Halaf level at Sabi Abyad (Akkermans 1989:287 and fig. VIII.2, no. 14). These notched 'talley sticks' were found at various sites of the 7th to early 5th millennium B.C., like Çayönü and Girikihaciyan in Turkey, Hajji Firuz Tepe in Iran, and Yarim Tepe I-II and Arpachiyah in Iraq (cf. Voigt 1983:212-213).

Finally, attention is drawn to a large, triangular object found in the level 6 building II, room 7 (fig. 8.13, no. 9). It was 26 cm long, 11 cm wide, and between 0.2 and 0.7 cm thick. Most likely, it was cut out of a shoulderblade. The object was polished and showed some some deep scratches or cutting marks parallel to the long sides near the pointed end. Shallow scratches covered the entire surface.

Catalogue

Fig. 8.1

1. SAB88 W-3. Level 4. Conical spindle whorl. Dolorite? D: 2.5 cm, Th: 1.0 cm. In open area.
2. SAB88 W-2. Level 3B. Conical spindle whorl. Red-brown stone (unidentified). D: 3.0 cm, Th: 1.4 cm. In debris area.
3. S91-342. Level 6. Conical spindle whorl. Dolorite. D: 3.0 cm, Th: 0.8 cm. In building II, room 6.
4. S91-337. Level 6. Conical spindle whorl. Serpentinite. D: 2.7 cm, Th: 1.0 cm. In building II, room 6.
5. O91-109. Level 6. Conical spindle whorl. Clay, burnished. D: 3.2 cm, Th: 1.2 cm. In building II, room 6.
6. O91-455. Level 6. Conical spindle whorl. Clay. D: 3.2 cm, Th: 1.5 cm. In building VI, room 1.
7. O93-140. Level 6. Conical spindle whorl. Clay. D: 3.1 cm, Th: 1.6 cm. In building II, room 1.
8. SAB88 W-8. Level 4 or 5. Conical spindle whorl. Clay, burnished. D: 2.9 cm, Th: 1.6 cm. In open area, together with SAB88 W-7.
9. O91-16. Level 6. Conical spindle whorl. Clay. D: 3.7 cm, Th: 1.4 cm. In building I, room 2.
10. O91-20. Level 8 or 9. Biconical spindle whorl. Clay, roughly finished. D: 3.7 cm, Th: 2.0 cm. In open debris area.
11. SAB88 W-7. Level 4 or 5. Biconical spindle whorl. Clay, burnished. D: 3.2 cm, Th: 1.8 cm. In open area, together with SAB88 W-8.
12. SAB88 W-6. Level 3. Biconical spindle whorl. Clay, burnished. D: 2.7 cm, Th: 1.8 cm. In debris area.
13. O93-12. Level 3. Biconical spindle whorl. Clay. D: 3.7 cm, Th: 2.2 cm. Upper fill of pit BY.
14. O91-50. Level 6. Rounded, biconical spindle whorl. Clay, burnished. D: 2.6 cm, Th: 1.7 cm. In building II, room 6.
15. O91-101. Level 6. Biconical spindle whorl. Clay. D: 2.9 cm, Th: 2.2 cm. In building II, room 6.
16. O91-408. Level 6. Biconical spindle whorl. Clay. D: 3.6 cm, Th: 2.6 cm. In open area between buildings VI and VII.
17. O91-103. Level 6. Biconical spindle whorl. Clay, burnished. D: 3.4 cm, Th: 2.8 cm. In building II, room 6.
18. O92-39. Level 6. Biconical spindle whorl. Clay. D: 3.5 cm, Th: 2.7 cm. In hearth east of oven area III.
19. O92-7. Level 5. Biconical spindle whorl. Clay, white paint on exterior (?). D: 1.7 cm, Th: 2.0 cm. In building I, room 2.
20. O93-36. Level 6. Biconical spindle whorl. Clay. D: 3.2 cm, Th: 2.4 cm. In building IX.
21. O93-91. Level 6. Biconical spindle whorl. Clay. D: 3.4 cm, Th: 2.0 cm. In building II, room 13.

Fig. 8.2

1. O92-46. Level 6. Biconical spindle whorl. Clay. D: 3.7 cm, Th: 2.1 cm. In open area between oven area III and building IV.

2. O91-265. Level 6. Biconical spindle whorl. Clay, roughly finished. D: 2.9 cm, Th: 2.1 cm. In building II, room 6.
3. O93-87. Level 6. Biconical spindle whorl. Clay. D: 2.6 cm, Th: 1.4 cm. In building IX.
4. O92-104. Level 6. Biconical spindle whorl. Clay. D: 3.6 cm, Th: 1.9 cm. In building IV, room 6.
5. O92-310. Level 6. Biconical spindle whorl. Clay. D: 3.0 cm, Th: 1.6 cm. In building IV, room 2.
6. O91-156. Level 6. Disc-like, biconical spindle whorl. Clay. D: 3.4 cm, Th: 1.4 cm. In building II, room 3.
7. SAB88 O-32. Level 6. Biconically pierced disc. Pottery (red-painted, black Dark-Faced Burnished ware). D: 4.0 cm, Th: 0.9 cm.
8. O92-13. Level 5. Biconically pierced disc. Pottery (buff Fine ware). D: 2.5 cm, Th: 0.5 cm. In building I, room 14.
9. O92-71. Level 5 or 6. Biconically pierced disc. Pottery (light-brown Fine ware). D: 4.6 cm, Th: 0.8 cm. In debris area.
10. O92-171. Level 6. Pierced disc with incomplete biconical perforation. Pottery (brown-burnished). D: 3.5 cm, Th: 0.8 cm. In building IV, room 2.
11. SAB88 O-31. Level 1. Biconically pierced disc. Pottery (cream Fine ware). D: 2.7 cm, Th: 0.6 cm. In debris area.
12. O92-166. Level 6. Biconically pierced disc. Pottery (painted-and-incised Dark-Faced Burnished ware). D: 4.0 cm, Th: 0.7 cm. In building IV, room 2.
13. O93-13. Level 6. Biconically pierced disc. Pottery (red-burnished). D: 4.9 cm, Th: 0.8 cm. In open area north of building I.
14. O93-29. Level 3. Biconically pierced disc. Pottery (buff Fine ware with dark-brown paint). D: 4.7 cm, Th: 0.8 cm. In open area.
15. O91-267. Level 6. Pierced disc. Perforated from one side. Bevelled edges. Pottery (brown-burnished). D: 3.6 cm, Th: 0.5 cm. In building II, room 6.
16. O91-268. Level 6. Biconically pierced disc. Bevelled edges. Pottery (buff Fine ware). D: 4.0 cm, Th: 0.6 cm. In building II, room 6.
17. O91-57. Level 6. Biconically pierced disc. Pottery (black-burnished). D: 2.8 cm, Th: 0.7 cm. In building II, room 6.
18. O92-318. Level 6. Biconically pierced disc. Pottery (buff Fine ware). D: 4.5 cm, Th: 0.7 cm. In building IV, room 2.

Fig. 8.3

1. O92-321. Level 6. Biconically pierced disc. Pottery (black-burnished). D: 4.2 cm, Th: 0.7 cm. In building IV, room 2.
2. O92-47. Level 6. Biconically pierced disc. Pottery (brown-burnished). D: 3.7 cm, Th: 0.5 cm. In open area.
3. O92-305. Level 6. Coarsely finished, biconically pierced disc. Pottery (brown). D: 3.1 cm, Th: 0.9 cm. In building IV, room 2.
4. SAB88 O-19. Level 6. Pierced disc. Pottery (buff Fine ware with black paint). D: 3.9 cm, Th: 0.4 cm.
5. SAB88 O-92. Level 3. Cream loamer. Pottery (buff Fine ware with black paint). D: 4.0 cm, Th: 0.8 cm. In debris area.
6. O91-193. Level 6. Disc or loamer. Pottery (red-slipped). D: 3.8-4.3 cm, Th: 0.7 cm. In building I, room 9.

7. O93-26. Level 3. Disc or loamer. Pottery (orange Fine ware with red-brown paint). D: 5.4 cm, Th: 0.7 cm. In open area.
8. S91-222. Level 6. Disc. Incompletely perforated, with traces of drilling on one side. Limestone. D: 2.9-3.5 cm, Th: 0.6 cm. In open area.
9. S92-206. Level 6. Biconically pierced disc with small striations. Limestone. D: 3.2 cm, Th: 0.5 cm. In open area between buildings I and II.
10. S91-121. Level 6. Biconically pierced disc. Limestone. D: 4.2 cm, Th: 0.8 cm. In building II, room 6.
11. S92-155. Level 6. Biconically pierced disc. Gypsum. D: 2.9 cm, Th: 0.6 cm. In building IV, room 2.
12. S92-176. Level 6. Biconically pierced disc with cut marks or incision. Limestone. D: 4.5 cm, Th: 0.4 cm. In building IV, room 12.
13. O92-302. Level 6. Coarsely finished lid or loamer. Pottery (orange-brown). D: 10.3-10.9 cm, Th: 2.0 cm. In building V, room 2.
14. O92-322. Level 6. Lid or loamer. Pottery (orange-brown). D: 11.0 cm, Th: 2.2 cm. In building IV, room 2, together with seven similar loamers.

Fig. 8.4

1. S93-446. Level 6. Stone (marl) sphere, token. D: 1.2 cm.
2. O92-177. Level 6. Clay sphere with band of nail impressions, token. D: 1.8 cm. In building V, room 7.
3. O91-416. Level 6. Clay sphere with nail impressions, token. D: 2.2 cm. In building II, room 6.
4. SAB88 O-77. Level 3. Clay sphere, token. D: 1.5 cm. In building I, room 3.
5. O92-94. Level 6. Clay sphere, token. D: 1.6 cm. In building V, room 6.
6. O91-125. Level 6. Clay sphere, token. D: 1.6 cm. In building II, room 6.
7. O91-82. Level 6. Clay sphere, token. D: 1.1 cm. In building II, room 6.
8. O91-439. Level 6. Clay sphere, token. D: 1.2 cm. In building VI, room 2.
9. O91-51. Level 6. Clay sphere, token. D: 3.9 cm. In building II, room 6.
10. O92-10. Level 5. Clay sphere, token. D: 3.5 cm. In building I, room 14.
11. O91-154. Level 6. Clay sphere, token. D: 2.9 cm. In building II, room 7.
12. O93-71. Level 6. Clay hemisphere with curved incision, token. D: 1.3 cm, Th: 0.5 cm. In building X, room 3.
13. O93-62. Level 4. Clay hemisphere with nail impression, token. D: 1.1 cm, Th: 0.8 cm. In fill of kiln G.
14. O91-151. Level 6. Clay hemisphere, token. D: 2.5 cm, Th: 1.4 cm. In building II, room 6.
15. O92-178. Level 6. Clay hemisphere, token. D: 2.2 cm, Th: 1.4 cm. In building V, room 7.
16. O93-50. Level 6. Clay disc with incisions, token. D: 4.0 cm, Th: 1.3 cm. In fill of tholos IX.
17. O92-196. Level 6. Clay disc, token. D: 1.9 cm, Th: 0.8 cm. In building V, room 7.
18. O91-76. Level 6. Clay disc, token. D: 2.0 cm, Th: 0.7 cm. In building II, room 6.
19. O92-257. Level 6. Clay oval disc, token. L: 2.7 cm, W: 2.5 cm, Th: 0.9 cm. In building V, room 7.
20. O93-69. Level 6. Clay disc, token. D: 2.5 cm, Th: 0.6 cm. In building II, room 7.
21. SAB88 O-51. Level 3. Clay disc, token. D: 1.4 cm, Th: 0.7 cm. In building I, room 17.
22. O93-105. Level 6. Clay disc, token. D: 2.8 cm, Th: 0.6 cm. In building II, room 7.
23. SAB88 O-47. Level 6. Clay cone, token. D: 1.8 cm, Th: 1.2 cm. In open area.
24. O91-8. Level 8. Clay cone, token. D: 1.9 cm, Th: 1.6 cm. In fill of pit AD.

25. O91-141. Level 11. Clay cone, token. D: 2.1 cm, Th: 2.3 cm. In open area.
26. O91-61. Level 6. Clay cone, token. D: 2.1 cm, Th: 1.8 cm. In building II, room 6.

Fig. 8.5

1. SAB88 W-5. Level 4. Clay bicone, token. D: 2.0 cm, Th: 1.8 cm. In fill of tholos.
2. O91-69. Level 6. Clay cylinder, token. D: 1.7 cm, L: 4.3 cm. In building II, room 6.
3. O93-6. Level 6. Clay cylinder, token. D: 1.3 cm, L: 3.7 cm. In building XII, room 4.
4. O93-117. Level 6. Clay tetrahedron, token. L: 2.2 cm, W: 2.1 cm, H: 1.8 cm. In building II, room 13.
5. S92-231. Level 6. Tetrahedron, token? Transparent, whitish stone (gypsum or rock-crystal). L: 1.2 cm, W: 1.0 cm, H: 1.0 cm. In building V, room 7.
6. S93-276. Level 4. Triangle, token. Unidentified stone. L: 1.8 cm, W: 1.6 cm, H: 0.4 cm. In fill of kiln S.
7. O91-97. Level 6. Clay triangle, token (damaged). L: 3.3 cm, W: 2.3 cm, H: 0.5 cm. In building II, room 6.
8. O92-4. Level 5. Clay cone with protrusions, token. L: 3.0 cm, W: 1.9 cm, H: 1.6 cm. In area north of building I.
9. O91-75. Level 6. Clay cone with rounded protrusions at top, token. L: 1.5 cm, W: 1.3 cm, H: 1.7 cm. In building II, room 6.
10. SAB88 O87-I. Level 3A. Clay miniature jar with rounded rim, token. D: 2.8 cm, L: 5.5 cm. In building I, room 11.
11. SAB88 O87-II. Level 3A. Clay miniature jar (damaged), token. D: 2.6 cm, L: 4.2 cm. In building I, room 11.
12. SAB88 O87-III. Level 3A. Clay miniature jar with plain rim, token. D: 1.6 cm, L: 3.6 cm. In building I, room 11.
13. SAB88 O87-IV. Level 3A. Clay miniature jar with grooved rim, token. D: 1.4 cm, L: 3.2 cm. In building I, room 11.
14. SAB88 O87-V. Level 3A. Clay miniature jar with plain rim, token. D: 2.2 cm, L: 3.1 cm. In building I, room 11.
15. SAB88 O87-VI. Level 3A. Clay miniature jar, token (damaged). D: 1.5 cm, L: 3.1 cm. In building I, room 11.
16. SAB88 O86a. Level 3A. Clay miniature jar with plain rim, token. D: 1.6 cm, L: 2.8 cm. In building I, room 11.
17. P92-47. Level 6. Clay miniature jar, token. D: 1.9 cm, L: 2.7 cm. In building IV, room 1.
18. P92-86. Level 6. Clay miniature vessel, token (damaged). D: 1.3 cm, L: 1.9 cm. In building V, room 3.
19. SAB88 O-29. Level 3A. Clay miniature vessel, token (damaged). D: 2.8 cm, L: 1.4 cm. In open area.
20. P91-93. Level 6. Clay miniature bowl, token (?). D: 3.0 cm, L: 2.4 cm. In building II, room 6.
21. P91-27. Level 6. Baked-clay miniature bowl, token (?). D: 3.6 cm, L: 2.2 cm. In building II, room 6.
22. P91-118. Level 6. Clay miniature bowl, token (?). D: 3.9 cm, L: 1.6 cm. In building II, room 6.
23. SAB88 P-34. Level 3C. Clay miniature vessel, token (?). D: 2.7 cm, L: 1.2 cm.
24. P91-73. Level 6. Clay miniature bowl, token (?). D: 7.4 cm, L: 2.6 cm. In building II, room 6.

Fig. 8.6

1. O92-350. Level 6. Clay ritual (?) object. Two shallow holes along each of the long sides, one hole on top. L: 62.0 cm, W: 41.0 cm, H: 24.0 cm. In building V, room 3.
2. O92-351. Level 6. Clay ritual (?) object. Two shallow holes along each of the long sides, one hole on top. L: 48.0 cm, W: 39.0 cm, H: 23.0 cm. In building V, room 7.
3. O92-355. Level 6. Clay ritual (?) object. One shallow hole along each of the long sides, one hole on top. L: 51.0 cm, W: 34.5 cm, H: 21.0 cm. In building V, room 6.
4. O92-343. Level 6. Clay ritual (?) object. One shallow hole along each of the long sides. L: 28.5 cm, W: 28.0 cm, H: 16.0 cm. On remains of wall between building V, room 4, and building IV, room 13.
5. O92-353. Level 6. Clay ritual (?) object. One shallow hole along each of the long sides, one hole on top with wild-sheep horn. L: 52.0 cm, W: 41.0 cm, H: 24.0 cm. In building V, room 7.
6. O92-363. Level 6. Clay ritual (?) object. One shallow hole along each of the long sides, one hole on top with wild-sheep horn. L: 45.0 cm, W: 36.0 cm, H: 24.0 cm. In building V, room 7.

Fig. 8.7

Selection of clay ritual (?) objects.

Fig. 8.8

Section of clay ritual (?) object with wild-sheep horn *in situ*.

Fig. 8.9

1. SAB88 B-7. Level 3C. Biconically pierced bead with bevelled edges. Obsidian. D: 1.0 cm, Th: 0.4 cm. In open area north of main building.
2. SAB88 B-6. Level 4. Longitudinally pierced, cylindrical bead. Serpentinite. L: 1.8 cm, D: 0.9 cm. In open area.
3. B91-16. Level 6. Flattened, conical bead, laterally perforated. Serpentinite. L: 1.4 cm, W: 1.1 cm, Th: 0.35 cm. In open area east of building II.
4. B91-17. Level 6. Flattened, biconical bead, laterally pierced. Breccia. L: 2.1 cm, W: 1.45 cm, Th: 0.83 cm. In building I, room 2.
5. SAB88 B-8. Level 4. Cylindrical bead, longitudinally perforated. Bone. L: 1.8 cm, D: 0.6 cm. In open area north of tholos.
6. B92-2. Level 5. Shell bead. L: 1.0 cm, D: 0.85 cm. In building I, room 14.
7. B91-11. Level 10. Diamond-shaped bead, longitudinally perforated. Gabbro. L: 3.5 cm, W: 2.3 cm, Th: 0.8 cm. In open area.
8. S93-101. Level 6. Truncated, conical pendant, drilled from top and side. Gypsum. L: 2.5 cm, D: 1.4 cm. In open area north of building I.
9. F93-14. Level 4. Rectangular pendant with protruding, rounded top, carrying two perforations. Chlorite, polished. L: 3.2 cm, W: 2.7 cm, Th: 0.2 cm. In open area northeast of oven O.
10. F92-13. Level 6. Rectangular pendant with protruding, rounded top, carrying two perforations. Shell. L: 3.4 cm, W: 3.0 cm, Th: 0.2 cm. In building IV, room 13.
11. S92-18. Level 5. Nail-shaped labret. Gabbro, polished. L: 1.8 cm, D: 0.8 cm. In building I, room 14.
12. O91-22. Level 6. Labret. Clay, burnished. L: 3.05 cm, D: 1.5 cm. In open area east of tholos VIII.

13. O91-77. Level 6. Labret. Clay, burnished. L: 3.4 cm, D: 1.3 cm. In building II, room 6.
14. SAB88 S-42. Level 4. Nail-shaped labret. Black stone (unidentified). L: 3.1 cm, D: 0.6 cm. In open area east of tholos.
15. SAB88 S-38. Level 4. Nail-shaped labret. Black stone (unidentified), burnished. L: 4.3 cm, D: 0.8 cm. In open area.
16. O91-472. Level 6. Nail-shaped labret. Clay, burnished. Sharply-cut base. L: 4.0 cm, D: 1.1 cm. In building II, room 6.
17. S92-1. Level 5. Squat, cylindrical labret. Transparent whitish stone (rock crystal or gypsum). L: 2.4 cm, D: 1.5 cm. In open area north of building I.
18. SAB88 S-16. Level 4. Squat, cylindrical labret. Transparent whitish stone (rock crystal or gypsum). L: 1.6 cm, D: 1.1 cm. In open area.
19. S91-345. Level 6. Squat, cylindrical labret. Dolorite, burnished. L: 1.5 cm, D: 1.3 cm. In open area south of tholos VI.
20. SAB88 O-4. Level 3C. Squat, cylindrical labret. Clay, burnished. L: 1.76 cm, D: 1.35 cm. In open area north of stone terrace wall.
21. S92-211. Level 6. Squat, cylindrical labret. Dolorite. L: 1.7 cm, D: 1.3 cm. In building IV, room 2.
22. S92-195. Level 6. Squat, cylindrical labret. Chlorite. L: 1.4 cm, D: 1.0 cm. In oven area III.
23. O92-319. Level 6. Squat, cylindrical labret. Clay. L: 1.3 cm, D: 1.3 cm. In building IV, room 2.

Fig. 8.10

1. O91-398. Level 3B. Selection of biconical sling missiles (type 1). Clay. In pit in open area between building I and building V.
2. O91-398. Level 3B. Selection of squat cylindrical sling missiles (type 2). Clay. In pit in open area between building I and building V.
3. O91-407. Level 3B. Selection of cylindrical sling missiles (type 3). Clay. In pit in area north of building V.
4. O91-400. Level 3B. Selection of spherical sling missiles (type 4). Clay. In pit sunk in floor of building V.
5. O92-72. Level 6. Conically-shaped object. Longitudinally perforated with a second hole in the side. Clay. D: 15.7 cm, L: 11.3 cm. In open area east of building V.
6. SAB88 O-85a. Level 3. Fragment of house model? Clay. L: 13.0 cm, Th: 3.3 cm. In building I, room 11.
7. O91-178. Level 6. Irregularly-shaped object. Partly perforated. Clay. D: 13.0 cm, H: 9.0 cm. In building II, room 6.

Fig. 8.11

1. O92-186. Level 6. Fragment of house model? Tapering rectangular shape with protruding, triangular roof. Clay. L: 4.5 cm, W: 3.0 cm, H: 3.9 cm. In building V, room 7.
2. O92-73. Level 6. Fragment of cylinder with protruding, 'mushroom'-shaped top. Clay. D: 5.5 cm, L: 3.8 cm. In open area east of building V.
3. O91-428. Level 6. Fragment of cylinder with protruding, 'mushroom'-shaped top. Clay. L: 4.0 cm, W: 3.0 cm, H: 4.5 cm. In building VI, room 3.
4. O93-11. Level 6. Fragment of cylinder with protruding, 'mushroom'-shaped top. Clay. L: 5.8 cm, W: 4.6 cm, H: 2.8 cm. In upper fill of tholos IX.

5. O92-95. Level 6. Fragment of biconically perforated ring. Clay. D: 2.5 cm, H: 2.1 cm. In building V, room 6.
6. O92-44. Level 6. Fragment of 'whistle'. Clay. D: 2.5 cm, L: 4.8 cm. In upper fill of building V.
7. O93-27. Level 6. Conical object with rounded base. Two holes made in top. Clay. D: 3.5 cm, H: 2.5 cm. In tholos IX.
8. J92-16. Level 6. Awl. Polished by use. Bone. L: 14.0 cm, W: 1.1 cm, Th: 0.7 cm. In open area east of building V.
9. J91-37. Level 6. Awl. Polished by use. Bone. L: 10.5 cm, W: 1.5 cm, Th: 1.0 cm. In building II, room 6.
10. J91-30. Level 6. Awl. Polished by use. Bone. L: 10.4 cm, W: 1.3 cm, Th: 0.9 cm. In building II, room 6.
11. J91-24. Level 6. Awl. Polished by use. Bone. L: 10.6 cm, W: 1.5 cm, Th: 1.1 cm. In building II, room 6.

Fig. 8.12

1. SAB88 I-4. Level 3A. Awl. Polished by use. Bone (metapodium of small adult herbivore). L: 9.8 cm, W: 1.0 cm, Th: 0.5 cm. In open area south of building I.
2. J93-5. Level 3B. Awl. Polished by use. Bone (metapodium). L: 8.9 cm, W: 1.5 cm, Th: 1.1 cm. In tholos S.
3. J91-18. Level 6. Awl. Polished by use near the point. Bone. L: 6.2 cm, W: 1.6 cm, Th: 1.4 cm. In burnt fill between buildings I and VI.
4. J91-43. Level 6. Awl. Polished by use. Bone. L: 7.1 cm, W: 2.1 cm, Th: 1.0 cm. In building II, room 6.
5. J91-47. Level 6. Awl. Pointed top, perhaps indicative of hafting. Polished by use. Bone. L: 13.1 cm, W: 1.7 cm, Th: 1.0 cm. In building VI, room 3.
6. J92-4. Level 5. Awl. Polished by use. Bone. L: 15.3 cm, W: 2.7 cm, Th: 1.6 cm. In building I, room 8.
7. J93-19. Level 6. Gouge. Obliquely-cut working edge, polished by use. Bone (long bone of young animal). L: 16.4 cm, D: 2.3 cm. In building X, room 2.
8. J93-25. Level 6. Gouge. Obliquely cut working end, polished by use. Bone (tibia of small mammal). L: 11.5 cm, W: 2.4 cm. In building II, room 14.
9. J92-22. Level 6. Spatula (damaged). Polished by use. Bone (longitudinally split rib). L: 14.0 cm, W: 3.3, Th: 0.2 cm. Found in bowl (P92-62) in building V, room 10.
10. J93-11. Level 6. Spatula (slightly damaged). Rectangular shape wit pointed ends, scratched. Polished by use. Bone (rib). L: 11.5 cm, W: 1.5 cm, Th: 0.4 cm. In tholos IX.

Fig. 8.13

1. J91-16. Level 3A or 6. Spatula (damaged). Polished by use. Bone (rib of large mammal). L: 9.8 cm, W: 1.8, Th: 0.4 cm. In open area.
2. J93-13. Level 6. Spatula (damaged). Polished by use. Bone (rib). L: 11.1 cm, W: 3.2 cm, Th: 0.2 cm. In open area.
3. SAB88 I-21. Level 2. Spatula (damaged). Conical perforation on one end. Bone (rib). L: 8.9 cm, W: 2.1 cm, Th: 0.4 cm. East of oven O.
4. J91-14. Level 8 or 9. Incised bone. Obverse has 19 parallel incisions, reverse unworked. L: 11.9 cm, W: 5.2 cm, Th: 1.4 cm. Found in open area.

5. J91-28. Level 8. Incised bone (scapula of large mammal). Obverse has 12 parallel incisions, reverse unworked. L: 3.9 cm, W: 2.3 cm, Th: 1.1 cm. In burnt fill.
6. J93-16. Level 6. Incised bone. Obverse has 24 parallel incisions, reverse unworked. L: 9.8 cm, W: 3.5 cm, Th: 1.2 cm. In fill in open area.
7. J92-25. Level 6. Incised bone. Obverse has 26 parallel incisions, reverse unworked. L: 8.0 cm, W: 2.0 cm, Th: 1.0 cm. In building II, room 6.
8. J91-2. Level 8. Incised bone (scapula of large mammal). Obverse has 9 parallel incisions, reverse unworked. L: 4.0 cm, W: 3.5 cm, Th: 1.3 cm. In burnt fill.
9. J93-22. Level 6. Triangular object (damaged). Polished. Some deep scratches (cutting marks?) near pointed end, parallel to long sides. Entire surface carries shallow scratches. Bone (shoulderblade?). L: 26.0 cm, W: 11.0 cm, Th: 0.7 cm. In building II, room 7.

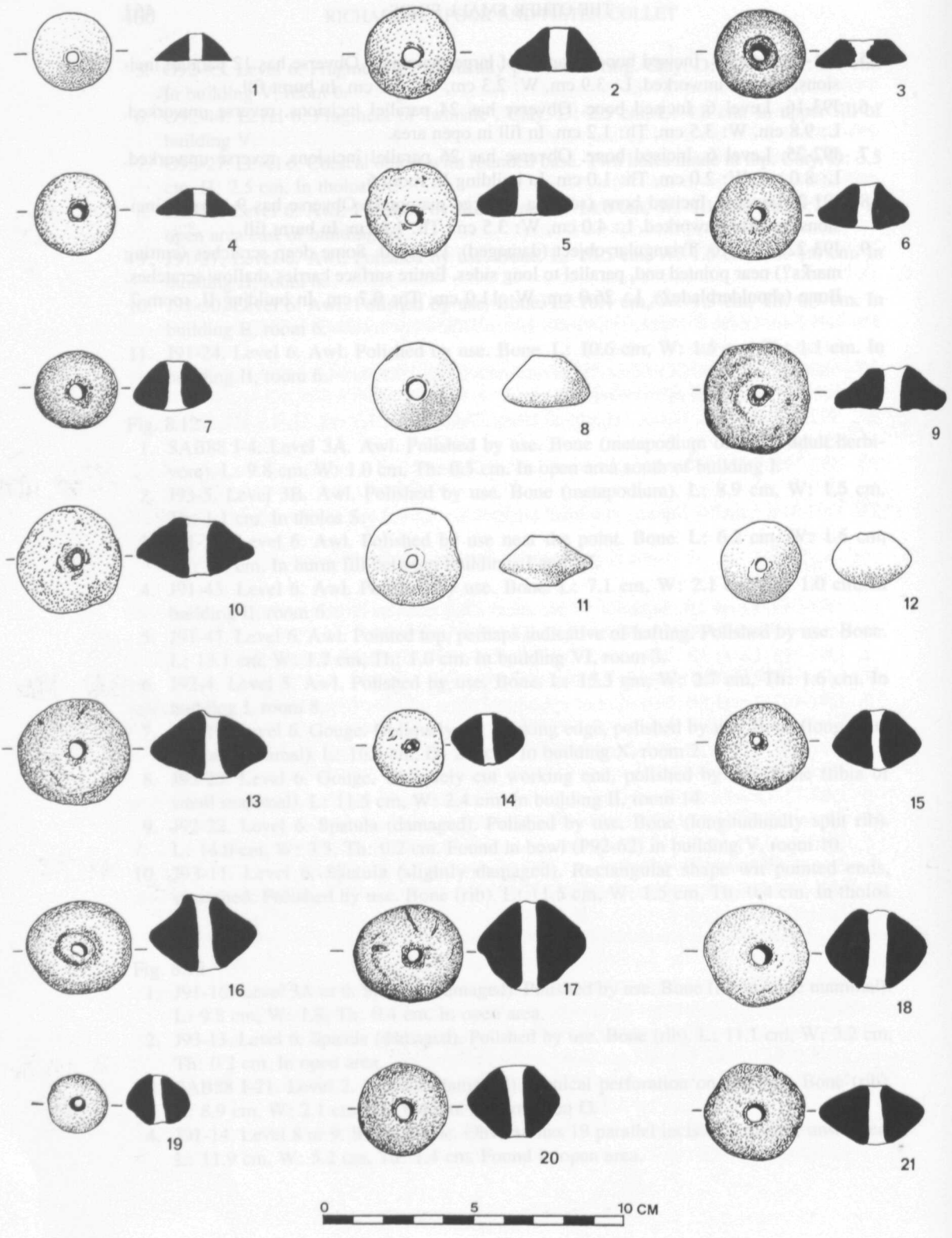


Figure 8.1. Spindle whorls.

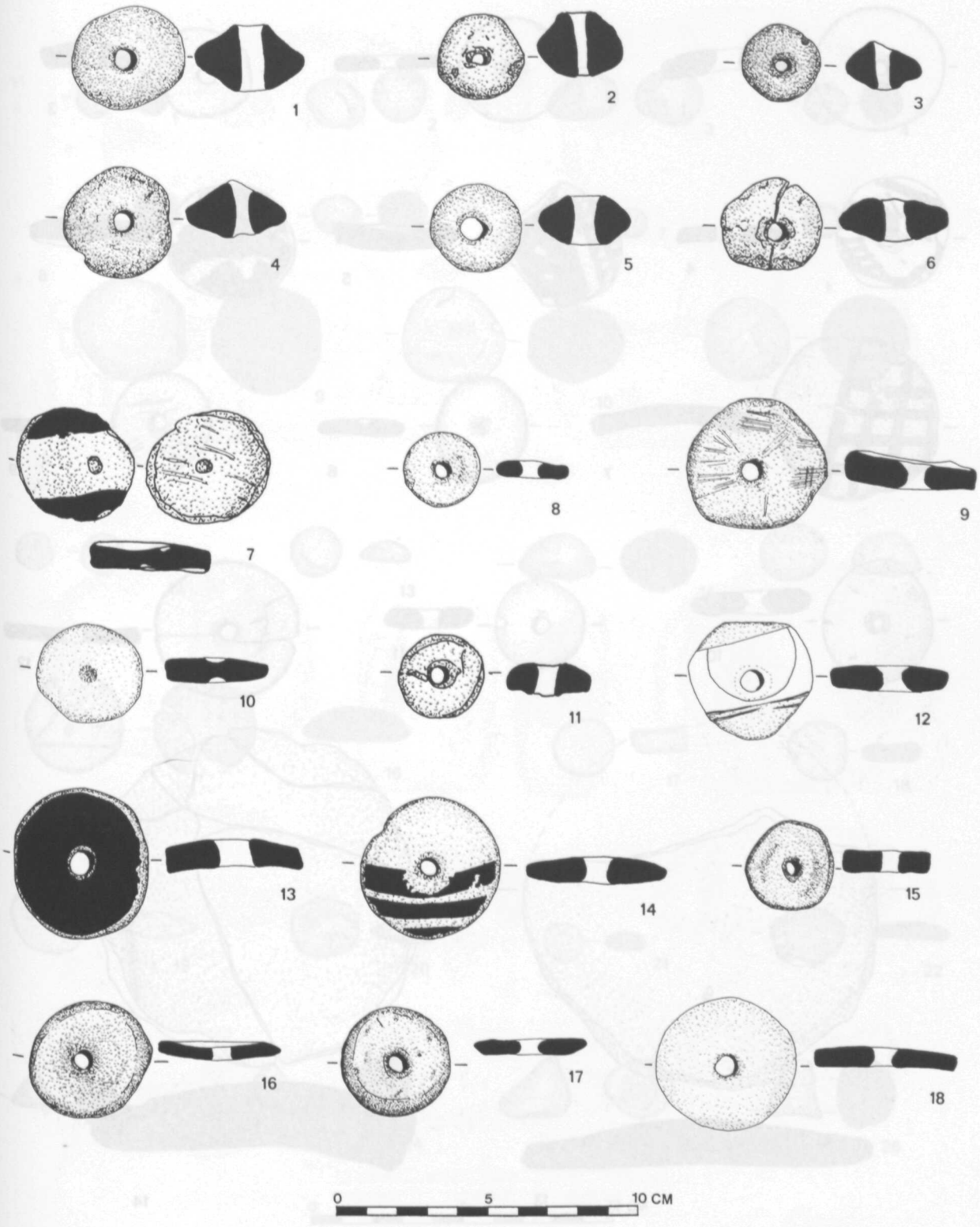


Figure 8.2. Spindle whorls and pierced discs.

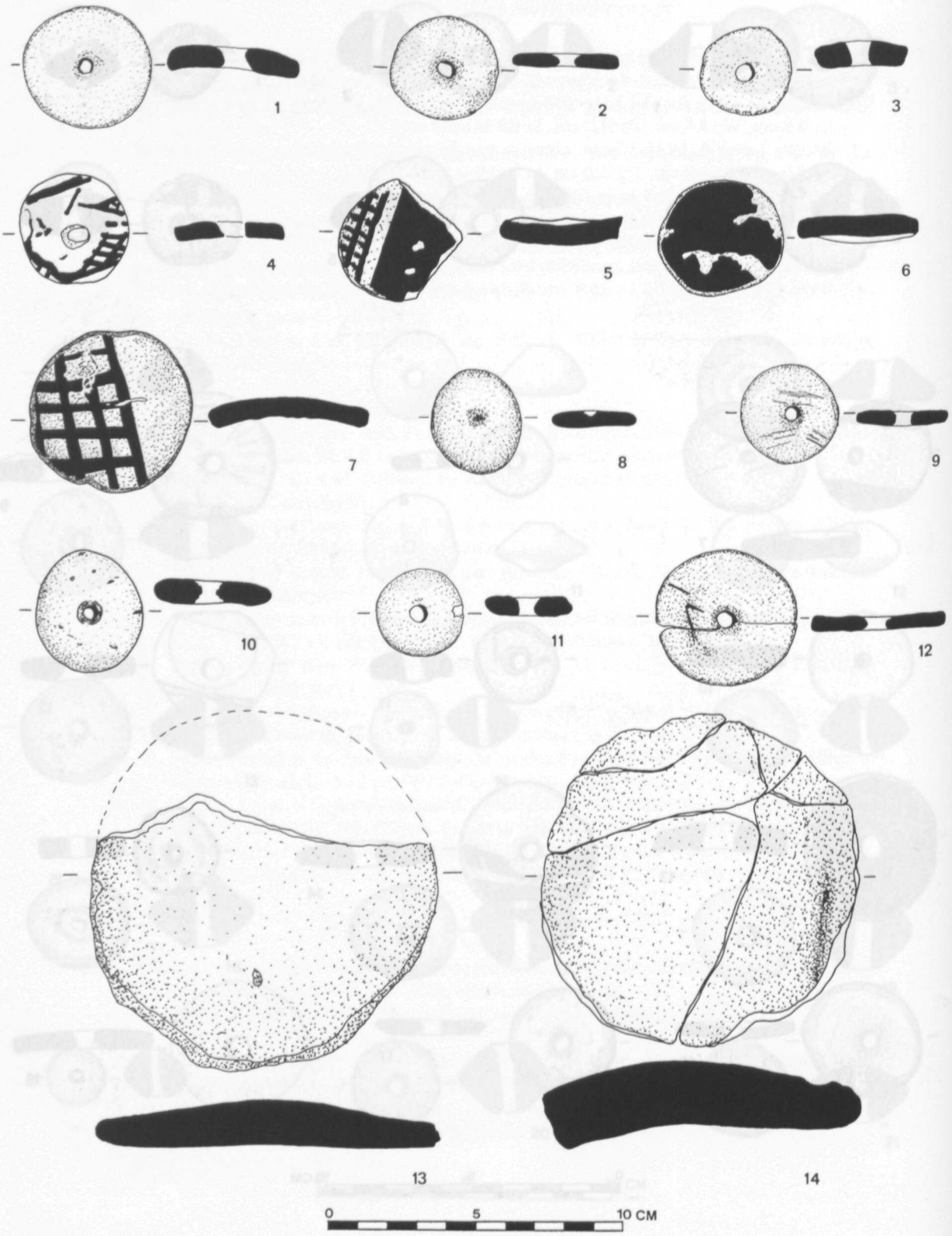


Figure 8.3. Pierced and unpierced discs, loamers and lids.

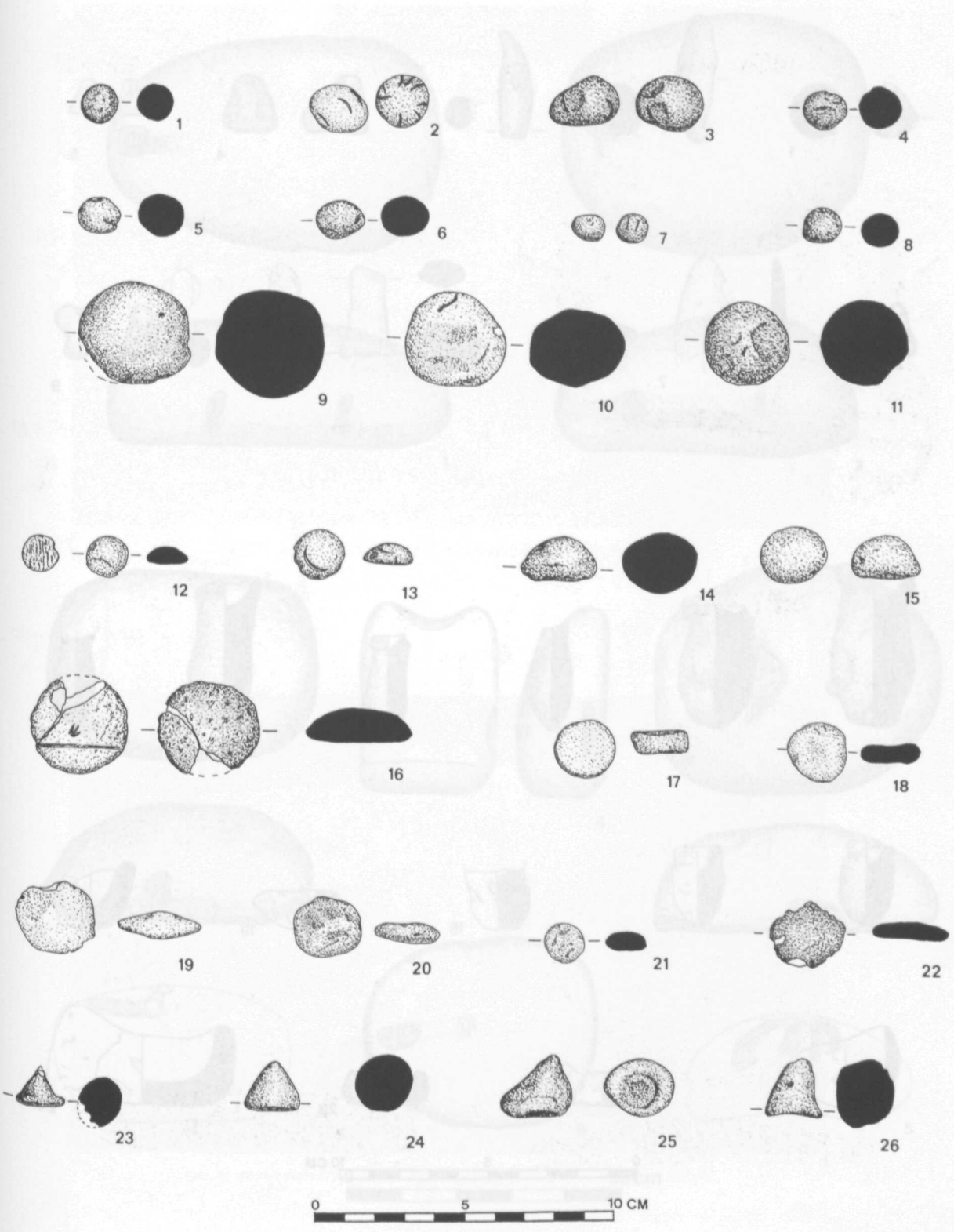


Figure 8.4. Tokens.

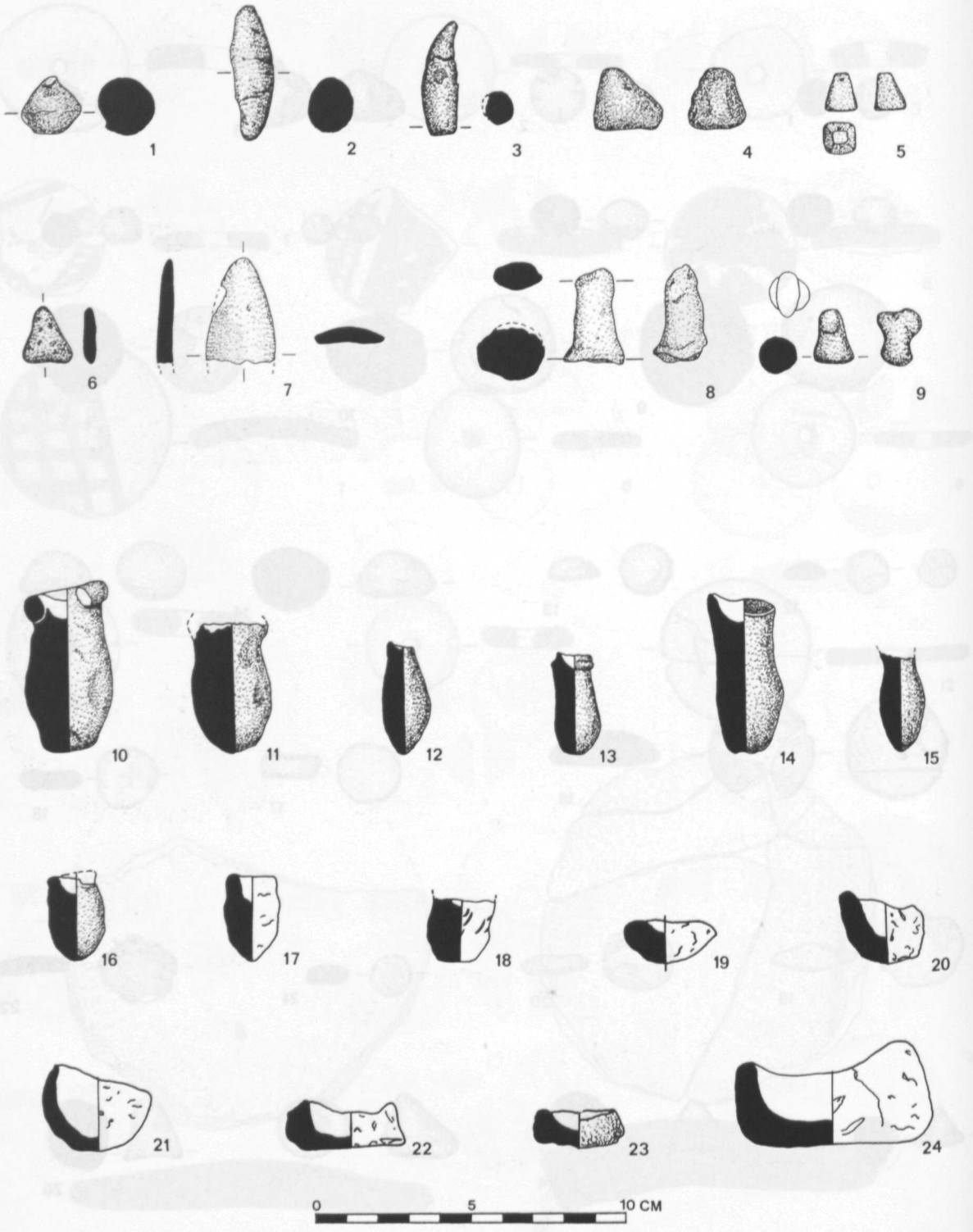


Figure 8.5. Tokens.

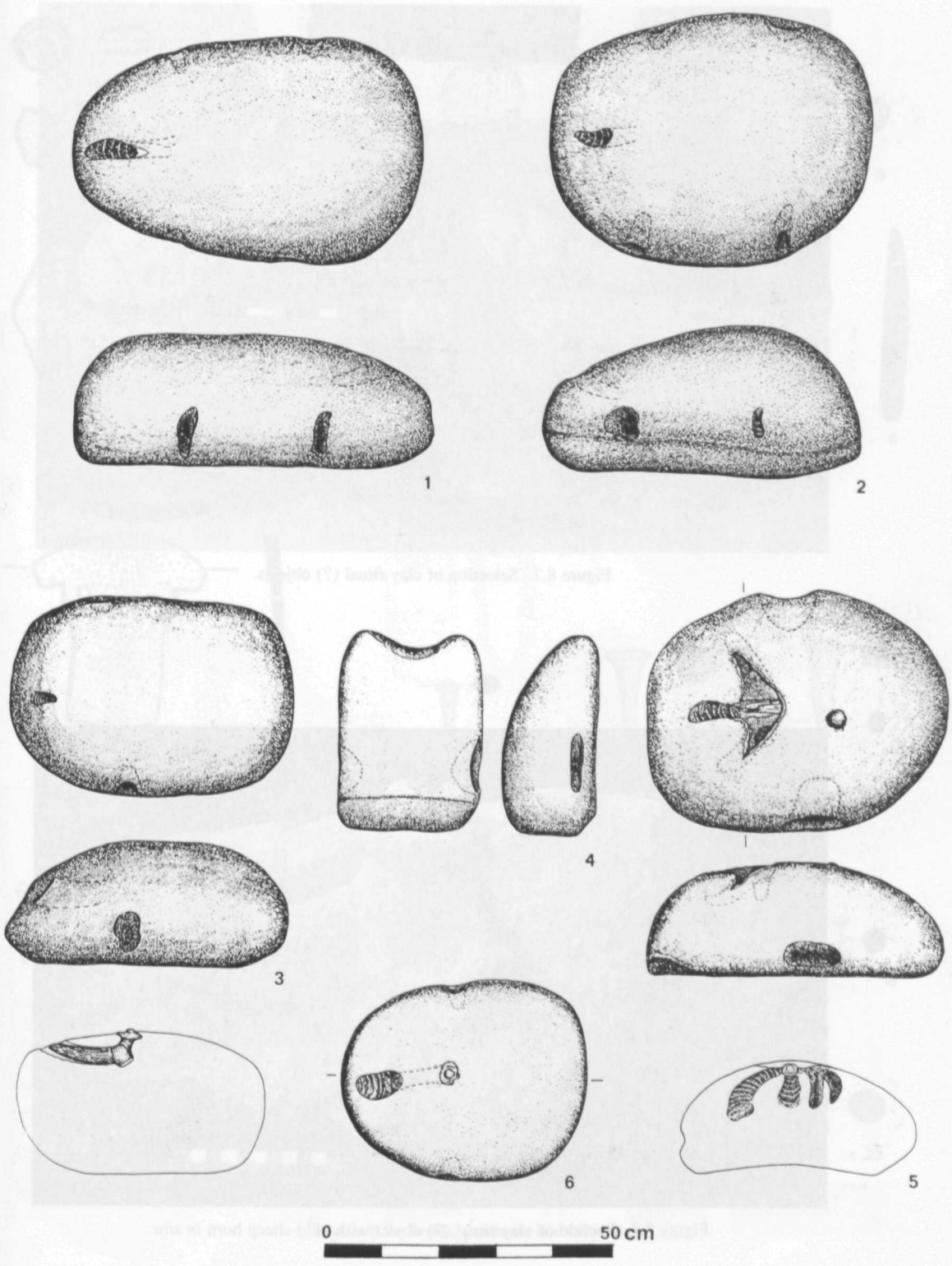


Figure 8.6. Clay ritual (?) objects.

Figure 8.7. Selection of clay ritual (?) objects.

Figure 8.8. Section of clay ritual (?) object with wild-sheep horn *in situ*.

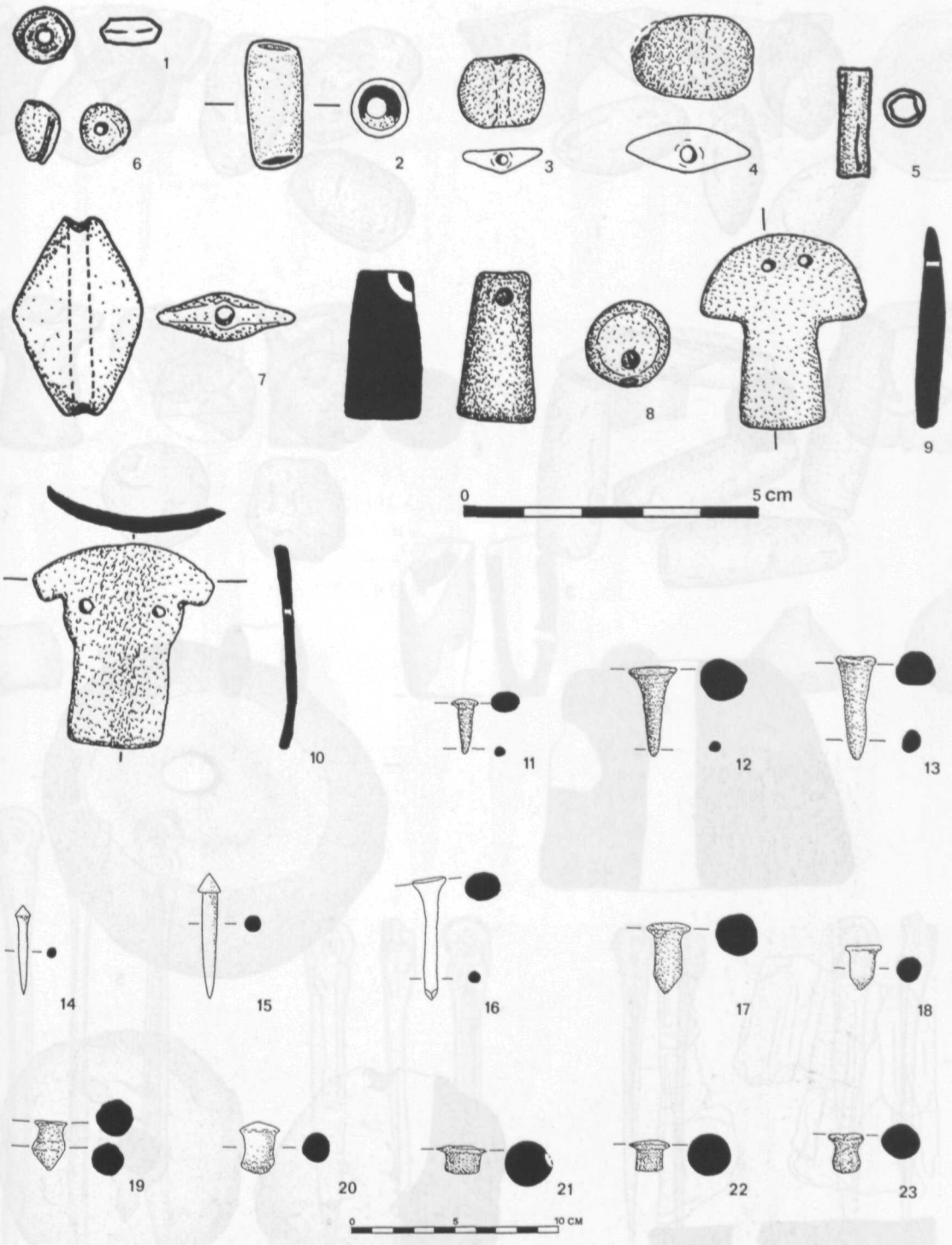


Figure 8.9. Beads, pendants and labrets.

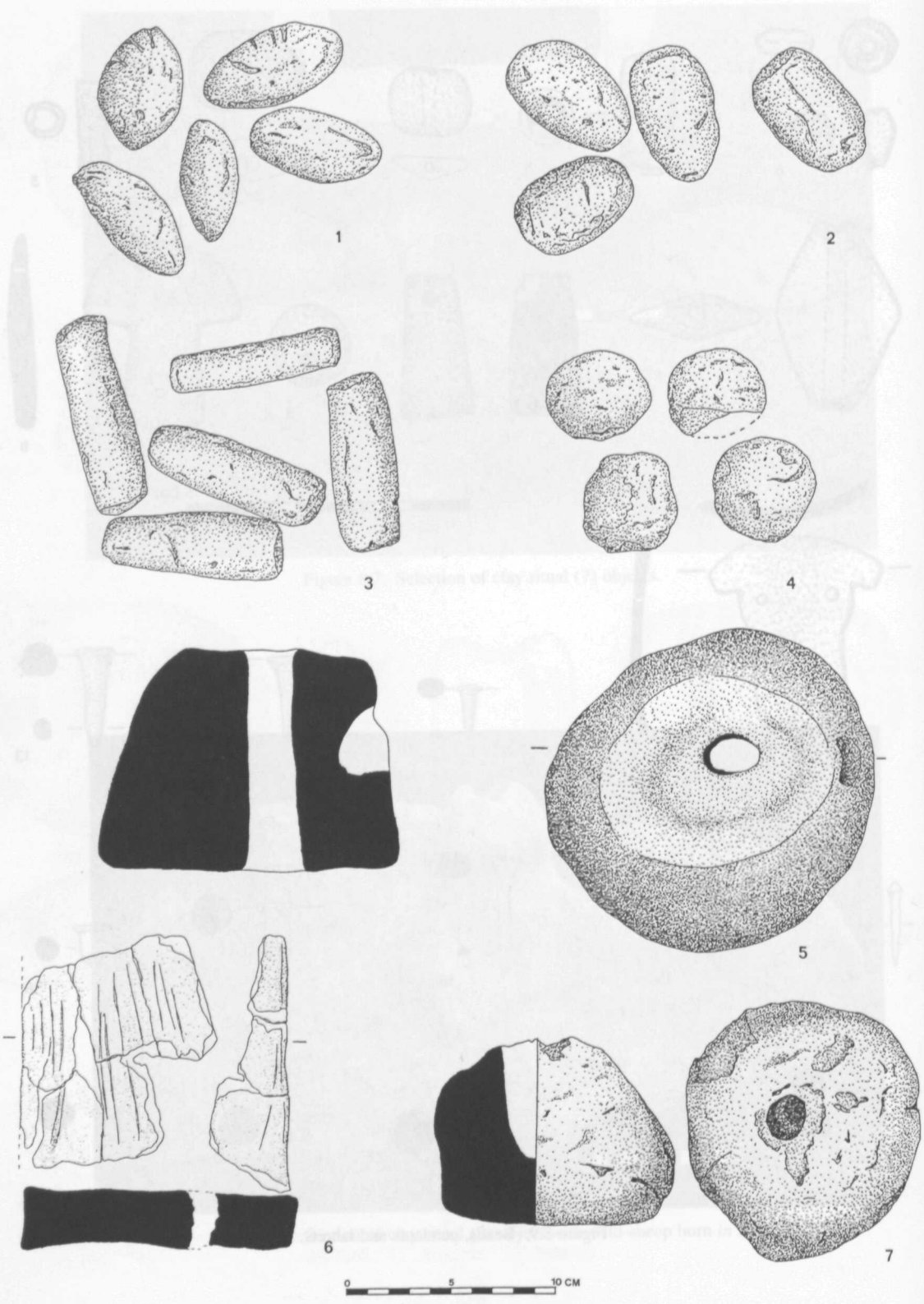


Figure 8.10. Clay sling missiles (nos. 1-4) and miscellaneous clay objects.

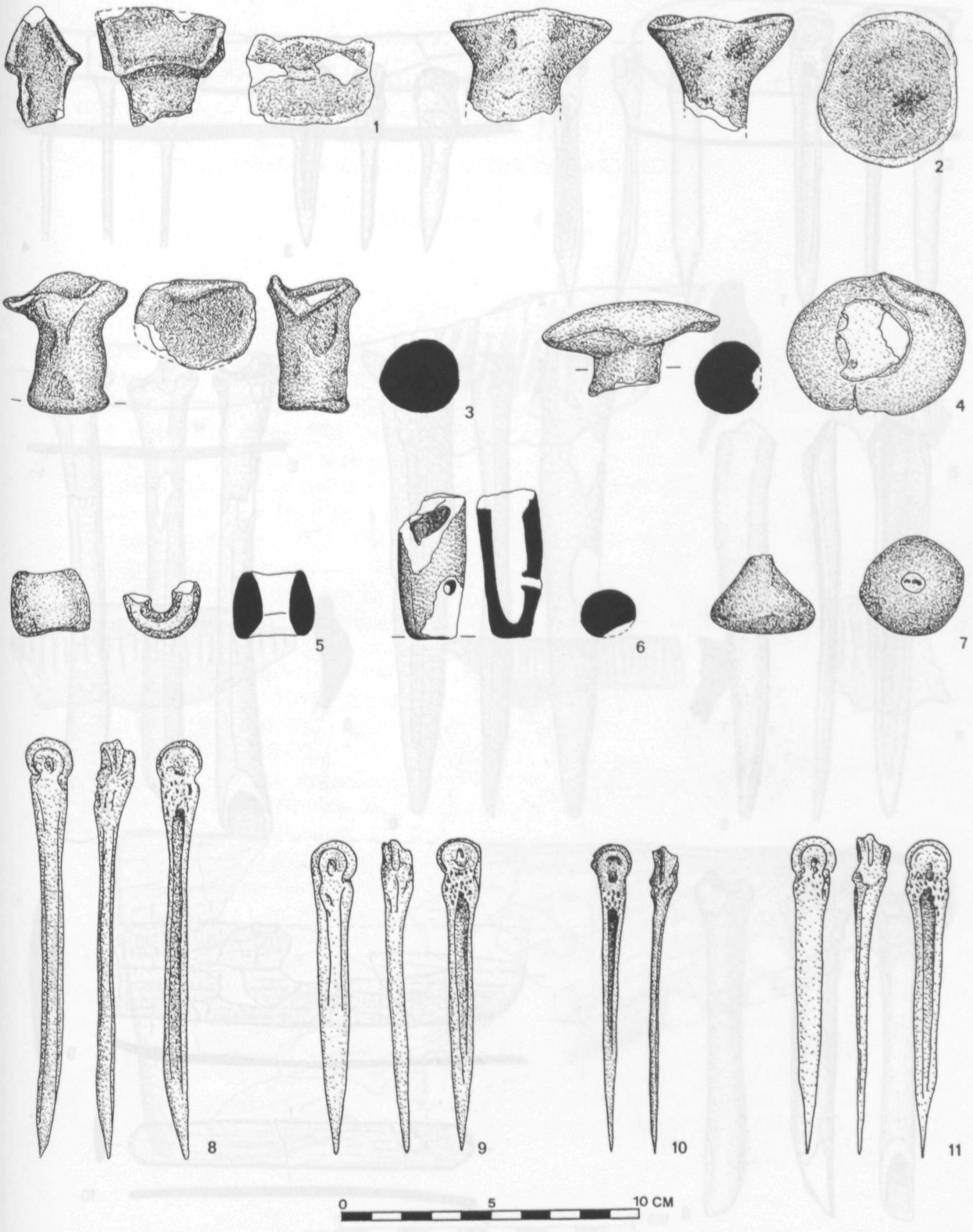


Figure 8.11. Miscellaneous clay objects (nos. 1-7) and bone tools.

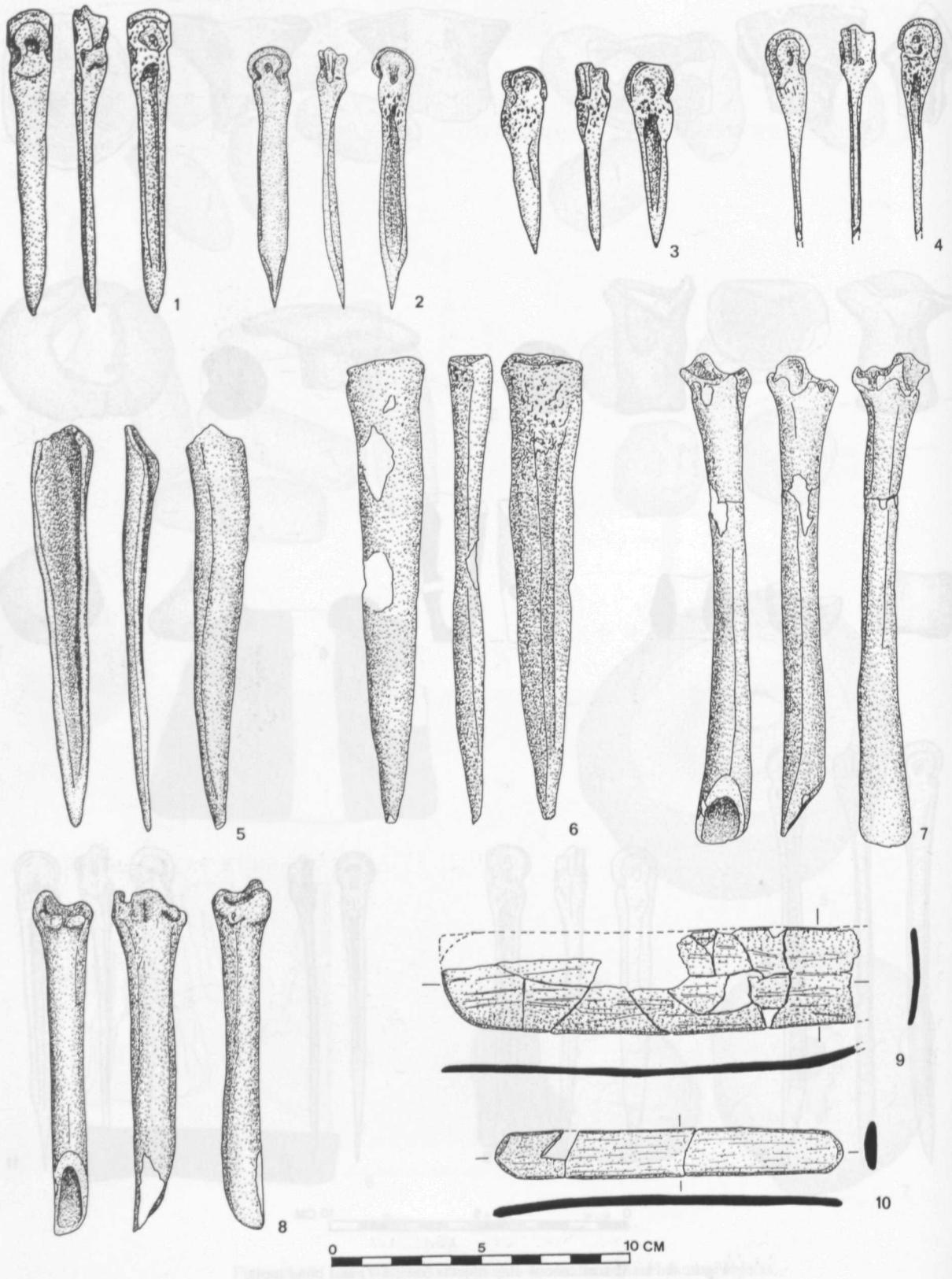


Figure 8.12. Bone tools.

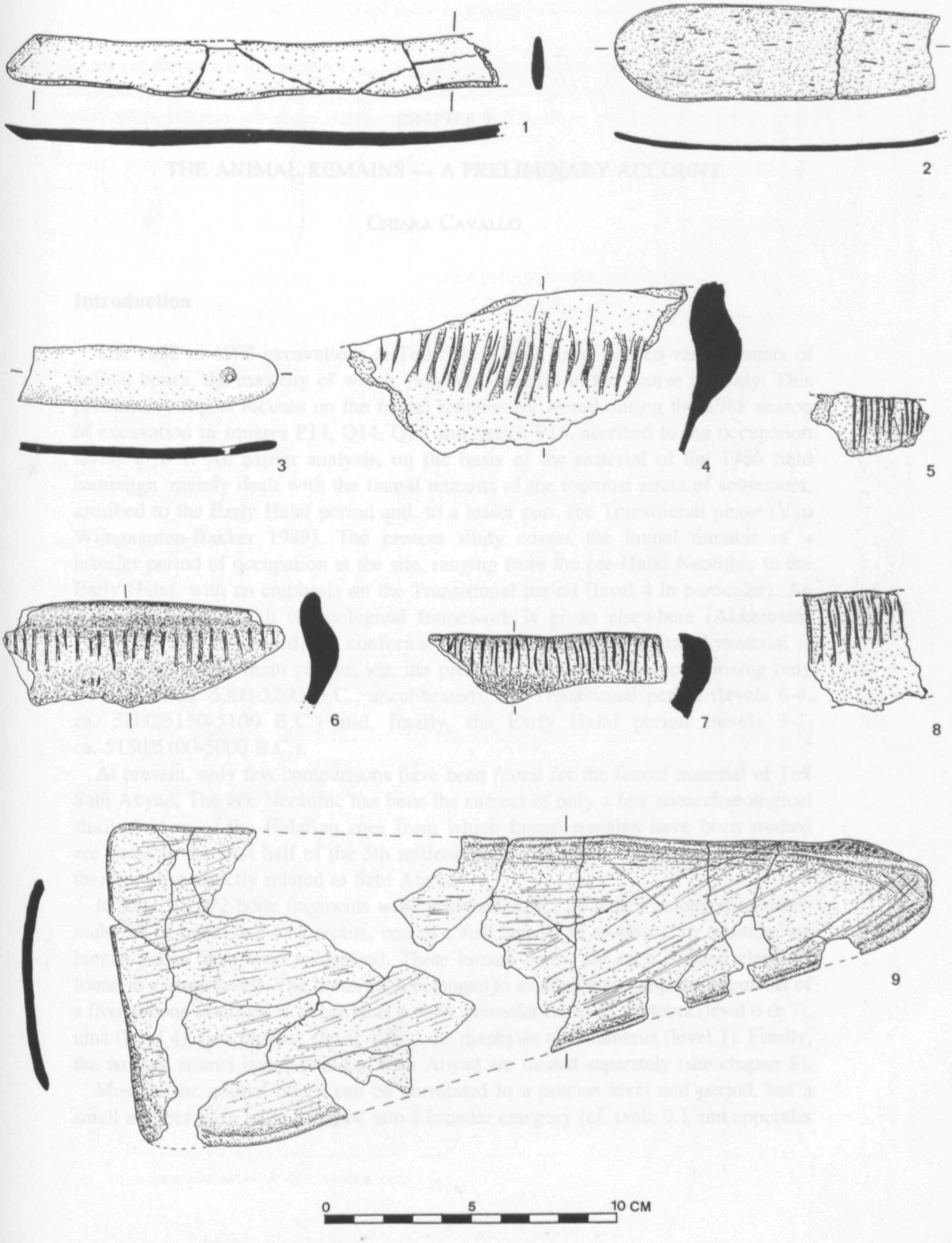


Figure 8.13. Bone tools.

CHAPTER 9

THE ANIMAL REMAINS — A PRELIMINARY ACCOUNT

CHIARA CAVALLO

Introduction

The 1988 to 1993 excavations at Tell Sabi Abyad have yielded vast amounts of animal bones, the majority of which, however, are still in the course of study. This preliminary report focuses on the faunal remains recovered during the 1988 season of excavation in squares P14, Q14, Q15 and trench P15, ascribed to the occupation levels 8 to 1. An earlier analysis, on the basis of the material of the 1986 field campaign, mainly dealt with the faunal remains of the topmost strata of settlement, ascribed to the Early Halaf period and, to a lesser part, the Transitional phase (Van Wijngaarden-Bakker 1989). The present study covers the faunal remains of a broader period of occupation at the site, ranging from the pre-Halaf Neolithic to the Early Halaf, with an emphasis on the Transitional period (level 4 in particular). An account of the Balikh chronological framework is given elsewhere (Akkermans 1993; see also Foreword). In conformity with this scheme, the faunal material is grouped into three main phases, viz. the pre-Halaf Neolithic (here comprising only levels 8-7, ca. 5300-5200 B.C., uncalibrated), the Transitional period (levels 6-4, ca. 5200/5150-5100 B.C.) and, finally, the Early Halaf period (levels 3-1, ca. 5150/5100-5000 B.C.).

At present, only few comparisons have been found for the faunal material of Tell Sabi Abyad. The late Neolithic has been the subject of only a few zooarchaeological studies. Most of the Halafian sites from which faunal remains have been studied are dated to the first half of the 5th millennium B.C. or Late Halaf period, and are therefore not directly related to Sabi Abyad.

In total, 13,072 bone fragments were analysed, 3,921 of which belonged to mammals, 20 to birds, one to a reptile, one to a fish and 99 to molluscs. In addition, six human bones have been recognised. These human bones are each isolated elements found in various levels. The bones each belonged to an adult and comprise fragments of a frontal bone (ascribed to either level 4 or 5), premolar (level 6), vertebra (level 6 or 7), ulna (level 4), first phalanx (level 4) and the diaphysis of a humerus (level 7). Finally, the worked animal bones found at Sabi Abyad are treated separately (see chapter 8).

Most of the animal bones can be correlated to a precise level and period, but a small number have to be grouped into a broader category (cf. table 9.1 and appendix

9.1). The general results are presented in table 9.1. A more detailed analysis per level will be given at a later stage of research, when the material from the later seasons of excavation and from the squares left out of consideration in the present study will have been examined.[1]

Taphonomy

Degree of identification and fragmentation

Generally, the material is in a poor state of preservation. Most bones are broken and heavily fragmented, with a very brittle surface. The colour of the bones is mainly a light yellowish-brown. The colour of the burnt bones varies from black or white (calcinated bones) to different nuances of red. Inevitably, the poor state of preservation and the high level of fragmentation results in a high percentage of unidentifiable bones (ca. 75%).

The material from square Q15 and trench P15 was taken as a sample for the calculation of the ratio of identifiable bones versus unidentifiable ones through time. The percentage of identified bones varies from about 30% in the lowest levels to ca. 15% in the upper ones (table 9.2). Almost half of the unidentifiable fragments could not even be ascribed to the categories of medium or large mammals (MM resp. LM). The overall proportion of unidentified fragments is higher than in the previous investigation (Van Wijngaarden-Bakker 1989), demonstrating the subjectiveness of the exercise. The ratio between the categories medium and large mammals is, however, similar to that presented in the previous analysis for most levels. Only in level 6 the percentage of LM surpasses that of MM (table 9.3). These differences are, however, obliterated if the percentages are calculated per phase. So far, only two fragments of small mammals have been identified among the total assemblage.

The high degree of fragmentation may be the result of butchery, trampling and/or weathering; any definite conclusions in this respect are hampered by the general bad state of preservation. Varying per level, up to half of the bones may have been preserved to less than a quarter of their original size. As the degree of completeness of the individual bones increases, their relative frequency decreases. The majority (ca. 70%) of the group of completely preserved specimens consists of phalanges and carpal/tarsal bones.

[1] The present preliminary analysis is part of a Ph.D. thesis actually in preparation at the Institute for Pre- and Protohistoric Archaeology 'Albert Egges van Giffen' of the University of Amsterdam. The author wishes to thank the members of the Zooarchaeological Department, in particular C.H. Maliepaard, for their continuous help and assistance. Thanks are also due to H. Buitenhuis for his advice on the identification of some gazelle bones, and to L.H. van Wijngaarden-Bakker, W. Groenman-van Waateringe and P.M.M.G. Akkermans for their critical reading of the manuscript.

phase:	pre-Halaf	Transitional	Early Halaf	Unknown	Total	%
Sheep/Goat, *Ovis/Capra*	149	1323	572	338	2382	60.4
Sheep/Goat (?)		2			2	0.1
Sheep, *Ovis aries*	18	192	37	29	276	7.0
Goat, *Capra hircus*	3	31	20	10	64	1.6
Cattle, *Bos taurus*	30	381	99	72	582	14.7
Pig, *Sus domesticus*	29	160	115	54	358	9.1
Dog, *Canis familiaris*	5	6		2	13	0.3
Tot. domestic mammals	234 (87%)	2093 (93%)	854 (97%)			
Equids, *Equus sp.*	26	54	6	3	89	2.3
Wild cattle, *Bos primigenius*	1	4	1		6	0.1
Gazelle, *Gazella sp.*	6	55	10	19	90	2.3
Gazelle (?)	1	17	2	5	25	0.6
Persian fallow deer, *Dama mesopotamica*	1	3			4	0.1
Red deer, *Cervus elaphus*		2	2		4	0.1
Wild pig, *Sus scrofa*		1			1	0.03
Striped hyaena, *Hyaena hyaena*		1			1	0.03
Bear, *Ursus arctos*		1			1	0.03
Fox, *Vulpes vulpes*		5	1	1	7	0.2
Hare, *Lepus capensis*		9	3	4	16	0.4
Tot. wild mammals	35 (13%)	152 (7%)	25 (3%)			
Rodents		5			5	0.1
Birds		3	2	1	6	0.1
Goose, *Anser sp.*		1		1	2	0.1
Duck, *Anas sp.*		3			3	0.1
Stork, *Ciconia cf. ciconia*		1			1	0.3
Hooded crow, *Corvus vorone*		2		1	3	0.1
Tortoise, *Testudo graeca*			1	1	2	0.1
Fish			1		1	0.03
Molluscs	+	+	+	+	+	
Total	269	2260	874	541	3944	

+ present

Table 9.1. List of identified species and quantities per phase.

Level:	8	7	6	5	4/5	4	3B	unknown	P	T	E
n	495	390	1524	317	1255	6433	65	831	885	9529	65
IDENT	30.5	30.2	23.9	19.6	18.9	20.2	15.3	21.5	30.4	20.6	15.3
MM	30.1	26.9	17.1	27.4	27.7	23.5	38.5	22.6	28.8	23.2	38.5
LM	8.1	16.2	20.0	6.9	8.1	7.9	10.8	9.1	11.6	9.6	10.8
INDET	31.3	26.7	38.8	46.7	47.3	48.4	35.4	46.7	29.3	46.6	35.4
P = pre-Halaf, T = Transitional, E = Early Halaf											

Table 9.2. Percentage of identified (IDENT) versus non-identified (INDET) fragments per level and phase (squares P15-Q15).

Level:	8	7	6	5	4/5	4	3B
n	189	168	565	109	424	2041	32
MM	78.8	62.5	46.0	79.8	82.1	75.0	78.1
LM	21.2	37.5	54.0	20.2	17.9	25.0	21.9

Table 9.3. Percentage of medium mammals (MM) versus large mammals (LM) (squares P15-Q15).

Teeth are generally better preserved than the bone fragments (cf. fig. 9.1), which is mainly due to the higher content of inorganic material in teeth, both in the dentine and the enamel. Mammalian bones and teeth are characterised by a different chemical composition (data according to Davis 1987:48):

	organic	inorganic
bone	35%	65%
dentine	20%	80%
enamel	0.5%	99.5%

The presence of complete or almost complete loose teeth is also high because of the post-depositional fragmentation of mandibles.

The pattern of fragmentation of bones and teeth is more or less similar in all phases. In contrast with expectation, the lowest, most deeply buried occupation levels in trench P15 have a somewhat lower instead of higher degree of fragmentation. Perhaps this is due to the location of the trench at the outskirts of the mound; settlement shifted more and more towards the centre of the tell in the course of time, which resulted in only a moderate pressure from overlying layers on the bones of the lowest levels. It may also be the case that the accumulation of bones in and around buildings restricted the effects of trampling (such as in the case of the level 6 buildings IV and V, and the level 7 architecture).

The degree of fragmentation was analysed separately for each of the three main species found in the faunal assemblage, viz. ovicaprids, bovids and suids. As shown by figure 9.2, the pattern of fragmentation of the ovicaprid bones is more or less equal throughout the stratigraphic sequence. Unfortunately, limited sample size prohibits a true comparison of ovicaprids with bovids and suids, but it seems that in the Early Halaf period a higher degree of fragmentation is indicated for *Sus*, followed by *Bos* and the *Ovis/Capra*. Among the ovicaprids, the group of completely preserved teeth is more evident; in *Sus* teeth are more fragmented than in the other two species. *Bos* shows a high value of complete bones, mostly carpals and tarsals.

Pre-depositional factors

The different degree of preservation for the various species, and their overall high degree of fragmentation, can partly be explained by the taphonomic factors that have modified the material in relation to the setting of the site. There are, however, also specific biotic forces that have influenced the assemblage, such as human activity (butchery and cooking) and animal activity (carnivore gnawing). The impact of these factors seems to have been low generally, but with a different pattern according to the separate levels (fig. 9.3). It should be borne in mind that post-depositional processes may have partly obliterated the traces of biotic forces.

The butchering marks mainly consist of short and fine, repeated cutmarks located in the articular zones of the bones. Chopmarks were observed in a few cases, and are mainly associated with horncores or large mammal bones. A slightly higher percentage of butchering marks is present in the lowest levels 8 to 6.

Within the three main domestic species, *Bos* presents a higher proportion of butchered bones, followed by *Ovis/Capra* and *Sus*, both found in equal numbers (table 9.4). A remarkably high number of cutmarks and chopmarks was observed on the equid bones. A single bone of *Canis* showed cutmarks.

When compared with the butchered bones, the bones with traces of carnivore gnawing give evidence of a much larger variability per level. As shown by figure 9.3, bones with traces of carnivore gnawing are much more abundant (ca. 8-20% of the faunal sample) in the lower levels 8 to 6 than in the upper levels 5-1 (ca. 1-3% only). A possible explanation lies in the utilisation of the area where the bones were found, viz. trench P15. Whereas settlement at Sabi Abyad shifted more and more towards the centre of the mound in the course of time, it seems that the slopes of the mound (including trench P15) were turned into open, outdoor areas (cf. chapter 2). The accumulation of household debris around the buildings of levels 8 to 6 would certainly have attracted scavenging dogs. It is not surprising that in these levels the highest percentage of carnivore gnawing is present (appendix 9.1).

Within the three main domestic species, the highest proportion of gnawed bones was observed in *Bos*, followed by *Sus* and *Ovis/Capra* (table 9.4). The high value of

	Cutmarks		Gnawed		
	%	n	%	n	Total
Ovis/Capra	2.2	61	2.7	73	2722
Bos	4.0	25	6.2	175	588
Sus	2.2	8	4.8	36	359
Canis	7.7	1	23.1	3	13
Equus	11.2	10	22.5	20	89
Gazella	3.5	4	1.7	2	115

Table 9.4. Percentage of cutmarks and gnawed bones.

	all levels			without level 6			only level 6		
	%	n	Total	%	n	Total	%	n	Total
Ovis/Capra	4.7	130	2722	3.6	95	2524	9.1	18	198
Bos	8.8	51	588	4.8	22	453	8.9	12	135
Sus	3.1	11	359	1.5	5	325	17.6	6	34
Canis	3.1	4	13	25.0	2	8	40.0	2	5
Equus	5.6	5	89	1.6	1	63	15.4	4	26
Gazella	13.1	15	115	8.6	9	104	81.8	9	11

Table 9.5. Percentage of burnt bones.

gnawed bones in *Canis* and *Equus* is probably biased, due to the small sample sizes for these species.

The level 6 settlement shows the highest percentage of burnt animal remains (ca. 20%), which can be correlated to its destruction by fire (cf. chapter 2; see also Akkermans and Verhoeven 1995). In the other levels, burnt bones amount up to ca. 3%, except for levels the 3A and 7 in which the percentage of burnt remains is less than 1% (fig. 9.3). When taking all levels together, *Bos* shows the highest percentage of burnt remains among the domesticates. This is in contrast with level 6, where *Sus* predominates (table 9.5). The high values of burnt remains for *Canis* and *Gazella* are biased by the small number of fragments recovered so far.

Post-depositional factors

The bones show only limited traces of cracking and flaking; it is assumed that they lay on the surface for a short time only and were buried quickly. The faunal assemblage may have been affected by various post-depositional variables, such as the activity of micro-organisms, which is very high in hot regions and which can

rapidly destroy the organic component of the bones, or the large differences in temperature between night and day and between the seasons, which have a mechanical impact on the bones. In addition, indications of acid action of plant roots were occasionally noticed. On the surface of some bones precipitations of salt are found.

The Animal Species

Sheep (*Ovis aries* and *O. orientalis* (?)) and goat (*Capra hircus*)

The remains of sheep and goats are most abundantly present. In total, 2,724 bones have been ascribed to these species; together, they account for about 69% of the overall (identified) faunal sample and for over 70% of the domestic-animal remains (table 9.1).

The remains of *Ovis* are difficult to separate from those of *Capra*, and therefore both have been taken together as ovicaprids. However, with the aid of the indications given by Boessneck et al. (1964), 276 bones were ascribed to *Ovis* and 64 to *Capra*. Whereas the overall proportion of ovicaprid remains is fairly constant through time, the importance of the goat remains seems to increase in the topmost levels. The ratio of *Ovis* versus *Capra* is ca. 6:1 in the pre-Halaf and Transitional periods, but is 2:1 in the Early Halaf phase (table 9.6). So far, a more detailed analysis per level is prohibited by the limited sample size, with the exception of the Transitional level 4. For this level some skeletal elements, which are considered to have better diagnostic criteria, were selected and again the ratio between the two genera was estimated. Although the ratios for the individual bones vary considerably, the average is again 6:1 (table 9.7).

	Ovis	*Capra*	O:C
Early Halaf	37	20	1.8:1
Transitional	192	31	6.2:1
Pre-Halaf	18	3	6.0:1

Table 9.6. Ratio between *Ovis* and *Capra*.

	Ovis	*Capra*	O:C
scapula	22	2(8.3%)	11:1
humerus d.	27	2(10.5%)	13:1
radius p.	5	1(16.7%)	5:1
calcaneum	8	2(20%)	4:1

Table 9.7. Number of fragments of selected elements of *Ovis* and *Capra* in the Transitional level 4.

	Pre-Halaf		Transitional		Early Halaf	
	n	%	n	%	n	%
proc. corneus	1	0.6	11	0.7	11	1.7
cranium	4	2.4	57	3.7	20	3.2
maxilla	3	1.8	5	0.3	7	1.1
mandibula	18	10.6	121	7.8	49	7.8
dentes	59	34.7	482	31.2	213	33.8
hyoid			1	0.1		
atlas			22	1.4	7	1.1
axis	3	1.8	15	1.0	8	1.3
vert. cervicales			2	0.1		
sternum			1	0.1		
sacrum			2	0.1		
scapula	4	2.4	54	3.5	22	3.5
humerus	14	8.2	84	5.4	28	4.4
radius	14	8.2	76	4.9	25	4.0
ulna	3	1.8	29	1.9	16	2.5
carpalia	1	0.6	21	1.4	10	1.6
metacarpus	9	5.3	63	4.1	13	2.1
pelvis	7	4.1	118	7.6	28	4.4
femur	9	5.3	58	3.8	19	3.0
patella			4	0.3	2	0.3
tibia	8	4.7	93	6.0	29	4.6
astragalus	2	1.2	38	2.5	9	1.4
calcaneum	4	2.4	30	1.9	15	2.4
tarsalia	14	0.9	10	1.6		
metatarsus	5	2.9	40	2.6	14	2.2
metapodia			17	1.1	16	2.5
phalanx 1	1	0.6	56	3.6	38	6.0
phalanx 2	1	0.6	17	1.1	10	1.6
phalanx 3			14	0.9	11	1.7
sesamoidea			1	0.1	1	0.2
Total	170		1546		631	

Table 9.8. Frequency of ovicaprid skeletal remains.

The various skeletal elements were found in more or less similar proportions in the three main periods of occupation (table 9.8). Loose teeth occur most frequently (comprising 34.5% of the faunal assemblage in the pre-Halaf Neolithic, 31.1% in Transitional period and 33.8% in the Early Halaf). Phalanges are predominant in the Transitional level 5 (comprising 14.7% of the identified faunal remains), with most phalanges concentrated in the large pit AK (cf. chapter 2).

phase:	Transitional		surv. Transit.	Early Halaf	
<1yr (dP4, dP4+, dP4++)	4	14%	–	2	20%
1-2ys (dP4+++, M1, M1+)	8	27%	86%	2	20%
2-3ys (P4, P4+, M1++, M2, M3-/+)	4	14%	59%	3	30%
3-4ys (P4++, M3+)	6	21%	45%	3	30%
>4ys (P4+++, M3++)	7	24%	25%	2*	20%
Total	29			10	

* very old + slight wear +++ heavy wear
-/+ erupting ++ wear surv. survivorship

Table 9.9. Mandibular wear and eruption data of ovicaprids.

	UF	F	FS*	UF tot.	F tot.	%UF	killed in age range	surv. (%)
< 1 yr								
pelvis	6	52	2					
scapula	7	90		18	242	7%	7%	–
humerus d.	3+2j	62	3					
radius p.	3	38						
1-2 yrs								
phalanx p.	4	35	1					
metapodia d.	19	39		35	119	23%	16%	93%
tibia d.	12	45	2					
2-3 yrs								
ulna p.	4	5						
femur p.	9	20	1	29	49	37%	14%	77%
calcaneus	7	15						
radius d.	9	9	1					
3-4 yrs								
humerus p.	3		1					
femur d.	3	11	1	18	19	48%	11%	59%
tibia p.	12	7						
>4 yrs							51%	47%

* not calculated in percentages UF = unfused d. = distal FS = fusing
j. = juvenile F = fused p. = proximal surv. survivorship

Table 9.10. Mortality of ovicaprids based on epiphyseal fusion (Transitional period; n= 529).

	UF	F	FS*	UF tot.	F tot.	%UF	killed in age range	surv. (%)
< 1 yr								
pelvis	4	10						
scapula	2	8		8	54	13%	13%	–
humerus d.	1	23	1					
radius p.	1	13						
1-2 yrs								
phalanx p.**	10	27		26	48	35%	22%	87%
metapodia d.	10	8						
tibia d.	6	13						
2-3 yrs								
ulna p.	2	3						
femur p.	5	5		20	16	55%	20%	65%
calcaneum	9+1j.	4						
radius d.	3	4						
3-4 yrs								
humerus p.		1						
femur d.	4	1		7	2	78%	22%	44%
tibia p.	3							
> 4 yrs							22%	22%

* not calculated in percentages
** including phalanx 1 and 2
abbreviations: see table 9.10

Table 9.11. Mortality of ovicaprids based on epiphyseal fusion (Early Halaf period; n= 181).

Few bones show traces of butchering marks. These are mainly humeri and metapodials.

A few horncores are in a good state of conservation. Their morphology suggests that they belonged to domestic animals. *Capra* gives evidence of two groups of horncores (cf. fig. 9.6). The first group consists of large-size horncores with a sharp anterior keel, bilaterally compressed with an almost flat medial surface and a convex lateral surface. The surface is smooth and a slight twist inward is present. The second group comprises small-size horncores with anterior and posterior keel not as sharply pronounced as in the previous group. The cross section is also medially compressed but no twist is visible. Most likely, the first group represents the males and the second the females. If so, the sex ratio at Sabi Abyad is five male goats (one

of them juvenile) versus two females (all levels considered together). A male goat horncore from level 7 showed traces of chopmarks on the lateral side.

Only two sheep horncores have been found, one of which (ascribed to the Transitional period) consisted of the tip of a male horncore with the characteristic torsion of the domestic ram. The tip turns inwards and the cross section is almost triangular (fig. 9.6). The bone surface is rough and the inner structure is spongy. The anterior side has two blunt ridges, of which the posterior ridge is more pronounced. The other specimen is much more fragmented but has the same characteristics. The ratio of male versus female sheep, based on the horncores, is 2:3.

Three skull fragments present a clear rounded tuberosity on the frontal bone, where a horn should have been (fig. 9.5). Hornlessness is usually regarded as evidence for domestication (Hole et al. 1969; Bökönyi 1977), but female wild sheep are sometimes hornless as well (Ryder 1983). The other way round, it appeared that at the later Halafian site of Shams ed-Din on the Euphrates female ewes bore horns (Uerpmann 1982). If the Sabi Abyad remains belong to domesticated animals, they suggest the coexistence of various types of breeds of sheep in the region.

The age structure of the ovicaprid remains was calculated on the basis of the database as a whole, in order to bypass the limits of restricted sample size per level. The mandibular data suggest that about 40% of the animals were killed before the end of their second year, ca. 35% between the ages of two and three, whereas the remaining 25% of the animals survived into their fourth year (table 9.9). The data from the epiphyseal fusion seem to confirm the above for the Transitional period (table 9.10); in the case of the Early Halaf, both sets of data are not entirely comparable due to small sample size and taphonomic bias (tables 9.9 and 9.11). This age distribution conforms to expectation in the case of non-intensive herd strategies which adopt a culling pattern that optimises herd security (extra males are killed when they are between nine months and two years old to conserve forage and labour investment of herdsmen), and is similar to that found in most non-urban settlements in the Near East (cf. Zeder and Myler 1989).

The shoulder height of the Sabi Abyad sheep is 63 cm on average; calculation, using the multiplication factor suggested by Von den Driesch and Boessneck (1974), is based on three metacarpi 130 mm, 136 mm and 126.4 mm long, respectively, and one radius with a length of 151.9 mm (fig. 9.8).

Interestingly, the analysis of the metrical data suggests that the wild sheep, *O. orientalis*, was present at Sabi Abyad (fig. 9.7 and appendix 9.5). Nowadays, the distribution of the wild sheep is confined to the Taurus and Zagros mountains (Harrison 1968); its presence further southwards, in the plains of Syria, in the early stages of the Holocene was postulated by Uerpmann (1982, 1987), who considers the presence of wild sheep more likely than that of wild goat. The remains of wild sheep have been found at a variety of sites, from early Neolithic Mureybit on the Syrian Euphrates to late Roman and Byzantine Tell Hesban in Jordan (Ducos 1978; Weiler

1981). The Halafian sites with remains of the wild sheep, such as Banahilk and Girikihaciyan (Laffer 1983; McArdle 1990), were mainly located in mountainous regions, i.e. in those areas which today are also within the range of distribution of the animal. An exception is Yarim Tepe II, located in the undulating plain of the Iraqi Jezirah (Bibikova 1981).

Cattle (*Bos taurus*) and aurochs (*Bos primigenius*)

Cattle bones (n= 588) make up about 15% of the overall (identified) faunal assemblage (table 9.1 and appendix 9.3) and ca. 12-18% of the domesticated animal remains (fig. 9.4). In general, cattle is more or less evenly distributed through time, with small oscillations between the different levels. The highest number of bovids were found in level 6, where they constituted about 36% of the domesticates (appendix 9.1).

The distribution of skeletal remains is more or less the same for each main period of occupation (table 9.12). The elements represented most are loose teeth and foot bones. The teeth are often associated with one and the same jaw and their abundant occurrence is presumably due to taphonomic factors (see above). The high frequency of phalanges (about 22%) may be due to several reasons. Compact bones are generally better preserved, and the degree of preservation is related to the size and volume of the bone (Von Endt and Ortner 1984). The phalanges were not fractured by butchery activities but discarded completely in most cases. No signs of cutmarks were observed either. Numerous cutmarks were, however, observed on the distal end of the metapodials and on tarsal bones. This may suggest that the distal parts of the feet were separated as one piece from the rest of the skeleton at the level of the carpal/ tarsal joints.

Since only a few jaws are available for determining age, this was done mostly on loose teeth, in particular the lower third molar. As in the case of the ovicaprids, age determination is based upon the data set as a whole. The data on mandibular eruption and tooth wear, and on the epiphyseal fusion of the long bones, show that only a few animals were killed at a young age; most bovids were kept until they were adult (tables 9.13-14). This points to a primitive, late-maturing breed which does not, however, exclude the exploitation of cattle for their secondary products such as milk and traction.

Wild cattle may also have been killed at Sabi Abyad, as is suggested by the presence of some large-sized bones. A metrical analysis indicates that six skeletal elements can be ascribed to *Bos primigenius* (cf. fig. 9.9 and appendix 9.6), viz. a lower premolar (from level 3A), a first, second and third phalanx (the latter from level 8, the others from level 4), an astragalus (level 4) and, finally, a metacarpal (level 6). It seems clear that the occurrence of wild cattle is not restricted to a particular level or period, but that the animal is present in all three main phases of occupation.

Actually, the occurrence of wild cattle at Sabi Abyad is not unexpected (cf. Van Wijngaarden-Bakker 1989), and it seems to be a recurrent feature at late 6th and early 5th millennium (Halafian) sites, albeit always in small numbers. The identification of

the aurochs on the basis of metrical data is supported by the comparative evidence from a series of sites from widely separated geographical regions. Laffer (1983:636ff and table 53), in her study of the faunal remains of Halafian Banahilk, points out that a series of Neolithic sites from Denmark provide the most complete set of measurements which are useful despite the large distance to the sites in the Near East. In local terms, comparisons are found at sites like Mureybit, Girikihaciyan, Çavi Tarlasi,

	Pre-Halaf		Transitional		Early Halaf	
	n	%	n	%	n	%
proc. corneus	1	3.2	4	1.0	2	2.0
cranium			17	4.4	2	2.0
maxilla			1	0.3		
mandibula	2	6.5	23	6.0	6	6.0
dentes	3	9.7	96	24.9	2.0	20.0
hyoid			1	0.3	1	1.0
axis	1	3.2	3	0.8		
vert. lumbales			2	0.5		
sacrum			3	0.8	1	1.0
scapula			8	2.1	1	1.0
humerus	1	3.2	9	2.3	3	3.0
radius			18	4.7	4	4.0
radius + ulna			1	0.3		
ulna			3	0.8	3	3.0
carpalia	7	22.6	38	9.9	2	2.0
metacarpus	1	3.2	15	3.9	3	3.0
pelvis			7	1.8	3	3.0
femur			8	2.1	3	3.0
patella	1	3.2	3	0.8		
tibia	1	3.2	14	3.6	3	3.0
fibula			8	2.1		
astragalus	3	9.7	11	2.9	1	1.0
calcaneum			6	1.6	3	3.0
tarsalia			4	1.0	7	7.0
metatarsus	1	3.2	7	1.8	6	6.0
metapodia			8	2.1	5	5.0
phalanx 1	2	6.5	24	6.2	10	10.0
phalanx 2	3	9.7	19	4.9	7	7.0
phalanx 3	4	12.9	19	4.9	3	3.0
sesamoidea			5	1.3	1	1.0
Total	31		385		100	

Table 9.12. Frequency of bovid skeletal elements.

				only Transitional	
young	(<2.5 yrs) (M3I, DP4+++)	4	22.2%	3	23.1%
subadult	(ca. 2-2.5 yrs) (M3I+)	2	11.1%	2	15.4%
adult	(2.5-4 yrs) (M3I++)	12	66.7%	8	61.5%
Total		18		13	

Table 9.13. Mortality of bovids based on mandibular wear and eruption (all periods).

	UF	F	%UF	killed in age range	
<2.5 yrs acetabulum humerus d. radius p.	(1)	10	9%	9%	–
2-2.5 yrs metacarpus d. tibia d. phalanges	5	37	12%	3%	91%
2.5-4 yrs humerus p. ulna p. femur p. + d. tibia p. calcaneum metatarsus d. radius d.	17	16	51%	39%	78%
>4 yrs				49%	49%
( ) fusing abbreviations: see table 9.10					

Table 9.14. Mortality of bovids based on epiphyseal fusion (all periods; n= 86).

Yarim Tepe, Tell Turlu and Çatal Hüyük. The *Bos primigenius* remains from Mureybit on the Euphrates probably provide the best data for comparison with Sabi Abyad. The Mureybit aurochs remains are relatively large when compared with the evidence from other Near Eastern sites (although smaller when compared with the European aurochs; cf. Ducos 1978). At Çatal Hüyük, on the other hand, *Bos primigenius* seems to have been rather small in size, although this may be due to a predominance of female animals (Ducos 1988).

However, the use of metrical arguments for identification purposes meets with some difficulties. First, it appears that the set of data is not unequivocal but may be used and interpreted in a variety of ways (cf. Jarman 1969, 1971). For example, it cannot be excluded that the specimens were all members of a single but variable population, or that there were wild-domestic hybrids. Likewise, the association of relatively large skeletal elements with wild animals and small ones with domesticates is merely an assumption, not a proven fact. Secondly, if we suppose that the differences in bone size correspond to a different status (domestic or wild) of the animal in question, it must be taken into account that domestic cattle in the Near East are generally larger in size than their European counterparts, whereas the opposite holds for the wild ones (Ducos 1978; it is evident that this may result in an extensive overlap of the measurements between the two species). Thirdly, the use of local measurements in association with comparative sets of data from other and often far-away regions is of questionable value (cf. Jarman's criticism (1969:239) of Flannery (1968), who determined the domestic status of Iranian bovines on data from Denmark and England).

Pig (*Sus domesticus)* and wild boar (*Sus scrofa)*

Pigs, represented by 358 bones, constituted about 9% of the total faunal assemblage (table 9.1 and appendix 9.4) and about 7-13% of the domestic animal remains (fig. 9.4). The importance of the pig seems to vary to a considerable extent in the course of time. Within the group of domestic animals, the relative importance of pig remains is not the same in all levels. In the earliest phase (pre-Halaf), the mean percentage is 14%, but the two levels that are present show a quite different percentage: 6% for level 8 and 22% for level 7. In the Transitional period the percentage of pig decreases to 7.7%, to increase again in the Early Halaf phase to 13.6% (fig. 9.4).

The cranial elements and the teeth are the most commonly found skeletal elements (ca. 50% of the pig bones; table 9.15). The high proportion of teeth in pig remains can be explained in two ways: (1) pigs are usually killed quite young, and the skeletal remains (other than teeth) of young animals tend to disintegrate earlier; (2) pig bones have a high content of fat, which makes the decay of the bone easy when compared with teeth (Laffer 1983:634).

	Pre-Halaf		Transitional		Early Halaf	
	n	%	n	%	n	%
cranium	2	6.9	27	16.8	22	19.1
maxilla			10	6.2	5	4.3
mandibula	4	13.8	18	11.2	8	7.0
dentes	3	10.3	17	10.6	22	19.1
atlas	1	3.4	1	0.6		
vert. thorac			5	3.1		
sacrum			2	1.2		
scapula	4	13.8	11	6.8	3	2.6
humerus	4	13.8	6	3.7	7	6.1
radius	3	10.3	3	1.9	6	5.2
ulna	2	6.9	9	5.6	4	3.5
carpalia			2	1.2		
metacarpus	1	3.4	7	4.3	4	3.5
pelvis	1	3.4	5	3.1	1	0.9
femur			4	2.5	4	3.5
patella					1	0.9
tibia	1	3.4	8	5.0	6	5.2
fibula			2	1.2	1	0.9
astragalus	2	6.9	5	3.1	1	0.9
calcaneum			3	1.9	4	3.5
tarsalia			3	1.9	1	0.9
metatarsus			1	0.6	7	6.1
metapodia	1	3.4	3	1.9	1	0.9
phalanx 1			5	3.1	5	4.3
phalanx 2			2	1.2	1	0.9
phalanx 3			2	1.2	1	0.9
Total	29		161		115	

Table 9.15. Frequency of suid skeletal elements.

juvenile (<1 yr) (DP4, DP4+, DP4++, M1-/+, M1+, M2germ)	6	50%
adult (ca. 2 yrs) (P4+, P4++)	3	25%
mature (>2 yrs) (M3+, M3++)	3	25%
Total	2	

Table 9.16. Mortality of suids based on mandibular wear and eruption (all periods).

	UF	F	FS*	%UF	killed in age range	surv. (%)
0-1 yr acetabulum humerus d. radius p. phalanx 2 p. scapula	11+3j.	13	2	52%	52%	–
1-2.5 yrs metapodia d. tibia d. calcaneum phalanx 1 p.	18	18	1	50%	–	48%
2.5-3.5 yrs radius d. ulna p. femur p. + d. tibia p. humerus p.	19	–	–	100%	–	48%
>3.5 yrs				–	–	–
abbreviations: see table 9.10						

Table 9.17. Mortality of suids based on epiphyseal fusion (n= 86).

	n	Range	Mean
Wild:			
Modern: Near East[1]	21	37.6-49.3	37.3
Turkey[2]	5	39.7-42.8	41.1
Near East[3]	6	37.0-41.4	39.7
Syria[1]	1	38.8	
Sabi Abyad	1	39.3	
Çavi Tarlasi[4]	2	43.0;39.5	
Domestic:			
Çavi Tarlasi[4]	9	29.0-34.0	32.1
Banahilk[5]	5	28.6-34.0	31.7

[1] Flannery, 1983: table 3
[2] Payne and Bull 1988:57
[3] Stampfli 1983: table 37
[4] Laffer 1983
[5] Schäffer und Boessneck 1988

Table 9.18. Comparison of measurements of the length (in mm) of the lower third molar of wild and domestic pig.

The population structure, based on dental data, shows that half of the pigs were killed before the age of one; only a few animals were kept until an older age (table 9.16). None of the third molars showed an advanced stage of wear. The analysis of the epiphyseal fusion comfirms this picture (table 9.17).

The assessment of the domestic or wild status of the suid remains was done on the basis of measurements. Generally, these seem to fall within the range of the measurements given for domestic animals at Halafian sites like Banahilk and Çavi Tarlasi (Flannery 1983; Laffer 1983; Schäffer and Boessneck 1988). At Sabi Abyad, wild pig may be represented by a fragment of a lower jaw, found in level 6. The measurements of this jaw's third molar fall well within the range of wild pigs from the Near East, according to the data presented by Flannery (1983, table 9.3). One measurement from a modern Syrian wild boar is very similar to the Sabi Abyad measurement (table 9.18). If we compare the same measurement with those of modern wild boar from Turkey given by Payne and Bull (1988:57), it falls within the lower range. Remains of wild pig (identified on a metrical basis) are found in very small numbers at Halafian sites (one fragment was found at Shams ed-Din, two at Banahilk and four at Çavi Tarlasi). Today, the distribution of wild boar in the Near East is largely restricted to the valleys of Euphrates and Tigris, the southern marshes of Iraq (*S. scrofa attila*) and the Amuq plain of western Syria (*S. scrofa lybicus*). In the past, wild pigs may have had a much wider distribution, particularly along the upper course of the Euphrates and its tributaries.

It is difficult to compare other measurements because for most of the elements too few data for comparison are available due to the generally low number and young age of pigs at Halafian sites.

Dog (*Canis familiaris*)

Dog remains account for only 0.3% of the total assemblage and 0.3 to 2.1% of the domestic animals. The remains consisted of a cranium fragment, two mandibles, a first lower molar and some post-cranial fragments of the forelimb (one humerus, two radii, two ulnae and two metacarpi II) and the hindlimb (one femur and two tibiae).

Dog remains were mainly found in the earliest strata of occupation at the site, in particular levels 8 and 6 (these levels also yielded the highest proportions of gnawed bones). So far, dog bones are absent from the later, Early Halaf levels, but their presence is assumed on the basis of traces of carnivore gnawing on Early Halaf bones. In this respect, it seems that dogs were present at the site during its entire period of occupation. The dog skeletal remains must have been lying on the surface for some time since the bones show evidence of carnivore gnawing as well.

One specimen (radius) shows traces of numerous small, repeated cutmarks which are possibily due to the filleting of the surrounding meat on the medial side of the diaphysis (fig. 9.10).

P1-M3:	n		
89.9-94.9 mm	4	*C. lupus pallipes*	Jarmo[1]
78.0			Sabi Abyad
Length M1:			
22.9-94.9 mm		*C. lupus pallipes*	Indian[1]
24.8-28.5 mm	4	*C. lupus pallipes*	Near Eastern[1]
24.0			Sabi Abyad
20.2-23.8 mm	10	*C. lupus pallipes*[2]	

[1] Lawrence and Reed 1983
[2] Stockhaus 1965

Table 9.19. Comparison of canid measurements.

The two mandibles are of different size. The smallest, similar in size to that found at Shams ed-Din (Uerpmann 1982), is represented only by the main part of a left horizontal ramus. The length of its tooth row as well as the size of the teeth is smaller when compared with the other mandible. It belongs to an adult individual but no traces of wear on any of the teeth are present. Crowding of the teeth and, in particular, overlapping of the fourth premolar and the first molar was observed. The Sabi Abyad dog must have been rather large when compared with the dog remains from Çayönü (Lawrence 1980) or Tell Turlu (Ducos 1991). The length of the crown of the carnassial is only slightly smaller than that of the modern wolf (*Canis lupus pallipes*; cf. Lawrence and Reed 1983); however, the alveolar length of the tooth row (P1-M3) is much smaller (table 9.19).

Equids (*Equus* sp.)

The equid sample contains 89 bones, accounting for about 2.3% of the overall faunal sample. The importance of equids decreases in the course of time from 9.6% in the pre-Halaf Neolithic to 0.7% in the Early Halaf. Equid bones are most abundantly found in levels 7 and 6, where they comprise ca. 96% and 60%, respectively, of the wild-animal remains (cf. fig. 9.4). However, these figures may yield a somewhat distorted picture: whereas in the Transitional levels the skeletal remains mainly consist of tibia, scapula, and teeth, it appears that in the lower level 7 there is a large number of phalanges, most of which belong to one and the same feature. Generally, limb bones are most commonly found, whereas axial elements are rarely present (table 9.20). The predominance of limb bones may suggest that only partial carcasses were brought to the site.

The equid remains show the highest percentage (11.2%) of cutmarks among the mammal species (table 9.4). Cutmarks were observed on the diaphysis (at the end of

	Equus			Gazella		
	P	T	E	P	T	E
horncore					1	6
cranium		1				
maxilla					1	
mandibula	1	1		1	6	1
dentes	1	5			3	2
atlas		2			1	
sacrum		1				
scapula		7		2 (?)	16 (5?)	1 (?)
humerus				2	14 (5?)	1
radius		3		1		
ulna	1	2			4 (1?)	1
carpalia		1	3			
metacarpus	1				1	
pelvis	3		1		2 (?)	
femur	1	5				
patella	1	2				
tibia	2	8			4	
calcaneum		1			2	
atragalus	1	1			2	
tarsalia					1	
metatarsus	4	3			1	1
phalanx 1	6	1				
phalanx 2	2	1				
phalanx 3	2	2			1	
sesamoidea		1				
Total	25	48	4	6	72	12

P = pre-Halaf
T = Transitional
E = Early Halaf

Table 9.20. Frequency of equid and gazelle skeletal remains.

the crista) and the distal part of the tibia, on the pelvis (just below the sacroiliac articulation), on the distal part of the calcaneum and on the first phalanx. The frequent cutmarks on the first phalanx are clearly related to the careful removal of the skin of the equid.

Most equid fragments belong to adult animals. Only four long bones from level 6 have an unfused epiphysis (table 9.21; actually, two of them seem to belong to the same individual). A lower jaw from level 8 gave evidence of permanent dentition

		UF	F
scapula	10-12 m.	–	1
pelvis	10-12m.	–	1
phalanx 2	10-12m.	–	4
metacarpus	12-15m.	–	1
metatarsus	12-15m.	–	1
phalanx 1	12-15m.	–	8
radius p.	15-18m.	1	–
tibia d.	20-24m.	2	5
femur p.	3?-3,5y	1	3
femur d.	3?-3.5y	–	1
tibia p.	3?-3.5y	–	1
radius d.	3.5y	–	2
ulna	3.5y	–	1

UF = unfused
F = fused

Table 9.21. Mortality of equids (time of fusion according to Habermehl 1975, given for domestic horses) (all periods).

and may have been over 2.5 years old, according to the data given by Habermehl (1975) for horses.

Generally, *Equus* remains from prehistoric sites in the Near East are attributed to the onager (*Equus hemionus*). However, since Ducos (1968) raised the question of the presence of the wild ass (*E. africanus*) in northwestern Syria, zooarcheologists have been taking into account the possible occurrence of this species in their bone assemblages. The presence of wild ass has recently been confirmed at the site of Shams ed-Din, be it although after initial hesitation (Uerpmann 1982, 1991). In this respect, the presence of wild ass at Sabi Abyad cannot be completely excluded. The analysis of metric data shows a similarity between the Sabi Abyad remains and those of Shams ed-Din and Mureybit. Three elements were analysed in more detail: phalanx 1, phalanx 2 and astragalus. When comparing these measurements presented in the diagrams by Uerpmann (1991, figs. 19 and 24), it appears that (1) all first phalanges fall well within the range of *E. hemionus*, (2) two second phalanges fall within the range of *E. hemionus* (one is questionable and seems to fall in the range of ass measurements), and (3) two astragali seem to fall within the range of overlap between ass and onager, so that their attribution remains unclear. In conclusion, it seems that most measurements point into the direction of *E. hemionus* instead of the wild ass, *E. africanus*.

		F	FS
radius p.	ca.2 m.	1	–
humerus d.	ca. 2 m.	11	–
scapula	3-6 m.	18	–
tibia d.	8-10 m.	1	–
metapodia d.	10-16 m.	3	–
femur p.	10-16 m.	5	–
femur d.	10-18 m.	2	–
tibia p.	12-18 m.	2	–
ulna p.	12-18 m.	2	1
abbreviations: see table 9.10			

Table 9.22. Mortality of gazelle (time of fusion according to Davis 1980, given for *G. gazella*) (all periods).

Gazelle (*Gazella cf. subgutturosa*)

Gazelle is represented by 115 bones, including 25 fragments which, on the basis of morphological characteristics, have an uncertain determination (table 9.1); some of these fragments should perhaps be ascribed to roe deer (*Capreolus capreolus*) or fallow deer (*Dama sp.*). However, the rare occurrence of fallow deer and the absence of roe deer within the Sabi Abyad faunal sample, make it likely that the 25 fragments in question belong to gazelle as well.

Gazelle accounts for 2.3% of the overall faunal sample, equal to the equids (see table 9.1). However, within the wild-animal sample it seems that the importance of gazelle increases in the course of time, this at the expense of the equids (cf. fig. 9.4).

The question of which species of gazelle is present in the archaeological context has often been discussed. It seems that three species can occur in northern Mesopotamia, viz. the mountain gazelle (*G. gazella*), the Dorcas gazelle (*G. dorcas*) and the goitred or Persian gazelle (*G. subgutturosa*; cf. Uerpmann 1982). The first species is nowadays found in the mountains and foothills along the periphery of the Arabian peninsula and in the Levantine piedmont (Harrison 1968). The range of distribution of the less commonly found Dorcas gazelle is partly identical to that of the mountain gazelle. Both species are said to occur in northern Syria as well, near Tell Abyad at the Syro-Turkish border, but this requires confirmation (ibid.:353, 358). The third species, the goitred gazelle, is widely distributed in Iraq and Iran, and on the Arabian peninsula (ibid.). A distinction between the species on the basis of skeletal measurements seems to be impossible (Hakker-Orion 1986). The identification

at species level can be done on the basis of morphological criteria on the complete skull or the male horncore (fig. 9.11; Uerpmann 1982). In the case of Sabi Abyad, seven horncores are present, two of which are virtually complete. The horncores are morphologically very similar, and curve regularly in a posterior direction (so far, the degree to which the horns diverge laterally with respect to the sagittal plane could not be determined). Some specimens show a slight twisting in a heteronomous sense. They are all compressed medio-laterally. The lateral surface is almost flat and the medial convex. Deep longitudinal furrows run along almost the entire lenght. They are deeper and wider on the posterior side and less pronounced on the other sides. These horncores suggest that only one species is present within the Sabi Abyad assemblage, viz. the goitred gazelle.

The gazelle remains mainly consist of the distal part of the scapula and the humerus. This is probably due to the fact that, on the one hand, these two elements are relatively easy to attribute either to gazelle or to any of the other small herbivores, and that, on the other hand, these elements fuse earlier and thus have a better chance to be preserved. The underrepresentation of the axial elements is due to the fact that it is extremely difficult to distinguish vertebrae and costae between the various small herbivore species. The presence of almost all kinds of skeletal elements (see table 9.20), including the cranial elements and the first vertebrae, suggests that the gazelle carcasses were brought to the site intact, where they were further processed. The majority of animals were killed at an adult age (table 9.22), but one has to keep in mind that the unfused elements are probably underrepresented because of taphonomic loss or sampling bias (unfused epiphysis not found and diaphysis not identified to species). The data of the epiphyseal fusion are comfirmed by the eruption ones. Most of the mandibles or the isolated teeth belong to adult individuals (four third lower molars were found, and only one deciduous premolar). In addition, there is one complete horncore from a young individual, ascribed to the Transitional or the Early Halaf period.

Persian fallow deer (*Dama mesopotamica*)

So far, one scapula (almost complete), two upper molars (one is M3) and one tibia (diaphysis) were identified as *Dama*.

Two species of fallow deer are found in the Near East: the European fallow deer (*Dama dama*) and the Persian fallow deer (*Dama mesopotamica*). The latter is sometimes regarded as a separate subspecies of *D. dama* (Chapman 1975:23). The Persian fallow deer is larger than the European one (Harrison 1968), but the distinction between the species is mainly based on the shape of the antlers: in contrast with the European fallow deer, the antlers of the Persian fallow deer are not palmate distally and are flattened in their basal part. In addition, the Persian fallow deer has a smaller brow tine. Unfortunately, no antlers have yet been found in the Sabi Abyad faunal sample.

		n	SLC	n	BG
Sabi Abyad		1	24,2	1	27,9
Demircihüyük	(*D. dama*, Eur.)[1]	14	18.5-27.5	13	23.7-32.5
Lidar Höyük	(*Dama sp.*)[2]	5	22.5-28.0	6	29.5-35.5
Fikirtepe	(*D. dama*, Eur?)[3]	7	24.0-20.5	7	28.5-32.0
Aïn Mallaha	(*D. mesopotamica*)[4]	4	32.2-26.0	4	32.0-36.0
Çavi Tarlasi	(*D. mesopotamica*)[5]	1	(53.5) ♂	1	40.0 ♂
Hayaz Hüyük	(*D. mesopotamica*)[6]	1	27.3	1	29.7
Kinneret	(*D. mesopotamica*)[7]	3	24.0-32.0	6	31.0-37.0
Jebel Aruda	(*D. mesopotamica*)[8]	1	19.7	2	26.3;31.8

[1] Rauh 1981
[2] Kussinger 1988
[3] Boessneck and von den Driesch 1979
[4] Ducos 1968
[5] Schäffer und Boessneck 1988
[6] Buitenhuis 1988
[7] Ziegler und Boessneck 1990
[8] Buitenhuis 1988

Table 9.23. Comparison of the measurements of the scapula of Dama found at Sabi Abyad and other sites.

Nowadays, the Persian fallow deer, threatened with extinction, mainly lives in restricted areas in the plain of Khuzistan in southwestern Iran, although it has also been reported in recent times as far north as Zakho in Iraq, close to the Turkish and Syrian border (Harrison 1968). Little is known about the status of the animal in Syria. Talbot (1960:284) mentions an unverified report of its existence in the Alawit region, north of Latakia, suggesting that it may have survived in the forested hills of northwestern Syria. In the past, fallow deer occurred just across the northern frontier of Syria, near Gaziantep in Asia Minor (Harrison 1968). It is unknown whether the distribution of the two subspecies in the past overlapped or was contiguous (cf. Chapman 1975:23), but, on present evidence, it appears that both lived in separate regions without any overlap (Harrison 1968:368).

Remains of the Persian fallow deer have been found during excavation at a series of sites in Syria and southeastern Turkey, like Mureybit, Shams ed-Din, Tell Turlu and Çavi Tarlasi (Ducos 1978, 1991; Uerpmann 1982; Schäffer and Boessneck 1988). At Tell Assouad on the Balikh, a calcaneum was found, but, as its size is smaller than that of *Dama mesopotamica*, it was identified as *Dama* spec. (Helmer 1985).

When comparing the measurements of the scapula found at Sabi Abyad with those of other sites (table 9.23), it appears that the specimen from Sabi Abyad can be placed in either species. Kussinger (1988:146), referring to data from Greece,

Turkey, Israel and Syria, points out that there is an overlap between the measurements of male European fallow deer and female Persian fallow deer. At present, it is suggested that the Sabi Abyad fallow deer is a female *D. mesopotamica*, this on the basis of size of the skeletal remains and the geographical distribution of the species.

Red deer (*Cervus elaphus*)

Red deer is represented by a partial molar, a third phalanx and two scapula fragments. The identification of the two scapula fragments is not certain. These are blade fragments, in particular the margo thoracicus (caudalis). Their shape does not resemble an ovicaprid but rather a cervid. The section has a more triangular shape and it flattens towards the proximal end (margo vertebralis). The fossa scapularis is deeper than in the ovicaprids. Also the fragments do not resemble the scapula of *Dama*.

Only one measurement is available for comparison. The third phalanx from Sabi Abyad has a diagonal length of 49.8 mm and is smaller than the one of a female *Cervus* from Demircihüyük (59.5 mm; Rauh 1981). At Hayaz Hüyük, Buitenhuis (1988:122) identified a third phalanx of red deer, but no measurements are given.

Hyaena (*Hyaena hyaena*)

The hyaena is represented by a virtually complete mandible, found in the Transitional level 6. The jaw belongs to an adult animal and shows a high degree of tooth wear.

The striped hyaena (*Hyaena hyaena*) is the sole species of hyaena found in the Near East (Harrison 1968). This animal is known to come close to the villages, especially at night, and to feed itself on discarded human food (Kruuk 1975:78).

Brown bear (*Ursus arctos*)

The presence of the brown bear was indicated by an almost complete third phalanx, found in the Transitional level 6. The bear may have been brought to the site for its skin but no traces of cutmarks have been found on the fragment to confirm this assumption. Bear remains were also found at the Halafian sites of Banahilk and Çavi Tarlasi (Laffer 1983; Schäffer and Boessneck 1988:4). At the latter site and, further west, at Fikirtepe only limb bones were present. In the case of Fikirtepe, Boessneck and Von den Driesch (1979) suggested that the lower foot bones were brought to the site as part of the skin of the bear. The same may hold for the Sabi Abyad bear. Another explanation could be the consumption or the use of the fat found around the bear claws.

Fox (*Vulpes vulpes*)

The fox is represented by a few fragments only, viz. one mandibula, one axis, one humerus and four metatarsals. Most fragments belong to the Transitional period

(table 9.1). No cutmarks were noticed. One humerus from level 6 is partly burnt (perhaps as a result of the destruction by fire of the level 6 settlement). The only measurement that could be taken, indicates an animal of small size if compared to those of Demircihüyük (Rauh 1981) but similar to those from Korucutepe in eastern Turkey (Boessneck and Von den Driesch 1975).

The fox is fairly common in Halafian faunal assemblages. The animal may have been exploited for its meat and/or its fur.

Hare (*Lepus capensis*)

Sixteen fragments of *Lepus capensis* were identified, most of them belonging to the Transitional period. Apart from the fragments of a mandibula and a costa, the sample mainly consists of limb bones of adult animals (one scapula, three radii, two ulna, one humerus, one pelvis, one femur, one tibia, three metatarsi, one phalanx I). One fragment, a metatarsal, was burnt.

Rodents

Some fragments of rodents were found, all coming from the Transitional phase. The identification is not yet certain; they may represent the desert rat or the jerbil (*Tatera* spec. and *Nesokia indica*, respectively). Because of the habit of these animals of digging deeply in the ground, and because of the light colour of some of the bones, it is not excluded that these remains are of recent date and intrusive in the Transitional levels.

Birds

Birds seem to have constituted only a small part of the diet at Sabi Abyad. Bird remains are mainly found in the Transitional period, in particular in level 4. Apart from six unidentified bird bones, the following species are present:

Goose (*Anser sp.*)

Two fragments of the genus *Anser* were found, viz. one tibiotarsus in level 4 and one braincase in an uncertain context, ascribed to either level 3, 4 or 5. Their identification at species level was not possible because of the small part of the element preserved.

Nowadays, three different species of goose are found as winter visitors in the regions south of the Taurus and Zagros mountains (particularly in the wetter areas of the valleys of Tigris and Euphrates; cf. Cramp and Simmons 1977), viz. the graylag goose (*A. anser*), the white-fronted goose (*A. albifrons*) and the lesser white-fronted goose (*A. erythropus*).

Duck (*Anas sp.*)

Three species of duck are represented by one fragment each, all found in level 4, viz. a radius of the mallard (*A. platyrhynchos*), an ulna of the wigeon (*A. penelope*), and a tibotarsal of the gadwall (*A. strepera*). These ducks are winter visitors in northern Syria; they are found mainly at the confluence of the Balikh and Euphrates, but the mallard occurs also further north, in the Balikh valley proper (Cramp and Simmons 1977:507).

Stork (*Ciconia cf. ciconia*)

The presence of the white stork is indicated by the distal end of a humerus found in level 4. This species is present in northern Syria in summer; it has its winter grounds in lower Mesopotamia and eastern Africa. Remains of the white stork have been found at Shams ed-Din, where it was identified tentatively as *C. cf. ciconia* (Uerpmann 1982:13), and at El Qitar on the Euphrates (Buitenhuis 1988; the El Qitar fragment was not identified at species level, because the fragment is much larger than its counterpart in the reference collection at Groningen university).

The stork prefers open wetlands, savannah with scattered trees, steppes, floodlands, irrigated lands, moist meadows and pasture or arable fields, which each offer an easy supply of food of exclusively animal origin (cf. Cramp and Simmons 1977).

Hooded crow (*Corvus corone*)

The hooded crow is represented by three fragments, two of which come from level 4, whereas the third could not be assigned to a definite layer with certainty. The two fragments from level 4, one tibia and one femur (both right), came from the fill in the antechamber of the large tholos in square Q15 and may have belonged to the same animal.

Most crow races in northern Syria are seasonal visitors coming from the Iranian central plateau, but at least one race of the hooded crow is a year-round resident in the region between the Persian Gulf and the upper Tigris (Hole et al. 1969).

Tortoise (*Testudo graeca*)

Among the non-mammal remains, two fragments of a carapax of a tortoise were identified, one in level 3A, the other is ascribed to either level 3B or level 4. The species was found at two other Halafian sites, viz. Girikihaciyan and Çavi Tarlasi (McArdle 1990; Schäffer and Boessneck 1988).

Molluscs and fish

Nearly a hundred fragments of molluscs were found, half of which belong to the freshwater mussel *Unio sp.*, most probably *Unio tigridis*. The other half have not yet been identified. In addititon, an unidentified fish bone was found.

Conclusions

The present study has made it clear that the spectrum of animal species found at Sabi Abyad is much broader than appeared from the previous faunal analysis based upon the remains of the 1986 season of excavation (Van Wijngaarden-Bakker 1989). Particularly the number of wild species is larger than previously expected (cf. Cavallo 1993). The presence of the aurochs is now confirmed, and it is not excluded that wild sheep and wild ass can be found at Sabi Abyad as well. However, a detailed analysis of the wild-animal sample at the site is hampered by (a) the lack of diagnostic morphological criteria to distinguish between the various species, (b) an overlap in size between the domestic and wild forms, (c) the possible presence of hybrids, and (d) the subjectivity of the investigator regarding identification.

The present faunal sample has been affected by a high degree of fragmentation, mainly due to post-depositional factors. This results in a high proportion of unidentifiable bones, particularly when taking into account the various difficulties of identification at species level. Other taphonomic factors seem to have affected the sample to a lesser extent, but with a different pattern according to the different layers (i.e. related to different use of an area).

The present analysis has made it clear that the emphasis was on domestic animals in all main phases of occupation at late Neolithic Sabi Abyad. Ovicaprids are the most frequently occurring genera by far, and their importance is constant through time. However, pig and cattle give evidence of a different trend. Pig and cattle are found in more or less equal numbers in the pre-Halaf Neolithic but in the subsequent Transitional period pig decreases in importance, in favour of cattle. In the Early Halaf period, pig and cattle are found in equal numbers again, as in the lowest strata of occupation. Various reasons may account for this obvious pattern. First, it may signify a shift towards drier climatic conditions in the Transitional period, but any proof is lacking so far. Secondly, it may indicate a change in the subsistence strategy in the Transitional period, with more emphasis on cattle husbandry. The available data for determining the age of cattle suggest that mature animals predominated. Unfortunately not enough data about the mortality pattern of the animals are available for the separate phases, so that detailed changes through time cannot yet be assessed. Thirdly, it is not excluded that different patterns of disposal of butchery and food refuse, in relation to the spatial layout of the village (houses, courtyards, refuse areas, etc.), led to a concentration of certain types of material in specific, limited areas.

The ratio of domestic versus wild animals in the course of time is defined by a consistent decrease of hunted mammals, the exploitation of which decreased from about 13% in the pre-Halaf Neolithic, through 7% in the Transitional phase, to ca. 3% in the Early Halaf (table 9.1). This may reflect some major economic and social changes in Transitional times, with the pattern of habitation shifting to more permanent settlement based more and more on pastoral economy, at the expense of hunting.

However, it may also mark the beginning of a settlement organisation, with, on the one hand, relatively large and permanently occupied agricultural settlements of long duration and, on the other hand, small, short-term sites largely relying on hunting. This socio-economic trend is a characteristic of the late Halaf period in northern Syria and adjacent regions (cf. Akkermans 1993) but has not yet been attested for the earlier stages of the Halaf period. It should, however, be noted that the frequency of ovicaprids remains constant throughout the chronological sequence.

Interestingly, while hunting decreases in importance in the course of time, the number of hunted mammal species increases, from four in the pre-Halaf Neolithic to nine in the Transitional period. Fowling is also first attested in the latter period. Most of the bird species are winter visitors suggesting an exploitation of wild game concentrated in this period of the year. The presence of a few summer species, on the other hand, confirms the permanent occupation of the settlement at Sabi Abyad. The presence of *Unio* remains, albeit in restricted quantities, and the presence of a fish bone suggest that exploitation of the riverine resources was practised by the Sabi Abyad inhabitants. Nowadays, the Balikh flows at five kilometres from the tell but originally the Nahr Turkman (a branch of the Balikh) probably took its course in the immediate vicinity of the tell (Akkermans 1993). It seems clear that the exploitation of this riverine biotope became more intense in Transitional times. Birds, molluscs and tortoises were hunted and gathered there, while the exploitation of the steppe continued, with the hunting of mainly onager and gazelle. This broadening of the spectrum may simply be due to differences in sample sizes but, more probably, it is due to changes in hunting strategy. Hunting now seems to rely less on specific animals, like the large herbivores, but comprises a more widespread range of species including small game, birds, etc., as well. The broadening spectrum may be interpreted simply as a change in food preference but, more likely, it refers to a trend towards more opportunistic hunting and, consequently, a more opportunistic subsistence strategy.

Continuing research will extend the overall faunal assemblage under study, so that the observed changes in subsistence strategy at Sabi Abyad will receive firmer support. It will then be possible to place Sabi Abyad in a larger context within the Late Neolithic cultures of northern Syria.

Levels:	8	7	Tot. P	6	5	4	6-4	Tot. T	3B	3A	3	1	3-1	Tot. E	Unknown	Total	%
Ovis/Capra	98	51	149	166	34	922	201	1323	287	55	13	15	202	572	338	2384	60.45
Ovis/Capra(?)									2					2		2	0.05
Ovis	12	6	18	27	7	118	40	192	22	6	1		8	37	29	276	7.00
Capra	1	2	3	5		19	7	31	9	2			9	20	10	64	1.62
Bos taurus	19	11	31	133	6	172	69	381	53	7	3	4	32	99	72	582	14.75
Sus dom.	9	20	29	33	5	115	7	161	51	35	2	2	25	115	54	358	9.08
Canis	4	1	5	5		1		6							2	13	0.33
Equus	1	25	26	26	1	21	6	54	3	1			2	6	3	89	2.26
Bos prim.	1		1	1		3		4		1				1		6	0.15
Gazella	5	1	6	8	4	31	12	55	6	2	1		1	10	19	90	2.28
Gazella (?)	1		1	3		13	1	17	1	1				2	5	25	0.63
Dama	1		1	1		1	1	3								4	0.10
Cervus						1	1	2	1		1			2		4	0.10
Sus scrofa				1												1	0.03
Hyaena				1				1								1	0.03
Ursus				1				1								1	0.03
Vulpes				2		2	1	5	1					1	1	7	0.18
Lepus				1	3	3	2	9	3					3	4	16	0.41
Rodentia				1	1	3		5								5	0.13
Aves						2	1	3					2	2	1	6	0.15
Anser						1		1							1	2	0.05
Anas					3			3								3	0.08
Ciconia						1		1								1	0.03
Corvus					2			2							1	3	0.08
Testudo										1				1	1	2	0.05
Pisces													1	1		1	0.03
Molluscs	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Total	152	117	269	426	66	1492	349	2260	439	111	21	21	282	874	541	3944	

P = pre-Halaf; T = Transitional; E = Early Halaf

Appendix 9.1. Frequency of species per level.

Levels:	8	%	7	%	6	%	5	%	4	%	3B	%	3A	%	3	1
proc. corneus			1	1.7	2	1.0			5	0.5	3	0.9	1	1.6		
cranium	4	3.6			5	2.5	1	2.4	33	3.1	9	2.8	3	4.8		1
maxilla	2	1.8	1	1.7	1	0.5			5	0.4	2	0.6	1	1.6		1
mandibula	13	11.7	5	8.5	14	7.1	2	4.9	83	7.8	36	11.3	2	3.2	1	1
dentes	40	36.0	19	32.2	54	27.3	9	22.0	354	33.4	112	35.0	22	34.9	10	5
hyoid									1	0.1						
atlas					4	2.0	1	2.4	15	1.4	4	1.3	3	4.8		
axis			3	5.1	2	1.0	1	2.4	11	1.0	2	0.6	5	7.9		
cerv.									2	0.2						
sternum									1	0.1						
sacrum									1	0.1						
scapula	2	1.8	2	3.4	5	2.5			39	3.7	17	5.3	1	1.6		
humerus	8	7.2	6	10.2	15	7.6	4	9.8	55	5.2	17	5.3	1	1.6		
radius	6	5.4	8	13.6	10	5.1	1	2.4	57	5.4	14	4.4	4	6.3		2
ulna	2	1.8	1	1.7	6	3.0	3	7.3	15	1.4	8	2.5	2	3.2	1	
carpalia	1	0.9					1	2.4	15	1.4	4	1.3	5	7.9		
metacarpus	7	6.3	2	3.4	15	7.6			38	3.6	9	2.8	1	1.6		
pelvis	5	4.5	2	3.4	11	5.6	5	12.2	81	7.6	19	5.9	1	1.6		2
femur	8	7.2	1	1.7	6	3.0			39	3.7	9	2.8	1	1.6		
patella					1	0.5	1	2.4	2	0.2	2	0.6				
tibia	4	3.6	4	6.8	24	12.1	3	7.3	54	5.1	15	4.7	2	3.2	1	3
astragalus	2	1.8			3	1.5	2	4.9	27	2.5	5	1.6	2	3.2		
calcaneus	2	1.8	2	3.4	5	2.5			22	2.1	8	2.5				
tarsalia					2	1.0			10	0.9	4	1.3	1	1.3	1	
metatarsus	3	2.7	2	3.4	4	2.0	1	2.4	29	2.7	10	3.1	1	1.6		
metapodia					2	1.0			12	1.1	4	1.3	3	4.8		
phalanx 1	1	0.9			6	3.0	4	9.8	38	3.6	6	1.9	1	1.6		
phalanx 2	1	0.9			1	0.5	2	4.9	7	0.7	1	0.3				
phalanx 3									8	0.8						
sesamoidea									1	0.1						
Total	111		59		198		41		1059		320		63		14	15

Appendix 9.2. Frequency of ovicaprid skeletal elements per level.

Levels	8	7	6	%	5	4	%	3B	%	3A%	3	1
proc. corneus	1		1	0.7		2	1.1					
cranium			5	3.7	1	8	4.6	2	3.8			
maxilla						1	0.6					
mandibula		2	8	5.9	1	12	6.9	3	5.7	2		
dentes	2	1	23	17.1	1	35	20.0	13	24.3	1		
hyoid			1	0.7				1	1.9			
axis	1		2	1.5		1	0.6					
lumb.						2	1.1					
sacrum			2	1.5		1	0.6					
scapula			7	5.2		1	0.6	1	1.9			
humerus		1	4	3.0		3	1.7			1		
radius			6	4.4		9	5.1	1	1.9			
ulna			1	0.7		1	0.6	2	3.8			
carpalia	5	2	11	8.1	2	22	12.6			1		1
metacarpus	1		10	7.4		2	1.1	2	3.8			
pelvis			3	2.2		2	1.1	2	3.8			1
femur			2	1.5		6	3.4	2	3.8	1		
patella		1				3	1.7					
tibia	1		6	4.4		8	4.6	2	3.8			
fibula			4	3.0		4	2.3					
astragalus	1	2	4	3.0		7	4.0					
calcaneum			2	1.5		2	1.1	2	3.8			1
tarsalia			3	2.2				5	9.4		1	
metatarsus	1		4	3.0		3	1.7	3	5.7	1		
metapodia			3	2.2		3	1.7	1	1.9			
phalanx 1	1	1	9	6.7	1	12	6.9	6	11.3		1	
phalanx 2	2	1	7	5.2		11	6.3	5	9.4			1
phalanx 3	4		7	5.2		11	6.3			1	1	
sesamoidea						3	1.7					
Total	20	11	135		6	175		53		8	3	4

Appendix 9.3. Frequency of bovid skeletal elements per level.

Levels	8	7	6	%	5	4	%	3B	%	3A	%	3	1
cranium	1	1	6	17.6	1	19	16.5	14	27.5	3	8.6	1	
maxilla			1	2.9		9	7.8	3	5.9	1	2.9		
mandibula	2	2	8	23.5	1	9	7.8	4	7.8	4	11.4		
dentes		3				15	13.0	8	15.7	10	28.6		1
atlas		1				1	0.9						
thor.			4	11.8		1	0.9						
sacrum			1	2.9		1	0.9						
scapula	1	3	2	5.9		9	7.8	2	3.9				1
humerus	2	2	1	2.9		5	4.3	3	5.9	3	8.6		
radius	1	2	1	2.9		2	1.7	2	3.9				
ulna		2				9	7.8	2	3.9	1	2.9		
carpalia					1	1	0.9						
metacarpus	1		3	8.8		4	3.5	2	3.9	2	5.7		
pelvis		1				4	3.5	1	2.0				
femur			2	5.9		1	0.9	1	2.0				
tibia		1	1	2.9		7	6.1	2	3.9	3	8.6		
fibula						1	0.9			1	2.9		
astragalus		2	2	5.9		3	2.6			1	2.9		
calcaneum			1	2.9		2	1.7	3	5.9	1	2.9		
tarsalia						3	2.6	1	2.0				
metatarsus						1	0.9	2	3.9	2	5.7	1	
metapodia	1		1	2.9	2								
phalanx 1						5	4.3			3	8.6		
phalanx 2						1	0.9						
phalanx 3						2	1.7	1	2.0				
Total	9	20	34		5	115		51		35		2	2

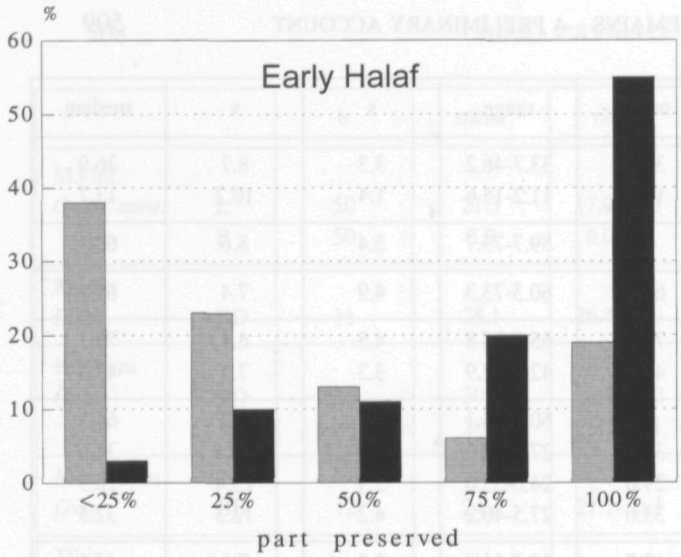
Appendix 9.4. Frequency of suid skeletal element for each level.

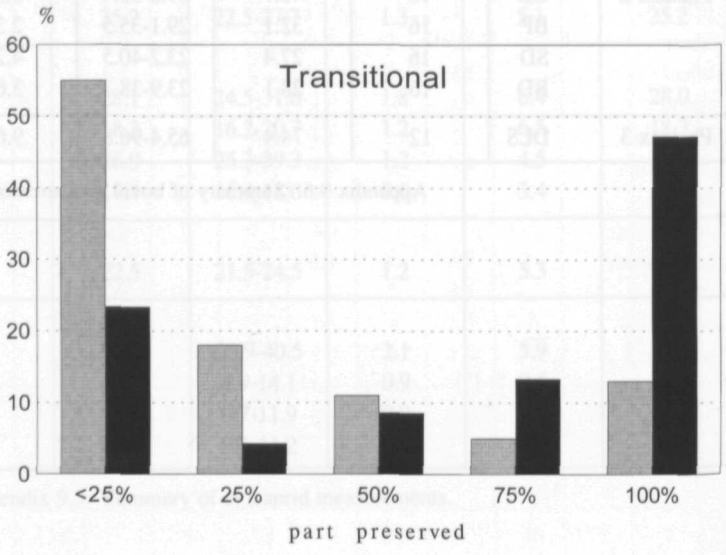
		n	mean	range	s	v	median
M3 inf.							
Ovis/Capra:	L	50	21.3	17.9-24.3	1.5	7.0	21.4
	B	50	8.0	6.0-9.6	0.7	8.7	8.0
Radius							
Ovis:	BD	11	28.1	26.4-31.0	1.6	5.7	27.7
Humerus							
Ovis:	BD	38	30.2	27.5-34.0	1.6	5.3	30.1
	BT	38	28.4	25.2-31.1	1.5	5.3	28.4
Metacarpus							
Ovis:	BD	12	24.1	21.1-26.3	1.6	6.6	24.5
Tibia							
Ovis/Capra:	BD	52	25.2	22.5-27.7	1.3	5.1	25.2
Astragalus							
Ovis/Capra:	GLL	22	28.1	24.5-31.6	1.8	6.4	28.0
	BD	22	18.3	16.2-20.7	1.2	6.5	18.3
Ovis:	GLL	8	26.9	25.3-29.3	1.2	4.5	26.9
	BD	8	17.4	16.4-18.0	0.6	3.4	17.6
Metatarsus							
Ovis	BD	9	22.5	21.5-24.5	1.2	5.3	21.7
Phalanx 1							
Ovis/Capra	GL	44	35.5	29.9-40.5	2.1	5.9	35.1
	BP	44	11.6	9.9-14.1	0.9	8.5	11.8
	SD	44	9.1	7.7-11.9	0.9	9.9	9.2
	BD	44	11.1	9.5-11.2	0.9	8.2	11.0

Appendix 9.5. Summary of ovicaprid measurements.

		n	mean	range	s	v	median
M3 inf.	L	11	38.0	33.7-46.2	3.3	8.7	36.9
	B	11	13.7	11.2-15.6	1.4	10.2	13.7
Metacarpus	BD	6	63	59.7-73.7	5.4	8.6	62.1
Tibia	BD	8	66.1	60.3-73.3	4.9	7.4	65.7
Astragalus	GLL	8	70.5	65.2-78.8	4.5	6.4	70.3
	BD	8	46.0	42.8-52.9	3.3	7.2	45.4
Phalanx 1	GL	8	66	60.9-74.1	5.2	7.9	64.8
	BP	8	33.9	27.3-40.6	4.6	13.6	34.4
	SD	8	29.0	24.0-35.6	3.9	13.4	28.9
	BD	8	33.0	27.5-40.2	4.2	12.3	32.5
Phalanx 2	GL	16	43.7	39.2-53.4	3.3	7.6	43.1
	BP	16	32.1	29.1-35.5	2.3	7.2	32.4
	SD	16	27.4	23.2-40.5	4.2	15.3	27.3
	BD	16	28.1	23.9-38.3	3.6	12.8	28.2
Phalanx 3	DLS	12	74.4	65.4-96.8	9.6	12.9	72.0

Appendix 9.6. Summary of bovid measurements.





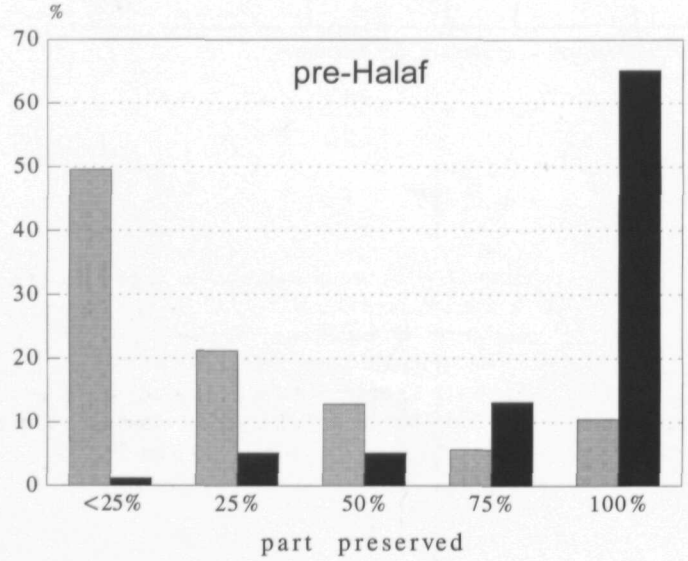
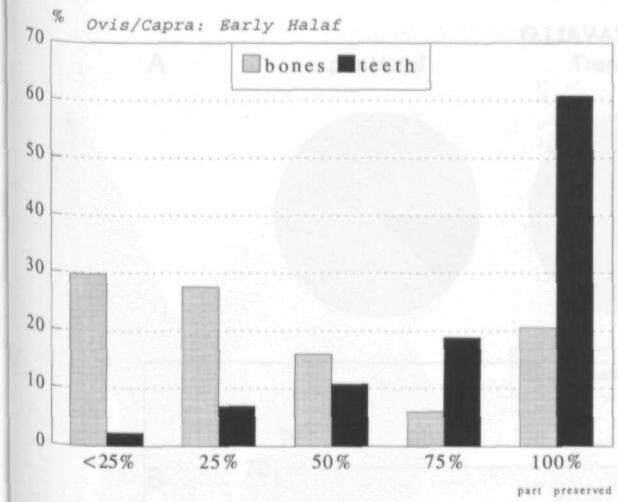
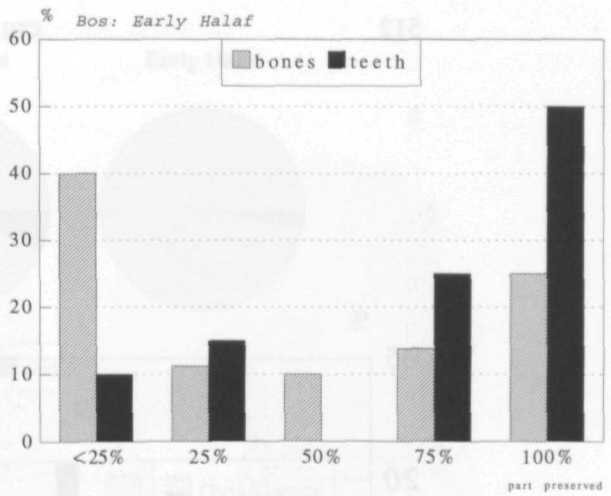
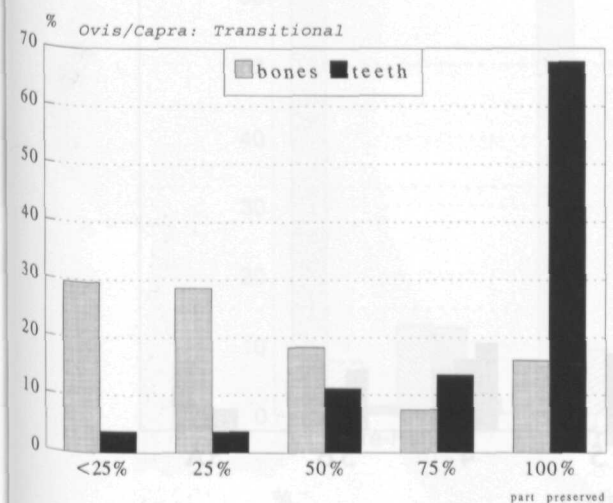
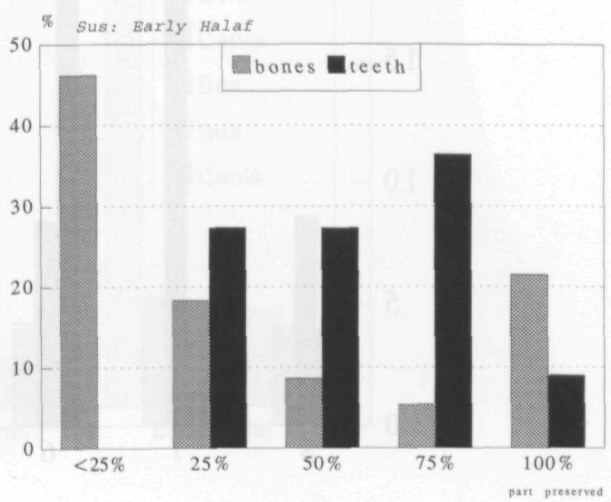


Figure 9.1. Degree of fragmentation of bones and teeth of large and medium mammals (LM and MM). The X-axis shows the parts preserved of bone/tooth in percentages, divided in five categories. Sample sizes: Early Halaf phase: 694 bones and 261 teeth; Transitional phase: 3114 bones and 790 teeth; pre-Halaf phase: 363 bones and 75 teeth.









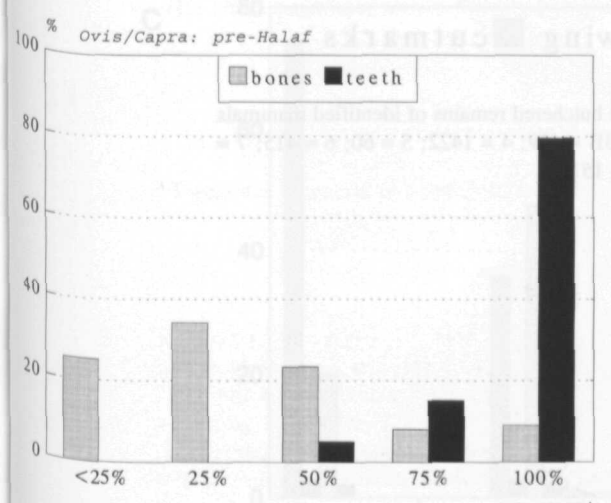


Figure 9.2. Degree of fragmentation of bones and teeth of sheep and/or goat, pig and cattle. The X-axis shows the parts preserved of bone/teeth in percentages. Sample sizes: Early Halaf phase, *Ovis/Capra*: 416 bones and 212 teeth; Transitional phase, *Ovis/Capra*: 1058 bones and 482 teeth; pre-Halaf phase, *Ovis/Capra*: 111 bones and 59 teeth; Early Halaf phase, *Sus*: 96 bones and 22 teeth; Early Halaf phase, *Bos*: 80 bones and 20 teeth.

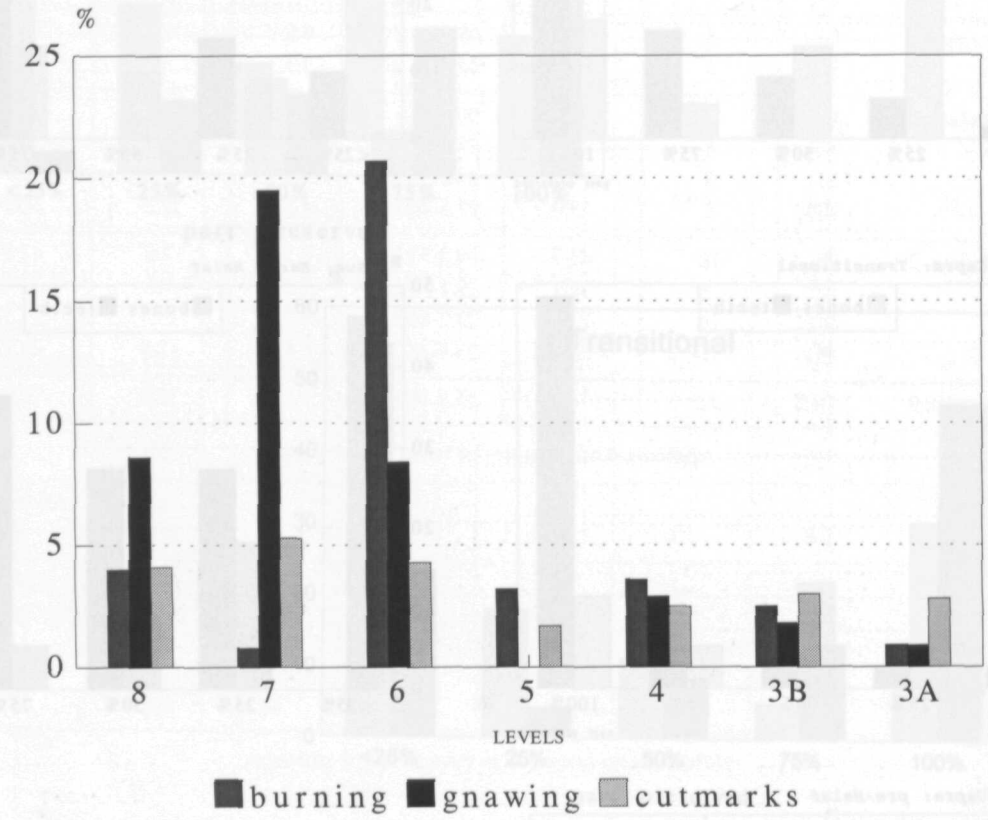


Figure 9.3. Percentages of burnt, gnawed and butchered remains of identified mammals per level. Sample sizes per level: 3A = 110; 3B = 439; 4 = 1422; 5 = 60; 6 = 415; 7 = 118, 8 = 151.

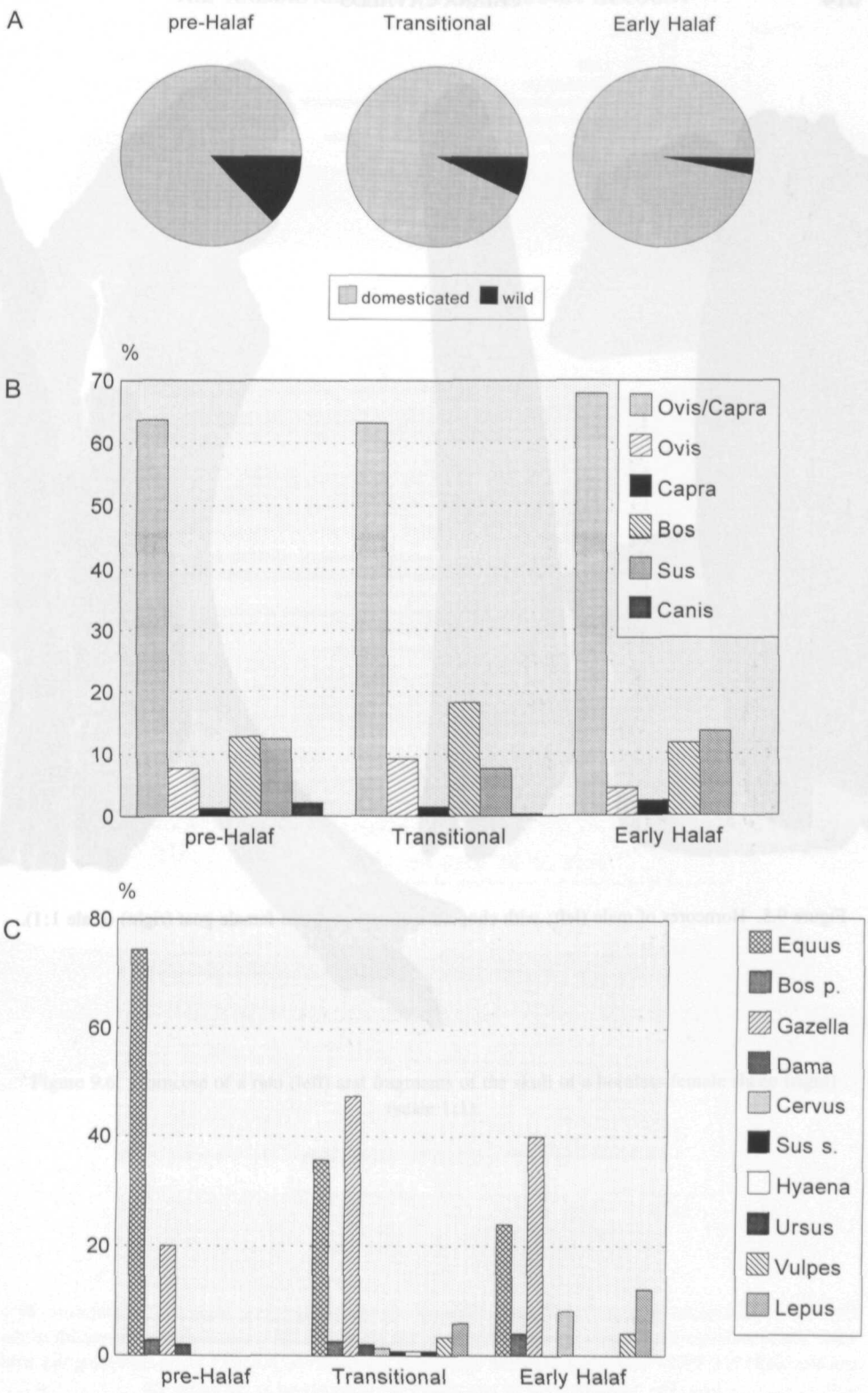


Figure 9.4. Percentages of domestic and wild animal (above), domestic (middle) and wild (below) species identified at Sabi Abyad per phase.

Figure 9.5. Horncores of male (left; with chopmark at its basis) and female goat (right) (scale 1:1).

Figure 9.6. Horncore of a ram (left) and fragments of the skull of a hornless female sheep (right) (scale 1:1).

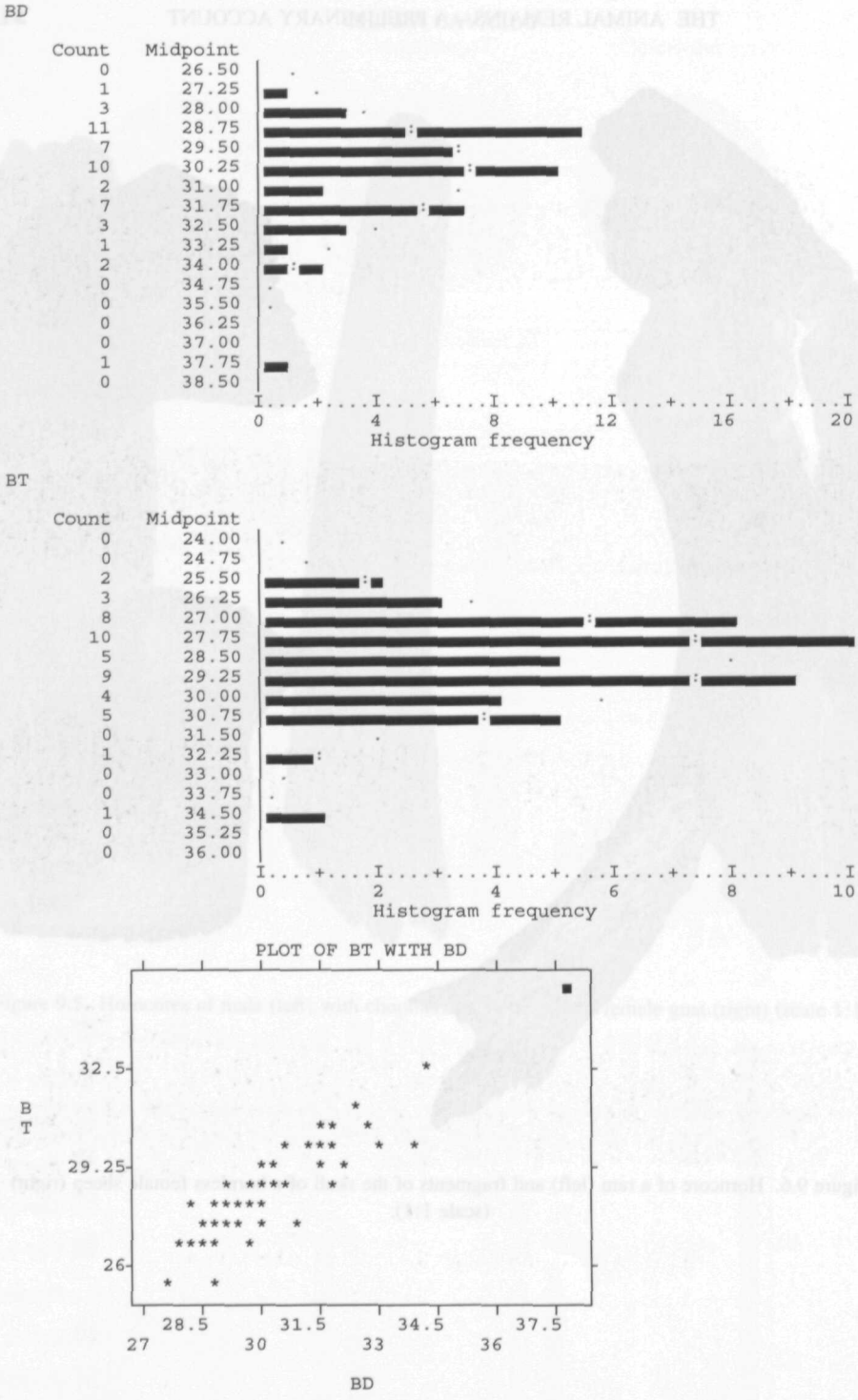


Figure 9.7. Histogram frequency and scatterdiagram of sheep and/or goat humeri: * = domestic, ■ = wild. The correlation between the greatest breadth of the distal end (BD) and the greatest breadth of the trochlea (BT) is 0.90027 when including the (probably) wild one and 0.85073 when excluding the wild one. The measurements of ovicaprids are summarised in appendix 9.5.

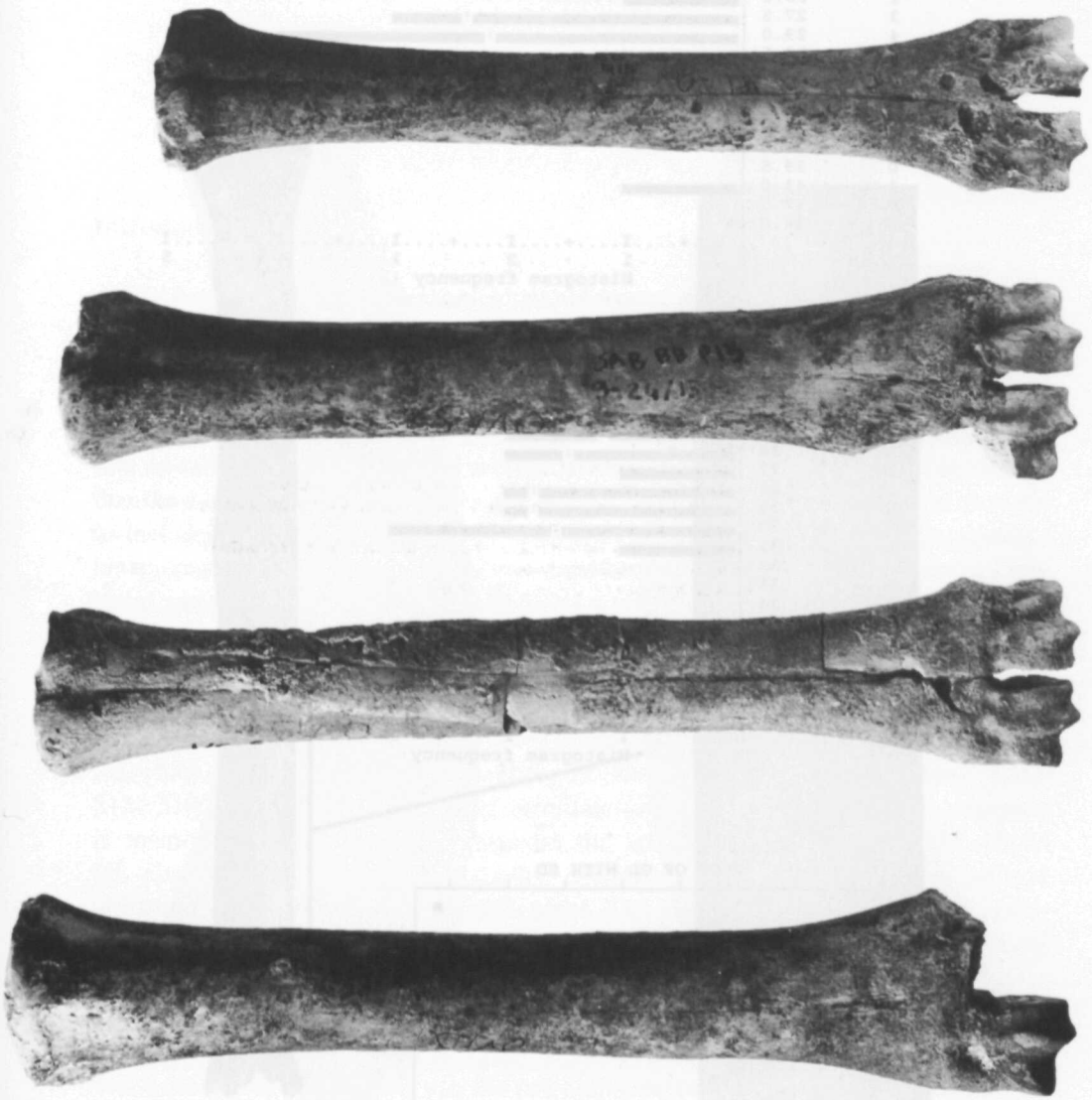


Figure 9.8. Sheep metacarpals from Sabi Abyad (scale 1:1).

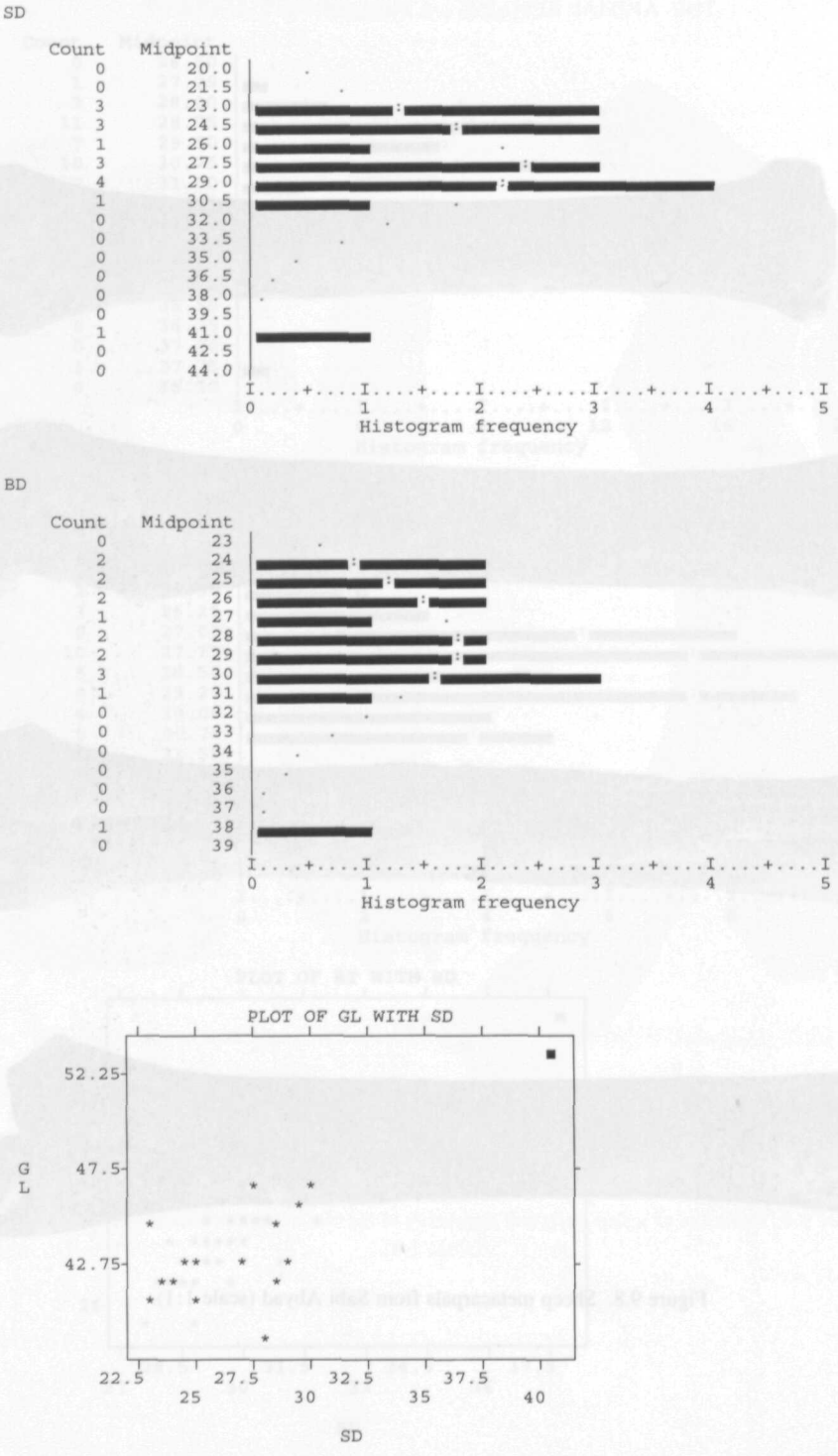


Figure 9.9. Histogram frequencies and scatterdiagram of cattle second phalanx: * = domestic, ■ = wild. The correlation between the gratest length (GL) and smallest breadth of the diaphysis (SD) is 0.79587. The measurements of cattle bones are summarised in appendix 9.6.

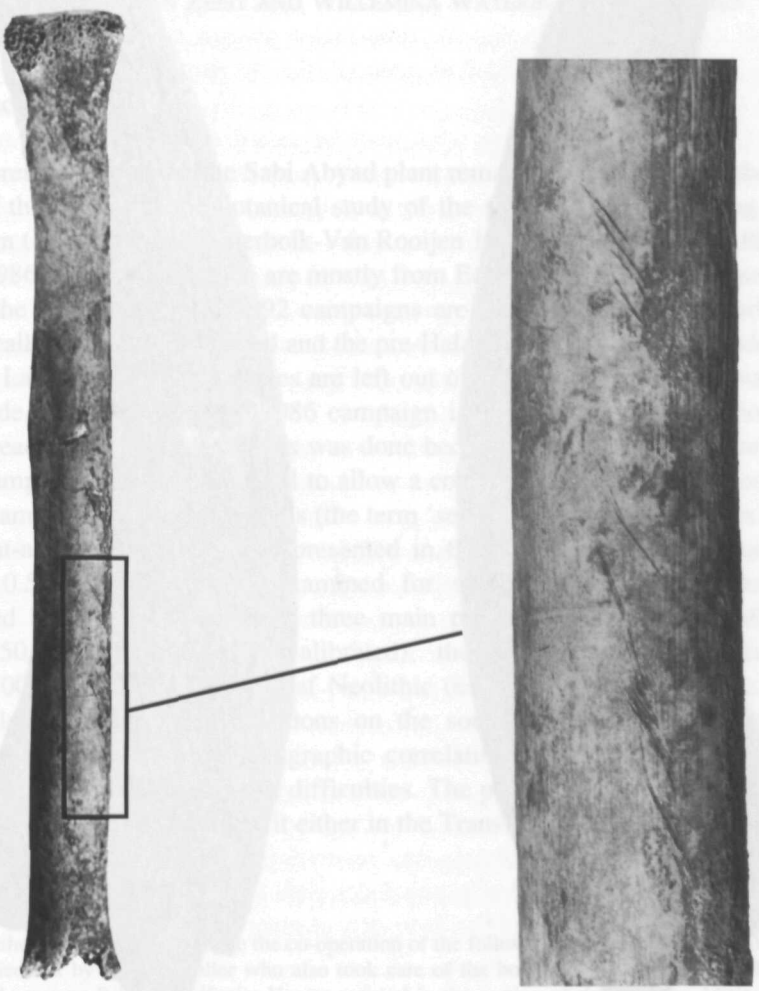


Figure 9.10. Radius of a dog with (inset) filletting marks on the medial side of the diaphysis (actual length of radius: 11.5 cm).

Figure 9.11. Partially burnt gazelle horncore with chopmark at its basis (left: lateral side, right: medial side) (scale 1:1).

CHAPTER 10

THE CULTIVATED AND WILD PLANTS

WILLEM VAN ZEIST AND WILLEMINA WATERBOLK-VAN ROOIJEN

Introduction

The present chapter on the Sabi Abyad plant remains forms as it were the continuation of the report on the botanical study of the samples secured during the 1986 campaign (Van Zeist and Waterbolk-Van Rooijen 1989).[1] In contrast with the samples of the 1986 field season which are mostly from Early Halaf contexts, those retrieved during the 1988, 1991 and 1992 campaigns are predominantly from earlier levels (the so-called Transitional period and the pre-Halaf Neolithic), with the understanding that the Late Bronze Age samples are left out of consideration here. It was decided to include the samples of the 1986 campaign in the present report, although these have already been published. This was done because otherwise the number of Early Halaf samples would be too small to allow a comparison with other periods.

The samples examined for seeds (the term 'seeds' as used here includes 'fruits' in the plant-anatomical sense) and presented in this paper are shown in table 10.1.[2] Table 10.5 lists the samples examined for wood charcoal. The plant remains discussed in this study are from three main periods, i.e. the Early Halaf period (ca. 5150/5100-5000 B.C., uncalibrated), the Transitional period (ca. 5200-5150/5100 B.C.) and the pre-Halaf Neolithic (ca. 5700-5200 B.C.). This sequence is mainly based on the excavations on the southeastern mound of Sabi Abyad (cf. chapter 2). The exact stratigraphic correlation between the southeastern and northeastern mounds meets with difficulties. The pre-Halaf samples from the northeastern mound (see table 10.1) fit either in the Transitional period or in the pre-Halaf Neolithic.

[1] The authors wish to acknowledge the co-operation of the following persons. The wood identifications were carried out by G.J. de Roller who also took care of the botanical sampling during the 1986 and 1988 field seasons. Rita M. Palfenier-Vegter assisted in the sorting of the samples. Miriam A. Weijns and J.H. Zwier prepared the illustrations for publication. Sheila M. van Gelder-Ottway improved the English text. Information on the samples and comments on the first draft of the report were received from Dr. P.M.M.G. Akkermans.

[2] With respect to table 10.1, the following should be mentioned. Sample indications (locus-lot, level) are those employed in this volume, but for the 1986 samples the old sample designation system had to be used. This implies that in the locus-lot column, the first number denotes the area and the second one the old level, e.g. 15/4. No lot numbers are given for the 1986 samples.

Many more samples than listed in tables 10.1 and 10.5 were secured for botanical examination. Some of them were discarded because they yielded no or only very few identifiable plant remains. Of the 1988 samples, a quite considerable number was not analysed. The selection of the samples to be examined was determined mainly by the prospects of retrieving a fair quantity of seeds (after brief inspection). Furthermore, the aim was to cover several features. One is always faced with the problem of deciding to what extent the investment in time is justified by the expected additional information. It is unavoidable that the time factor plays a crucial role in the time-consuming examination of this kind of material. For the same reason, many samples have been examined only in part.

Some of the samples are from what may be called occupational soil or refuse deposits, with plant remains from diverse origins (most of the samples in tables 10.2-4). Other samples are from more or less pure cereal-grain concentrations. Samples from two large grain deposits are presented in tables 10.6 and 10.7. The sequence of the plant taxa in tables 10.2, 10.3 and 10.4 is as follows. First, in the upper part of the tables, cultivated plants and, if present, a few other food plants are listed. The wild-plant taxa, starting with *Aegilops*, are arranged according to family, first Gramineae (grasses) and Leguminosae (pea family), and then the other families in alphabetical order.

Although altogether a fair number of wild-plant taxa could be demonstrated for prehistoric Sabi Abyad, the representation of this group of plants in the archaeobotanical record is fairly meagre (many zero scores). No comments on the wild plant remains themselves are presented. The seed types demonstrated for Sabi Abyad have been described (and partly illustrated) in other papers on Near Eastern archaeobotany. On the other hand, relatively much attention is paid to the cereal remains, which not only make up the bulk of the Sabi Abyad plant record but also give rise to some interesting observations.

Crop Plants

In this section the crop-plant remains secured from prehistoric levels at Sabi Abyad will be discussed. The section concludes with some comments on the possible role of the various crop plants in the Sabi Abyad plant husbandry.

Wheat

The wheat grains recovered are almost all of einkorn and emmer wheat, which are both hulled wheats. In hulled or glume wheats, the grains are enclosed by stiff glumes, and a special treatment is required to free the kernels from the spikelets. In naked wheat, on the other hand, the grains are easily released from the ears in threshing, hence the term 'free-threshing wheat'.

Free-threshing wheat. As has been discussed in earlier papers (e.g. Van Zeist and Bakker-Heeres 1982), two naked-wheat species come into consideration for the prehistoric Near East, viz. hard wheat or durum wheat (*Triticum durum*) and bread wheat (*Triticum aestivum*). As the charred grains of these wheats cannot be distinguished one from the other, they are indicated here as *Triticum durum/aestivum*. On ecological grounds *T. durum* is the most likely candidate: this species is well adapted to the Mediterranean-type climate with warm, dry summers and rather mild, rainy winters. Free-threshing wheat is only scarcely represented at prehistoric Sabi Abyad (tables 10.3, 10.4, 10.7) and one wonders whether it was grown intentionally. One is rather inclined to think that it occurred as a contaminant in glume-wheat fields.

Emmer wheat. The charred remains of various rather pure emmer-wheat (*Triticum dicoccum*) supplies were uncovered. In the majority of these predominantly emmer-wheat samples appreciable numbers of spikelet forks and glume bases were found, suggesting that the crop had been stored in the spikelets, which up to recent times was common practice in traditional farming villages (cf. Hillman 1984). The dehusking of the grains was done on a piecemeal basis, prior to food preparation. For samples with sufficiently large numbers of rather well preserved grains the dimensions were taken in the usual way (table 10.8). It is to be expected that there are differences in size and shape of the grains between samples from different provenances. Differences in climatic conditions (annual climatic fluctuations) and in the condition of the fields must have affected the development of the kernels. However, what about the grain of one large supply, which may be expected to be of the same harvest but not necessarily from the same field? One such deposit is the grain layer in square Q14, seven samples of which have been examined (table 10.6). The mean dimensions and index values of the grains in the two samples from this deposit that have been measured show only insignificant differences. The frequencies of the length and L:B index values show largely identical distributions (fig. 10.1). For comparison the frequency distributions of kernels from sample 88-10, from the large grain deposit, are plotted against those obtained for another Early-Halaf emmer-wheat sample (fig. 10.2). The frequency distributions for the length are almost identical, but the L:B index values of sample 88-21 show a distinct 'tail' towards the higher values.

Einkorn wheat. Einkorn wheat (*Triticum monococcum*) is represented in a fair number of samples, but mostly by small numbers of grains. A notable exception is formed by the almost pure einkorn-wheat samples of table 10.7, which will be discussed below. In einkorn wheat, usually one grain develops in a spikelet. As a consequence, not only the dorsal side but also the ventral side is curved in side view. In emmer wheat, usually two grains develop in a spikelet, and in this type the ventral side of the grain is flat and longitudinally straight. This is caused by the fact that in the spikelet the grains are situated with the ventral sides towards each other. However, in emmer wheat one-seeded spikelets may occur, particularly in the top of the ear. The grains formed in those spikelets resemble those of einkorn wheat, but

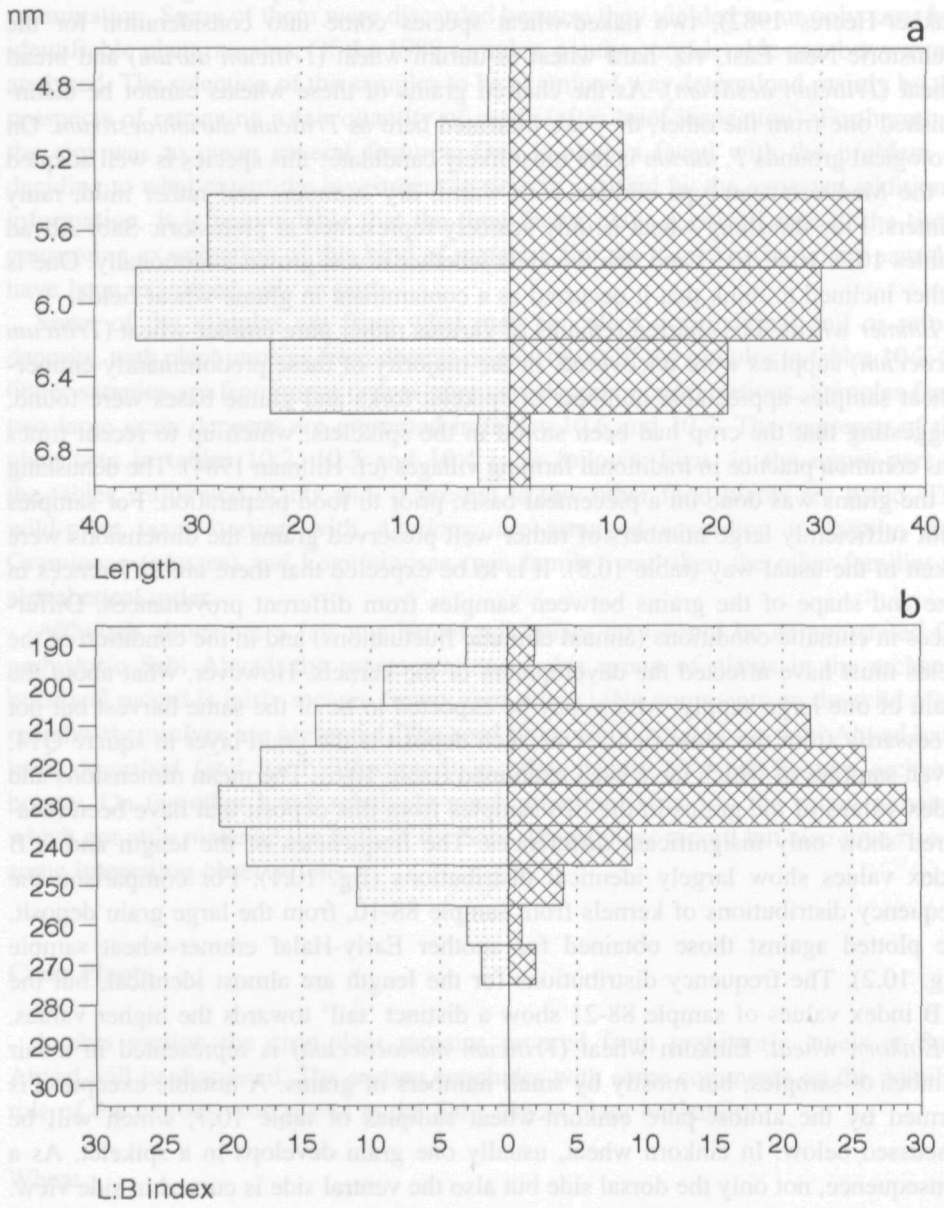


Figure 10.1. *Triticum dicoccum*. Left: 88-10; right: 88-14. N= 100.

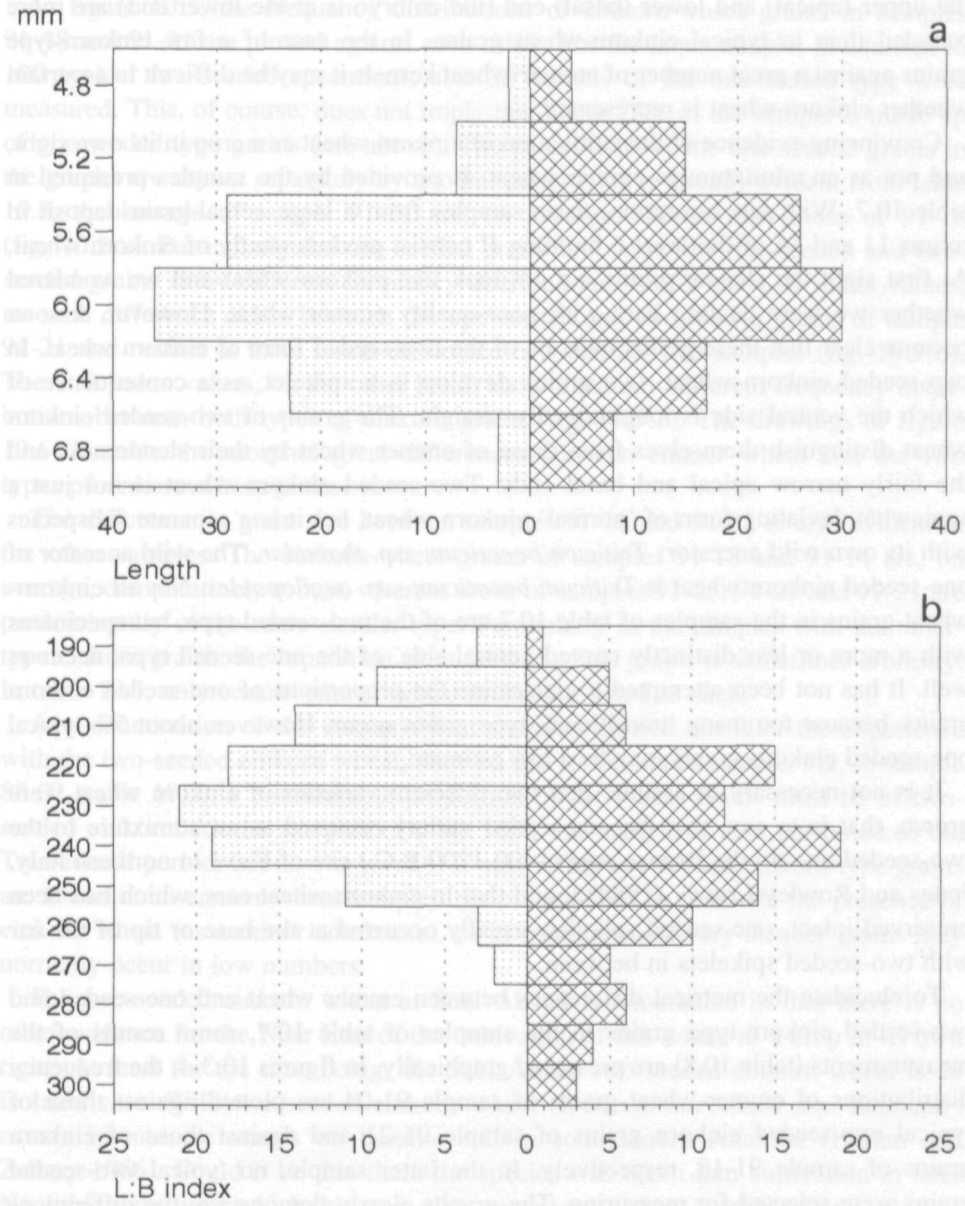


Figure 10.2. *Triticum dicoccum*. Left: 88-10; right: 88-21. N=100.

the upper (apical) and lower (basal) end (the embryo is at the lower end) are more rounded than in typical einkorn-wheat grains. In the case of a few einkorn-type grains against a great number of emmer-wheat kernels it may be difficult to ascertain whether einkorn wheat is represented.

Convincing evidence of the cultivation of einkorn wheat as a crop in its own right, and not as an admixture to emmer wheat, is provided by the samples presented in table 10.7. With one exception, these samples from a large cereal-grain deposit in rooms 11 and 14 of the level 6 building II consist predominantly of einkorn wheat. At first sight the slender grains did not look like einkorn wheat and we wondered whether we were dealing here with poor-quality emmer wheat. However, it soon became clear that these grains must be of the two-seeded form of einkorn wheat. In two-seeded einkorn wheat, two grains develop in a spikelet, as a consequence of which the ventral side is longitudinally straight. The grains of two-seeded einkorn wheat distinguish themselves from those of emmer wheat by their slenderness and the fairly narrow apical and basal ends. Two-seeded einkorn wheat is not just a somewhat deviating form of 'normal' einkorn wheat, but it is a separate subspecies with its own wild ancestor: *Triticum boeoticum* ssp. *thaoudar*. The wild ancestor of one-seeded einkorn wheat is *Triticum boeoticum* ssp. *aegilopoides*. Not all einkorn-wheat grains in the samples of table 10.7 are of the two-seeded type, but specimens with a more or less distinctly curved ventral side, of the one-seeded type, occur as well. It has not been attempted to determine the proportions of one-seeded einkorn grains, because too many 'transitional'-type grains occur. However, about 5% typical one-seeded einkorn grains may be a fair estimate.

It is not necessary to assume that two different varieties of einkorn wheat were grown, that is to say, that the one-seeded variety occurred as an admixture to the two-seeded one. In the Bronze Age (1400-1200 B.C.) site of Fiavé in northern Italy, Jones and Rowley-Conwy (1984) found that in einkorn-wheat ears, which had been preserved intact, one-seeded spikelets usually occurred at the base or tip of the ear with two-seeded spikelets in between.

To elucidate the metrical differences between emmer wheat and one-seeded and two-seeded einkorn-type grains in the samples of table 10.7, some results of the measurements (table 10.8) are presented graphically. In figures 10.3-4, the frequency distributions of emmer-wheat grains of sample 91-04 are plotted against those of typical two-seeded einkorn grains of sample 91-21 and against those of einkorn grains of sample 91-18, respectively. In the latter sample, no typical two-seeded grains were selected for measuring. The graphs clearly demonstrate the differences in size and shape between the grains of emmer wheat and two-seeded einkorn wheat. Although in both cases two grains develop in a spikelet, there are distinct morphological differences. There is some overlap in the frequency distributions, suggesting that for some grains it may be difficult to attribute them to either einkorn or emmer wheat (see below).

In figure 10.5, the frequency distributions of einkorn-wheat grains in samples 91-18 and 91-21 are plotted against each other. For the latter sample, in addition to 100 typical two-seeded specimens, also 35 kernels of the one-seeded type were measured. This, of course, does not imply that about 25% of the sample is made up of one-seeded type grains (see above). The proportions of the one-seeded grains in the graphs are shown separately by another pattern. As is already evident from table 10.8, the kernels of sample 91-21 are, on average, shorter than those of 91-18 (fig. 10.5:a). Particularly the one-seeded grains are short: the one-seeded and two-seeded grains show different frequency distributions. As for the L:B index values, no such difference exists between the one-seeded and two-seeded grains of sample 91-21 and neither is there much difference between the two samples (fig. 10.5:b). The T:B index values, on the other hand, show distinctly different frequency distributions between both types of einkorn grains (fig. 10.5:c). The drawings of figure 10.6 illustrate the morphological differences between emmer wheat and the two types of einkorn-wheat grains.

The difference in grain size between samples 91-18 and 91-21 is also evident in the other samples. The einkorn-wheat grains of samples 91-18 and 91-14 are, on average, comparatively robust, whereas those of samples 91-05, 91-09 and 91-21 are predominantly of the more slender type. Particularly in the samples with the taller-type einkorn grains, the separation from emmer-wheat grains is sometimes arbitrary. In table 10.7, only certain emmer-wheat grains are listed as such.

A re-examination of the emmer-wheat samples, carried out after the experience with the two-seeded einkorn wheat, showed that in one more sample, viz. in sample 88-02 (table 10.3), a considerable proportion of the wheat grains must be of two-seeded einkorn. As the samples of table 10.7, this sample is also attributed to the Transitional period, but now to level 4. If only a few two-seeded einkorn-type grains are found in an emmer-wheat sample, it is not justified to conclude the presence of einkorn wheat (as a minor admixture), as in emmer wheat very slender grains may normally occur in low numbers.

The two-seeded einkorn wheat at Sabi Abyad is remarkable in that there is no other evidence for the Near East of the cultivation of this wheat as a crop in its own right. At least for the time being, the Sabi Abyad two-seeded einkorn wheat is an isolated case. Wild two-seeded einkorn wheat (*Triticum boeoticum* ssp. *thaoudar*) occurs in massive stands on basaltic soil in southeastern Anatolia (Harlan and Zohary 1966). Could it be that there the species was taken into cultivation in later Neolithic time, after which this crop plant spread to adjacent northern Syria? Be this as it may, in the North Syrian region its cultivation must have been abandoned rather soon.

Spikelet forks. In addition to the caryopses of emmer and einkorn wheat, glume bases and spikelet forks of hulled wheat were recovered, not seldom in very considerable quantities (refuse of dehusking activities). In this section attention is paid to

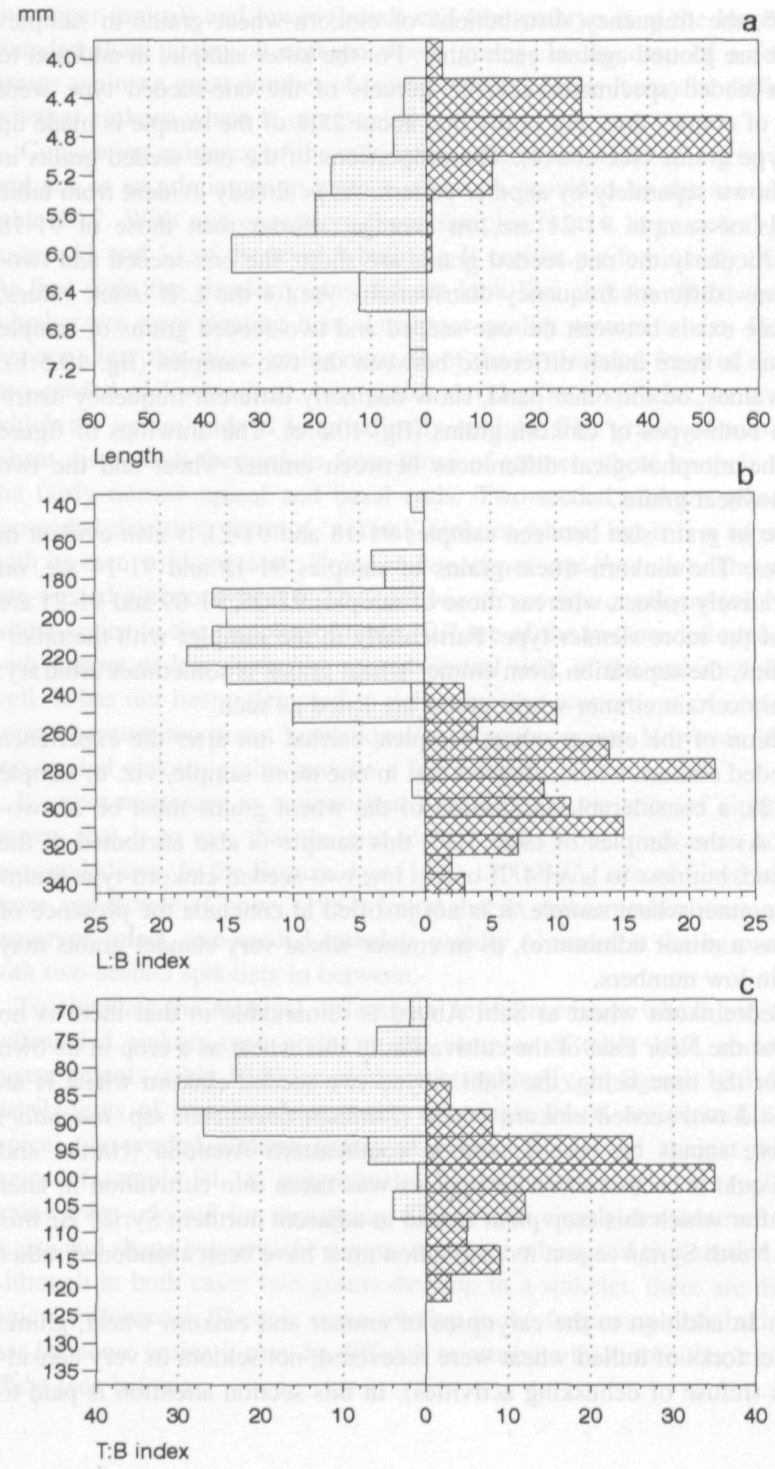


Figure 10.3. Left: *Triticum dicoccum* (91-04); right: two-seeded *Triticum monococcum* (91-21). N= 100.

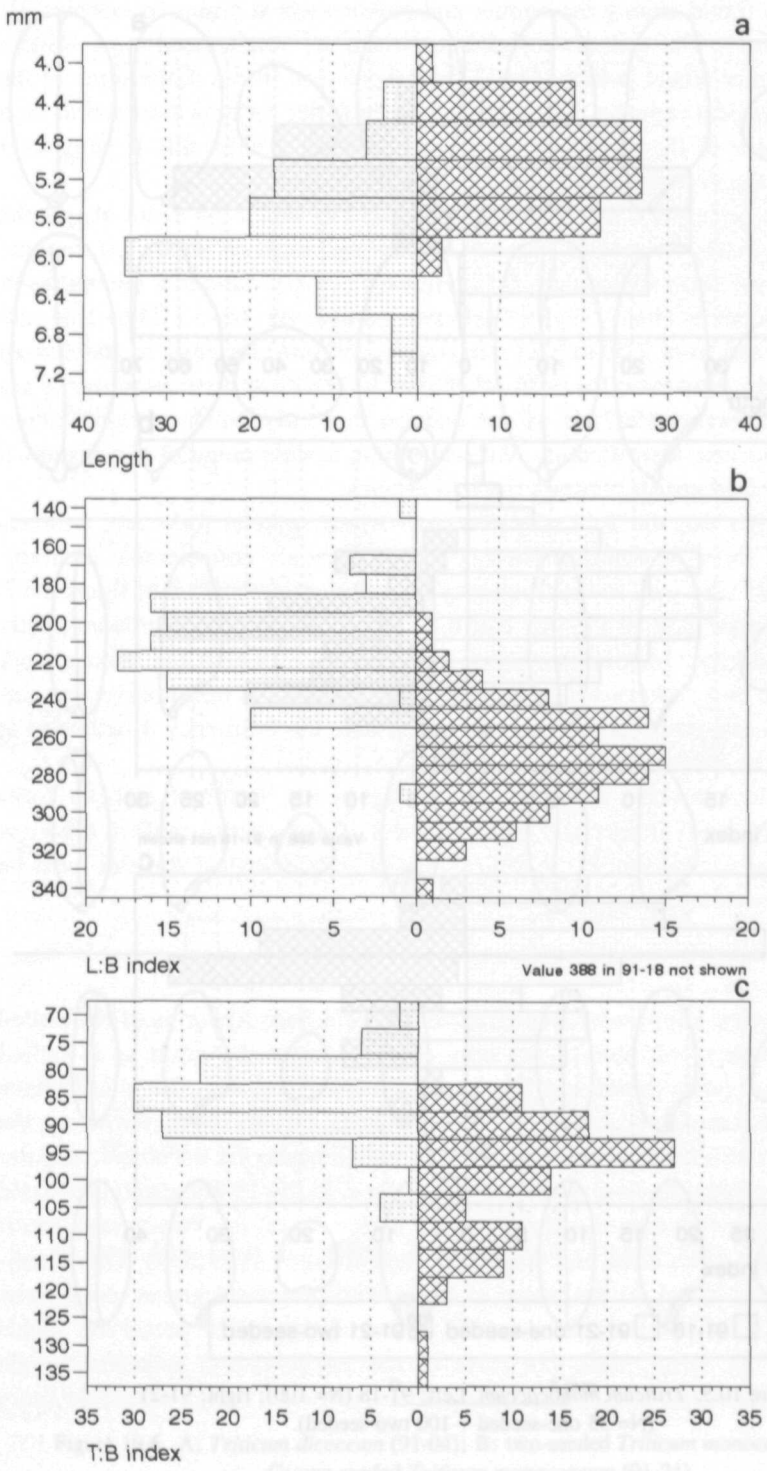


Figure 10.4. Left: *Triticum dicoccum* (91-04); right: *Triticum monococcum* (91-18). N=100.

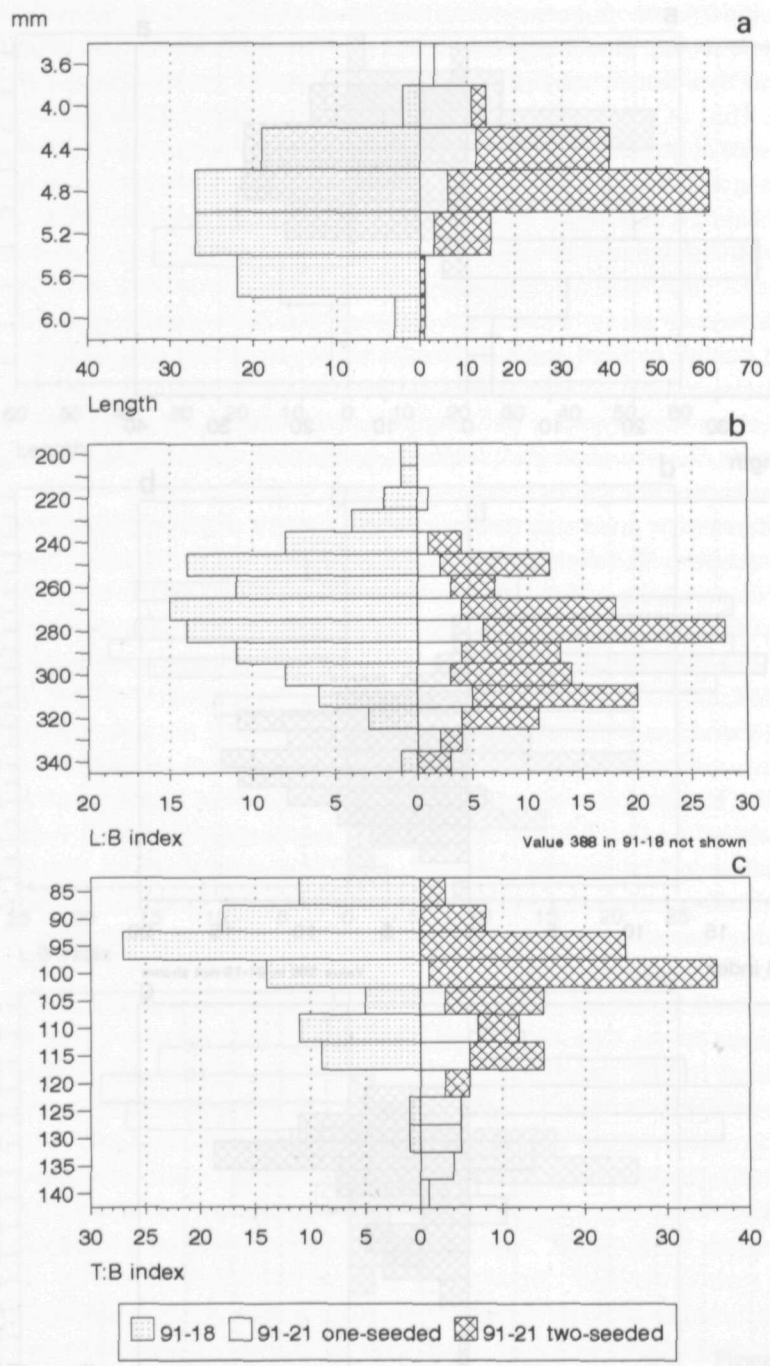


Figure 10.5. *Triticum monococcum*. Left: 91-18 (N= 100); right: 91-21 (N= 35 one-seeded + 100 two-seeded).

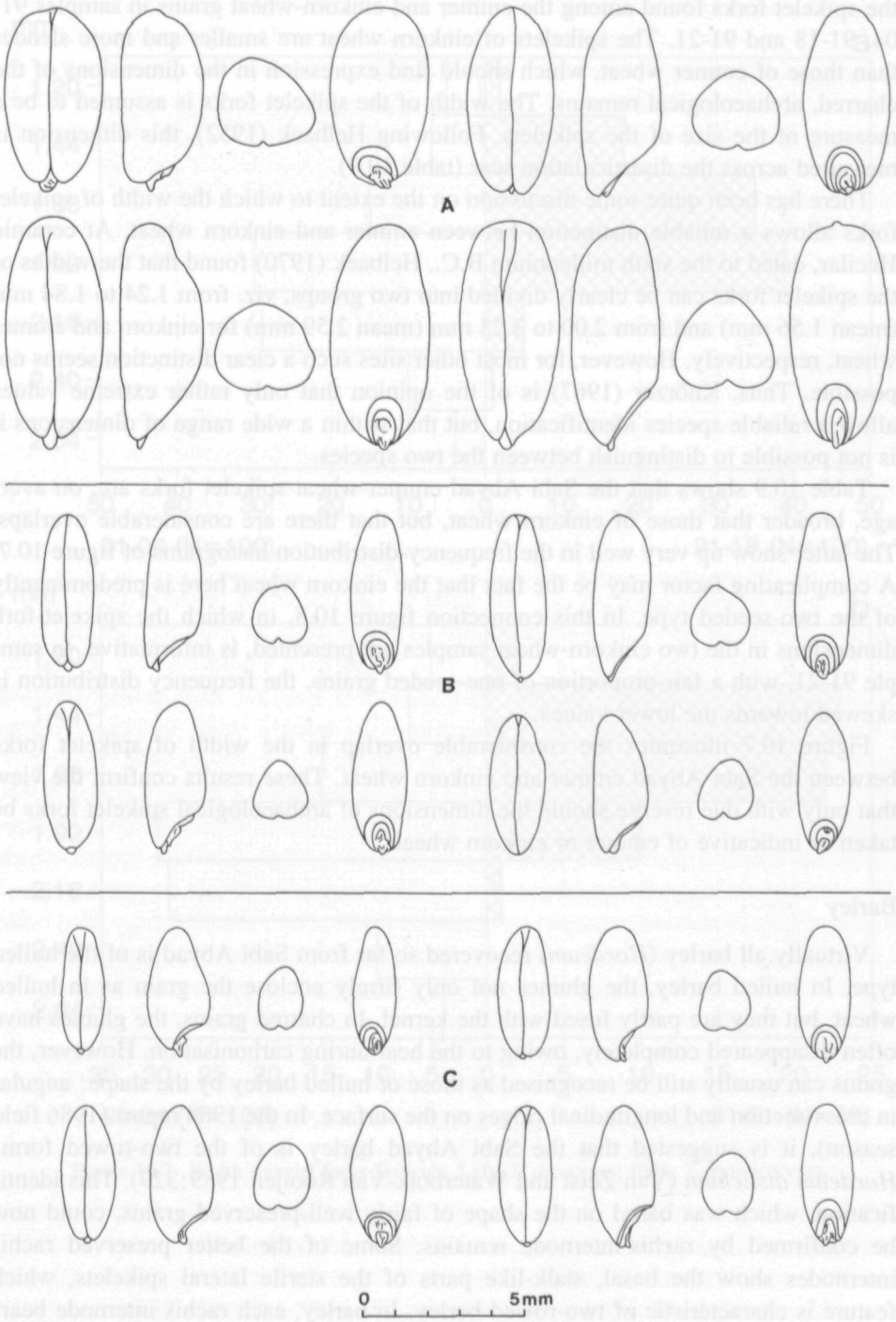


Figure 10.6. A: *Triticum dicoccum* (91-04); B: two-seeded *Triticum monococcum* (91-21); C: one-seeded *Triticum monococcum* (91-21).

the spikelet forks found among the emmer and einkorn-wheat grains in samples 91-04, 91-18 and 91-21. The spikelets of einkorn wheat are smaller and more slender than those of emmer wheat, which should find expression in the dimensions of the charred, archaeological remains. The width of the spikelet forks is assumed to be a measure of the size of the spikelets. Following Helbaek (1952), this dimension is measured across the disarticulation scar (table 10.9).

There has been quite some discussion on the extent to which the width of spikelet forks allows a reliable distinction between emmer and einkorn wheat. At ceramic Hacilar, dated to the sixth millennium B.C., Helbaek (1970) found that the widths of the spikelet forks can be clearly divided into two groups, viz. from 1.24 to 1.84 mm (mean 1.56 mm) and from 2.00 to 3.28 mm (mean 2.59 mm) for einkorn and emmer wheat, respectively. However, for most other sites such a clear distinction seems not possible. Thus, Knörzer (1967) is of the opinion that only rather extreme values allow a reliable species identification, but that within a wide range of dimensions it is not possible to distinguish between the two species.

Table 10.9 shows that the Sabi Abyad emmer-wheat spikelet forks are, on average, broader that those of einkorn wheat, but that there are considerable overlaps. The latter show up very well in the frequency-distribution histograms of figure 10.7. A complicating factor may be the fact that the einkorn wheat here is predominantly of the two-seeded type. In this connection figure 10.8, in which the spikelet-fork dimensions in the two einkorn-wheat samples are presented, is informative. In sample 91-21, with a fair proportion of one-seeded grains, the frequency distribution is skewed towards the lower values.

Figure 10.7 illustrates the considerable overlap in the width of spikelet forks between the Sabi Abyad emmer and einkorn wheat. These results confirm the view that only with due reserve should the dimensions of archaeological spikelet forks be taken as indicative of emmer or einkorn wheat.

Barley

Virtually all barley (*Hordeum*) recovered so far from Sabi Abyad is of the hulled type. In hulled barley, the glumes not only firmly enclose the grain as in hulled wheat, but they are partly fused with the kernel. In charred grains, the glumes have often disappeared completely, owing to the heat during carbonisation. However, the grains can usually still be recognised as those of hulled barley by the shape: angular in cross-section and longitudinal ridges on the surface. In the 1989 report (1986 field season), it is suggested that the Sabi Abyad barley is of the two-rowed form: *Hordeum distichum* (Van Zeist and Waterbolk-Van Rooijen 1989:329). This identification, which was based on the shape of fairly well-preserved grains, could now be confirmed by rachis-internode remains. Some of the better preserved rachis internodes show the basal, stalk-like parts of the sterile lateral spikelets, which feature is characteristic of two-rowed barley. In barley, each rachis internode bears

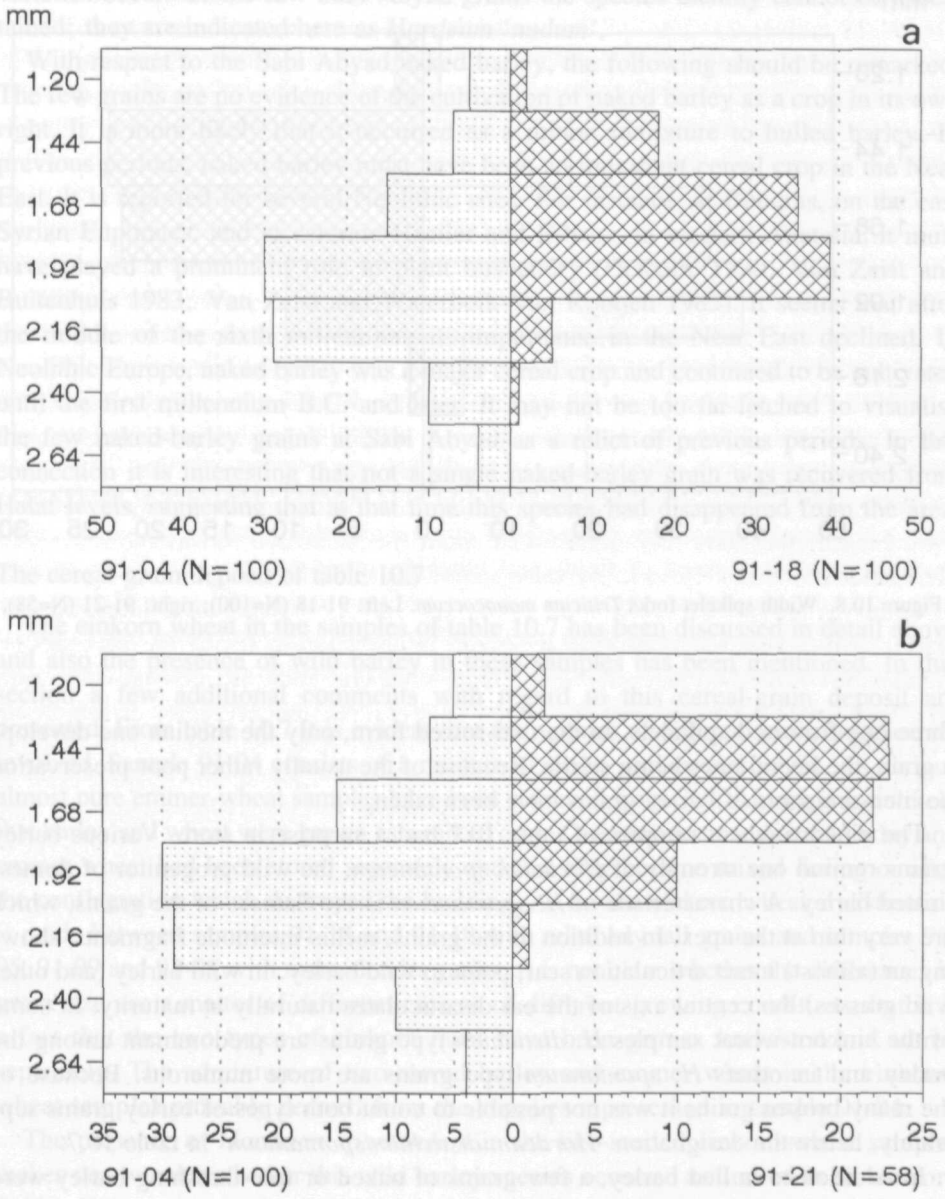


Figure 10.7. Width spikelet forks *Triticum*. Left: *T. dicoccum*; right: *T. monococcum*.

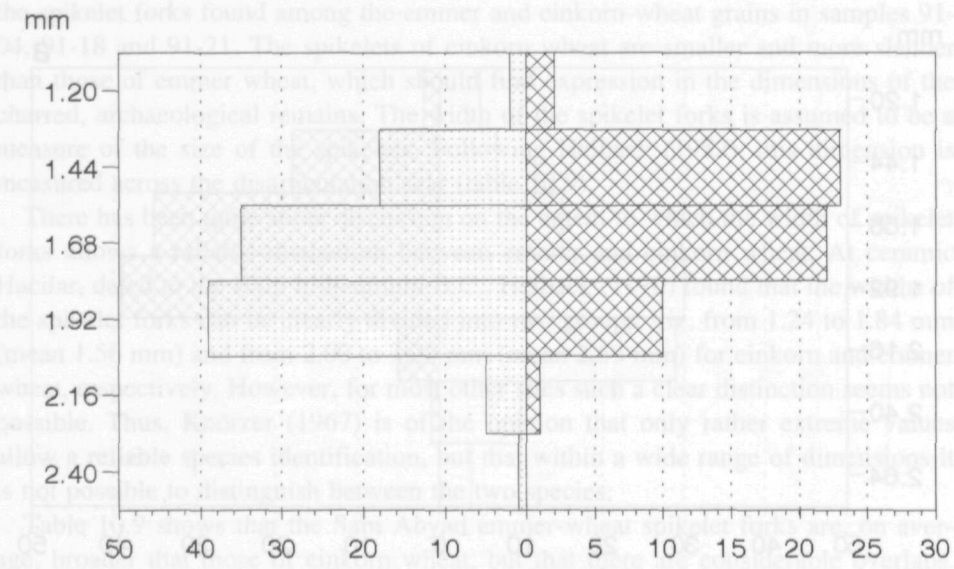


Figure 10.8. Width spikelet forks *Triticum monococcum*. Left: 91-18 (N=100); right: 91-21 (N=58).

three one-flowered spikelets. In the two-rowed form, only the median one develops a grain, the lateral ones being sterile. Because of the usually rather poor preservation no measurements of barley grains have been taken.

The einkorn-wheat samples of table 10.7 had a surprise in store. Various barley grains remind one strongly of *Hordeum spontaneum*, the wild progenitor of domesticated barley. A characteristic of *H. spontaneum* is the flatness of the grains, which are very thin at the apex. In addition to the grains, rachis-internode fragments, showing an (almost) intact articulation scar, point to wild barley: in wild barley (and other wild grasses) the central axis of the ear disarticulates naturally at maturity. In some of the einkorn-wheat samples *H. distichum*-type grains are predominant among the barley and in others *H. spontaneum*-type grains are more numerous. Because of the many broken grains it was not possible to count both types of barley grains separately, hence the designation '*Hordeum distichum/spontaneum*' in table 10.7.

In addition to hulled barley, a few grains of naked or free-threshing barley were recovered from Transitional period levels (table 10.3). As in free-threshing wheat, the grains in naked barley are loose in the mature ears and are released in threshing. Naked-barley grains have a more flowing shape than those of the hulled varieties and they are rounded in cross-section. Characteristic of naked barley is a fine transverse wrinkling on the surface, but this feature cannot always be observed in charred, archaeological specimens. Of both two-rowed and six-rowed barley, naked

varieties occur. Of the few Sabi Abyad grains the species identity cannot be ascertained; they are indicated here as *Hordeum 'nudum'*.

With respect to the Sabi Abyad naked barley, the following should be remarked. The few grains are no evidence of the cultivation of naked barley as a crop in its own right. It is more likely that it occurred as a minor admixture to hulled barley. In previous periods, naked barley must have been an important cereal crop in the Near East. It is reported for several Neolithic sites. For instance, at Bouqras, on the east Syrian Euphrates, and at ceramic Hacilar and Erbaba, in western Anatolia, it must have played a prominent role in plant husbandry (Helbaek 1970; Van Zeist and Buitenhuis 1983; Van Zeist and Waterbolk-Van Rooijen 1985). It seems that after the middle of the sixth millennium its importance in the Near East declined. In Neolithic Europe, naked barley was a major cereal crop and continued to be cultivated until the first millennium B.C. and later. It may not be too far-fetched to visualise the few naked-barley grains at Sabi Abyad as a relict of previous periods. In this connection it is interesting that not a single naked-barley grain was recovered from Halaf levels, suggesting that at that time this species had disappeared from the area.

The cereal-grain deposit of table 10.7

The einkorn wheat in the samples of table 10.7 has been discussed in detail above and also the presence of wild barley in these samples has been mentioned. In this section a few additional comments with regard to this cereal-grain deposit are presented. From table 10.7 it is evident that the remains of different grain supplies are involved. Sample 91-04 consists of a mixture of barley and emmer wheat. As various almost pure emmer-wheat samples have been retrieved from Sabi Abyad, it is unlikely that barley and wheat were grown as a mixed crop. One may assume that the barley and emmer wheat had been stored separately and that they became mixed during or after the conflagration which destroyed the building. As for the einkorn wheat, a distinction is made between samples 91-14 and 91-18 with relatively tall grains and samples 91-05, 91-09 and 91-21 with more slender grains. It is not clear whether the differences in grain size are a matter of different race or of different growing conditions, but it is a fact that the two types of einkorn must have been grown, harvested and stored separately. The admixture of two-rowed barley and emmer wheat in the einkorn-wheat samples probably derived from the supplies represented in sample 91-04.

The presence of *Hordeum spontaneum* in the two-seeded einkorn-wheat samples makes one wonder whether this wild barley species occurred as a weed in the einkorn fields. *H. spontaneum* has weedy characters, and besides in natural habitats, it is found in segetal, man-made habitats. Archaeobotanical indications of its occurrence as a weed of arable land are scarce, and the species is not reported by Jansen (1986) for the field-weed flora of northeastern Syria. Could it be that weedy *H. spontaneum* was introduced into the area together with two-seeded einkorn wheat and that it disappeared again after the cultivation of this wheat type had been abandoned?

Other crop-plant species

Of the non-cereal crop plants, linseed or flax (*Linum usitatissimum*) is best represented, be it only occasionally by more than a few seeds. Like barley, wheat and various pulses, linseed belongs to the early-Neolithic Near Eastern crop-plant complex. There is no sense in speculating as to whether at Sabi Abyad linseed was grown primarily for its oleaginous seeds or for its fibres. Loose seeds are not informative in this respect, and even in the case of the find of a cache of linseeds, one cannot be certain that it was destined for human consumption, as seed or as oil to be pressed from the seeds. It could equally well represent the remains of a sowing-seed supply. As at Sabi Abyad evidence of the use of other vegetable fats (e.g. *Pistacia*) is very scarce, linseed could have constituted a valuable contribution to the human diet.

Various pulse crops are attested for Sabi Abyad: lentil (*Lens culinaris*), field pea (*Pisum sativum*), grass pea (*Lathyrus sativus*) and bitter vetch (*Vicia ervilia*). The numbers of pulse seeds retrieved are so small that one wonders whether the species concerned were grown intentionally. However, it is unlikely that most of them could have maintained themselves as weeds of cultivated fields. Only bitter vetch could have occurred as a weed of fields and other disturbed habitats. Of *Vicia ervilia*, cultivated varieties and weedy races occur in addition to the wild form (Zohary and Hopf 1973, 1993), and the seeds of the three forms cannot be separated one from the other. The representation of pulses in archaeological settlement sites is somewhat puzzling. Usually only modest numbers of pulse seeds are retrieved, but in some sites they are found in quite considerable quantities. Were there really such striking differences in the consumption of pulses between sites, or is another, as yet unknown factor responsible for the conspicuous differences in the representation in the archaeobotanical record?

Attention is drawn to coriander (*Coriandrum sativum*) attested for the northeastern mound (table 10.4). It concerns here the 'inner' seed, the characteristic outer seed wall not being preserved. It would be too far-fetched to consider the single seed of this well-known kitchen herb as indicative of its intentional cultivation. More likely coriander seeds were gathered in the wild, if they were already used as a condiment in Neolithic times. Firm evidence of the cultivation of this species dates back to the second millennium B.C. Thus, at Tell ed-Der, in lower Mesopotamia, a sample from a 17th century B.C. context yielded a substantial number of charred coriander seeds (Van Zeist 1984).

Food-plant proportions

One of the pressing questions the archaeologist usually asks the botanist is that of the role of cultivated and wild plant species in the economy of the site. What can be said about their (relative) importance and possible changes therein in the course of time? Although Sabi Abyad has proved to be quite rich in charred plant remains, the

data obtained so far allow only some very general conclusions with respect to the role of the various species in the food economy.

As has already been remarked, we are in the dark about the role of the leguminous crop plants. Did pulses really play a minimal part at Sabi Abyad, as is suggested by the very small numbers of seeds? Flax usually seems to be under-represented in the archaeological seed record. For that reason, it is not unlikely that flax was of more than minor importance at Sabi Abyad, which to some degree is supported by the comparatively good representation of this species in a few samples (86-56 and 88-09 in table 10.2, 88-63 and 91-06 in table 10.3).

Irrespective of the question to what extent the representation of pulses and linseed gives a distorted picture, one may safely assume that cereals were the main crops of the Sabi Abyad farmers. Although no estimates can be given, wheat must have been of greater importance than barley. Cereal-grain concentrations consist almost entirely of wheat. From only a few samples substantial numbers of barley grains were recovered. In typical refuse samples, characterised by small numbers of cereal grains, many spikelet remains and relatively many weed seeds, barley grains are often more numerous than those of wheat. Experience from other sites suggests that this may be due to better chances for barley grains to be preserved in refuse deposits in a carbonised condition.

The total of the archaeobotanical record clearly indicates that emmer wheat was quantitatively the most important crop plant. This species must have been the backbone of arable farming at Sabi Abyad. Compared to that of emmer wheat, the proportion of einkorn wheat must generally have been rather modest. The two-seeded einkorn wheat from Transitional-period levels is somewhat puzzling. Why had this wheat been added to the crop-plant assortment, and to what extent had it superseded emmer wheat? The fact that apparently in Early Halaf times, the cultivation of two-seeded einkorn wheat had been abandoned, may indicate that this crop did not come up to expectations.

Judging from the scarce remains, the economic significance of wild-fruit collecting must have been negligible. It rather looks as though wild fruits were brought to the site only occasionally. This may largely be due to the fact that attractive wild fruits were hardly present in the surroundings of Sabi Abyad. Thus, the nearest stands of wild pistachio (*Pistacia atlantica*, *P. khinjuk*) may have been found as far away as 100 km from the site, in the Jebel Abdul Aziz and in the mountains of southeastern Anatolia. Only one small *Pistacia* nutshell fragment was recovered (table 10.2). Not a single grape pip (*Vitis vinifera*) has been retrieved, although this vine may have occurred in the Balikh valley in its wild form.

Grain storage

With respect to the question whether the beehive-shaped features, called tholoi, may have been grain-storage facilities (cf. Akkermans 1989b:59-66), the following

should be remarked. At Sabi Abyad, no concentrations of charred cereal grains have so far been found inside tholoi. The few samples from the contents of tholoi yielded plant-remain assemblages which are typical of refuse deposits. The large grain deposit excavated in 1988 (table 10.6) is "from an open area outside architectural features". Of course, it cannot be excluded that charred grain from inside a tholos had been dumped there. On the other hand, in that case one would have expected a less pure grain deposit, as in shoveling the burnt contents out of the tholos mixing with other debris could easily have taken place. The grain deposit recovered in 1991 (table 10.7) is from supplies stored inside a house. In conclusion, the Sabi Abyad botanical evidence does not support the hypothesis that grain had been stored in the beehive-shaped structures.

Wild Plants: Their Ecological and Economic Implications

Wild plant species attested for archaeological sites yield information on farming practices, environmental conditions and on the exploitation of the vegetation by ancient man. It is self-evident that the more extensive the archaeobotanical record is (in numbers of species and of seeds), the more in detail the conditions of the past can be reconstructed. For reasons which are partly still unclear, there are considerable differences between sites with regard to quantity and quality of plant remains preserved. Although prehistoric Sabi Abyad has yielded appreciable quantities of charred cereal remains, the wild-plant record is not particularly rich.

The weed flora

Most reliable information on the ancient field-weed flora may be expected from the remains of unprocessed crop supplies, as in that case the weed seeds in the cereal or leguminous crop may be expected to have originated from the fields concerned. Unfortunately, the Sabi Abyad charred cereal-grain deposits are almost free of weed seeds: the crop had been cleaned of weed seeds and other contaminants. They are of supplies ready for consumption or for being sown the next season. It is true that the emmer and einkorn-wheat deposits contained appreciable numbers of spikelet remains (spikelet forks and glume bases), but this is due to the way hulled wheats were stored, viz. in the spikelets, from which the grains were freed prior to food preparation. Sowing of hulled wheats also took (takes) place in the spikelets.

The extreme scarcity of weed seeds in the charred cereal-grain supplies suggests that relatively few arable weeds were (unintentionally) harvested together with the crop. Otherwise more weed seeds were to be expected in the grain supplies, this in spite of thorough cleaning. This does not necessarily imply that through weeding the fields were largely free of weeds, but most likely the harvesting method employed must be held responsible for the scarcity of weed seeds. By cutting or plucking the

individual ears or by uprooting the plants, only few weed seeds are harvested together with the crop. Be this as it may, at Sabi Abyad the charred cereal-grain deposits contain only scarce remains of the ancient arable weed flora.

From the samples of tables 10.6 and 10.7 and emmer-wheat samples 86-67, 86-74, 88-21 and 88-22 (table 10.2) one or more seeds of the following field-weed taxa were retrieved: *Lolium*, *Bromus danthoniae* type, *Aegilops*, *Hordeum* (wild, not *Hordeum spontaneum*), *Astragalus*, *Vicia*, *Bupleurum*, *Rumex pulcher*, *Galium*, and *Bellevalia*. These taxa are known to occur as arable weeds (cf. Jansen's (1986) study of the weed flora of northeastern Syria), although a genus like *Astragalus* includes also many non-weedy, perennial species (see below). The species identity of the '*Ornithogalum*' seed type is still enigmatic, but very probably it concerns a field weed.

One may assume that many more weed species than mentioned above were found in the fields of the Sabi Abyad farmers. For more information on the weed flora, samples from the occupational soil of refuse deposits may be informative. A disadvantage of this kind of provenance is the fact that here plant remains of diverse origins are usually found together. In interpreting the plant record obtained from these samples it is assumed that the past ecological affinity of the species was not much different from the present one. Tables 10.2, 10.3 and 10.4 list a fair number of taxa which could have occurred as weeds in fields and other disturbed habitats. In addition to the taxa enumerated above the following may be mentioned here: *Phalaris*, *Cynodon*, *Medicago*, *Prosopis*, *Trigonella astroites*, *Adonis*, *Silene* and *Cephalaria syriaca*.

The river-valley vegetation

Originally, before the more serious interference of man with the vegetation, the Balikh valley floor must have been covered by riverine forest. At the time of the prehistoric occupation of Sabi Abyad, this forest must still have been present. The charcoal remains (table 10.5) suggest that in addition to *Populus*, *Ulmus* and *Fraxinus* were constituents of this forest. The latter two are not mentioned for forest remnants which up to recently were still found on some islands in the Syrian Euphrates. Could it be that elm and ash have disappeared from the riverine forest as a result of intensive exploitation? Regular felling of trees could have favoured rapidly growing poplar. Moreover, one wonders to what extent already in ancient times poplar was planted by man.

Curiously, no charcoal was found of *Tamarix*, a shrub which is thought to have formed part of the natural river-valley forest. This could in part be due to the type of samples secured for wood identification. On the other hand, if at the time tamarisk had commonly occurred in the Balikh valley, it might be expected in the charcoal record. The (near) absence of *Tamarix* at prehistoric Sabi Abyad does not imply that in general tamarisk was at most of minor importance in the natural river-valley forest. Thus, the charcoal record of Neolithic Bouqras (6400-5900 B.C.), on the Syrian

Euphrates, demonstrates that there tamarisk was a major constituent of the river-valley forest (Van Zeist and Waterbolk-Van Rooijen 1985). Apparently, the conditions in the Balikh valley differed from those in the Euphrates flood plain.

Poplar, elm and ash must have been the principal building timbers (roof beams, lintels, etc.). Sample 88-75, from a level 6 context, yielded a few pieces of cedar (*Cedrus*) charcoal. As contamination from younger (Late Bronze Age) levels is very unlikely (oral communication P.M.M.G. Akkermans), one must assume that already in the early sixth millennium B.C. (Transitional period) cedar wood was imported, be it on a very modest scale.

Of the herbaceous ground flora of the Balikh valley the following could be demonstrated: *Carex* (sedge), *Eleocharis* (spike-rush) and *Scirpus maritimus* (sea club-rush). Sedge and club-rush could have been used as litter for bedding. No certain remains of *Phragmites* (reed) have as yet been demonstrated. The small seeds (caryopses) of reed may easily burn to ashes. Altogether one charred reed/cereal-type culm node (culm nodes are the sturdy connections between two internodes of grass stems) has been recovered from prehistoric levels, but this one, from a cereal grain sample (table 10.7), is very likely of barley or wheat. In the future, the examination of stem imprints in burnt clay may provide evidence of the utilisation of reed.

Fuel collecting

In addition to building timber, the riverine forest in the Balikh valley provided the occupants of Sabi Abyad (and other sites along this river) with firewood, but this source was not inexhaustible and should not have been exploited unscrupulously. One may assume that firewood from the valley was supplemented with other fuel. In principle, samples from ovens and such-like should provide information on the materials that were burnt. Unfortunately, only one of the oven samples is really informative in this respect, viz. sample 92-05 (table 10.3). Most of this sample consists of the seeds of *Prosopis*, suggesting that this species had been used as fuel. *Prosopis farcta* (syn. *P. stephaniana*), a low, straggling shrub with spiny branches, has become a noxious field weed, difficult to eradicate because of its deep-reaching roots. Among the few seeds retrieved from oven samples 92-06 and 92-07, those of *Prosopis* predominate (table 10.3).

The surrounding steppe vegetation harboured a great number of shrubby perennials which could have been gathered as firewood. The Sabi Abyad plant record provides no direct evidence for the exploitation of this source of fuel, but there are a few weak indications. For instance, could the great number of *Helianthemum* seeds in sample 88-61 have originated from shrubs brought to the site as firewood? The same holds for the unexpectedly great number of *Teucrium* seeds in sample 88-32. The genus *Teucrium* includes various shrubby species. One wonders whether the rather high frequencies of *Astragalus* seeds in some of the samples could point to the collecting of shrubby perennials of this genus as fuel. Milk-vetch species are quite common in steppe vegetation.

The subject 'fuel' inevitably leads to the question of whether animal dung was used for heating. At prehistoric Sabi Abyad, there is some evidence of the use of dung fuel. In addition to a few seeds, oven samples 92-06 and 92-07 already mentioned above yielded scarce remains of sheep/goat droppings (2 fragments and half a dropping, respectively). With respect to the question of whether dung fuel played an important part, the following may be remarked. The practice of burning dung for heating is assumed to have contributed substantially to the seed contents of occupation deposits. Seeds that have passed through the digestive tract of animals more or less undamaged, are excreted in the droppings. In burning the dung, some of those seeds were carbonised (most of them would have been burnt to ashes), after which they may have got incorporated in the archaeological soil, for instance in refuse deposits (Miller 1982; Miller and Smart 1984; Bottema 1984). Although altogether a fair number of plant taxa could be attested for prehistoric Sabi Abyad, most of them occur in low numbers and in low sample frequencies, which may indicate that dung fuel was burnt only to a limited extent.

Number	Square	Locus-Lot	Level	Context
A. Southeastern mound				
86-47	P14	15/4	2 or 3A	on surface in open area
86-54	P13	9/4	2	contents of tholos L
86-56	P13	1/4	2	burnt area, in pit
86-57	P13	2/4	2	burnt area around oven P
86-58	P13	13/5	2	contents of white plastered pit O
86-65	P13	17/4	2	oven V
86-67	P13	14/5	2	ashy area, pit
86-70	P13	17/4	2	ashy layer on floor of oven V
86-74	P14	22/7	3B	area around tholoi O and AC
86-77	P14	23/8	3B	on floor of tholos O
88-02	P15	11-16	4	red-burnt soil and dark-grey/black ash
88-03	Q14	16-39	3B	grain layer in open area outside architectural features
88-05	P15	11-30	4	fill of large pit
88-06	P15	14-34	4	fill of large pit
88-08	Q13	33-96	3A	upper part of ashy spot on floor of room in rectangular building
88-09	Q13	33-96	3A	lower part of ashy spot on floor (cf. 88-08)
88-10	Q14	16-39	3B	grain layer, cf. 88-03
88-11	Q14	16-42	3B	grain layer, cf. 88-03
88-12	Q14	17-50	3B	grain layer, cf. 88-03
88-14	Q14	17-50	3B	grain layer, cf. 88-03
88-15	Q14	42-	3B	grain layer, cf. 88-03
88-16	Q14	16-39	3B	grain layer, cf. 88-03
88-21	Q13	10-50	1	ashy spot on floor of building III
88-22	P14	20-151	1?	pit AY
88-27	P15	19-44	6	red-burnt and black, ashy soil
88-32	P15	23-53	6	cf. 88-27
88-33	Q15	17-51	4	fill of oven AG
88-37	Q13	45-	3B	from layer immediately above grain layer of 88-03 etc.; very probably formed part of this grain deposit
88-38	Q15	17-51	4	fill of over AF
88-39	P15	23-57	6	cf. 88-27

Table 10.1a. Samples examined for seeds etc. and presented in Tables 10.2-4, 6-7. The first column shows the sample numbers used in this chapter. Levels 6-4 = transitional period; levels 3-1 = Early Halaf. See further Introduction.

Number	Square	Locus-Lot	Level	Context
88-47	R13	25-64	6	ashy soil in open area
88-54	Q14	44-119	4	fill of oven AE
88-58	P12	71-109	6?	pit HH
88-63	P15	23-59	6	fill
91-04	Q13	85-263	6	burnt grain on floor, building II, room 14
91-05	Q13	85-263	6	burnt fill, building II, room 11 or 14
91-06	Q13	124-331	6	from floor west of platform, building II, room 2
91-07	Q13	119-310	6	burnt grain on floor, building II, room 7
91-09	Q13	85-263	6	cf. 91-05
91-14	Q13	85-260	6	burnt grain (and charcoal), northwest corner of building II, room 11
91-18	Q13	85-260	3	burnt vegetal material in western half of building II
91-21	Q13	87-253	6	burnt grain, building II, room 14
91-22	Q13	85-264	6	charcoal (and burnt grain), building II, room 9
92-01	Q14	82-208	6	small pit in outdoor area
92-03	Q15	70-269	5	fill of oven CD
92-05	Q15	57-212	5	fill of oven BD
92-06	Q15	50-245	5	fill of oven AT
92-07	Q15	76-302	5	oven or hearth BZ
92-09	Q15	120-469	6	grain sample from building IV, room 11
92-10	Q15	78-400	6	grain sample from floor of building V, room 8
B. Northeastern mound				
86-05	T4	8/7	E.Halaf	pit
86-26	T5	8/3	pre-Halaf	surroundings of oven
86-33	T5	7/3	pre-Halaf	contents of oven B
88-23	V5	13-1	E.Halaf	floor
88-41	U5	39-	pre-Halaf	brown fill with grey, powdery spots
88-43	Y5	15-1	pre-Halaf	fill between two layers of renewing of a floor
88-50	Y5	17-1	pre-Halaf	thin layers of ashes and charcoal
88-61	Y5	18-1	pre-Halaf	thin layers of ashes and charcoal

Table 10.1b. Samples examined for seeds etc. and presented in Tables 10.2-4, 6-7. The first column shows the sample numbers used in this chapter. Levels 6-4 = transitional period; levels 3-1 = Early Halaf. See further Introduction.

Sample number	86-54	86-56	86-57	86-58	86-65	86-67	86-70	86-47	86-74	86-77	88-22	88-21	88-08	88-09
Square	P13	P13	P13	P13	P13	P13	P13	P14	P14	P14	P14	Q13	Q13	Q13
Level	2	2	2	2	2	2	2	2–3A	3B	3B	1?	1	3A	3A
Part examined	1/1	1/1	1/3	1/1	1/1	1/5	1/5	1/1	1/18	3/7	2/7	1/3	1/1	1/1
Triticum dicoccum	28	7	260	45	79	880	91	97	580	22	600	1300	4	19
Triticum monococcum	8	1	11	1	3	15	2	4	7	6	10	5	–	1
Triticum, spikelet forks	11	5	28	17	19	138	10	25	140	17	142	129	–	7
Triticum, glume bases	100	2	205	104	80	299	7	85	425	119	153	171	–	11
Hordeum (distichum)	12	1	2	–	3	3	1	10	4	4	1	5	2	8
Hordeum, rachis internodes	–	–	–	–	2	3	–	1	–	12	1	–	–	–
Cereal grain fragments (in grammes)	1.50	0.56	5.48	0.85	1.10	5.60	0.30	3.06	13.6	1.38	5.25	27.9	0.12	0.97
Lens culinaris	10	–	–	–	1	–	–	–	–	–	–	–	–	–
Pisum sativum	1	–	–	–	–	–	–	–	–	–	–	–	–	–
Vicia ervilia	–	–	–	–	–	–	–	1	–	–	–	–	–	–
Pulse grain fragments	–	–	–	–	–	–	–	–	–	+	–	–	–	–
Linum usitatissimum	–	5	1	1	1	–	–	–	–	–	–	–	3	13
Ficus	9	–	–	–	1	–	–	2	–	2	–	–	–	–
Pistacia	–	–	–	–	–	+	–	–	–	–	–	–	–	–
Amygdalus	+	–	–	–	–	–	–	–	–	–	–	–	–	–
Aegilops, grains	–	–	–	–	–	2	–	1	–	1	–	–	–	–
Aegilops, spikelet bases	–	–	–	–	–	1	–	1	–	1	–	–	–	–
Agrostis/Poa	–	–	–	–	–	–	–	2	–	–	–	–	–	–
Bromus danthoniae type	3	–	–	–	–	–	–	–	–	1	3	–	–	–
Cynodon dactylon	8	2	–	–	–	–	–	–	–	–	–	–	–	3
Eremopyrum	1	–	1	–	–	–	–	–	–	–	–	–	–	–
Hordeum (wild)	17	–	–	–	3	–	–	–	–	3	–	–	–	–

Lolium	24	1	–	10	4	9	2	30	5	15	6	1	2	27
Phalaris	14	–	–	1	–	–	–	16	–	–	–	–	–	–
Unident. Gramineae	3	–	1	–	–	–	–	2	–	2	–	–	–	3
Grass grain fragments	++	+	–	+	+	+	–	++	–	+	–	–	–	+
Astragalus	4	1	–	1	–	1	–	1	–	–	–	–	–	–
Medicago	3	–	–	–	–	–	–	–	–	–	–	–	–	–
Prosopis	–	–	–	–	–	–	+	–	–	–	–	–	–	1
Trifolium type	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Trigonella astroites type	1	–	–	–	–	–	–	–	–	–	–	–	–	–
Vicia spec.	11	–	–	1	1	–	–	1	–	–	–	–	–	–
Unident. Leguminosae (small)	44	1	–	–	1	1	–	5	–	2	–	–	–	1
Arnebia decumbens	–	–	–	1	–	–	–	–	–	4	–	–	–	–
Heliotropium	1	–	–	–	–	–	–	–	–	–	–	–	–	–
Silene	5	1	1	–	2	–	–	1	–	4	–	–	–	1
Unident. Cruciferae	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Carex	1	–	–	–	1	–	–	–	–	–	–	–	–	–
Eleocharis	1	–	–	–	–	–	–	–	–	–	–	–	–	–
Scirpus maritimus	1	–	–	–	–	–	–	1	–	–	–	–	–	–
Cephalaria syriaca	2	–	1	–	–	–	–	–	–	–	–	–	–	–
Bellevalia	–	–	–	–	–	2	–	–	–	–	–	–	–	–
Polygonum corrigioloides type	–	–	–	–	–	–	–	1	–	–	–	–	–	–
Rumex pulcher/spec.	15	–	–	3	1	–	1	26	2	1	1	–	–	3
Adonis	–	–	–	–	1	–	–	1	–	–	–	–	–	–
Galium	12	–	–	1	–	–	–	–	2	–	–	1	–	–
Veronica persica type	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Solanum	1	–	–	–	–	–	–	1	–	–	–	–	–	1
Torilis type	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Verbena	1	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 10.2. Early Halaf samples. The samples from a large cereal grain deposit are shown in Table 10.6. + = present; ++ = fairly much.

Sample number	88-02	88-05	88-06	88-54	88-33	88-38	92-03	92-05	92-06	92-07	88-58
Square	P15	P15	P15	Q14	Q15	Q15	Q15	Q15	Q15	Q15	Q12
Level	4	4	4	4	4	4	5	5	5	5	6
Part examined	1/6	1/11	2/7	1/1	1/18	1/1	1/1	1/1	1/1	1/1	1/1
Triticum dicoccum	122	20	22	2	8	13	16	5	–	3	22
Triticum monococcum	111	–	4	–	–	–	1	–	–	–	4
Triticum, spikelet forks	61	75	17	33	429	136	–	1	–	–	15
Triticum, glume bases	144	117	63	85	1010	747	–	1	–	–	50
Triticum durum/aestivum	–	–	2	–	1	–	–	–	–	–	–
Hordeum (distichum)	21	82	135	6	5	1	13	8	1	2	33
Hordeum "nudum"	–	4	–	–	–	–	–	–	–	–	1
Hordeum, rachis internodes	5	4	4	4	48	–	–	–	–	–	1
Cereal grain fragments (in grammes)	3.35	2.92	1.75	0.45	0.53	0.64	0.08	–	–	–	0.71
Pisum sativum	–	cf 1	cf 3	–	–	–	–	–	–	–	–
Lens culinaris	–	–	–	–	–	–	–	–	–	–	–
Linum usitatissimum	–	1	–	–	–	–	–	1	–	–	2
Aegilops, grains	–	2	1	–	–	–	–	1	–	–	2
Aegilops, spikelet bases	–	2	2	–	–	–	–	3	–	–	–
Aegilops, glume bases	–	4	–	–	–	–	–	–	–	–	–
Agrostis/Poa	–	–	–	–	–	–	–	–	–	–	–
Bromus danthoniae type	–	–	5	–	–	–	–	–	–	–	4
Eremopyrum	–	–	2	–	–	–	–	–	–	–	–
Gramineae type B	–	–	–	–	1	–	–	–	–	–	–
Hordeum (wild)	–	1	14	–	–	–	–	–	–	–	–
Lolium	1	5	6	1	1	14	–	1	–	–	65
Phalaris	1	–	5	–	–	–	–	–	–	–	5
Triticoid type	–	–	–	–	–	–	–	–	–	–	–
Unident. Gramineae	–	5	18	2	1	–	–	15	–	–	–
Grass grain fragments	–	–	+	–	–	–	–	–	–	–	–
Astragalus	1	1	31	1	–	–	–	4	–	–	7
Medicago	–	–	–	–	–	–	–	–	–	–	–
Melilotus	–	–	–	–	–	–	–	–	–	–	9
Prosopis	–	2	–	–	–	2	–	410	3	7	–
Trifolium type	–	–	3	–	–	–	–	–	–	–	–
Trigonella astroites type	–	–	1	–	–	–	–	–	–	–	2
Vicia spec.	–	2	1	12	–	–	–	1	–	–	3
Unident. Leguminosae (small)	–	–	2	–	–	–	–	–	–	–	27
Lithospermum tenuiflorum	–	1	–	–	–	–	–	–	–	–	–
Silene	–	–	–	–	–	–	–	–	–	–	–
Centaurea (small)	–	–	–	–	–	–	–	–	–	–	–
Unident. Compositae	–	1	–	–	–	–	–	–	–	–	–
Convolvulus	–	–	1	–	–	–	–	–	–	–	–
Carex divisa/spec.	–	–	–	–	1	1	–	20	–	–	–
Scirpus maritimus	–	–	1	–	–	–	–	3	–	–	–
Euphorbia	–	–	–	–	–	–	–	–	–	–	–
Erodium	–	–	–	–	–	–	–	–	–	–	–
Teucrium	–	–	–	–	–	–	–	–	–	–	–
Bellevalia	–	–	–	–	–	–	–	–	–	–	–
Malva	–	–	–	–	–	–	–	–	–	–	1
Glaucium	–	–	–	–	–	–	–	–	–	–	–
Polygonum lapathifolium type	–	–	–	–	–	–	–	1	–	–	–
Rumex pulcher/spec.	–	–	–	–	–	–	–	–	–	–	–
Androsace maxima	–	–	1	–	–	–	–	–	–	–	–
Adonis	–	1	2	–	–	–	–	3	–	–	–
Galium	1	–	2	–	–	–	–	1	–	–	–
Aethusa cynapium	–	–	–	–	–	–	–	–	–	–	–
Torilis type	–	–	–	–	–	–	–	–	–	–	–
Valerianella coronata type	–	–	1	–	–	–	–	–	–	–	–

88-27	88-32	88-39	88-63	91-06	91-07	91-22	92-01	92-09	92-10	88-47	Sample number
P15	P15	P15	P15	Q13	Q13	Q13	Q14	Q15	Q15	R13	Square
6	6	6	6	6	6	6	6	6	6	6	Level
1/1	2/3	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/5	Part examined
14	4	2	2	–	–	7	107	305	155	1	Triticum dicoccum
3	–	–	–	1	–	–	–	–	10	–	Triticum monococcum
3	6	1	66	1	–	1	–	16	–	2	Triticum, spikelet forks
15	11	2	69	–	–	–	–	1	–	43	Triticum, glume bases
2	–	–	–	–	–	–	–	1	–	–	Triticum durum/aestivum
20	8	4	4	12	3	3	–	35	14	3	Hordeum (distichum)
–	–	–	–	–	–	–	–	–	–	–	Hordeum "nudum"
–	–	–	2	1	–	–	–	–	–	–	Hordeum, rachis internodes
0.36	0.19	0.03	0.03	–	–	0.03	0.53	3.41	5.33	0.17	Cereal grain fragments (in grammes)
–	–	–	–	1	–	–	–	–	–	–	Pisum sativum
–	–	1	–	–	–	–	–	–	–	–	Lens culinaris
–	–	–	10	5	–	–	–	–	–	–	Linum usitatissimum
–	–	–	–	–	–	–	–	–	–	–	Aegilops, grains
–	–	–	5	–	–	–	–	–	–	–	Aegilops, spikelet bases
–	–	–	1	–	–	–	–	–	–	1	Aegilops, glume bases
1	–	–	–	–	–	–	–	–	–	–	Agrostis/Poa
–	–	–	–	–	–	–	–	–	–	–	Bromus danthoniae type
–	–	–	–	–	–	–	–	–	–	–	Eremopyrum
–	–	–	–	–	–	–	–	–	–	–	Gramineae type B
5	3	–	–	–	–	–	–	–	–	–	Hordeum (wild)
3	4	1	–	14	–	–	–	–	–	–	Lolium
2	–	–	–	–	–	–	–	–	–	2	Phalaris
1	–	–	–	–	–	–	–	–	–	–	Triticoid type
8	–	–	–	–	–	–	–	–	–	–	Unident. Gramineae
+	–	+	–	–	–	–	–	–	–	–	Grass grain fragments
5	40	3	6	3	–	–	–	–	1	2	Astragalus
–	2	–	–	–	–	–	–	–	–	–	Medicago
–	–	–	–	–	–	–	–	–	–	–	Melilotus
–	+	–	–	–	–	–	–	–	–	–	Prosopis
–	–	–	–	–	–	–	–	–	–	5	Trifolium type
–	1	–	–	–	–	–	–	–	–	–	Trigonella astroites type
–	–	–	–	–	–	–	–	–	–	–	Vicia spec.
–	11	–	–	–	–	–	–	–	–	–	Unident. Leguminosae (small)
–	–	–	1	–	–	–	–	–	–	–	Lithospermum tenuiflorum
–	–	–	1	–	–	–	–	–	–	–	Silene
–	–	5	–	–	–	–	–	–	–	–	Centaurea (small)
–	–	–	–	–	–	–	–	–	–	–	Unident. Compositae
–	–	–	–	–	–	–	–	–	–	–	Convolvulus
–	–	–	1	–	–	–	–	–	–	4	Carex divisa/spec.
–	–	–	–	–	–	–	–	–	–	–	Scirpus maritimus
–	–	–	–	–	–	–	–	–	–	1	Euphorbia
–	–	–	–	–	–	–	–	–	–	1	Erodium
–	139	2	–	–	–	–	–	–	–	–	Teucrium
–	–	1	–	–	–	–	–	11	–	–	Bellevalia
4	1	–	2	–	–	–	–	–	–	1	Malva
–	–	1	–	–	–	–	–	–	–	–	Glaucium
–	–	–	–	–	–	–	–	–	–	–	Polygonum lapathifolium type
4	–	2	10	–	–	–	–	–	–	4	Rumex pulcher/spec.
–	–	–	–	–	–	–	–	–	–	–	Androsace maxima
–	1	–	–	–	–	–	–	–	–	–	Adonis
–	–	–	–	1	–	–	–	–	–	–	Galium
–	–	–	2	–	–	–	–	–	–	–	Aethusa cynapium
–	–	–	3	–	–	–	–	–	–	–	Torilis type
–	–	–	–	–	–	–	–	–	–	–	Valerianella coronata type

Table 10.3. Transitional period samples. The samples from the cereal grain deposit in building II are shown in Table 10.7. + = present.

	Early Halaf		Pre-Halaf					
Sample number	86-05	88-23	86-26	86-33	88-41	88-43	88-50	88-61
Square	T4	V5	T5	T5	U5	Y5	Y5	Y5
Part examined	1/1	1/1	1/1	3/7	1/1	1/4	1/2	1/1
Triticum dicoccum	4	20	4	9	2	11	11	4
Triticum monococcum	1	4	1	1	–	–	–	1
Triticum, spikelet forks	56	240	110	103	23	134	9	10
Triticum, glume bases	330	767	498	410	50	586	59	62
Triticum durum/aestivum	–	4	–	–	–	–	–	1
Hordeum (distichum)	16	72	29	21	11	7	24	8
Hordeum, rachis internodes	2	9	8	10	–	–	–	–
Cereal grain fragments (in grammes)	0.76	2.05	1.60	1.08	0.58	0.38	0.58	0.19
Pisum sativum	cf 1	1+cf8	–	–	–	–	–	–
Vicia ervilia	–	1	–	–	–	–	–	–
Lens culinaris	–	–	–	–	–	1	–	–
Lathyrus sativus	–	–	–	–	–	2	1	–
Pulse grain fragments	–	+	–	–	–	–	–	–
Linum usitatissimum	2	–	–	–	–	–	2	–
Ficus	–	1	–	–	–	–	–	–
Crataegus	–	–	–	–	–	–	–	4
Coriandrum	–	–	–	–	–	–	–	1
Aegilops, grains	1	16	–	1	1	1	1	–
Aegilops, spikelet bases	–	7	2	–	1	5	1	1
Aegilops, glume bases	–	3	–	–	–	–	1	7
Agrostis/Poa	1	–	–	–	–	–	–	3
Bromus danthoniae type	–	2	–	–	–	–	–	–
Eremopyrum	–	–	–	1	–	–	1	–
Hordeum (wild)	1	–	3	2	–	–	–	–
Lolium	23	26	2	16	6	7	3	3
Phalaris	1	7	2	–	–	1	–	–
Setaria viridis type	1	–	–	–	–	–	–	–
Unident. Gramineae	–	8	–	1	–	1	–	–
Grass grain fragments	+	+	+	+	–	+	–	+
Alhagi	–	1	–	–	–	–	–	–
Astragalus	4	15	15	4	30	–	4	47
Melilotus	–	–	–	–	–	2	–	–
Prosopis	–	–	2	2	+	+	–	–
Trigonella astroites type	–	–	3	–	2	1	2	2
Vicia spec.	–	9	–	1	–	1	3	4
Unident. Leguminosae (small)	2	17	4	7	–	2	–	60
Lithospermum tenuiflorum	–	–	1	–	–	–	–	–
Silene	5	1	–	–	–	–	–	3
Vaccaria	–	–	–	–	–	–	–	1
Atriplex	–	–	–	–	–	–	–	1
Salsola	–	–	–	–	–	–	–	1
Helianthemum	–	–	–	–	–	–	1	80
Unident. Cruciferae	–	–	–	–	–	1	–	–
Carex divisa/spec.	–	–	1	2	–	–	1	19
Eleocharis	–	–	1	–	–	–	–	2
Scirpus maritimus	–	–	2	1	–	–	–	5
Bellevalia	–	1	–	–	–	–	–	–
Malva	–	–	1	1	–	–	–	–
Fumaria	–	–	1	–	–	–	–	–
Glaucium	–	–	–	–	–	–	–	20
Polygonum corrigioloides type	–	–	–	1	–	–	–	–
Rumex pulcher/spec.	1	–	5	4	–	–	1	1
Adonis	–	–	3	–	–	1	1	3
Galium	–	7	2	5	–	–	–	–
Valerianella coronata type	–	1	–	–	–	–	–	–

Table 10.4. Samples from the northeastern mound. + = present.

Nr.	Square	Locus-lot	Level	Populus	Ulmus	Fraxinus	Cedrus	Unident.	Comments
88-	Q13	66-194	1/2/3	–	–	15	–	–	(BS 12)
88-	Q13	62-179	6	–	–	5	–	–	(BS10)
88-21	Q13	10-50	1	12	–	–	–	–	ashy spot
88-31	Q13	50-142	3B	20	–	–	–	–	fill on floor
88-75	Q13	65-184	6	1	–	–	3	–	from room fill
91-06	Q13	124-331	6	40	80	–	–	110	floor, bldg II, room 2
91-08	Q13	119-310	6	–	40	–	–	240	roof beam, bldg II
91-10	Q13	96-268	6	1100	–	–	–	–	on floor, bldg II, room 9
91-12	Q13	117-306	6	80	–	–	–	–	roof cover, bldg II
91-14	Q13	85-260	6	–	500	–	–	–	bldg II, room 11
91-20	Q13	85-263	6	–	600	–	–	–	fill, bldg II, room 8
91-22	Q13	85-264	6	480	–	–	–	–	on floor, bldg II, room 9
91-23	Q13	85-260	6	600	–	–	–	–	on floor, bldg II, room 14
91-26	Q13	122-328	6	–	10	20	–	280	outdoor area, bldg II
91-28	Q13	85-263	6	–	1000	–	–	–	roof beams, bldg II
91-29	Q13	85-263	6	–	4600	–	–	–	wooden beam, bldg II
91-30	R12	34-61	6	10	–	–	–	–	burnt wood
92-08	Q15	98-424	6	50	–	–	–	–	burnt wood, bldg V, room 3
92-11	Q15	79-499	6	360	–	–	–	–	beam, bldg V, room 7

Table 10.5. Charcoal identifications. Volumes in ml. Unidentified: mainly small fragments. Identifications by G.J. de Roller.

Sample number	88-03	88-10	88-11	88-12	88-14	88-15	88-16	88-37
Part examined	1/25	1/15	1/20	1/19	1/19	1/15	1/2	1/1
Triticum dicoccum	1310	600	520	1020	1050	900	1240	770
Triticum monococcum	27	4	7	11	3	2	–	–
Triticum, spikelet forks	90	56	96	164	240	166	108	125
Triticum, glume bases	140	111	128	132	285	242	182	306
Hordeum, grains	3	–	–	5	4	2	–	–
Hordeum, rachis internodes	–	–	1	–	–	2	–	–
Cereal grain fragments, in grammes	16.7	25.3	31.1	21.7	21.4	37.0	26.0	32.0
Cereal grain fragments, in grains	1640	2600	2825	1970	1945	3940	2575	2665
Lathyrus sativus	–	–	–	1	–	–	1	1
Lolium	4	–	–	–	–	3	3	–
Bromus danthoniae type	–	–	1	–	–	–	–	–
Bellevalia	–	–	–	–	–	–	1	–
Vicia spec.	–	–	–	–	–	1	–	–
"Ornithogalum"	–	–	–	–	–	1	–	–

Table 10.6. Cereal grain deposit in open area outside architectural features (squares Q13 and Q14). Level 3B (Balikh IIIB = Early Halaf). Sample 88-37 stems from immediately above the grain layer and very likely formed part of it.

Sample number	91-04	91-05	91-09	91-21	91-14	91-18
Part examined	1/8	1/15	1/24	1/9	1/12	1/12
Triticum dicoccum	560	–	7	3	13	38
Triticum monococcum	3	1555	2430	1380	580	1200
Triticum, spikelet forks	59	300	282	221	316	204
Triticum, glume bases	29	280	250	132	349	192
Triticum durum/aestivum	2	–	–	–	–	2
Hordeum distichum/spontaneum	425	70	65	41	45	102
Hordeum "nudum"	–	–	1	–	–	–
Hordeum, rachis internodes	19	7	8	1	5	10
Culm node	1	–	–	–	–	–
Pisum sativum	–	2	–	–	–	1
Aegilops, grain	–	–	–	–	–	1
Aegilops, spikelet bases	–	1	1	–	–	1
Bromus danthoniae type	1	–	–	–	–	–
Hordeum (wild)	2	–	–	–	–	–
Lolium	7	–	–	–	–	1
Unident. Gramineae	–	–	–	–	1	–
Astragalus	12	–	–	–	–	–
Bupleurum	–	1	–	–	–	–

Table 10.7. Cereal grain deposit in building II, rooms 11 and 14 (level 6). Cereal grain fragments converted to whole grains (included in *Triticum* and *Hordeum*).

Triticum dicoccum							
Sample	Length	Breadth	Thickness	100L:B	100T:B	N	Per
88-10	5.92(4.8-6.9)	2.62(2.1-3.3)	2.20(1.7-2.8)	227(190-267)	84(72-97)	100	Hal
88-14	5.85(5.0-6.8)	2.62(2.1-3.0)	2.18(1.8-2.8)	224(192-274)	83(69-97)	100	Hal
88-21	5.86(4.6-7.0)	2.44(1.8-3.1)	2.07(1.5-2.6)	242(190-304)	85(72-100)	100	Hal
86-57	5.66(4.5-7.3)	2.33(1.8-3.0)	2.02(1.6-3.0)	247(184-292)	87(63-107)	79	Hal
86-67	5.51(4.4-6.6)	2.44(1.9-3.0)	2.14(1.5-2.6)	228(178-317)	87(61-108)	100	Hal
86-74	5.58(4.6-6.6)	2.47(1.8-3.2)	2.14(1.7-2.6)	233(175-313)	87(69-116)	100	Hal
91-04	5.73(4.2-7.3)	2.73(1.7-3.5)	2.35(1.4-3.0)	212(141-290)	86(71-107)	100	Tr
92-09	5.36(4.6-6.4)	2.55(1.9-3.2)	2.24(1.7-2.7)	212(166-268)	88(76-100)	50	Tr
Triticum monococcum							
91-18	5.03(3.9-5.9)	1.87(1.4-2.6)	1.84(1.3-2.6)	271(203-388)	99(83-137)	100	Tr
91-21[1]	4.75(3.8-6.1)	1.67(1.3-2.1)	1.68(1.3-2.2)	286(241-344)	101(84-122)	100	Tr
91-21[2]	4.34(3.7-5.2)	1.52(1.2-1.8)	1.81(1.5-2.2)	287(219-328)	119(100-139)	35	Tr

[1] two-seeded
[2] one-seeded

Table 10.8. Mean, minimum and maximum dimensions (in mm) and index values of *Triticum* grains in Sabi Abyad samples. N = number of grains measured; Hal = Early Halaf; Tr = Transitional period.

	min.	mean	max.	N
T. dicoccum (91-04)	1.2	1.96	2.7	100
T. monococcum (91-18)	1.2	1.75	2.3	100
T. *monococcum* (91-21)	1.3	1.62	2.2	58

Table 10.9. Width (in mm) of *Triticum* spikelet forks. N = number of measurements.

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