

## EXCAVATIONS AT THE SHELL-MIDDEN OF RH6 1986–1988 (MUSCAT, SULTANATE OF OMAN)

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### Preface

The shell-midden site of RH6 is situated along the right bank of Wadi Aday, in the Qurm National Reserve, close to the northernmost mouth of the wadi itself (Fig. 1). It is one of the shell-middens discovered in the Sixties by R. Jäckli, distributed both along the edges of the mangrove swamp of Qurm and on the adjacent Cape of Ra's al-Hamra; an area whose ecological importance has already been pointed out in several articles [Tosi and Durante 1977; Biagi et al. 1984; 1989; Biagi and Nisbet 1992]. Its precise geographical location is 23°37'12" Lat N and 58°28'46" Long E (Fig. 2).

The site, some 7 metres higher than the highest level reached by the tide (Fig. 3), was tested for the first time in 1981, when a bull-dozer opened a trench along the western slope of the mound [Tosi and Durante 1977: 158] which brought to light a stratigraphical sequence, some 13 metres long and 1.70 metres thick, towards the centre of the site (Fig. 4-bottom). The section revealed the existence of alternate, almost horizontal, anthropogenic and natural layers, mainly composed of marine shells, (burnt) fish, charcoal and wind-blown sand. No archaeological feature, such as post-holes, pits or hearths, was recognized along the profile. Three samples of organogenic material were collected from different depths of the sequence for radiometric dating. They gave the following results: top layer: 5569 ± 60 BP (Hv-13195, on ashy sediments); 50–100 cms: 5566 ± 165 BP (Hv-11629, on fish bones); bottom layer: 5992 ± 80 BP (Hv-13196, on ashy sediments) [Biagi 1994: 20].

### The 1986 and 1988 excavations

The first season took place between December 31, 1985 and January 27, 1986 [Biagi 1985]. The excavations were carried out in three different areas of the site: 1) a trench, 1 metre wide and 12 metres long, was opened along the southern slope in order to define the depth of the anthropogenic deposits in this part of the site; no man-made feature was observed along its profiles (Fig. 4-top); 2) a second trench, 3 × 2 metres wide, was excavated at the top of the mound; 3) a third accurate excavation was carried out on the surface of only one square metre (square X), to continue the bull-dozer trench opened along the western slope. The aim of this trench was to control the depth of the deposits uncovered seven years before.

During the 1988 season of fieldwork, carried out between October 22 and November 2, one square metre (square Y), adjacent to square X, was excavated with the same methodology employed during the preceding campaign (Fig. 3).

All the deposits from areas 2) and 3) were sieved with a 3 mm mesh. Part of the soil removed during the 1986 season was also flotated; this led to the collection of the major part of the archaeological, macrobotanical and zooarchaeological remains.

As already mentioned, the upper trench was opened over a surface of six square metres in quadrants A-B/100–101–102. The excavations revealed the following sequence: layer 0: surface level of recent and subrecent eolic sand of yellowish brown colour (10YR 5/4), without archaeological finds, some 10–25 cms thick; layer 1: very loose-textured, sandy layer of dark greyish brown colour (10YR 3/2), with several fragments of marine shells and no charcoals, some 35 cms thick, with a thin level of small

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pebbles at its base. The remains of a burial with three bodies [Coppa pers. comm. 1997], in a very bad state of preservation, were found at the bottom of this layer in square A/101 (Fig. 5). The tomb had been delimited by a circle of sharp-edged limestone boulders, and the bodies had been buried without any grave goods. They lay crouched on their left side in northeast-southwest direction. A small sample of human bones was 14C dated to  $3580 \pm 80$  BP (OxA-2629) [Hedges et al. 1997: 256], which indicates that the skeletons are to be attributed to the Bronze Age. West of the burial, a small, shallow depression, called Pit 1, was discovered in squares A/100–101. Among the other finds, it yielded eight vessels obtained from *Fasciolaria Trapezium* shells removing part of their thick body whorl and the solid columella in the way described by Kenoyer [1984: 57]. This structure was dated to  $5750 \pm 60$  BP (Bln-3636/I) and to  $5890 \pm 60$  BP (Bln-3636/II), from the same sample of *Terebralia palustris* mangrove shells. Layer 2, a sandy-textured level of dark brown colour (7.5YR 3/2), with rare shells, was some 20 cms thick. From this level come several blanks, semi-finished and finished shell-hooks, which should indicate that the manufacture of these objects had taken place in this part of the site. All the specimens are obtained from valves of *Pinctada radiata* and *Pinctada margaritifera* shells [Ghisotti pers. comm. 1988]. The base of this level is represented by a palaeosurface on which many stone tools have been recorded and mapped *in situ* (Fig. 6), among which were one polished, conglomerate adze, anvils and various types of hammerstones, pestles and net-weights. Layer 3 below, was excavated only in square B/100, down to a depth of some 20 cms. It was composed of ash and concreted sand of a dark grey colour (10YR 3/1) with lenses of charcoal. It was dated to  $5970 \pm 80$  BP (Bln-4315), from charcoals of *Avicennia marina*, to  $5830 \pm 80$  BP (Bln-3640/I) and  $5930 \pm 80$  BP (Bln-3640/II), from the same sample of *Anadara uropigimelana* marine shells, and to  $5980 \pm 60$  BP (Bln-3641/I) and  $5950 \pm 60$  BP (Bln-3641/II), from the same sample of *Terebralia palustris* mangrove shells. This excavation was interrupted at the bottom of this layer when two well-defined post-holes, 26 and 18 cms deep respectively, were found at the base of square B/100 (Fig. 6).

The excavation of the two square metres (X and Y) in area 3 (Fig. 7), revealed a sequence some 1.70 m thick [Biagi 1985] composed of the following layers (Fig. 8):

**layer 0:** disturbed, recent or subrecent layer of light brownish grey colour sand (10YR 6/2) containing fragments of shells, some 30 cms thick. One deep burrow was observed in square X;

**layer 1:** disturbed sandy layer of dark brown (7.5YR 3/2) colour with shell fragments and charcoal pieces, 5–10 cms thick;

**layer 2:** is partly covered by a 2 cms thick, black (10YR 2.5/1) lens of charcoal above a level of sand with a few shells and fish bones, 10 to 18 cms thick;

**layer 3:** concreted at the top with fish bone lenses and concentrations of shells at the bottom, maximum 10 cms thick. Very dark greyish brown (10YR 3/2);

**layer 4:** almost continuous lenses of charcoal with burnt fish and ashes, some 5 cms thick, of very dark grey colour (10YR 3/1);

**layer 5:** sandy, concreted layer, very rich in shells and lenses of fish bones at its top, some 7 to 14 cms thick. Dark greyish brown (10YR 4/2);

**layer 6:** of sandy texture, containing many shell fragments, delimited by two thin levels of charcoal. It has a maximum thickness of 5 cms. Very dark greyish colour (10YR 3/2);

**layer 7:** fish lenses in a sandy texture, with charcoal lenses in square Y, 5 to 10 cms thick. Dark brown colour (7.5YR 3/2);

**layer 8:** concreted sand with charcoal, almost continuous lenses, maximum 5 cms thick. Dark greyish brown colour (10YR 4/2);

**layer 9:** layer of shells, mainly undecolored *Terebralia palustris*, some 30 cms thick, with a level of charcoals towards the bottom. A circular structure delimited by wadi pebbles containing several quartz crystals was found in square X. This layer, of dark brown colour (10YR 3/3), was dated to  $6230 \pm 70$  BP (Bln-3635/I) and  $6140 \pm 70$  BP (Bln-3635/II) from the same sample of *Anadara uropigimelana*, and

to  $6340 \pm 60$  BP (Bln-3639/I) and  $6240 \pm 60$  BP (Bln-3639/II), from the same sample of *Terebralia palustris*;

**layer 10:** thin level, some 4 cms thick, of almost pure sand covered with a continuous lens of very small, round beach pebbles and undecoloured shells of *Umbonium Vestiarium*, containing many chipped stone artefacts;

**layer 11:** sandy layer, some 7 to 10 cms thick, rich in Oyster shells still attached to rounded limestone pebbled, less than 10 cms in diameter. It was dated to  $6130 \pm 60$  BP (Bln-3634/I) and to  $6250 \pm 60$  BP (Bln-3634/II) from a sample of *Anadara uropigimelana*, and to  $6140 \pm 60$  BP (Bln-3633/I) and  $6279 \pm 60$  BP (Bln-3633/II), from the same sample of *Terebralia palustris*. Dark greyish brown colour (10YR 4/2);

**layer 12:** thin layer of sand containing a continuous level of charcoal fragments, maximum 4 cms thick. Very dark grey colour (10YR 5/1);

**layer 13:** layer of sand with scarce shell fragments, 18 cms thick, of very dark greyish brown colour (10YR 3/2), dated to  $6240 \pm 70$  BP (Bln-3632/I) and to  $6310 \pm 60$  BP (Bln-3632/II), from the same sample of *Terebralia palustris*;

**layer 14:** layer of sand of very dark greyish brown colour (10YR 3/2), with the same characteristics of the overlying one from which is separated by a level of shells. This layer produced the following dates:  $6360 \pm 60$  BP (Bln-3638/I) and  $6290 \pm 60$  BP (Bln-3638/II), from the same sample of *Anadara uropigimelana*, and to  $6420 \pm 80$  BP (Bln-3637/I) and  $6530 \pm 80$  BP (Bln-3637/II), from the same sample of *Terebralia palustris*. This layer lies on the calcarous rubified bedrock of the terrace, into which three wedged postholes, some 15 cms in diameter, have been excavated.

At present it is difficult to correlate the two sequences at the top of the mound (squares A-B/100–101–102) and along the western edge (squares X and Y). In fact there is a discrepancy of some 2.20 metres between the natural bedrock level in squares X-Y and that in the upper trench; this should suggest the presence of a step in the bedrock, between the two excavated areas (Fig. 3).

### The material culture finds

#### The chipped stone assemblage

The Holocene chipped stone industries of the Oman coastland have recently been revised by M. Uerpmann [1992] who has pointed out the difficulty in describing these assemblages according to any European typological list. This is mainly due to the presence of a very high number of “unconventional” instruments obtained with the hard hammering technique [Maggi and Gebel 1990], while the “conventional” tools often represent only a very small percentage of the total number of instruments. This is partly true also for the RH6 collection, even though this is one of the few cases in which the “conventional” instruments are rather numerous.

In this article, only the finds from square Y of the vertical sequence of the western trench opened in 1988 are taken into account, since the chipped stones from the 1986 excavations have already been published by Maggi [1990].

Table 1, below, shows the number and weight of the chipped stone artefacts and of the raw materials employed for their manufacture; while table 2 gives the number of the unretouched artefacts, instruments and cores according to their layer of recovery.

Unfortunately Maggi [1990] does not provide the exact number of artefacts collected during the 1986 excavation and the precise provenance of the artefacts layer by layer, so that the two assemblages are not easy to compare.

The importance of quartz and flint in the lowest layers (14 and 13) of the sequence is clear from table 1. The use of quartz, both opaque and hyaline, diminishes from layer 7 upwards, when the exploitation of blonde flint begins to increase. Jasper is relatively important in layer 10, a thin level of



**Table 1** RH6, square Y: materials employed for chipping artefacts. Q = quartz, HQ = hyaline quartz, J = jasper, F = flint, BF = blonde flint, QZ = quartzite, G = green/greystone. ( ) complete, unretouched artefacts. [ ] weight in grams.

Layer	Materials							
	Q	HQ	J	F	BF	QZ	G	totals
(1)	2 (−) [22]	1 (−) [1]	1 (−) [4]	5 (2) [7]	5 (4) [17]	3 (1) [6]	− [−]	17 (7) [57]
(2)	− (−) [−]	− (−) [−]	1 (−) [4]	15 (3) [13]	57 (23) [68]	− (−) [−]	− [−]	73 (26) [85]
(3)	2 (−) [13]	1 (−) [1]	− (−) [−]	8 (2) [3]	22 (10) [41]	3 (−) [13]	− [−]	36 (12) [71]
(4)	2 (−) [10]	1 (−) [1]	− (−) [−]	15 (3) [8]	9 (3) [4]	− (−) [−]	− [−]	27 (6) [23]
(5)	19 (−) [31]	1 (−) [1]	− (−) [−]	9 (2) [10]	29 (9) [31]	− (−) [−]	− [−]	58 (11) [73]
(6)	6 (−) [20]	1 (−) [1]	− (−) [−]	1 (−) [1]	8 (4) [11]	22 (−) [3]	− [−]	38 (4) [26]
(7)	16 (−) [19]	4 (−) [4]	− (−) [−]	4 (2) [5]	10 (3) [11]	1 (−) [1]	− [−]	35 (5) [40]
(8)	33 (−) [40]	36 (3) [19]	2 (1) [2]	12 (3) [9]	1 (1) [1]	3 (−) [9]	1 [3]	88 (8) [83]
(9)	17 (4) [38]	34 (4) [14]	9 (5) [4]	7 (2) [16]	1 (1) [1]	2 (1) [6]	1 [3]	71 (17) [82]
(10)	5 (−) [5]	37 (6) [23]	30 (9) [26]	5 (−) [1]	8 (6) [9]	− (−) [−]	− [−]	85 (21) [64]
(11)	6 (2) [8]	47 (9) [24]	3 (3) [5]	5 (2) [4]	1 (1) [1]	− (−) [−]	2 [2]	64 (17) [44]
(12)	3 (1) [1]	6 (−) [1]	1 (−) [1]	2 (2) [1]	− (−) [−]	− (−) [−]	− [−]	12 (3) [4]
(13)	13 (−) [55]	126 (17) [51]	3 (3) [2]	15 (7) [6]	6 (5) [5]	1 (1) [9]	17 [27]	181 (33) [155]
(14)	43 (4) [44]	33 (10) [21]	2 (1) [1]	51(16) [60]	− (−) [−]	3 (−) [41]	4 [19]	136 (31) [186]
Totals	167 (11) [306]	328 (49) [162]	52 (22) [49]	154 (46) [134]	157 (70) [200]	38 (3) [88]	25 [54]	921 (201) [993]

**Table 2** RH6, square Y: number of artefacts, instruments and cores recorded per layer.

Layer	Artefacts	Instruments	Cores
(1)	17	2	–
(2)	73	5	–
(3)	36	1	2
(4)	27	1	–
(5)	58	1	1
(6)	38	1	2
(7)	35	–	–
(8)	88	1	–
(9)	71	2	2
(10)	85	2	3
(11)	64	1	1
(12)	12	–	–
(13)	181	6	1
(14)	136	3	–
Totals	921	26	12

sand, beach gravel and marine shells of *Umbonium vestiarium*, which might indicate some kind of artificial floor related to a hut construction. These observations have ethnographic parallels in the subrecent hut-structures of the coast of northern Dhofar such as those of Ra's Sharbitat [Biagi and Maggi 1990: 551] and Shuwaymiya.

The square Y sequence yielded 921 artefacts, 201 of which were measured to develop the length/width and dimensional dispersion diagrams of Fig. 9, which show the microlithic and hypermicrolithic character of the assemblage. From these diagrams the relevance of blonde flint is noticeable from layer 7 upwards.

As shown in table 2, the number of retouched instruments and cores is rather low, and the ratio retouched : unretouched pieces is much lower (1 : 23) than that reported by Maggi [1990: 293] for square



X of the 1986 excavation (1 : 10).

The number of cores is relatively high (12), mainly microflakelet and hypermicroflakelet polyhedric types, often obtained from quartz (Fig. 10) except for two specimens on black jasper (Fig. 10-7) and blonde flint (Fig. 11-27).

The instruments include a very limited number of characteristic tools (Fig. 11 and table 3); they have been tentatively described according to the typological list of G. Laplace [1964].

**Table 3** RH6, square Y: list of the instruments and cores according to their layer of recovery

Layer	Instruments																Cores	
	B	G	T	Be	LD	PD	DT	Gm	F	R	P	L	A	D	Dv	N		
(1)	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–		
(2)	–	–	1	1	–	–	–	–	1	–	–	–	–	–	Sm2	–		
(3)	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–		
(4)	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–		
(5)	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1		
(6)	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	2		
(7)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		
(8)	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–		
(9)	–	1	–	–	–	–	–	–	–	–	–	–	–	–	Sp?	2		
(10)	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	3		
(11)	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1		
(12)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		
(13)	–	–	–	2	3	–	–	–	–	1	–	–	–	–	–	1		
(14)	–	1	–	1	–	–	–	–	–	1	–	–	–	–	–	–		
Totals	–	2	2	7	3	–	–	–	1	7	–	–	–	1	3	12		

The end-scrapers are represented by only two specimens from layer 9 (Fig. 11-1) and layer 14 (Fig. 11-2). The first is a long end-scraper on a blade of blonde flint with a complementary simple, bilateral retouch, opposed to a straight point. The second is a small carinated specimen on a broken bladelet of reddish flint.

There are two marginal truncations on flakelets of blonde flint from layer 2 (Fig. 11-3) and 3 (Fig. 11-4).

The perforators/drills are among the best represented classes of instruments: they come from layer 2 (Fig. 11-5), 4 (Fig. 11-6), 6 (Fig. 11-9), 8 (Fig. 11-7), 13 (Fig. 11-8 and 10) and 14 (Fig. 11-11). They are all straight, obtained from flakelets of blonde or reddish flint (1 from a bladelet) with two convergent abrupt, direct or bipolar retouches. One only specimen is on a broken bladelet (Fig. 11-5); while only one is made on a hyaline quartz flakelet (Fig. 11-8).

There are 3 backed blades on blonde flint from layer 13: two are fragments, on extremely narrow blade (Fig. 11-13 and 11-14), one on a fragment of bladelet with abrupt, lateral retouch (Fig. 11-12).

The foliates include only one pedunculated bladelet of blonde flint with a tang obtained by flat, inverse retouch, from layer 2 (Fig. 11-15).

The side scrapers comprise seven specimens (Fig. 11-16 to 22), six of which have a simple, deep retouch sometimes almost covering the entire surface of the tool. Only one has a simple, marginal retouch, on a hyaline quartz flakelet (Fig. 11-22). The others are chipped from different varieties of flint or from liver-coloured jasper (Fig. 11-19) of hyaline quartz (Fig. 11-18 and 20).

The denticulates are represented by one carinated, side scraper on a corticated flakelet of blonde flint (Fig. 11-23).

There is only one probable splintered piece on a hyaline quartz flakelet (Fig. 11-24) and two sommaire retouched tools on liver-coloured jasper (Fig. 11-25) and on blonde flint (Fig. 11-26).

The polished and ground stone industry

Many polished and ground stone tools were recorded on the palaeosurface uncovered at the base of layer 2 of squares A-B/101–102 (Fig. 12). The polished stone tools recorded *in situ* on this palaeosurface are listed in the following table:

**Table 4** RH6, tools recorded from the palaeosurface of squares A-B/101–102. Measures in mm. c = complete, f = fragment.

	Square	Layer	L	W	T	Weight (gr)	Type	Status	Material
1	B101	2	86	67	27	196	round stone	c	volcanic rock
2	B101	2	75	46	42	222	hammerstone	c	metamorphic rock
3	B101	2	61	55	40	212	hammerstone	c	limestone
4	B101	2	325	76	60	2720	pestle	c	metamorphic rock
5	B101	2	(67)	(14)	(42)	48	round stone	f	metamorphic rock
6	B101	2	120	125	33	838	flat stone	c	quartzite
7	B101	2	102	(60)	60	588	round stone	f	metamorphic rock
8	A102	2	84	34	22	102	hammerstone	c	quartzite
9	A101	2	50	43	17	60	net-sinker	c	limestone
10	A101	2	87	45	22	92	hammerstone	c	sandstone
11	A101	2	40	37	12	24	net-sinker	c	limestone
12	B101	2	112	25	20	82	hammerstone	c	schist
13	B101	2	(60)	37	32	108	hammerstone	f	sandstone
14	B101	2	79	26	15	36	hammerstone	c	quartzite
15	B101	2	48	36	14	38	net-sinker	c	limestone
16	B101	2	45	42	16	36	net-sinker	c	limestone
17	B101	2	65	62	29	188	round stone	c	metamorphic rock
18	B101	2	49	25	13	8	flake	f	limestone
19	B101	2	87	36	21	85	polished adze	c	conglomerate
20	B101	2	(162)	(145)	43	1485	flat stone	f	quartzite
21	B101	2	90	38	27	152	hammerstone	c	quartzite
22	B101	2	135	55	36	328	hammerstone	f	quartzite
23	A101	2	44	42	18	46	net-sinker	c	limestone
24	A101	2	60	(53)	17	84	net-sinker	f	limestone
25	A101	2	63	49	17	44	net-sinker	c	limestone
26	A101	2	48	58	18	78	net-sinker	c	limestone
27	A101	2	72	37	30	98	round stone	f	sandstone
28	A101	2	(47)	55	20	80	round stone	f	metamorphic rock
29	A101	2	72	54	22	130	round stone	c	sandstone
30	A101	2	41	47	18	54	net-sinker	c	sandstone
31	A102	2	104	47	23	134	hammerstone	c	quartzite
32	A102	2	(157)	59	40	523	pestle	f	quartzite
33	A101	2	63	30	11	44	hammerstone	c	quartzite
34	A102	2	107	70	45	555	anvil	c	limestone
35	A102	2	68	58	53	298	hammerstone	c	metamorphic rock
36	A102	2	(67)	(36)	(35)	64	hammerstone	f	quartzite
37	A102	2	(32)	(18)	(35)	22	round stone	f	limestone
38	A102	2	90	53	35	230	hammerstone	c	quartzite
39	A102	2	48	21	30	40	round stone	f	quartzite
40	A102	2	65	56	23	128	net-sinker	c	limestone
41	A101	2	100	85	34	400	net-sinker	c	sandstone
42	A102	2	(35)	(28)	(25)	48	round stone	f	limestone
43	A102	2	123	70	15	134	hammerstone	c	quartzite
44	B102	2	110	51	12	106	hammerstone	c	quartzite
45	B102	2	92	34	16	70	polisher?	c	metamorphic rock
46	B102	2	105	43	19	128	hammerstone	c	metamorphic rock
47	B102	2	67	54	21	116	round stone	c	limestone
48	B102	2	40	41	14	30	net-sinker	c	limestone
49	A102	2	42	48	14	48	net-sinker	c	limestone

Among the other pieces, the palaeosurface (Fig. 6) yielded one adze, accurately polished all over its surfaces from a conglomerate pebble of green and white colour. It has an oval section, with flattened central surfaces, and a slightly oblique, almost rectilinear cutting-edge (Fig. 13). Apart from this, five small fragments, most probably from another polished adze in redstone, come from Pit 1 in layer A/101 (Fig. 15-1), while one fragment of polished greenstone was found in layer 7 of square X (Fig. 15-2). Hammerstones. There are 17 (Fig. 14-8, 9 and 13) objects which are certainly hammerstones as proved by their bruised or fractured ends. They are often long and narrow quartzite or greenstone, flat pebbles which have not been shaped in any way, apart from the specimen of Fig. 14-8 which has a wide groove at its proximal end. Also three round greenstone pebbles from the palaeosurface which show evident traces of pecking at one edge can be included in this group.

Most of the hammerstones were found on the palaeosurface even though four of these objects were collected in layer 14, square X.

Pestles. Two large, heavy objects of cylindrical shape can be classified as pestles. One quartzite specimen has one heavily worn, flat edge; while the second is a long and heavy greenstone tool (Fig. 12) with surfaces almost completely worn by use. Both these instruments come from the palaeosurface.

Net-sinkers. The excavation yielded 49 net-sinkers of different shape and size. They can be easily subdivided into two main classes of objects: girdled sinkers (Fig. 14-1 to 7) and two-notch sinkers (Fig. 14-10 and 11). The girdled sinkers are oblong, spheroid pebbles girdled longitudinally by a slight pecked, or more rarely sawn-in groove. They are usually of a rather small size. It is still unclear whether they were used as net-sinkers or fishhook sinkers [Strong et al. 1930: 110]. The two-notch sinkers are of flat elliptical shape with two bifacial notches on the long sides. A complete list of the net-sinkers is provided in table 5.

Anvils. Only two elliptical stone objects with circular, concentrated zones of pitting or cup-marks on both flat surfaces (Fig. 14-12) have been classified as anvils or crushing stones [Uerpmann, 1992: 92]. As noted already for the scottish shell-middens, these tools might be connected with some kind of flint manufacture [Mellars, 1987: 122].

Other stone tools. The collection includes many other stone objects often of circular or elliptical shape whose function cannot be better specified. They are mainly obtained from wadi or beach pebbles.

Stone beads. The stone beads consist of fourteen serpentinite and one phyllite specimens from various layers (Fig. 16-A) whose dimensions have been plotted to develop the diagram of Fig. 16-B. Most specimens are of cylindrical shape ranging from 3 to 7 mm of diameter and 1.5 to 5 mm of thickness. Only two pieces vary from this typology. They are: one long, round-sectioned, serpentinite bead, 61 mm long, with oblique pierced holes at both edges, weighing 8.5 grams, (Fig. 15-3), and one 22 mm long, tubular, serpentinite specimen (Fig. 15-4); they both come from the south trench. One pierced, serpentinite small plaque, which probably represents an initial stage in the manufacture of the polished beads, was found in square X, layer 14.

The miscellaneous finds are represented by seven polished quartzite (Fig. 15-6, 8 and 9) and greenstone (Fig. 15-7 and 10) small balls collected from different levels of the sequence; one fragmented, almost cylindrical sandstone object (Fig. 15-5); one octagonal, polished, steatite artefact (Fig. 15-14); and three accurately polished greenstone (Fig. 15-11 and 13) and phyllite (Fig. 15-12) flat discs, with a perimetral groove, perhaps to be interpreted as labrets (?) [Heizer 1956: 53] or some kind of very specific weights (?).

### The marine shell assemblage

The marine shell industry is almost exclusively composed of three varieties of objects: vessels, fish-hooks at various stage of manufacture and beads.

Eight vessels obtained from *Fasciolaria trapezium* a gastropod which is very common along the coasts of the Gulf of Oman [Gensheimer 1984: 66], were found in square A/101, Pit 1 (Fig. 17). They



**Table 5** RH6, list of the net-sinkers. Measures in mm. c = complete, f = fragment. DA = Oman Dept. of Antiquities number.

Square	Layer	L	W	T	Weight (gr)	Status	Material	DA
Y	0	72	53	17	115	c	quartzite	10768
Y	0	71	55	23	83	c	quartzite	10769
Y	0	72	49	21	112	c	quartzite	10770
Y	0	72	48	21	70	c	quartzite	10771
Y	0	58	45	20	60	c	limestone	10772
Y	0	74	53	24	145	c	limestone	10773
X	1	67	52	22	94	c	quartzite	.....
X	1	60	57	17	74	c	sandstone	.....
Y	1	28	19	12	10	c	metamorphic	10839
A101	1	52	50	15	34	c	quartzite	.....
A101	1	38	31	12	22	c	limestone	.....
A101	1	37	42	15	38	c	limestone	.....
A101	1	47	49	20	70	c	limestone	.....
A101	1	38	35	19	38	c	limestone	.....
A101	1	37	40	13	32	c	limestone	.....
A101	1	50	42	16	50	c	limestone	.....
A101	1	53	43	13	46	c	limestone	.....
A101	1	60	46	32	134	c	metamorphic	.....
A101	PitI	38	38	15	32	c	sandstone	.....
A101	PitI	42	41	12	32	c	sandstone	.....
A101	PitI	42	40	13	38	c	sandstone	.....
A101	PitI	43	48	14	50	c	sandstone	.....
A101	PitI	49	48	22	80	c	limestone	.....
A102	1	73	57	22	128	c	limestone	.....
A102	1	48	43	18	56	c	limestone	.....
A102	1	47	38	12	32	c	limestone	.....
A102	1	65	50	18	90	c	limestone	.....
A102	1	30	29	11	16	c	limestone	.....
A102	1	53	46	22	74	c	limestone	.....
A102	1	35	25	11	16	c	limestone	.....
A102	1	30	25	13	14	c	limestone	.....
A102	1	82	68	28	266	c	sandstone	.....
B101	1	38	35	20	38	c	metamorphic	.....
B102	1	45	39	18	46	c	limestone	.....
B101	2	32	28	10	12	c	limestone	.....
B101	2	39	47	10	24	c	sandstone	.....
X	4	53	40	37	120	c	metamorphic	.....
X	13	26	16	16	7	c	sandstone	9887
Y	13	20	15	12	(4)	f	sandstone	10780
Y	13	(18)	25	23	(8)	f	quartzite	10841
X	14	28	25	22	24	c	metamorphic	.....
X	14	55	46	36	142	c	metamorphic	.....
Y	14	173	126	52	650	c	metamorphic	10767
Y	14	(36)	25	20	10	c	quartzite	10774
Y	14	39	29	22	50	c	metamorphic	10776
Y	14	30	26	22	27	c	metamorphic	10777
Y	14	32	23	22	26	c	metamorphic	10778
Y	14	(12)	13	8	(2)	f	sandstone	10779
Y	14	41	29	15	29	c	quartzite	10840

all show the same characteristics: part of the body whorl and the internal solid columella have been removed by sawing and chipping as well as the internal central part of the shell.

A list of the shell fish-hooks is given in table 6.

**Table 6** RH6: typology of the shell fish-hooks. Measures in mm. f = fragment, c = complete, r = retouched, p = polished, DA = Oman Dept. of Antiquities number.

Square	layer	L	W	T	status	tool	edges	others	Figure	DA
B/101	2	47	32	3	f	debitage	—	—	—	9810
A/102	2	67	34	8	f	debitage	—	—	—	9784
A/102	2	49	34	9	f	debitage	—	—	—	9785
A/101	1	54	40	4	c	blank	r	—	18–20	9781
A/101	Pit1	20	17	2	c	blank	r	—	—	9807
A/101	Pit1	47	36	4	c	blank	r	—	—	9811
A/101	Pit1	19	15	3	c	blank	r	—	—	9812
A/101	Pit1	28	10	—	f	blank	r	—	—	9813
A/101	Pit1	37	30	3	c	blank	r	—	18–19	9808
B/101	1	40	32	7	c	blank	r	—	18–17	9786
A/102	1	35	19	3	c	blank	r	—	—	9814
A/101	2	50	42	6	c	blank	r	—	18–22	9790
A/101	2	36	26	5	c	blank	r	—	—	9789
A/101	2	55	48	7	c	blank	r	—	18–21	9797
A/101	2	50	38	5	c	blank	r	—	18–23	9800
A/101	2	75	64	11	c	blank	r	—	18–25	9798
A/101	2	63	54	11	c	blank	r	—	18–24	9799
A/101	2	41	32	3	c	blank	r	—	18–18	9791
A/101	2	28	24	4	c	blank	r	—	—	9794
A/101	2	(32)	(17)	4	f	blank	r	—	—	9795
A/101	2	(37)	(26)	4	f	blank	r	—	—	9815
A/101	2	(22)	19	3	f	blank	r	—	—	9816
B/101	2	83	65	11	c	blank	r	—	—	9806
B/101	2	52	39	5	c	blank	r	—	—	9796
A/102	2	52	40	8	c	blank	r	—	—	9783
A/102	2	56	48	12	c	blank	r	—	—	9782
A/102	2	(27)	10	3	f	blank	r	—	—	9803
A/102	2	(25)	(21)	2	f	blank	r	—	—	9804
A/102	2	52	(36)	4	f	blank	r	—	—	9805
Y	9	37	23	4	c	blank	r	—	—	10782
Y	10	32	19	5	c	blank	r	—	—	10783
Y	14	29	20	5	f	blank	r	—	—	10781
A/102	2	23	17	2	c	blank	p	—	18–15	9802
B/102	2	22	(14)	4	f	blank	p	—	18–16	9817
B/101	1	(31)	(22)	3	f	blank	p	—	—	9787
A/101	Pit1	37	30	3	c	blank	p	notch	18–12	9808
A/101	2	(27)	(15)	3	f	blank	?	pierced	—	9793
B/102	2	24	19	2	c	blank	r	notch	18–13	9818
B/102	2	(25)	25	3	f	blank	p	notch	18–14	9819
X	11	(32)	(23)	8	f	blank	p	—	—	9792
A/101	1	39	11	6	f	hook	p	notches	18–9	9830
A/101	1	(34)	13	(2)	f	hook	p	—	—	9831
A/102	1	(13)	3	2	f	hook	p	—	—	9836
B/101	1	15	3	(2)	f	hook	p	notch	18–1	9832
B/101	1	52	10	8	f	hook	p	notches	18–10	9829
B/101	1	(14)	5	(1)	f	hook	p	—	—	9788
B/101	1	(22)	(5)	2	f	hook	p	—	—	9822
A/101	Pit1	(19)	2	2	f	hook	p	—	—	9826
A/101	Pit1	(28)	10	(3)	f	hook	p	notches	—	9813
A/102	2	14	3	(1)	f	hook	p	—	—	9826
A/102	2	(50)	12	6	f	hook	p	notches	18–11	9827
A/102	2	37	7	5	f	hook	p	notches	18–4	9828
A/102	2	(40)	9	5	f	hook	p	notches	18–6	9801
B/101	2	(20)	4	3	f	hook	p	—	—	9835
Y	1	31	5	4	f	hook	p	notches	18–5	10784
X	5	21	5	3	f	hook	p	notch	18–7	9824
X	9	13	7	2	f	hook	p	—	18–3	9823
X	14	33	7	2	f	hook	p	—	18–2	9820
X	14	22	3	3	c	hook	p	notch	18–8	9821
South trench		(29)	7	(4)	f	hook	p	notches	—	9825

Artefacts representing all the different stages of manufacture of the shell fish-hooks are attested at RH6, even though they are particularly common in layers 1 and 2 of the upper trench [Biagi and Travers 1985: 410]. Their manufacture procedure seems to have been similar, but not identical, to that described by Arkell [1953: 65] for Sudan and Dyall [1982: 56] for Australia. In fact, the RH6 fish-hooks are from valves of *Pinctada radiata* and *Pinctada margaritifera* marine shells [Ghisotti pers. comm. 1987]. Drop-shaped, pointed blanks were produced retouching the shell valves. The blanks were later polished all over their surface (Fig. 18-15 and 16) and pierced near the pointed edge. A notch was then obtained enlarging the small hole, from which the polishing for the definitive shaping of the hook had been initiated (Fig. 18-12 to 14). Finally, one or more notches were produced along the stem of the finished hook, whose scope was to hold the line (Fig. 18-3 to 11).

Other shell instruments are one small, well-polished, pierced, shell ball from square X, layer 11, 15 pierced *Columbella* shells, all from the uppermost levels, and 24 beads, polished from shell valves, except one from *Dentalium*, whose occurrence throughout the sequence and dimensions is shown in the diagrams of Fig. 16.

### The bone industry

It consists of two main categories of objects: fish-hooks and points. The fish-hooks are of double-pointed type, otherwise called gorges [Schenck 1926: 227], obtained from narrow flakes of long mammal bone polished all-over their surface. They are of variable dimension, 19–52 mm long and 3–6 mm wide, with a slightly convex shape and oval section. RH6 yielded 11 of such items both from the top trench and from squares X and Y of the western trench (Fig. 19-32 to 42). Given the absence of any worn part of their surface, or of an off-centre equatorial groove for line attachment, it is difficult to ascertain whether they were part of composite fish-hooks [Schenck 1926: 226], or were utilized as horizontal hooks [Cleyet-Merle 1990: 84] in the way illustrated by Clark [1948: 47].

The bone points are 19, mainly obtained from flakes of long, small mammal bones or from (caprovind or gazelle) bones with epiphysis (Fig. 19-1 to 31). They occur throughout the whole sequence. Their tip has a circular, oval or, more rarely, triangular section. In a few cases they are polished over the entire surface. One almost complete, very elongated, entirely polished specimen from the upper trench has a circular section. The awl has a groove towards its rounded, proximal end (Fig. 19-20).

Other bone instruments include polished, oval-sectioned, elongated fragments with one perforation, sometimes close to a polished, round edge (Fig. 19-28 to 31).

Apart from the already-mentioned artefacts, the assemblage comprises a small, polished plaquette (Fig. 19-43) and a turtle bone with a double, diverging perforation (Fig. 19-44).

### Considerations

The importance of RH6 as one of the oldest shell-midden sites of the coast of Oman has already been pointed out in a few papers [Biagi 1987; 1988; Biagi et al. 1989; Uerpmann 1992].

In fact this is one of the few coastal aceramic settlements which have been carbon dated between the half of the seventh and the first centuries of the sixth millennium BP [Biagi 1993]. These dates indicate that the site was inhabited during the climatic deterioration which, according to the available data, started around 6500 BP and led, soon afterwards, to the current arid phase [Clark and Fontes 1990].

The material culture assemblage includes a chipped stone industry obtained from raw materials which are available in a two hours' walk from the site [Maggi and Gebel 1990: 6]. Even though the material employed for chipping instruments varies throughout the seven centuries of occupation of the site, the classes of instruments, which are in fact poorly represented, seem to be characterized by rather constant types. According to Maggi [1990: 298] there are only three pieces which recall specific tools which are typical for the assemblages of the fifth millennium BP neighbouring site of RH5, namely three pièces esquillées of the so-called Ra's al-Hamra chisel [Maggi and Gebel 1990: 18] or wedge



type [Uerpmann 1992: 78]. Following the observations of M. Uerpmann [1992: 89] the chipped stone assemblage of RH6 is to be attributed to the Saruq-Facies, even though the presence of flat-retouched tools, which characterize the facies itself, are extremely rare [Maggi 1990: Fig. 5-19]. A typical instrument is the so-called RH6-drill [Uerpmann 1992: 82], like those illustrated in Fig. 12-9 to 11. A certain continuity between RH6 and RH5 can also be postulated on the basis of the characters of the chipped stone assemblages of the lowest layers of site RH5, where the “conventional instruments” are better represented than in the upper levels, which yielded a high percentage of wedges and sommaire-retouched types [Biagi et al. 1989: 4].

Regarding the ground and polished stone assemblage, a noticeable difference can be observed between the RH6 and RH5 hammerstones. The RH6 ones are from naturally-shaped wadi or beach pebbles, while most of the RH5 ones have a well-defined form, sometimes with polished surfaces, often showing pecking marks on the flat faces [Biagi et al. 1984: 52], and with a wider working edge.

The RH6 net-sinker are represented by a few specimens, namely the grindled, grooved or saw-in small types, which occur, for example, at Saruq [Uerpmann 1992: 95], but which are not common at RH5. It is not easy to state whether the variability in the net-sinker types would suggest different fishing techniques, even though one can notice that the small specimens are more common to the lowest part of the sequence, as can be seen from table 5. Fishing was surely one of the main activities of the RH6 settlers as shown by the abundance of fishing implements, such as net-sinkers, shell-hooks and bone gorges, and the amount of bones attributable to several fish species [Biagi and Travers 1985: 409]; the marine reptiles are also represented by sea-snake and rare green turtle (*Chelonia Mydas*) bones. A workshop for the production of shell-hooks is most probably documented by the finds of the palaeosurface uncovered in the topmost trench (Fig. 13).

As regards the mammal remains, the presence of domesticated animals is documented since the lowest layers of RH6 by the occurrence of dog bones [Uerpmann H-P. pers. comm. 1995], while Thar has been identified from layer 11, dated to  $6270 \pm 60$  BP (Bln-3633/II) and  $6130 \pm 60$  BP (Bln-3634/I). The gathering of marine and mangrove shellfishes was also practised as indicated by the great amount of shells throughout the entire sequence. *Terebralia palustris* is common from the lowest layer 14, dated to the mid-seventh millennium BP; it shows that the mangrove swamp already existed by that time as confirmed by the archaeobotanical analyses [Biagi and Nisbet 1992: 575]. Other interesting observations are provided by the finds of layer 11: the commonest shell species, *Saccostrea cucullata*, was introduced into the site in small groups still attached to round pebbles, suggesting the presence of a rocky coastline during this settlement phase.

To conclude, RH6 is one of the oldest shell-midden sites of the coast of Oman and, undoubtedly, the oldest of the Ra's al-Hamra/Qurm region. Even though only two small trenches were opened at the site, an extremely interesting and rich material culture assemblage has been recovered which shed some light on the way-of-life of the first Holocene fisher/gatherers of the Oman peninsula since the middle of the seventh millennium BP. Unfortunately, most of the faunal assemblages brought to light during the excavations are still waiting for being analysed. Nevertheless the few data available indicate that the economic strategy of the RH6 inhabitants was almost completely based on the exploitation of the resources provided by the marine and mangrove swamp environments.

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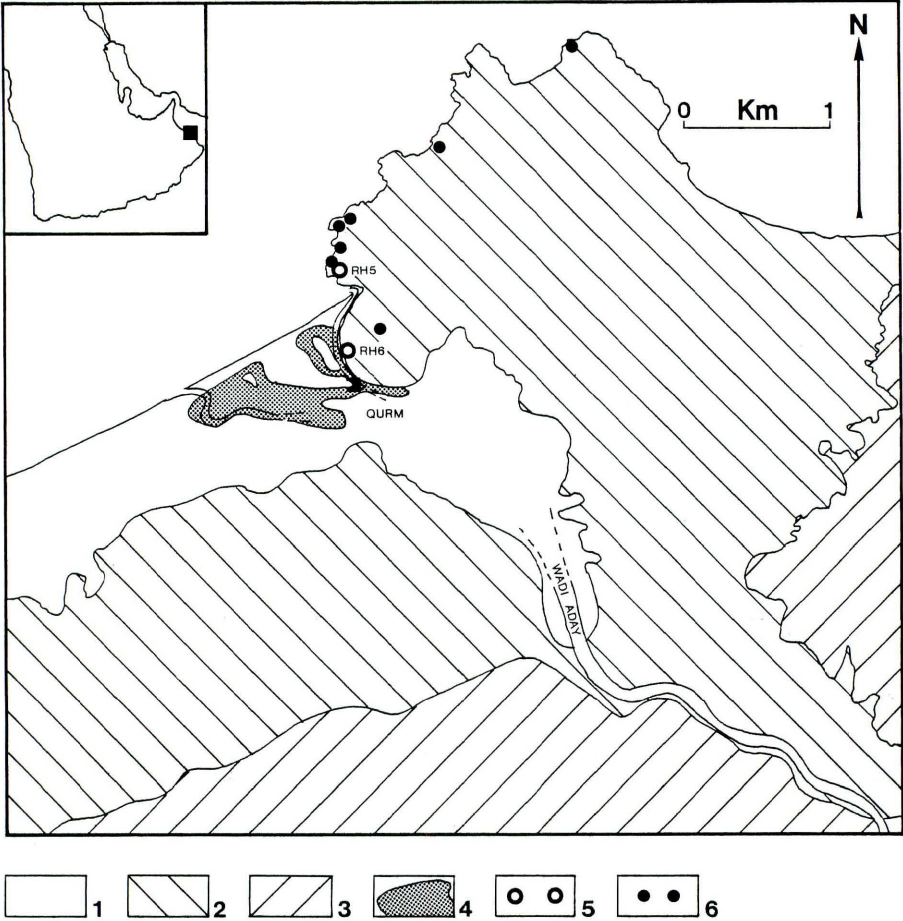
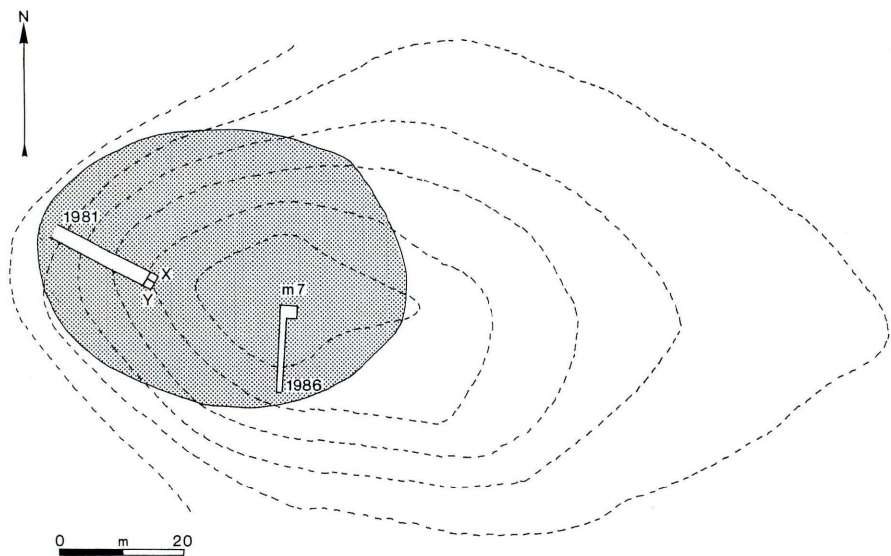


Fig. 1 Distribution map of the shell-middens in the Qurm and Ra's al-Hamra area with the location of site RH6.

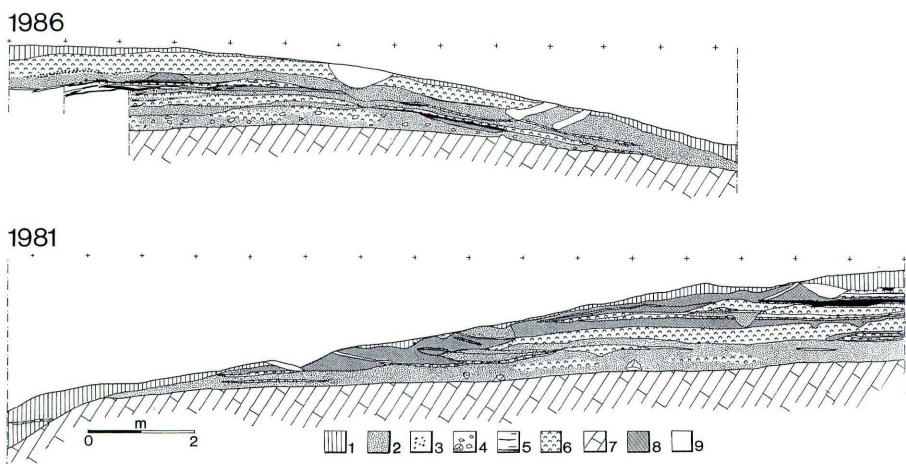
- 1) lowland zone, 2) foothills, 3) mountain zone, 4) mangrove swamp of Qurm,  
5) 14C dated shell-middens, 6) other sites in the area (after P. Biagi 1994: 21).



**Fig. 2** Aerial photograph of the Qurm/Ra's al-Hamra zone with the location of site RH6 (arrow) (top) and of site RH6 from the north (bottom) (photos by R. Salm and P. Biagi).



**Fig. 3** RH6: site plan with the indication of the extension of the shell-midden (shaded area) and the location of the various trenches. Contour lines every 1 metre (drawing by P Biagi).



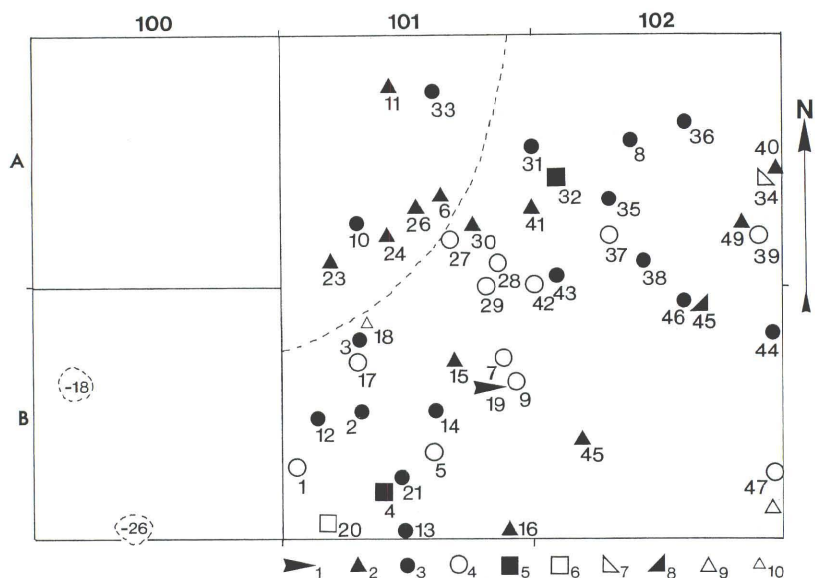
**Fig. 4** RH6: section through the deposits excavated in 1981 (west trench), and in 1986 (south trench).

- 1) Subrecent sand, 2) sand, 3) allocthonous pebbles, 4) stones, 5) charcoal lenses, 6) marine and mangrove shells, 7) bedrock, 8) fish bones, 9) disturbed deposit (drawing by E. Starnini from original by M. Cattani, S. Salvatori and I. Tiscornia).



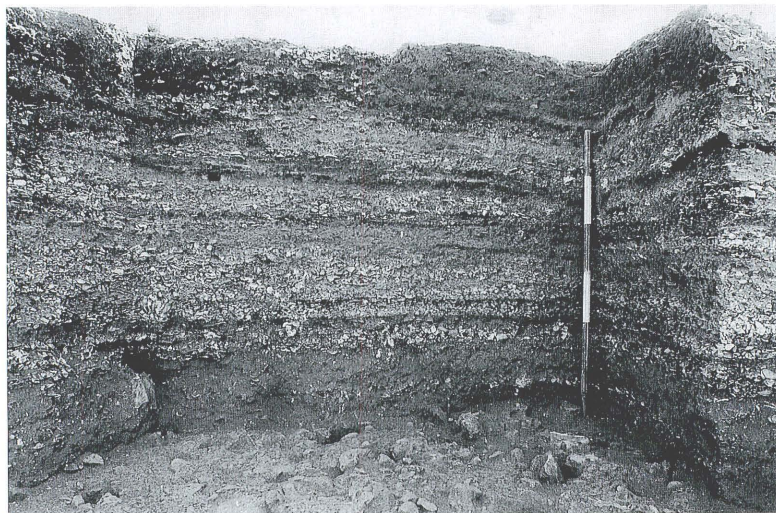


**Fig. 5** RH6: remains of the crouched, multiple burial uncovered in squares A/100–101, layer 1 of the top trench at the moment of discovery (top) and at the end of excavation (bottom) (photos by P. Biagi).



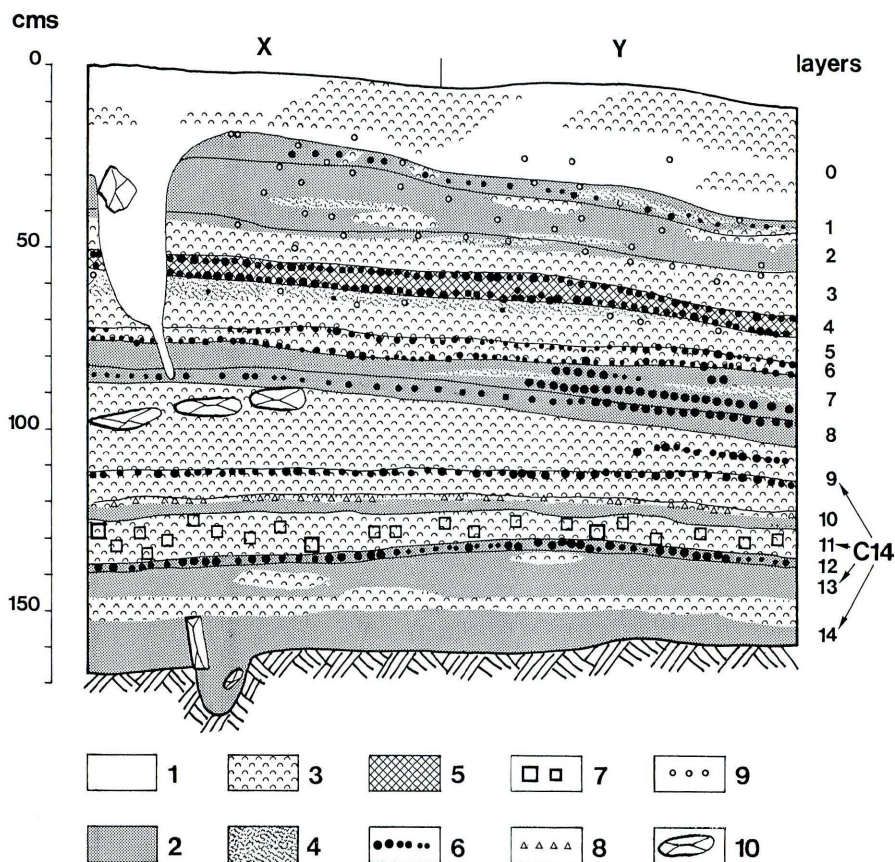
**Fig. 6** RH6: palaeosurface of squares A-B/101-102, with the indication of the various finds.

1) polished adze, 2) net-sinkers, 3) hammerstones, 4) round pebbles, 5) pestles, 6) flat stones, 7) anvils, 8) polishers, 9) grooved disc, 10) stone flake (drawing by P. Biagi from original by M. Cattani and I. Tiscornia).



**Fig. 7** RH6: section through the deposits of squares X and Y in the western trench (photo by P. Biagi).





**Fig. 8** RH6: section through the deposits of squares X and Y in the western trench with the indications of the different layers and of the samples taken for  $^{14}\text{C}$  dating.

1) disturbed, 2) sand 3) marine and mangrove shells, 4) fishbone lenses, 5) ash, 6) charcoal, 7) coastal pebbles, 8) beach gravel, 9) concretions, 10) stones (drawing by P. Biagi).



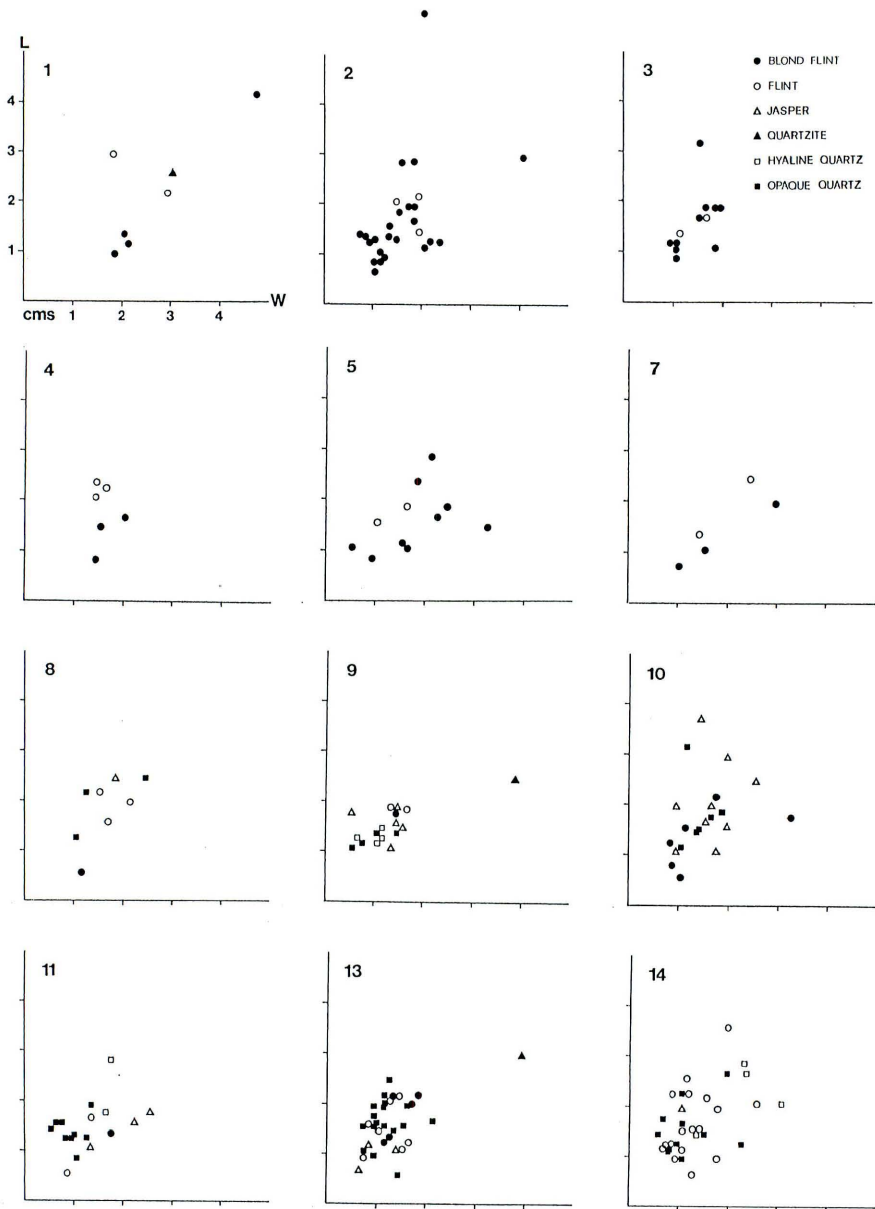
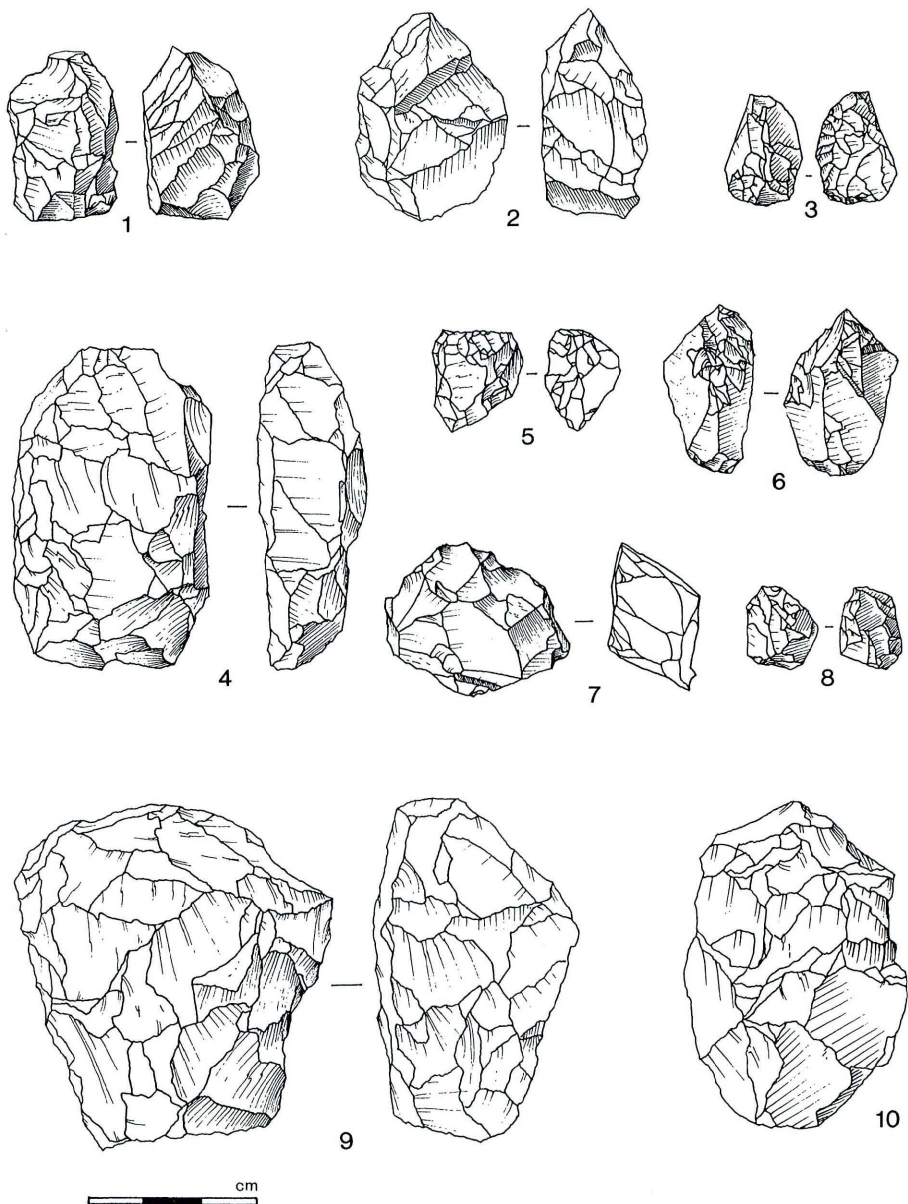
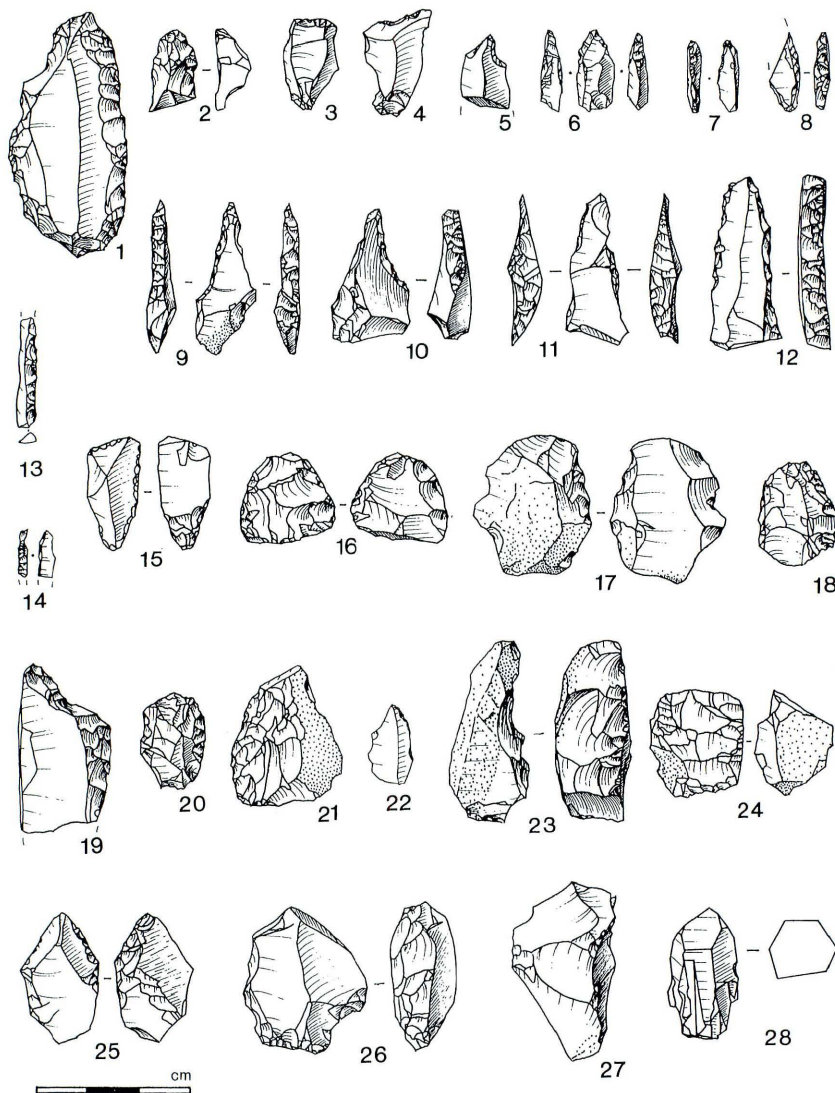


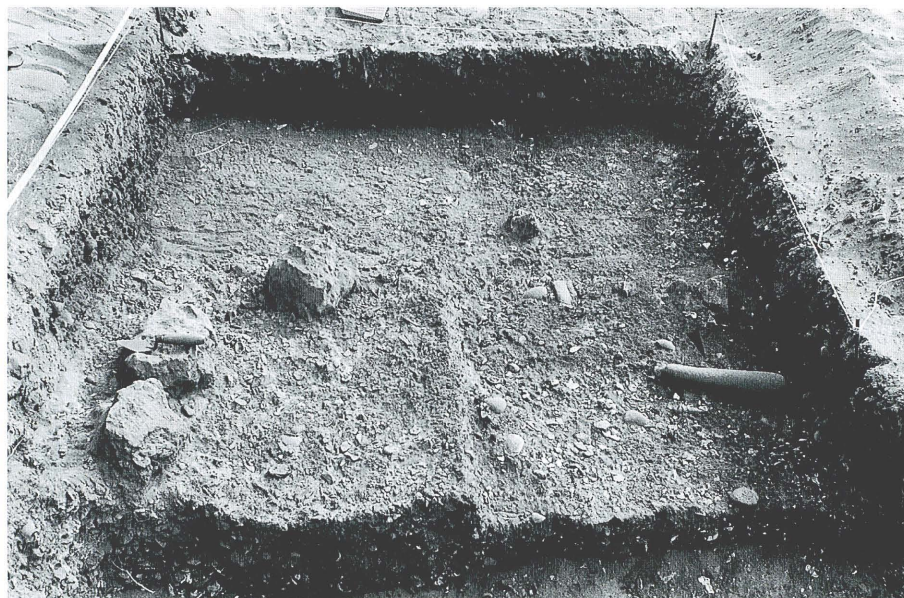
Fig. 9 RH6: dispersion diagrams of the complete, unretouched, chipped stone artefacts from different layers (drawing by P. Biagi).



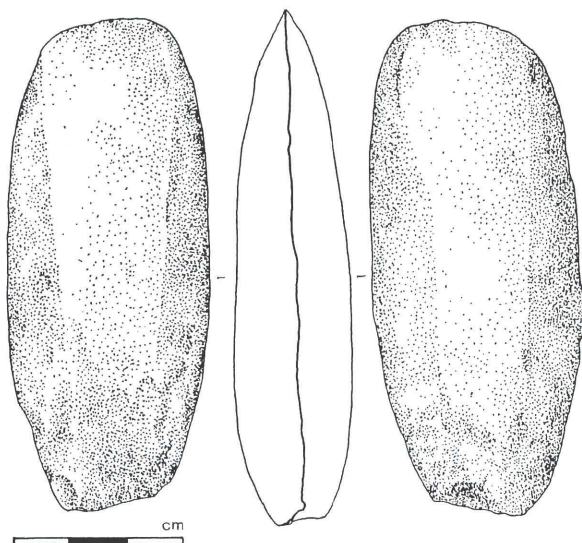
**Fig. 10** RH6: cores from layer 6 (2 and 3), 9 (4, 5 and 9), 10 (6-8), 11 (1) and 13 (10) (1:1) (drawing by G. Bombonato).



**Fig. 11** RH6: chipped stone artefacts from square Y. End scrapers (1 and 2), truncations (3 and 4), drills (5-11), backed blades (12-14), foliate (15), side scrapers (16-22), denticulate (23), spintered piece (24), sommaire tools (25 and 26), blonde flint core (27) and hyaline quartz crystal (28). Provenance: layer 1 (16 and 23), 2 (3, 5, 15, 25 and 26), 3 (4), 5 (27 and 28), 6 (9), 8 (7), 9 (1, 24 and 28), 10 (18 and 19), 11 (20), 13 (8, 10, 12, 13, 14 and 22), 14 (2, 11 and 21) (1:1) (drawing by G. Bombonato).

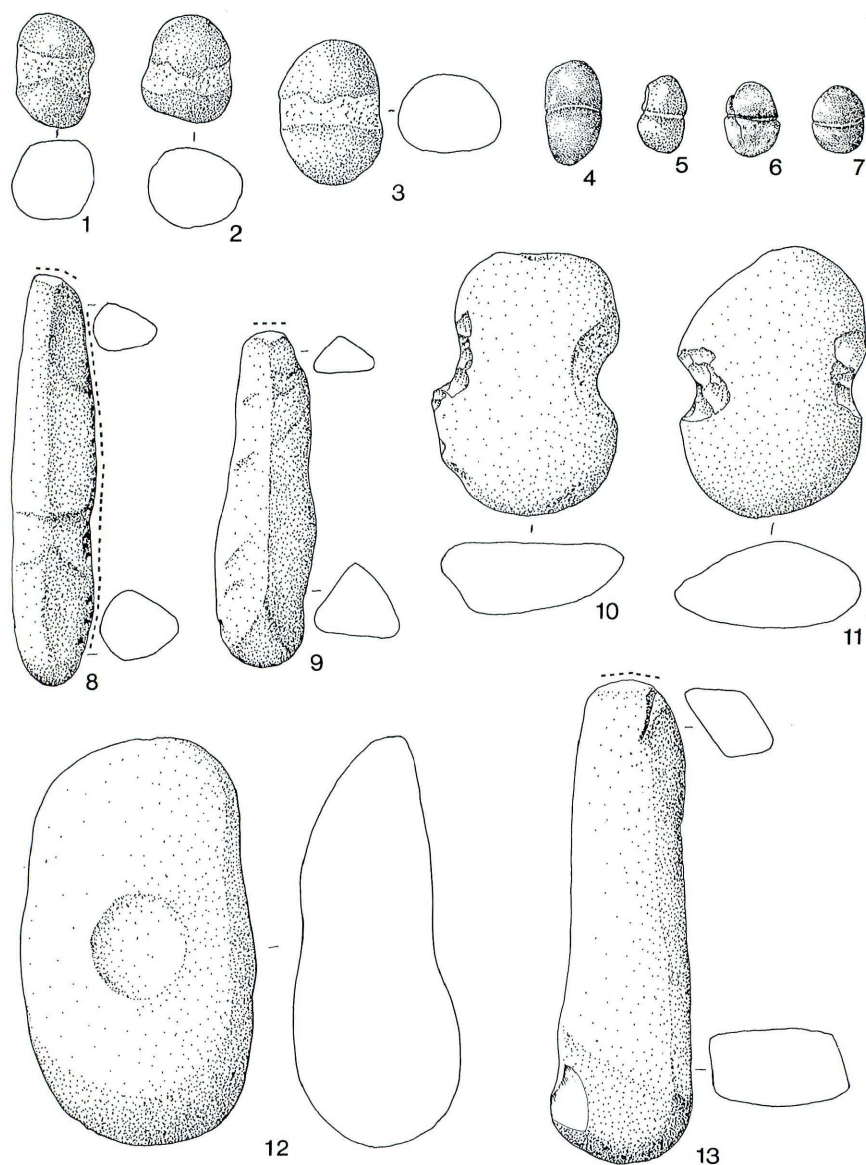


**Fig. 12** RH6: palaeosurface uncovered in square A-B/101–102, layer 2 with instruments still *in situ* among which the greenstone pestle (arrow) (photo by P. Biagi).

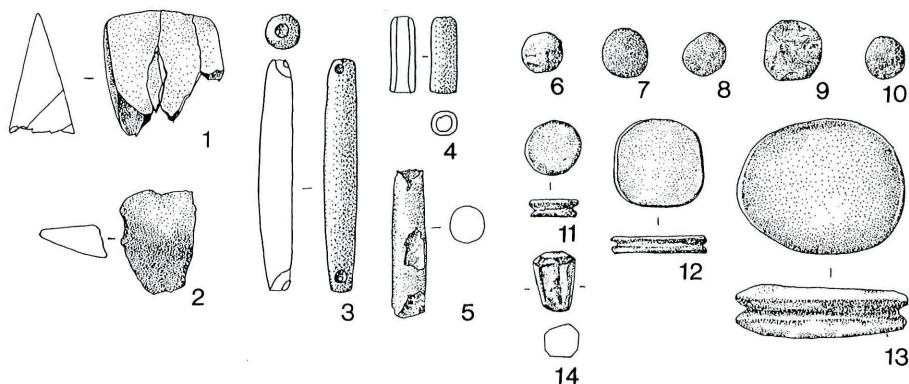


**Fig. 13** RH6: polished, conglomerate adze from square B/101, layer 2 (drawing by G. Marchesi).

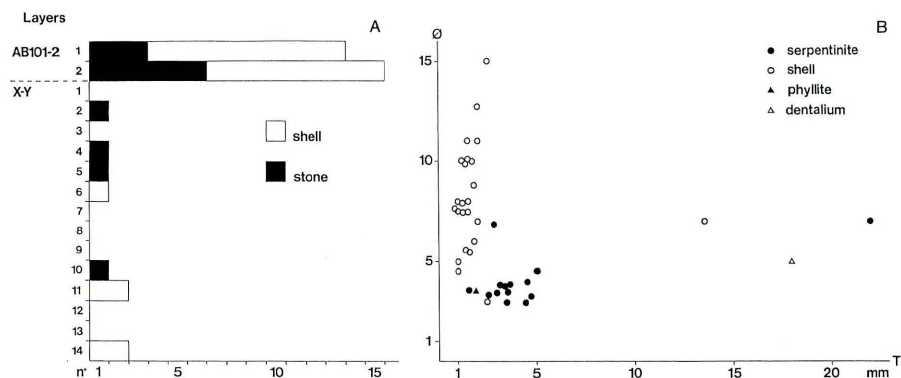




**Fig. 14** RH6: stone grindled (1 to 7) and two-notch (10 and 11) net-sinkers, hammerstones (8, 9 and 13) and anvil (12). Provenance: Y14 (1 to 3), Y13 (5), X13 (6), surface (4 and 7), B101-2 (8), A101-2 (9), Y0 (10 and 11), A102-2 (12), A101-1 (13) (2:3) (drawings by G. Marchesi and E. Starnini).



**Fig. 15** RH6: polished stones (1 and 2), long beads (3 and 4), sandstone cylinder (5), small balls (6 to 10), grooved discs (11 to 13) and steatite artefact (14) (2:3) (drawing by G. Marchesi).



**Fig. 16** RH6: distribution diagram of the stone and shell beads through the sequence (A) and diameter/thickness dispersion diagram of the stone and shell beads (B) (drawing by P. Biagi).

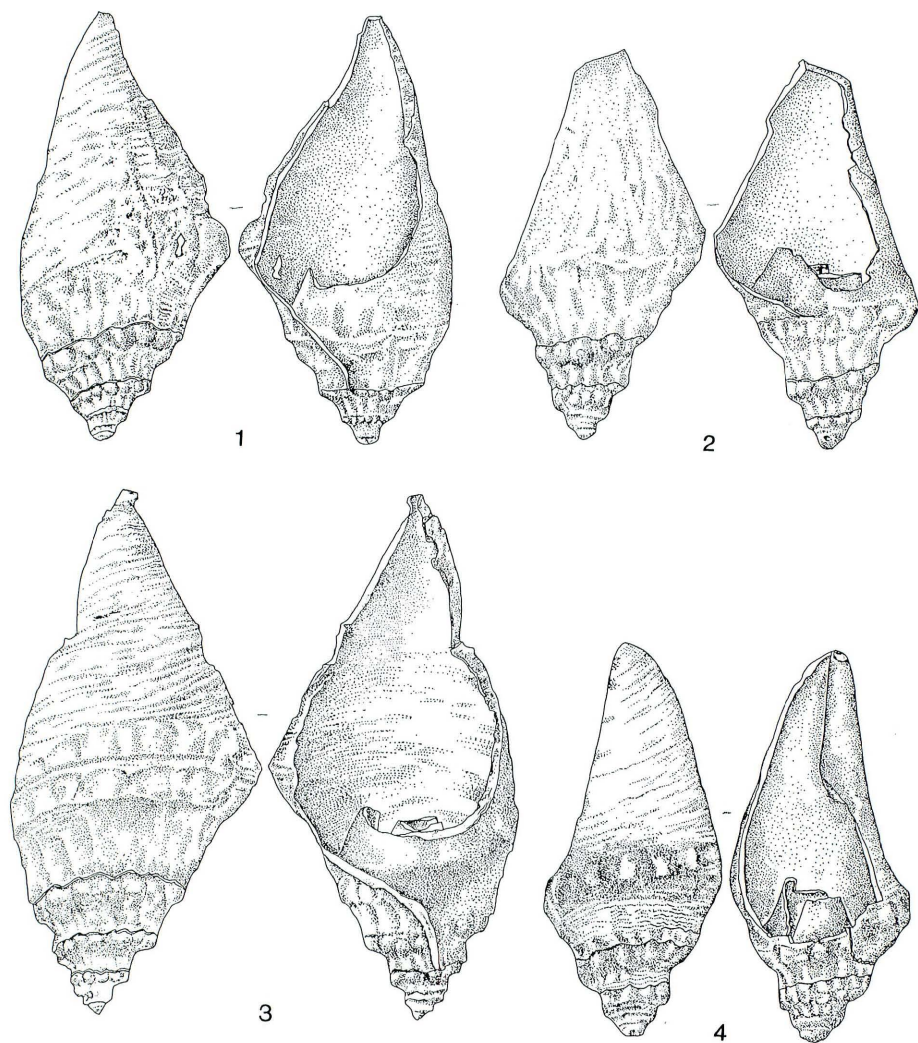


Fig. 17 RH6: *Fasciolaria trapezium* vessels from A/101, Pit 1 (1:2) (drawing by G. Marchesi).

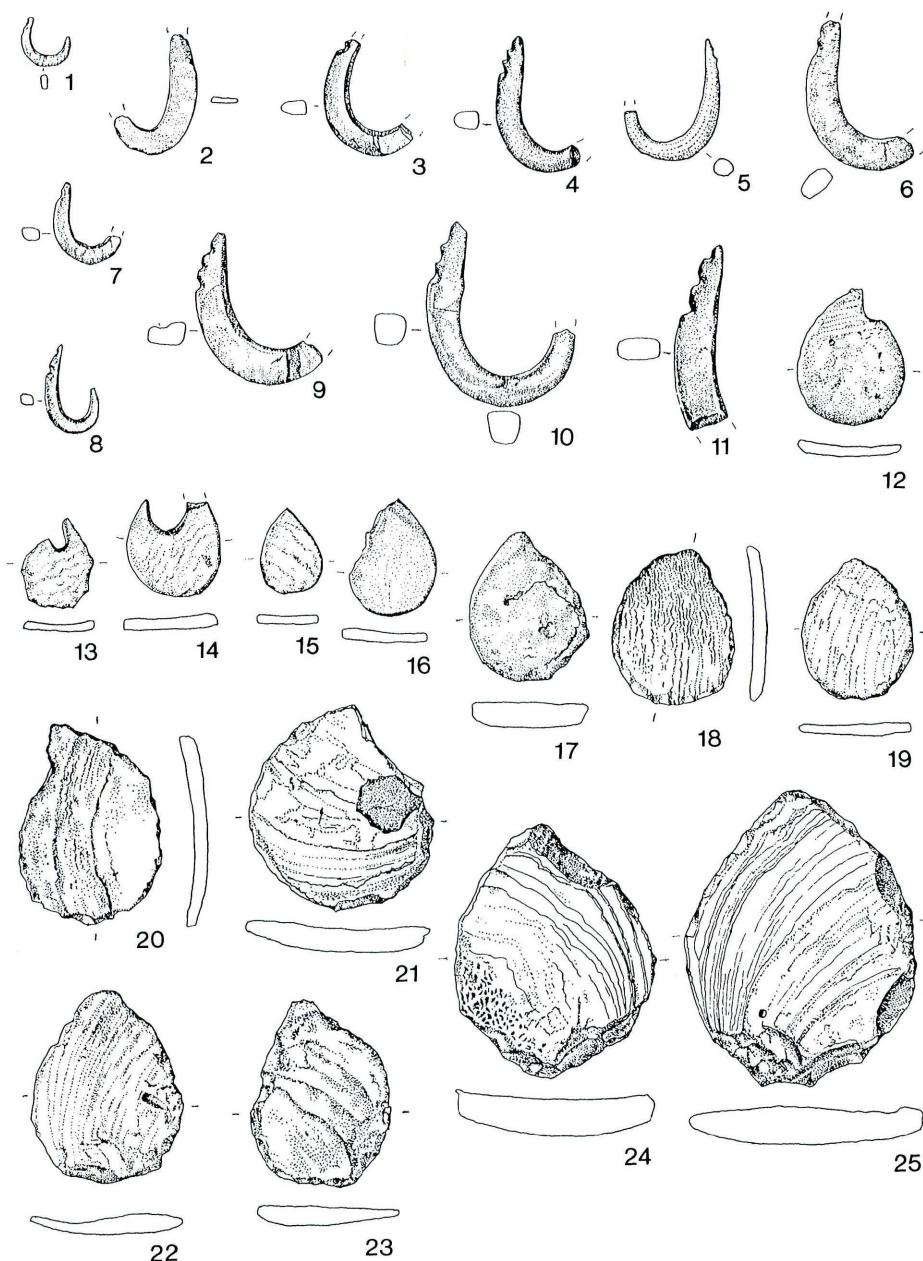
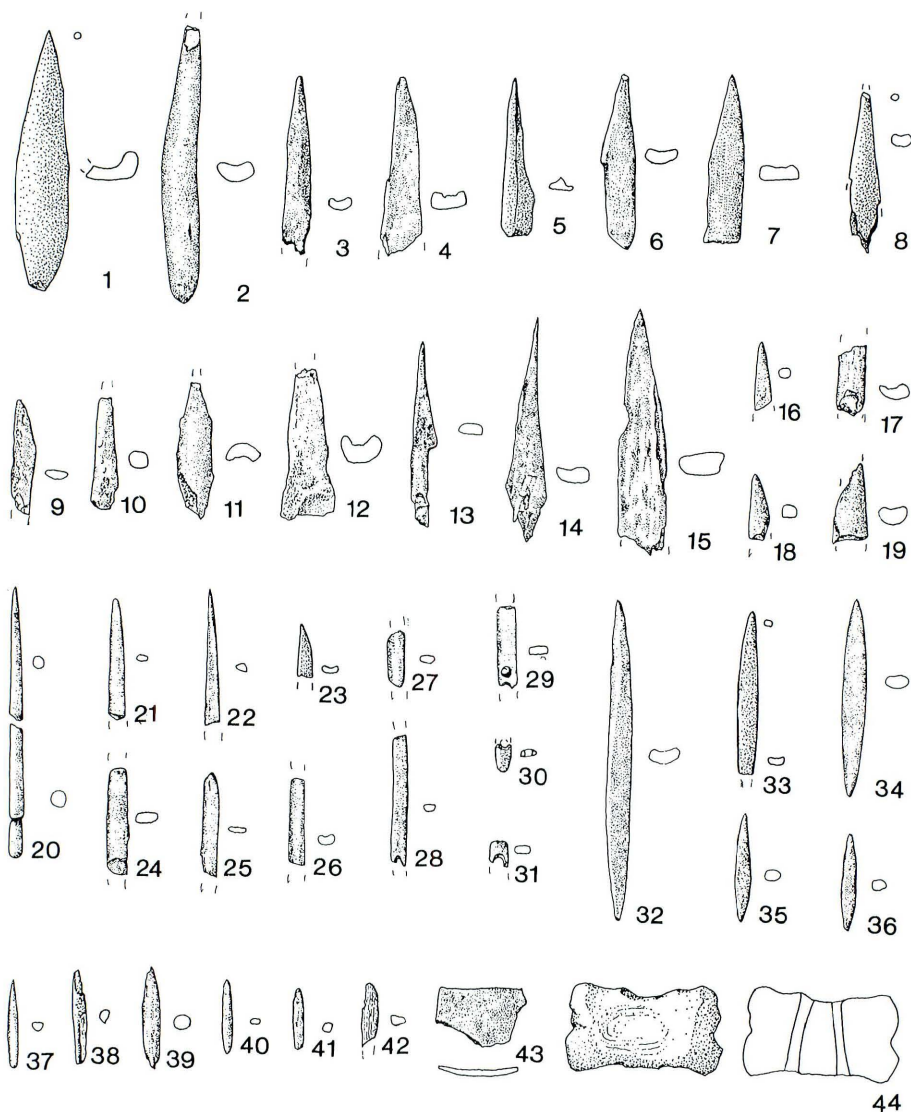


Fig. 18 RH6: shell fish-hooks at different stages of preparation (2:3) (drawing by G. Marchesi).





**Fig. 19** RH6: bone points (1 to 31), gorges (32 to 42), plaquette (43) and pierced turtle bone (44). Provenance: X1 (21), X2 (29), X6 (13 and 16), X10 (6, 22, 38 and 42), X11 (2), X13 (11, 17 and 25), Y1 (1, 5 and 44), Y2 (8 and 30), Y10 (23), A101-1 (3, 10, 15, 19, 20 and 26), A101-Pit 1 (7, 18 and 31), A101-2 (4, 12 and 41), A102-1 (28, 37 and 39), A102-2 (40). B101-2 (9, 14 and 24), B100-3 (27 and 43) (2:3) (drawing by G. Marchesi).