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Er-Rujum (Shaʿalabim East): An Intermediate Bronze Age (EB IV) Site in the Ayyalon Valley

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The site of Er-Rujum is located on the western slopes of the Ramallah Anticline in the northern part of the Ayyalon Valley, c. 220 m above sea level, some 15 km east of the Mediterranean coast (map ref. NIG 20015–45/64145–85; OIG 15015–45/14145–85), and enjoys a typical Mediterranean climate (Figs. 1, 2). The vicinity of the site is characterized by the chalk and chert outcrops of the Menuḥa and Meshash Formations. In recent decades, the area has become urbanized and the surviving vegetation is secondary in nature.

The site was discovered by Shimon Gibson in a survey undertaken prior to the construction of Road 2, which links the modern city of Modiʿin with the Tel Aviv–Jerusalem Highway (Shimon Gibson, pers. comm.). During this survey, a number of features were discerned, which were assigned numbers preceded by the letter 'F'. These features included stone heaps containing pottery from different periods, mainly from the Middle Bronze Age II, as well as terrace walls and other elements visible on the surface. During May–July 1998, a salvage excavation was conducted, revealing that the stone heaps covered building remains from the Intermediate Bronze Age (Early Bronze Age IV), c. 2300–2000 BCE.[1]

The site was identified with Er-Rujum, which appears on a map of the British Government of Palestine (1945). In Arabic, one of the meanings of *rujum* is a heap of stones cleared from the fields to enable plowing of the land (see also Lane 1968:1047–1048).[2] During the British Mandate in Palestine, a number of archaeological sites representing heaps of stones covering ancient remains, mainly in agricultural areas, were labeled *rujum* (see also Edelstein, Milevski and Aurant 1998:8–10). As the site is located c. 1 km east of Kibbutz Shaʿalabim, formerly the village of Salbit (Khalidi 1992:410), which is identified as Tel Shaʿalabim, biblical Shaʿalbim (Judges 1:35), the label 'Shaʿalabim East' was appended to the *rujum* site. Tel Shaʿalabim was occupied during MB II, and c. 3.5 km to the east is another MB II site, Kh. Dhanab el-Kalb (Gophna and Porat 1972:236, Site 238).

Several excavations have been conducted at Tel Shaʿalabim, revealing, among other antiquities, a Samaritan synagogue dated to the fourth–fifth centuries CE (Sukenik 1949). In addition, two MB II burial caves were excavated, yielding numerous pottery and other artifacts (Bahat 1981; Singer-Avitz and Levy 1993). Along the eastern side of the kibbutz, more burial caves from the same period were

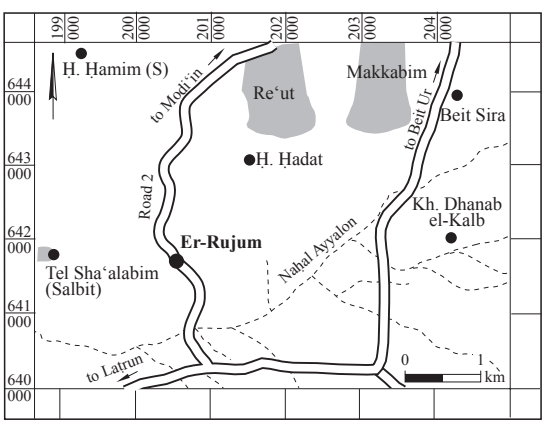


Fig. 1. Location map.

Fig. 2. General view of the site and the southern Ayyalon Valley, looking southwest. The *rujum* of Area F70 is in the center; in the background: the Jerusalem–Tel Aviv highway and the Shephelah hills.

exposed, as well as building remains and installations from the Late Bronze Age and Iron Age II. Agricultural installations and several *rujum*s were also excavated in the area (Parnos 2007; Arbel 2008). Two sites, dating to the Chalcolithic period and EB I, Ḥorbat Ḥamim South (Gorzalczany 2008) and Ḥorbat Ḥadat (van den Brink 2011), were excavated nearby. In addition, a small probe was conducted at the site by Elena Kogan-Zehavi (2000) prior to our excavations. Until the present excavation, the presence here of an Intermediate Bronze Age settlement was unknown.

This report presents the architecture and finds of the Intermediate Bronze Age occupation. A small assemblage of MB II pottery, mostly cooking pots and store jars, was retrieved, mainly within the fills of the *rujum* in Area F70. As the sherds were not found *in situ*, and no complete or restorable vessels were recovered, only a brief description is presented in Appendix I.

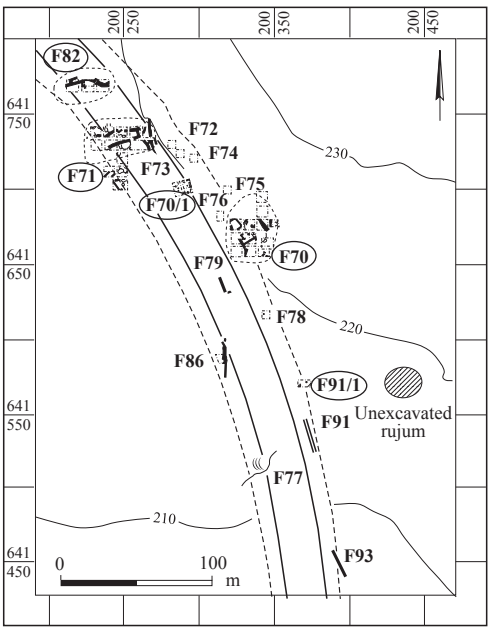


Fig. 3. Location of survey sites and excavated areas (marked within a circle).

THE EXCAVATION

Following the survey conducted by Gibson (see above), eight excavation areas were opened (Fig. 3), five of which revealed archaeological remains. These five areas were labeled F70, F70/1, F71, F82 and F91/1, continuing the numbering of Gibson's survey. Areas F70/1 and F91/1 are labeled in this way as they were located between F70 and F71 and near F91 respectively, and were not noticed in Gibson's survey.

The areas were excavated according to a grid of 5 × 5 m squares with a balk of 1 m between them. When a *rujum* was excavated, the grid was oriented according to the topography of the heap of stones. Dry sieving with a 5 mm mesh was employed for the main stratigraphic levels, including floors and other living surfaces.

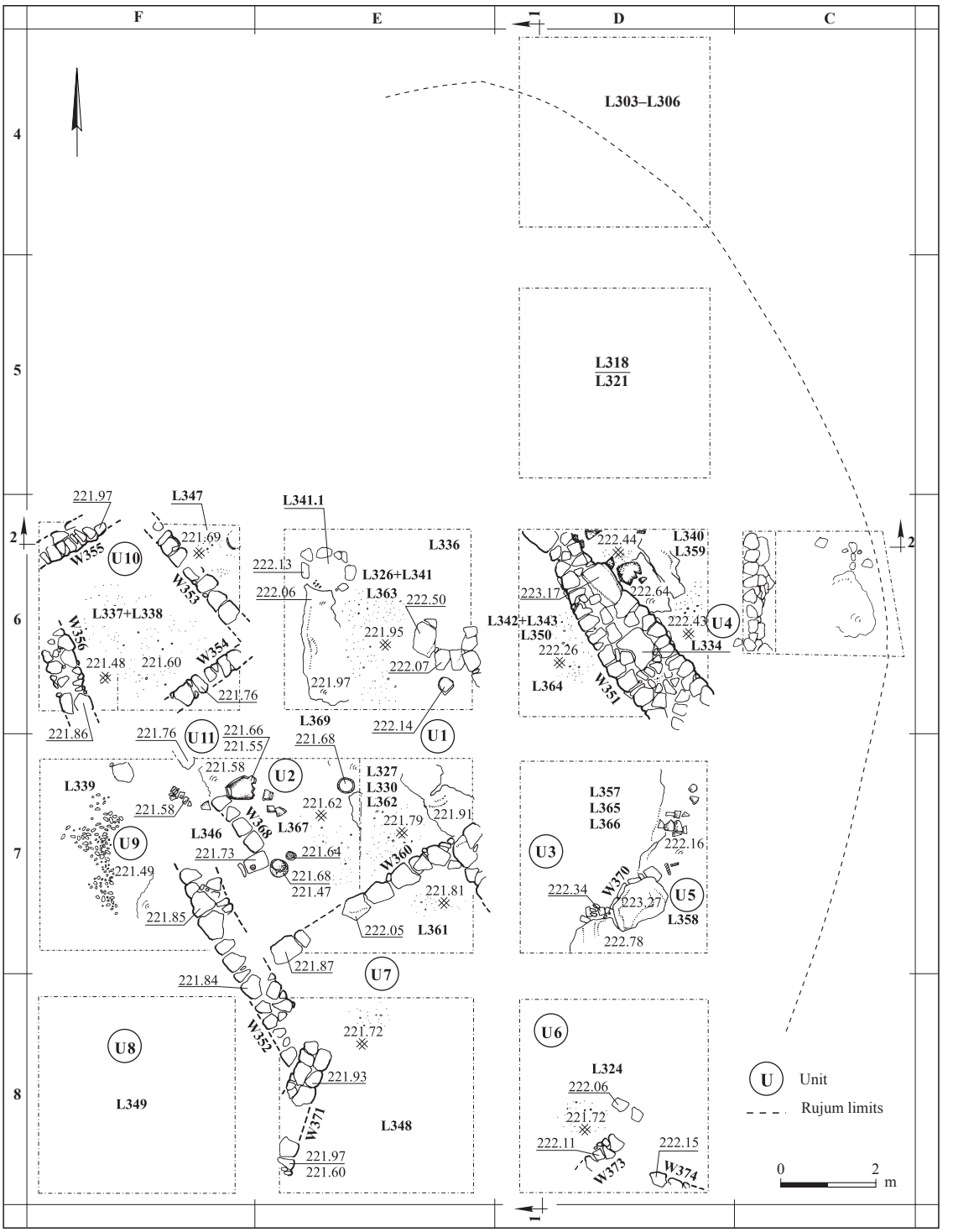
Appendix II presents a list of loci for Areas F70, F70/1, F71 and F82, including archaeological contexts and descriptions.

Area F70

This area, comprising an ovoid heap of stones (c. 30 × 40 m, height c. 3.5 m; Fig. 4), is located at the center of the site. Nine squares were excavated, revealing three structural levels labeled III to I, from bottom to top (Fig. 5; Plan 1), representing the Intermediate Bronze Age architecture (Level III), the *rujum* (Level II) and modern topsoil (Level I). A number of charcoal pieces and olive stones were retrieved from Level III (L327, L341.1, L359,

Fig. 4. Area F70. The *rujum* prior to the excavations, looking southwest.

Fig. 5. The *rujum* during the excavations, looking east.



Plan 1. Area F70. Level III: Plan and sections (on opposite page).

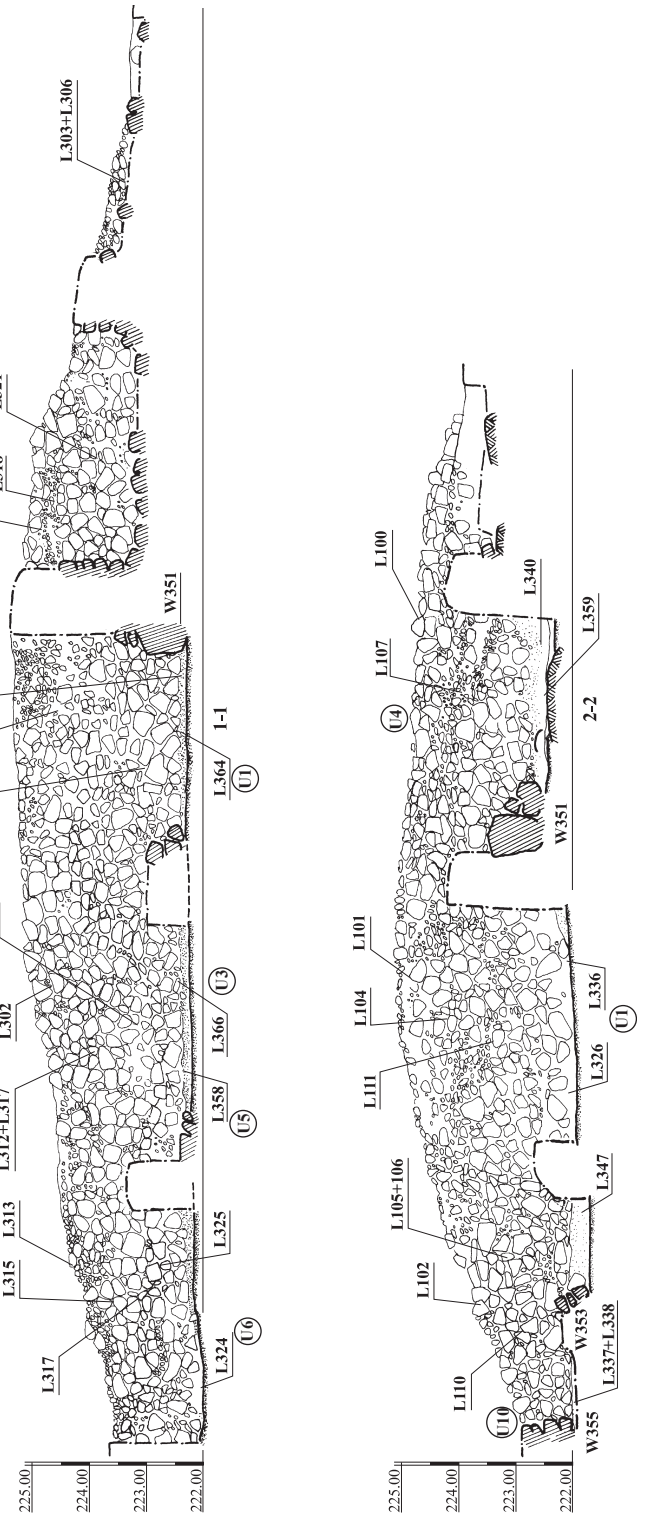

1-1
L303+L306
L321
L318
L301+L304
L342+L343
W351
L107
L350
L364
U1
L357
L302
U3
L366
L358
U5
L312+L317
L313
L315
L325
L317
L324
U6
225.00
224.00
223.00
222.00
2-2
L100
L340
L359
L107
U4
W351
L101
L104
L336
U1
L111
L326
L105+106
L347
L102
W353
L337+L338
L110
U10
W355

Fig. 6. Area F70. *In situ* vessels in Unit 2, looking northeast.

Fig. 7. Area F70. Cache of sickle blades in Unit 5, looking northwest.

L361, L363) and submitted for radiocarbon analysis. Three of the samples produced dates corresponding to the accepted dates of the Intermediate Bronze Age (see Boaretto, below).

Level III

This level comprises the architectural remains buried below the *rujum*, dating to the Intermediate Bronze Age. It was further divided into three phases to designate the construction fills (IIIc), the occupation (IIIb) and the accumulation of debris following abandonment (IIIa).

Phase IIIc: The construction fills of the building were exposed in the west (e.g., L339 in Unit 9) as a thin layer of stones below the beaten-earth floors and above bedrock. These construction fills were probably intended to create a level surface on the hill slope.

Phase IIIb: A building was erected on the slope of the hill, consisting of 11 units (Units 1–11). Although the building was not fully excavated, the partial plan reveals a series of quasi-rectangular rooms (Units 4, 5, 7, 8 and 10) around a larger, T-shaped courtyard, subdivided into three parts (Units 1, 2, 3). Unit 11 is a corridor between Unit 10 and the courtyard in Unit 2. Units 4 and 5 were probably built on a higher level of the hill (see Appendix 2 for a list of loci per unit).

This occupation phase is represented by well-packed, light-gray floors in the courtyards and rooms, containing large quantities of pottery vessels *in situ* (Fig. 6), most of them storage jars (e.g., L362, L363, L364, L367). In some places, the floors lay directly on bedrock, comprising only a very thin layer of soil. The gray living surface was preserved in some cases, measuring c. 0.2 m in depth (Plan 1: Section 2–2). Several Canaanean sickle blades were found in Unit 5 (L358) atop bedrock (Fig. 7). Very few faunal remains were retrieved (see below).

The walls of this structure, made of one or two rows of stones, were only preserved to the foundation level (Fig. 8), with the exception of W351 (Sq D6) and W370 (Sq D7), which probably represent massive support walls to level the slope on the northeastern side of the

Fig. 8. Area F70. Unit 10, looking northeast.

building. Wall 351 was constructed of two rows, preserved four courses high, and W370 comprised two large boulders enclosing the courtyard (Unit 3) from the southeast. A pillar base (L341.1; Sq E6), and above it part of the carbonized pillar (made of *Quercus calliprinos* and *Olea europea* wood; see Liphschitz, below), were found in Unit 1, indicating that the building was probably roofed.

Phase IIIa: The abandonment of the building is represented by collapsed stones on the living surfaces (e.g., L350, L357). We could not ascertain the reason for the abandonment or destruction of the building.

Level II

Level II is represented by a fill of stones and dark brown soil (see Plan 1: Sections 1–1, 2–2) above the building remains of Level III. It was divided into two phases: Phase IIb, the lower one, consisting of stones and soil, and Phase IIa, consisting of brown soil. These represent the fill of the *rujum* after the Intermediate Bronze Age building was abandoned. On the basis of the pottery and other finds, such as fragments of glass vessels,[3] dating mainly to MB II and the Hellenistic, Early Roman, Byzantine and Ottoman periods, this *rujum* can be dated to the last period. The later potsherds certainly originated from Tel Sha'alabim and the nearby sites in the area, brought here together with the fill of the *rujum*.

Level I

Modern topsoil covers the heap of stones and the entire abandoned site. A military casemate built of fieldstones atop the *rujum* probably dates between 1948 and 1967. Potsherds dating to MB II, the late Byzantine–Early Islamic and Ottoman periods were found in Level I as well. It must be stressed that very few Intermediate Bronze Age sherds were found in this level, which explains why previous surveys were unable to identify a settlement dating to this period at the site.

Area F70/1

Area F70/1 is located c. 50 m northwest of Area F70, below the terrace fill on which the *rujum* of Area F71 was encountered (see below). An archaeological level was discerned after bulldozers began work between Areas

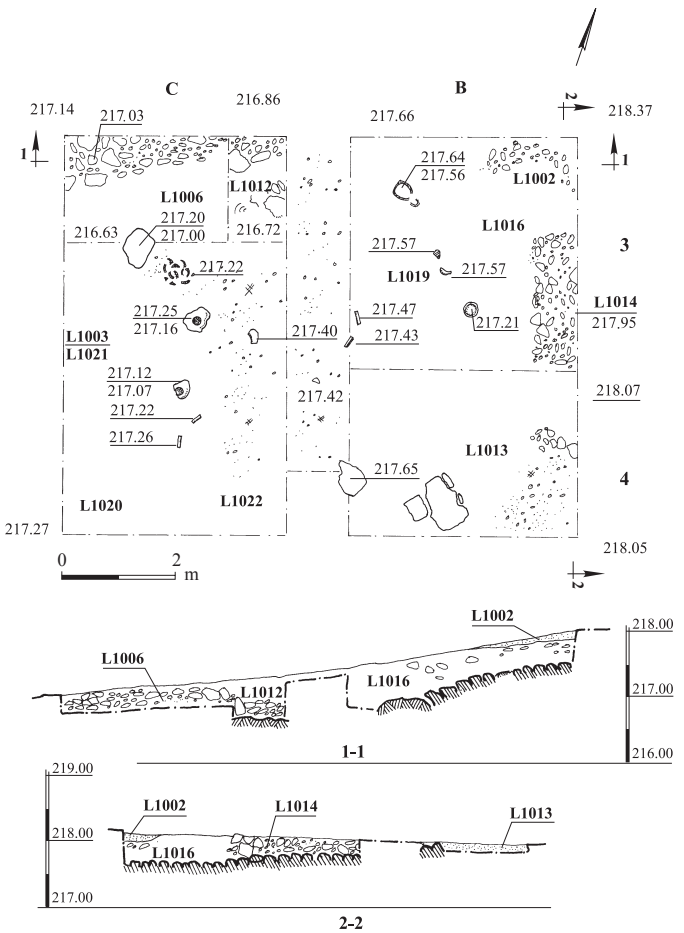
F70 and F71, following completion of the archaeological excavations in these areas. Four squares were excavated, revealing the floor of a courtyard or large room (at least 8 × 10 m), but no walls or structures relating to it (Fig. 9; Plan 2). Piles of stones found at the eastern edge of the area were the result of the bulldozer activity, but they may be an indication of walls removed prior to the excavation. Two structural levels (labeled II to I from bottom to top) were discerned.

Level II

Level II, which represents the *terra rosa* soil layer above bedrock (e.g., L1006, L1012; Sq C3), was revealed in several probes excavated below Level I. This layer is sterile and the construction phase of Level I was built directly upon it.

Level I

This level was subdivided, as in Area F70, into three phases: construction (Phase Ic), occupation (Phase Ib), and accumulation of debris following abandonment (Phase Ia). The construction phase (Ic) was noticed in several probes below the floors (e.g., L1014; Plan 2: Section 2–2), comprising a layer of small stones, as in Area F70. The Intermediate Bronze Age occupation phase (Ib) is defined by a whitish, crushed-calcite floor (e.g., L1013;



Plan 2. Area F70/1. Plan and sections.

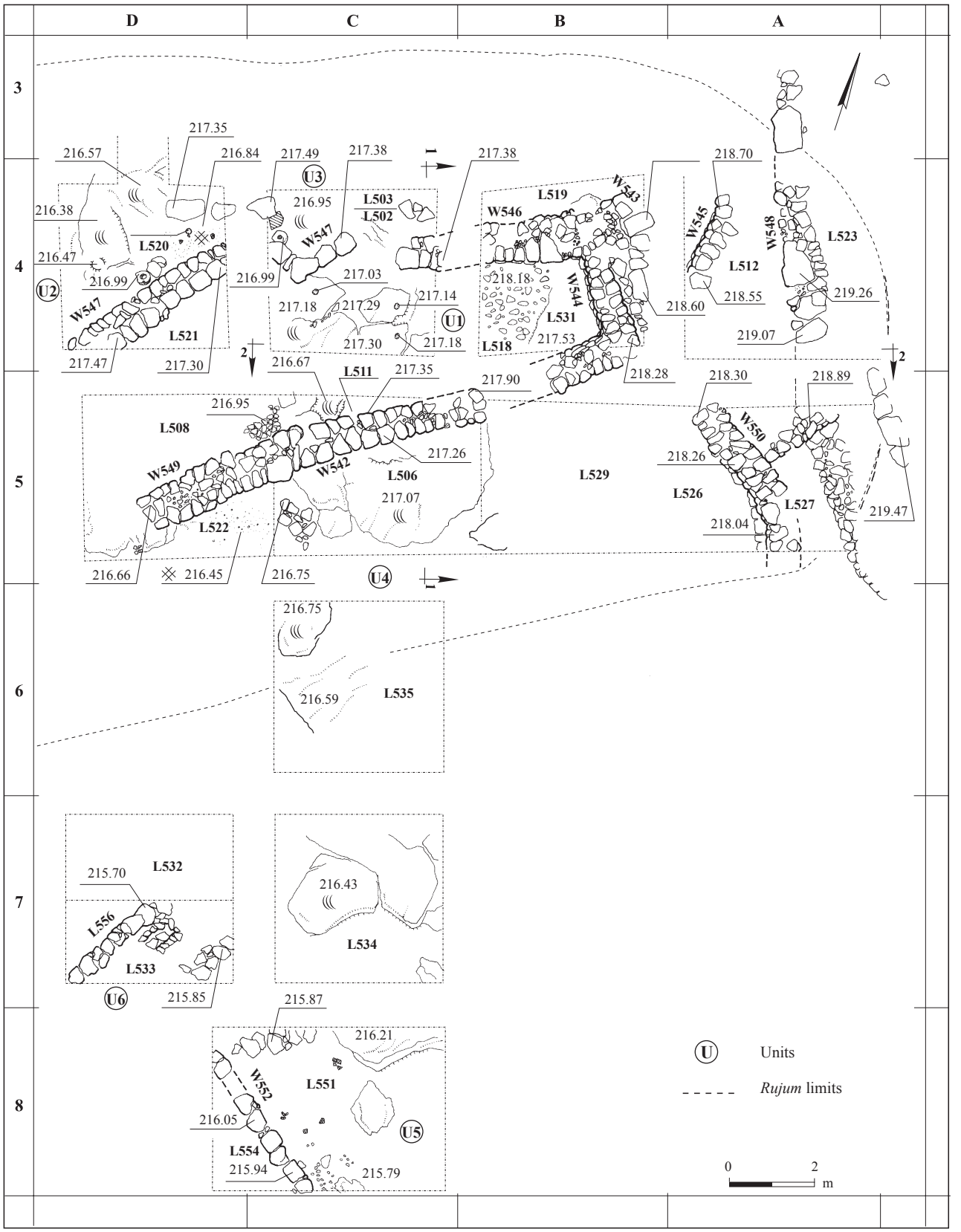
Fig. 9. Area F70/1. General view of floor with mortar *in situ* and construction fills below it, looking northeast.

Fig. 10. Area F71. The *rujum* and the excavated squares, looking southwest.

Sq B4), upon which mortars, pottery vessels and sherds, as well as flint blades were found. In addition, a metal blade (probably an axe, see Fig. 43:1) was also retrieved from the fill above the floor (L1021; Sqs C3–4; see below). The debris of Phase Ia (e.g., L1003; Sqs C3–4) comprised a compact, gray-colored layer. This phase appears only in the western side of the area, and unfortunately could not be discerned in the sections.

Area F71

Area F71 is located some 100 m to the northwest of Area F70 below an elongated heap of stones (c. 15 × 30 m, height c. 1.5 m; Fig. 10; Plan 3). The area continues for some 15 m to the south of the *rujum*, underneath the topsoil. In the east, the *rujum* is attached to walls of an agricultural terrace. Fifteen squares were excavated, revealing four structural levels



Plan 3. Area F71. Plan and sections (on opposite page).

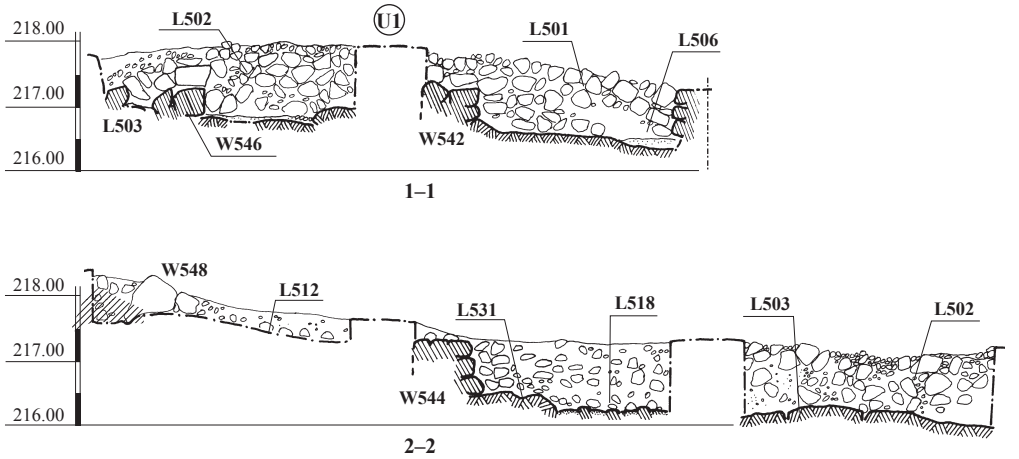


Fig. 11. Area F71. Eastern part of Unit 1, looking northeast.

labeled IV to I, from bottom to top, representing the construction, use and abandonment of the architectural remains (Level IV), the fill of the *rujum* (Level III), the agricultural terrace (Level II) and topsoil (Level I).

Level IV

Level IV constitutes the Intermediate Bronze Age building erected upon bedrock. As in the previous areas, three phases were discerned: construction (Phase IVc), occupation (Phase IVb) and abandonment (Phase IVa). Six architectural units (Units 1–6) can be discerned in Level IV, although the plan of the building is less clear than that in Area F70.

Unit 1 is a broad rectangular room, partially paved on the eastern side (Fig. 11), with cupmarks hewn into the bedrock in the center (Fig. 12). The borders of Unit 2 to the northwest are unclear. A mortar was found within the collapse (Phase IVa) of this room. To the north, Unit 3 is a semicircular compartment containing a mortar alongside a probable pillar base (Fig. 13). Pottery sherds dating to the Intermediate Bronze Age (e.g., Fig. 20:9) were recovered from the fills of the abandonment phase. Unit 4 is an open area to the south, mainly comprising exposed bedrock. Units 5 and 6 are probably rooms divided by narrow walls.

Fig. 12. Area F71. Cupmarks in bedrock in Unit 1, looking west.

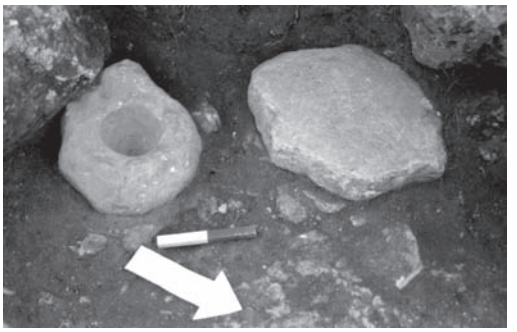


Fig. 13. Area F71. Mortar and probable pillar base in Unit 3, looking southwest.

Fig. 14. Area F82. General view of the *rujum*, looking west.

The walls defining Units 1–4 are built of two rows of stones, in some cases preserved three–four courses high. Wall 544 in Unit 1 (Sq B4) seems to have also served as a supporting wall to level the slope. Floors comprised a thin layer of organic material lying directly upon bedrock. Construction fills were rarely discerned, for example in L531 of Unit 1 (Sq B4; Plan 3: Section 2–2). A few sherds and flint artifacts were retrieved on the floors.

Level III

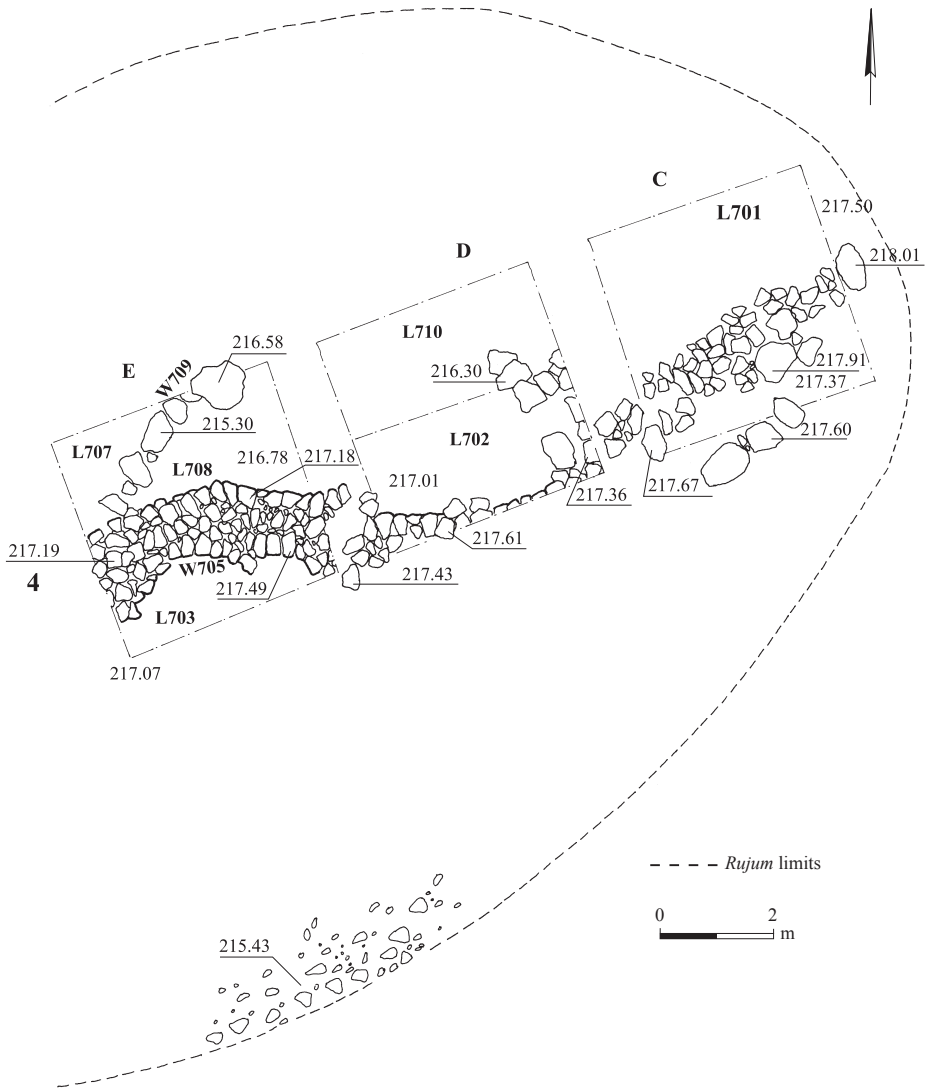
Level III represents the fill of the *rujum*, consisting of stones and dark brown soil above the remains of the Level IV building. On the basis of the pottery and fragments of glass vessels embedded in this fill, which date mainly to the Hellenistic, Byzantine and Ottoman periods, the *rujum* is attributed to the last period.

Level II

Level II comprises the agricultural terraces attached to the heap of stones from the east (W545, W548 and W550; Plan 3; Sqs A4–5). The terrace could also be dated to the Ottoman period based on the pottery from this level.

Level I

Level I represents the modern topsoil covering the heap of stones, and the total



Plan 4. Area F82.

abandonment of the area. As in Area F70, a few Intermediate Bronze Age sherds were found in this level.

Area F82

Area F82 is located c. 30 m north of Area F71, below an elongated ovoid heap of stones (c. 10 × 20 m, c. 1 m high; Fig. 14; Plan 4). A limited excavation carried out in three squares revealed a stratigraphy of four levels, IV–I from bottom to top.

Level IV

A debris layer was uncovered in Sq E4, containing large quantities of restorable vessels dated to the Intermediate Bronze Age: cups, bowls, basins, jars and amphorae (Figs. 15; 17:4; 21:8; 23:2–5). Wall 709 was built of one row of stones, but as excavation did not continue in this area, it cannot be ascertained to what kind of structure it belonged. A pottery dump containing numerous diagnostic Intermediate Bronze Age sherds (L707; see e.g., Figs. 17:4; 21:8; 23:2–5) was related to this wall.

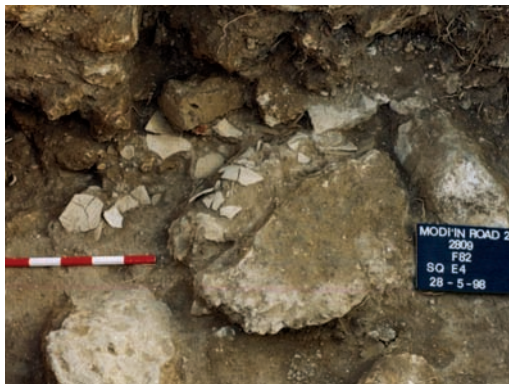


Fig.15. Area F82. Level IV, concentration of pottery sherds in L707.

Level III

Wall 705, oriented west–east, is probably the remains of a fence wall dividing agricultural plots. It was dated to the Byzantine period, according to the pottery found within it.

Level II

Level II is the fill of the *rujum* above the fence wall of Level III and the Level IV Intermediate Bronze Age debris. The suggested dating is the Ottoman period, as in Areas F70 and F71.

Level I

This is modern topsoil.

Area F91/1

This area is located in the southern part of the site, some 90 m southeast of Area F70 and some 25 m north of Area F91. Area F91 was identified in the survey as an agricultural terrace. A trench dug by mechanical equipment did not uncover any traces of ancient occupation. However, half a square, manually excavated in Area F91/1, provided evidence of dumping activities during the Intermediate Bronze Age. Prior to excavation, the topsoil and the fill of the agricultural terraces were removed by a bulldozer (Fig. 16). A thick gray layer (c. 0.4 m) above bedrock contained numerous eroded pottery sherds, a few flint artifacts and one animal bone.

Fig. 16. Area F91/1. General view, looking north.

THE FINDS

Following is a describtion of the finds from the Intermediate Bronze Age occupation at the site. A brief report of the MB II pottery is presented in Appendix I.

Pottery

The Intermediate Bronze Age pottery from Er-Rujum belongs to the Southern Family, as defined by Amiran (1960; 1969), or Family S as it was termed by Dever (1980). Almost all the known types from this family are represented at the site. We follow here the typological and technological studies of Gitin (1975) and London (1985), with some additional interpretations derived from analysis of our assemblage.

The Intermediate Bronze Age pottery assemblages from the occupation levels can be divided into two groups according to state of preservation. The first group includes the well-preserved material from Area F70, of which numerous vessels were completely or partially restored. The state of preservation of the pottery from Area F70/1 resembles that of Area F70; however, the very poor condition of the occupation level precluded any restoration. The second group includes the pottery from Areas F71 and F82, which was extremely eroded and only a few vessels were restorable. The sherds from the latter area appear to have been derived from a pottery dump (see

above). Consequently, most of the examples presented in this discussion originated in Area F70 (Table 1).

In the following section, I have attempted to quantify the number of diagnostic sherds found in Area F70. Unfortunately, time and budget constraints did not allow quantification of each sherd as a fraction of a complete vessel, which would have enabled estimation of the Minimum Number of Individuals (MNI) comprising the pottery repertoire.[4] Rather, our quantitative analysis considers all the diagnostic rim sherds from Area F70, arriving at the Number of Identified Specimens (NISP).

Table 1. Pottery Type Frequencies (NISP) from Area F70, Level III

Units / Types*	1	2	3	4	5	6	7	8	9	10	11	Total	
												N	%**
Cups													
D	4	3					1		1			9	3.8
BS	1			1						1		3	
Beakers													
D	3									2		5	2.1
BS													
Bowls													
D	4	1	4	2	1							12	5.0
BS	1		1									2	
Basins													
D		1									1	2	0.8
BS			1									1	
Store Jars Type 1													
D		16										16	6.7
BS	54	164										218	
Store Jars Types 2, 3													
D	4									2		7	2.9
BS		26								18		44	
Unidentified Store Jars													
D	27	64		7			2	3	3		12	118	49.6
BS	231	564		133	5		51	9	40		76	1109	
Holemouth Jars													
D	8	19	6	2			1			3	1	40	16.8
BS	175	58	183	67	6		19	5	7	10	47	577	
Amphoriskoi													
D	8						1	1				10	4.2
BS											1	1	

* D = Diagnostic; BS = body sherds
** % of total Intermediate Bronze Age diagnostic sherds in the area

Table 1. (cont.)

Types* \ Units	1	2	3	4	5	6	7	8	9	10	11	Total	
												N	%**
Spouted Vessels													
D			1									1	0.4
BS													
Lamps													
D		1										1	0.4
BS	10	6										16	
Handles													
Vestigial Ledges	4	1					1					6	
Lugs	1											1	
Decorated Sherds	15	8		3		1	2			2		31	
Varia													
D	6		6	2	2		5			2		18	7.5
BS	374	150	249	110	53	2	67	15	42	145	68	1275	
Total Diagnostic Sherds	64	105	17	11	3		7	4	4	9	14	238	100.0
Total Sherds	930	1082	451	327	67	3	145	33	93	185	206	3522	

Cups.— The cups are handmade and S-shaped (termed by Gitin, 'cyma-profiled'), with the protuberance of the 's' at mid-point (Fig. 17:1–8; Gitin 1975:55*, Fig. 4:1). They have a flat base, a splayed, tapered rim, some with ribbing below it (Fig. 17:2, 4, 6; cf. Finkelstein 1991: Fig. 14:1; Cohen 1999: Fig. 145:1, 2, 4), and are generally decorated with two or three combed lines and incised horizontal bands (Fig. 17:3, 4, 8). Diagnostic cup sherds represent 3.8% of the assemblage from Area F70.

Beakers.— These handmade beakers (Fig. 17:9–11) are deep and flat-based, with a tapered or flattened rim and ribbing below it (Cohen 1999: Fig. 145:15–17; Milevski 2004: Fig. 7:7). They belong to the subtype labeled by Gitin as beakers with sides curved in the "configuration of a 'bow'" (1975:58*, Fig. 4:22).

Bowls.— Seven types of bowls were defined, all handmade. In most cases, the rim was wheel finished.

Type 1: Slightly carinated bowls with a sharp rim (Fig. 18:1; cf. Gitin 1975: Fig. 3:20, 21).
Type 2: Deep carinated bowls with a tapered rim (Fig. 18:2; cf. Gitin 1975: Fig. 3:18; London 1985: Fig. A.9:11; Cohen 1999: Fig. 146:12).
Type 3: Hemispherical bowls with a gentle carination, the rim either flattened or rounded (Fig. 18:3, 4; similar to Gitin 1975: Fig. 3:19; London 1985: Fig. A.8:5, 6).
Type 4: Hemispherical bowls with a tapered rim (Fig. 18:5; cf. Gitin 1975: Fig. 3:12; London 1985: Fig. A.11:20–22; Milevski 2004: Fig. 7:1).
Type 5: Hemispherical bowls with a ridged shoulder (Fig. 18:6; similar to Gitin 1975: Fig. 3:22; London 1985: Fig. A.11:19).
Type 6: V-shaped bowls with a grooved rim (Fig. 18:7).
Type 7: Bowls with a slight ribbing and a rounded rim (Fig. 18:8; cf. Cohen 1999: Fig. 146:9).

Twelve diagnostic bowl sherds were recovered from Level III of Area F70, most of

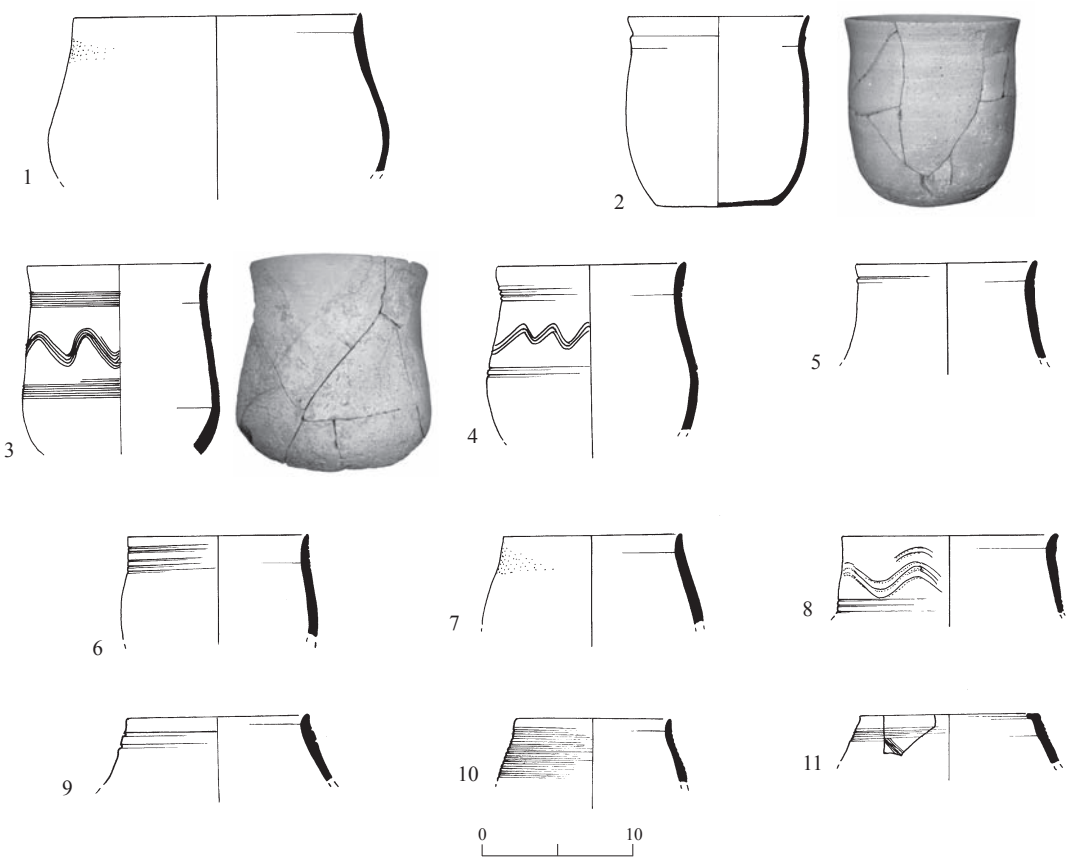


Fig. 17. Intermediate Bronze Age pottery: cups and beakers.

No.	Type	Reg. No.	Area	Locus	Level	Description
1	Cup	2169	F70	359	IIIc	Very pale brown clay (10YR 7/3); light gray core (7.5YR 7/1); gray grits
2	Cup	2217	F70	330	IIIc	Reddish yellow clay (5YR 6/8); pink coat (7.5YR 8/3); light gray core (7.5YR 7/1); gray grits
3	Cup	10007	F70/1	1002	Ia	Reddish yellow clay (7.5YR 7/8); pink coat (7.5YR 8/3); light gray core (7.5YR 7/1); white and gray grits
4	Cup	7027/3	F71	707	IV	Yellow clay (10YR 7/6); light gray core (10YR 7/1); few white grits
5	Cup	2193/1	F70	366	IIIc	Very pale brown clay (10YR 7/3); light gray core (10YR 7/1); few small grits
6	Cup	-	F70	Surface	-	Reddish yellow clay (5YR 7/6); light gray core (5YR 8/2)
7	Cup	1032/2	F70	108	IIc	Light yellowish brown clay (10YR 6/4); pink coat (7.5YR 7/3); light gray core (5YR 8/2); white grits
8	Cup	2031/2	F70	318	IIb	Very pale brown clay (10YR 7/3); light gray core (7.5YR 7/1); white grits
9	Beaker	1020/9	F70	104	IIb	Light, yellowish brown clay (10YR 6/4); dark gray core (10YR 4/1)
10	Beaker	1075/24	F70	107	IIc	Very pale brown clay (10YR 7/3); light gray core (10YR 7/1); small gray grits
11	Beaker	2154	F70	363	IIIc	Pink clay (7.5YR 7/4); light gray core (7.5YR 7/1); gray and white grits

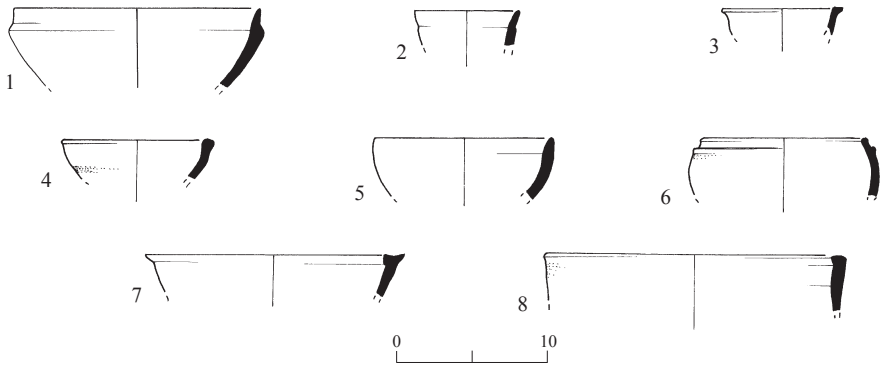


Fig. 18. Intermediate Bronze Age pottery: bowls.

No.	Reg. No.	Area	Locus	Level	Description
1	2100/2	F70	344	-	Pink clay (7.5YR 7/4); light gray core (7.5YR 7/1); white grits
2	5054/3	F71	510	III	Reddish yellow clay (7.5YR 6/6); light gray core (7.5YR 7/1); small gray and white grits
3	5170	F71	534	IV	Light red clay and core (2.5 YR 7/6); gray core (2.5 YR 6/1); few white grits
4	1015/38	F70	107	IIc	Light red clay (2.5 YR 6/6); gray core (2.5 YR 6/1); small white grits
5	2027/10	F70	318	IIb	Very pale brown clay (10YR 7/3); light gray core (10YR 7/1); small white grits
6	1075/23	F70	107	IIc	Very pale brown clay (10YR 7/3); light gray core (10YR 7/1); small gray grits
7	2020/3	F70	314	IIb	Very pale brown clay (10YR 7/3); light gray core (10YR 7/1); small dark red grits
8	2003/28	F70	307	II	Very pale brown clay (10YR 7/3); light gray core (10YR 7/1); small gray grits

Fig. 19 ▸

No.	Reg. No.	Area	Locus	Level	Description
1	7027/1	F82	707	IV	Yellow clay (10YR 7/6); very pale brown coat (10YR7/4); light gray core (10YR 7/1); few white grits
2	2100/44	F70	344	-	Pink clay (7.5 YR 7/4); gray core (5 YR 6/1); few coarse white grits
3	1024/3	F70	109	I, II	Pink clay (7.5 YR 7/3); light gray core (7.5 YR 7/1); red and white grits
4	2050/1	F70	321	IIb	Pink clay (7.5 YR 7/4); light gray core (7.5 YR 7/1); gray and white grits
5	2201/1	F70	367	IIIc	Pink clay (7.5 YR 7/4); light gray core (7.5 YR 7/1); gray and white grits
6	2202/1	F70	346	IIIc	Very pale brown clay (10YR 7/4); gray core (10YR 6/1); dark gray grits
7	1015/7	F70	107	IIc	Pink clay (5 YR 7/4); gray core (5 YR 6/1); few coarse dark gray and white grits
8	5000/5	F71	500	I	
9	2007/9	F70	311	IIb	Pink clay (7.5 YR 7/3); gray core (5 YR 6/1); few white grits

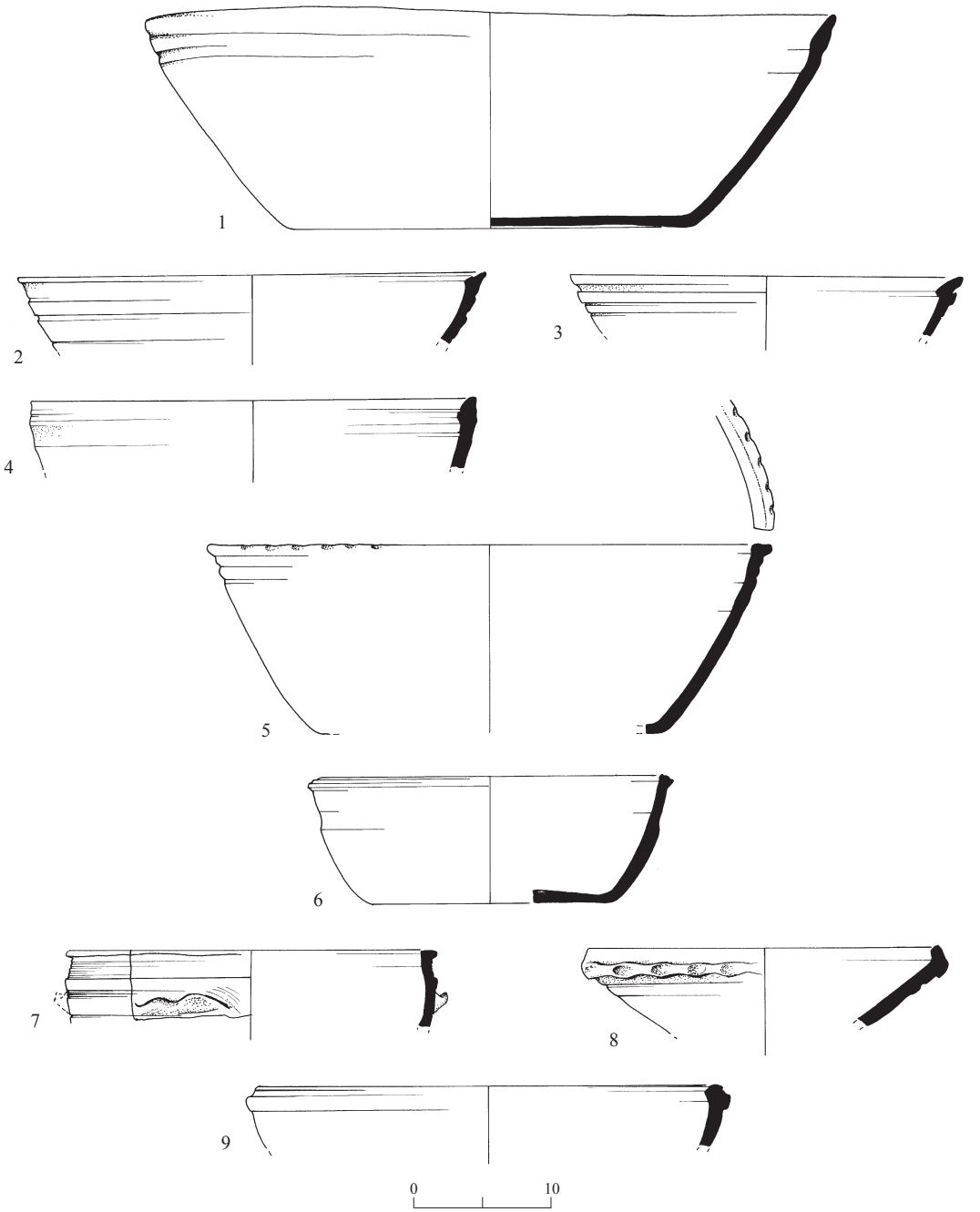


Fig. 19. Intermediate Bronze Age pottery: basins.

them from Units 1, 3 and 4, representing 5% of the total diagnostic Intermediate Bronze Age sherds in this level of Area F70.

Basins.— There are five types of basins, all handmade with a wheel-finished rim.

Type 1: Deep V-shaped basins with straight walls and ribbing below the rim (Fig. 19:1–4). In general, the rims are rounded. Signs of wheel-finishing are rare (cf. Gitin 1975: Fig. 2:14–15; Dever 1981: Fig. 3:1 = London 1985: Fig. A.12:1; Cohen 1999: Fig. 146:17).

Type 2: Same as Type 1, but with a flanged rim decorated with indentations (Fig. 19:5; cf. Cohen 1999: Fig. 146:18).
Type 3: Slightly carinated basins with a grooved or flat everted rim and ribbing below it (Fig. 19:6, 7). These basins are smaller than the V-shaped basins and are sometimes decorated with vestigial ledge handles (cf. Gitin 1975: Fig. 2:13; London 1985: Figs. A.5:5, A.13:2; see Dever 1970 for vestigial handles).
Type 4: V-shaped basins with a strong carination, an inverted rim and a plastic, thumb-indented decoration applied below the rim (Fig. 19:8; cf. Gitin 1975: Fig. 2:16).
Type 5: A round basin with an incurved rim and ribbing below it (Fig. 19:9; cf. Gitin 1975: Fig. 2:11; London 1985: Fig. A.11:24).

It should be noted that only two diagnostic sherds of basins, Fig. 19:5, 6, originated in Level III of Area F70, representing only 0.8% of the diagnostic sherds. The examples in Fig. 19:3, 4, 7, 9 were found in Area F70 Levels I and II, while the examples in Fig. 19:1, 8 are from other areas.

Necked Store Jars.— Three types of necked store jars were found at Er-Rujum, all of them handmade with a wheel-finished neck.
Type 1: Large jars with an elongated, ovoid body, a flat base and a flaring neck with a flanged or rounded rim (Fig. 20:1–8; cf. Gitin 1975: Fig. 1:1–4; Dever 1981: Fig. 3:5; Cohen 1999: Figs. 149:5; 150:11). These jars have vestigial lug handles and are decorated below the neck with punctured patterns or diagonal or horizontal combed bands made with a five-toothed comb. The average height is 69 cm, based on two relatively complete examples and several necks, with a maximum body diameter of 35 cm and a neck 6 cm in height and 12–15 cm in diameter. Store jars of this type contained a volume of c. 21 liters. One sherd with applied rope decoration was found (Fig. 20:9), although it is uncertain if it belonged

Fig. 20 ▸

No.	Type	Reg. No.	Area	Locus	Level	Description
1	Store jar	2215/1	F70	369	IIIc	Reddish yellow clay (5YR 7/6); very pale brown coat (10YR 7/4); gray core (10YR 6/1); small white grits
2	Store jar	2198	F70	367	IIIc	Very pale brown clay (10YR 7/3); gray core (10YR 6/1); white grits
3	Store jar	5166	F71	533	IV	Brownish yellow clay (10YR 6/6); light yellowish brown coat (10YR 6/4); gray core (10YR 6/1); white grits
4	Store jar	2114	F70	348	IIIb	Light red clay (2.5YR 6/8); very pale brown coat (10YR 7/3); gray core (2.5YR 6/1); white grits
5	Store jar	5098	F71	533	IV	Brownish yellow clay (10YR 6/6); light yellowish brown coat (10YR 6/4); gray core (10YR 6/1); white grits
6	Store jar	7011	F71	706	I	Very pale brown clay (10YR 7/4); gray core (10YR 6/1); few gray grits
7	Store jar	2130	F70	360	IIIc	Light gray clay and core (2.5YR 7/2); small, coarse white grits
8	Store jar	5042/1	F71	510	III	Very pale brown (10YR 7/3); light gray core (10YR 7/1); white grits
9	Decorated sherd	5010/3	F71	502	III, IV	Reddish yellow clay (5 YR 6/6); very pale brown coat (10YR 7/3); dark gray core (5YR 4/1); few white grits

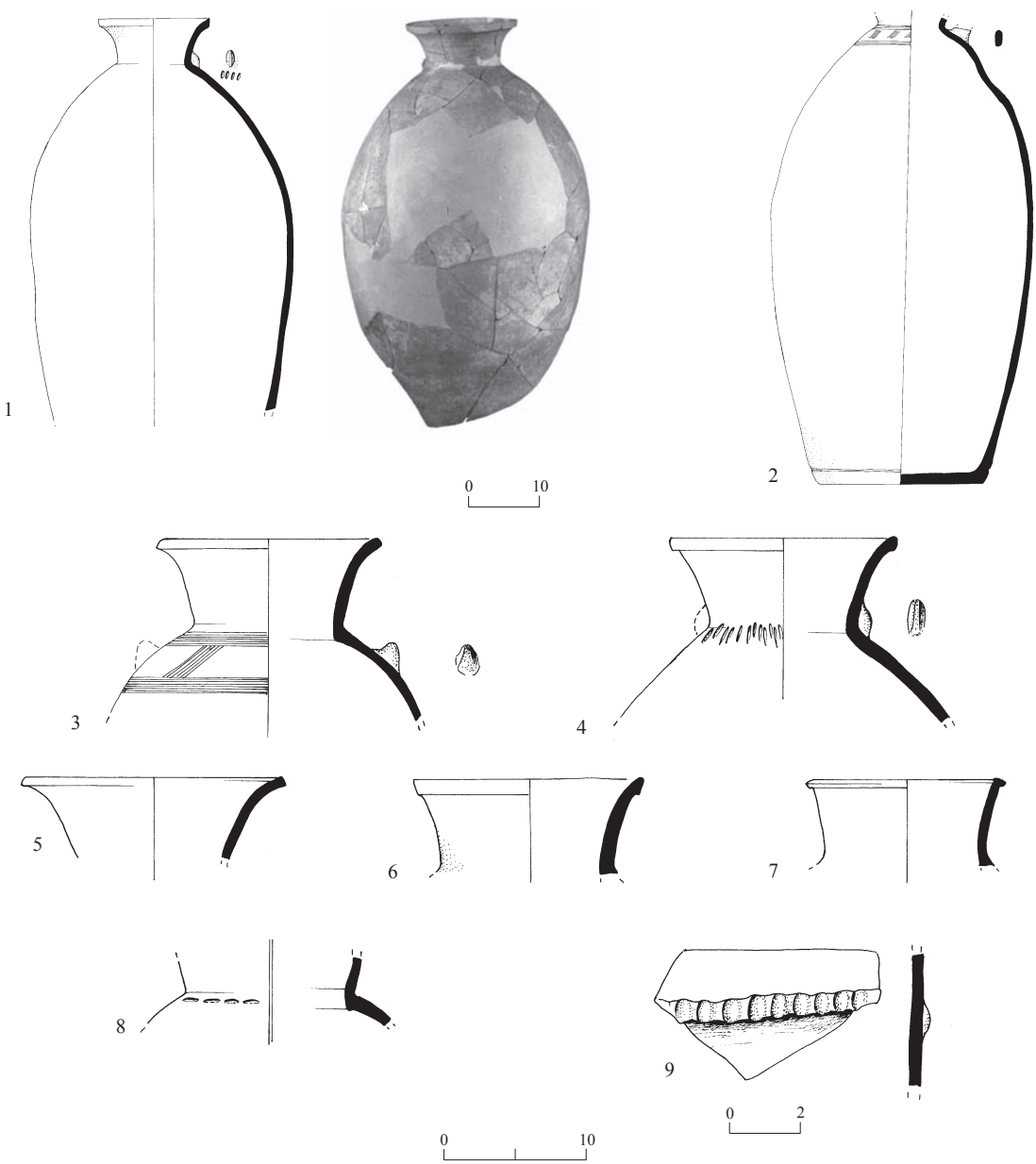


Fig. 20. Intermediate Bronze Age pottery: necked store jars.

to a Type 1 elongated store jar. Similar elongated store jars with rope decoration were encountered in the Negev (Cohen 1999: Fig. 151:6–8).

Type 2: Similar to Type 1, but shorter (Fig. 21:1–12, cf. Dever 1981: Figs. 3:6; 4:5; Cohen 1999: Fig. 150:1), they have an average height of 57 cm, a maximum diameter of 35 cm and a volume of 15–16 liters. The necks are 4–5 cm in height and 12–15 cm in diameter. It should be mentioned that two examples (Fig. 21:7, 12) show a deformation of the rim, probably the

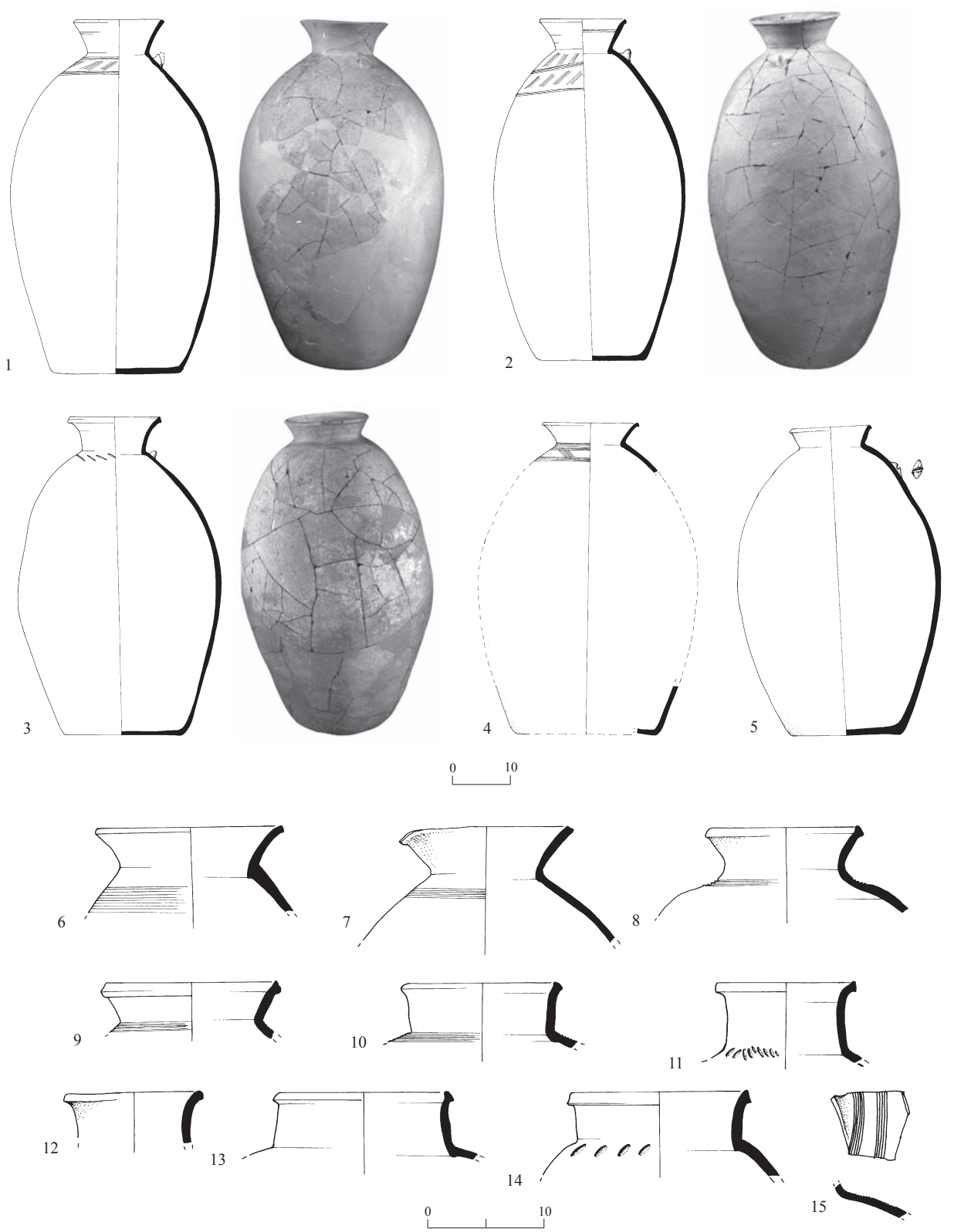


Fig. 21. Intermediate Bronze Age pottery: necked store jars.

◂ **Fig. 21**

No.	Type	Reg. No.	Area	Locus	Level	Description
1	Store jar	2203	F70	367	IIIc	Very pale brown clay (10YR 7/3); gray core (10YR 6/1); white grits
2	Store jar	2213/1	F70	369	IIIc	Very pale brown clay (10YR 7/3); gray core (10YR 6/1); gray grits
3	Store jar	2215/2	F70	369	IIIc	Very pale brown clay (10YR 7/3); light, brownish gray core (10YR 6/2), white grits
4	Store jar	2213/2	F70	369	IIIc	Very pale brown clay and core (10YR7 /3); white grits
5	Store jar	2172	F70	359	IIIc	Reddish yellow clay (5YR 7/6); pink coat (7.5YR 8/3); gray core (5YR 6/1); white grits
6	Store jar	10012	F70/1	1003	Ia	Light gray clay and core (5B 6/1); coat (10YR 7/2); few small white grits
7	Store jar	5185	F71	520	IV	Very pale brown clay (10YR 7/3); light gray core (10YR 7/1); white grits
8	Store jar	7027/4	F82	707	IV	Very pale brown clay (10YR 7/3); light gray core (10YR 7/1); few white grits
9	Store jar	2005/5	F70	307	II	Light gray clay and core (2.5YR 7/2); small white grits
10	Store jar	2003/3	F70	307	II	Yellow clay (10YR 7/8); coat (10YR 7/3); gray core (10YR 6/1); few white grits
11	Store jar	2005/3	F70	307	II	Very pale brown clay and core (10YR 7/3); few red grits
12	Store jar	1041/4	F70	107	II	Reddish-yellow clay and core (7.5YR 7/8), light gray coat (5YR 7/2); small white grits
13	Store jar	2120	F70	346	IIIc	Very pale brown clay (10YR 7/4) and coat (10YR 7/3); gray core (10YR 6/1); white grits
14	Store jar	2045/1	F70	323	II	Pink clay (7.5YR 7/4); very pale brown coat (10YR 7/3); light, brownish gray core (10YR 6/2); few coarse white grits
15	Decorated sherd	2044	F70	316	II	Reddish yellow clay (5YR 7/6); pink coat (7.5YR 8/3); light gray core (7.5YR 7/1); small white grits

result of an accident during the wheel finishing of the neck or the drying of the vessel. Other deformations were noted in vessel Nos. 3 and 5.[5]
Type 3: The sherds in Fig. 21:13–15 represent a slightly different store jar with a broad neck. The body was probably similar in dimensions to Type 2, although this cannot be determined as no restorable vessels were recovered.

It must be stressed that all the restorable necked store jars originated in Area F70, where the largest concentration of jars was found in Unit 2 (Table 1). In Area F70, the NISP for the Type 1 elongated store jars is 16, that for the shorter Types 2–3 store jars is 7. In addition, there are 118 further diagnostic sherds of store jars of unidentified type. All in all, store jars represent c. 58% of the total diagnostic Intermediate Bronze Age sherds in Area F70.

Holemouth Vessels.— Holemouth vessels, completely handmade, are classified into two groups according to their clay components and, consequently, their function: cooking pots and storage jars. Cooking pots have a globular body (Fig. 22:1–6, 8–10) with a variety of rim finishing. Figure 22:7 is a cooking pot that was reshaped into a sort of rounded basin

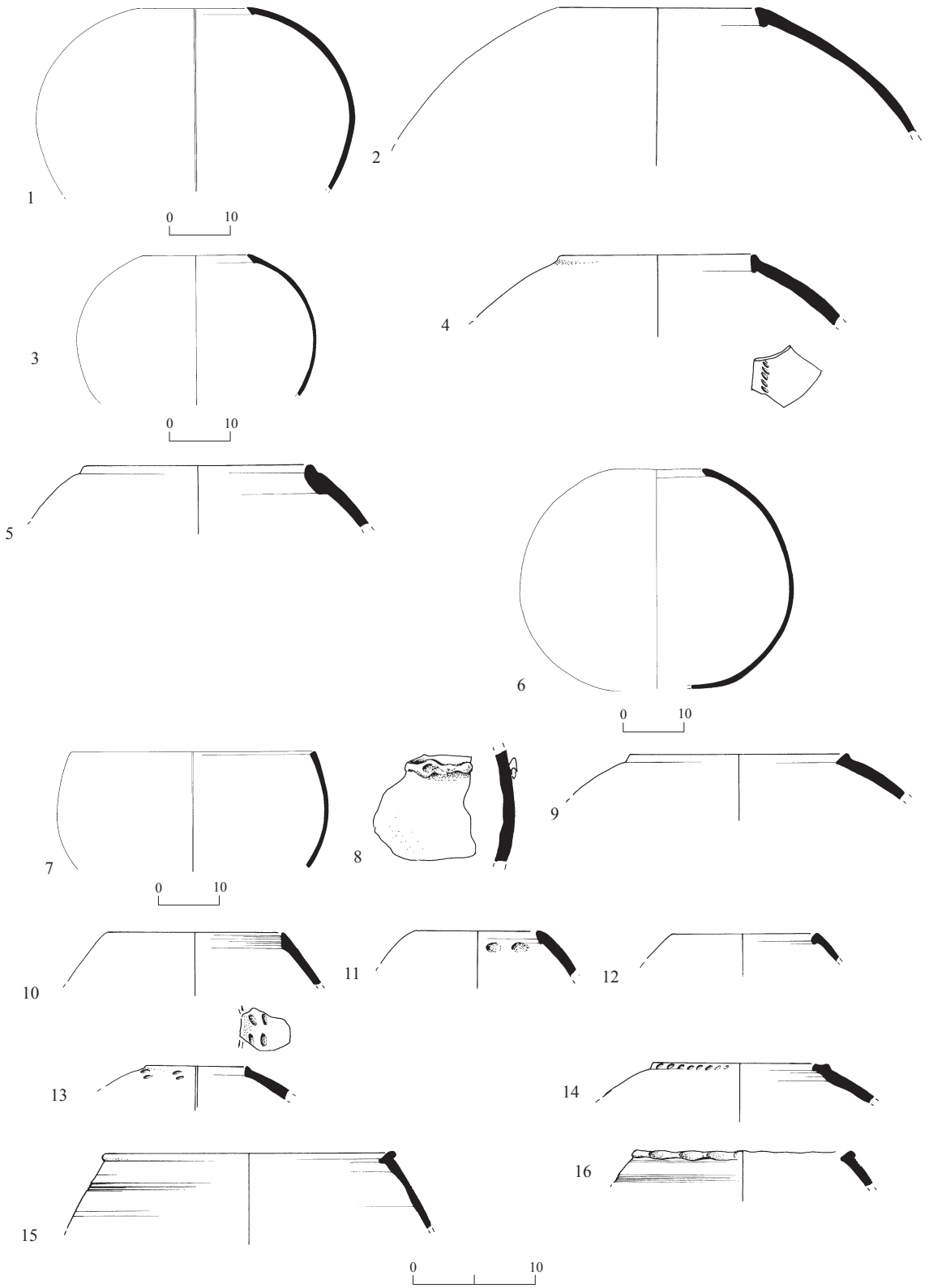


Fig. 22. Intermediate Bronze Age pottery: holemouth vessels.

◂ **Fig. 22**

No.	Reg. No.	Area	Locus	Level	Description
1	2204	F70	346	IIIc	Reddish yellow clay (7.5YR 7/6); light gray core (7.5YR 7/1); coarse, shiny gray grits
2	2211/1	F70	366	IIIc	Pink clay (7.5YR 7/4); gray core (7.5YR 6/1); shiny gray grits
3	2218/1	F70	369	IIIc	Pink clay (7.5YR 7/4); gray core (7.5YR 6/1); coarse gray and white grits
4	2058/9	F70	327	IIIa	Light red clay (2.5YR 6/6); light gray core (2.5YR 7/1); coarse white and gray grits
5	8009	F91	803	-	Pale brown clay (10YR 6/3); grayish brown core (10YR 5/2); few white grits
6	2193/2	F70	366	IIIc	Light red clay (10R 6/6); reddish gray core (10R 6/1); gray and white grits
7	5185	F71	520	IV	Light reddish brown clay (5YR 6/4); gray core (5YR 5/1); coarse gray grits
8	2074/1	F70	334	IIIa	Very pale brown clay (10YR 7/4); gray core (10YR 5/1); coarse white grits
9	1041/1	F70	107	II	Light brown clay (7.5YR 6/3); gray core (7.5YR 5/1); white grits
10	5055/4	F71	508	I	Very pale brown clay (10YR 7/3); gray core (10YR 5/1); white grits
11	2045/5	F70	323	II	Light reddish brown clay and core (2.5YR 6/3); coarse gray, white, red and shiny grits
12	2177	F70	336	IIIa	Light reddish brown clay (5YR 6/4); gray core (5YR 6/1); white and gray grits
13	2186	F70	338	IIIb	Pink clay (7.5YR 7/3); light gray core (7.5YR 7/1); coarse gray grits
14	2072/5	F70	332	-	Pink clay (7.5YR 7/4); light gray core (7.5YR 7/1); coarse white and gray grits
15	2156	F70	362	IIIc	Very pale brown clay (10YR 7/4); gray core (10YR 6/1); few small white grits
16	2011/3	F70	312	II	Pink clay (7.5YR 8/4); light gray core (7.5YR 7/1); few small gray grits

by removing the upper part of the vessel and straightening the new rim (with a knife?). The temper or non-plastic components of the clay consist of rounded limestone, chert, chalk, mollusk fragments, quartz geodes, foraminifers and crushed calcite (see below). One body sherd of a cooking pot bears an applied rope decoration (Fig. 22:8).

The holemouth vessels in Fig. 22:11–16 are assumed to have been utilized for storage, as they contain different temper than the holemouth cooking pots, resembling that of other vessel types (e.g., store jars), mainly limestone and quartz, with some feldspar grains (see below). They are generally half the volume of those used for cooking purposes and show rims decorated by incisions, thumb indentations or rope decoration. Diagnostic holemouth sherds of both types represent c. 17% of all the diagnostic sherds in Level III of Area F70. Interestingly, they are concentrated in the central units (1–3) that comprise the courtyard of the building (Table 1).

Amphoriskoi.— Two types of amphoriskoi were recovered at Er-Rujum, all of them handmade, 13–23 cm high, with a wheel-finished neck.

Fig. 23 ▸

No.	Type	Reg. No.	Area	Locus	Level	Description
1	Amphoriskos	2199	F70	367	IIIc	Very pale brown clay (10YR 8/4); light gray core (10YR 7/1); few coarse white grits
2	Amphoriskos	7027/5	F82	707	IV	Reddish yellow clay (5YR 6/6); gray core (5YR 6/1); white grits
3	Amphoriskos	7027/8	F82	707	IV	Pink clay (7.5YR 7/4); light gray core (7.5YR 7/1); red and white grits
4	Amphoriskos	7027/7	F82	707	IV	Pink clay (7.5YR 7/4); light gray core (7.5YR 7/1); red and white grits
5	Amphoriskos	7027/6	F82	707	IV	Reddish yellow clay (7.5YR 7/6); light gray core (7.5YR 7/1); small white grits
6	Amphoriskos	1015/17	F70	107	II	Brownish yellow clay (10YR 6/8); very pale brown coat (10YR 7/3); gray core 10YR 6/1); small white grits
7	Small jar	-	F70	-	-	Very pale brown clay (10YR 7/4); gray core (10YR 5/1); white and gray grits
8	Small jar	2033/13	F70	321	II	Very pale brown clay (10YR 8/2); light gray core (10YR 7/1); white grits
9	Spouted amphoriskos	5182	F71	551	IV	Pale yellow clay and core (5Y 7/3); white and gray grits
10	Spouted small jar	2209	F70	347	IIIc	Very pale brown clay (10YR 7/4); light gray core (10YR 7/1); few coarse white grits
11	Spout	10034	F70/1	1011	I?	Pink clay (7.5YR 7/4); brown core (7.5YR 5/2); red, white and brown grits
12	Spout	8003/4	F91	801	-	Yellow clay (10YR 7/6); gray core (10YR 6/1); small white grits
13	Spout	2040/13	F70	314	II	Pink clay (7.5YR 8/3); gray core (7.5YR 6/1); coarse white and gray grits
14	Handle	2159	F70	366	IIIc	Light red clay (10R 6/6); very pale brown coat (10YR 7/3); gray core (10YR 6/1); white grits
15	Handle	5055/2	F71	508	I	Reddish yellow clay (5YR 7/6); very pale brown coat (10YR 8/4); gray core (10YR 6/1); white grits

Type 1: This type is a medium-sized, oval-shaped amphoriskos, with a flat base, a narrow flared neck and two lug handles at the juncture of the neck and body (Fig. 23:1; cf. Dever 1981: Fig. 4:6).

Type 2: This type of bag-shaped amphoriskos has a flared neck, a pointed rim and two lug handles at the juncture of the neck and body (Fig. 23:2–6). Decorative motifs are often applied at the joint between the neck and body in the form of punctures, and on the shoulder in the form of horizontal combing (with three-, five- and six-toothed combs; cf. Kenyon 1960: Figs. 81:4; 86:7, 8; 98:8; 103:4; 110:1; Dever 1981: Fig. 4:3). Sherds of this type were found in relatively large quantities in the pottery dump of Area F82 (L707).

In Area F70, only 13 diagnostic amphoriskos sherds were found, encountered mainly in Unit 1, comprising c. 4% of the total Intermediate Bronze Age diagnostic sherds in Level III of this area (Table 1).

Small Jars.— Two sherds from Area F70 indicate the presence of small jars: a small vessel with a straight neck and a rounded rim

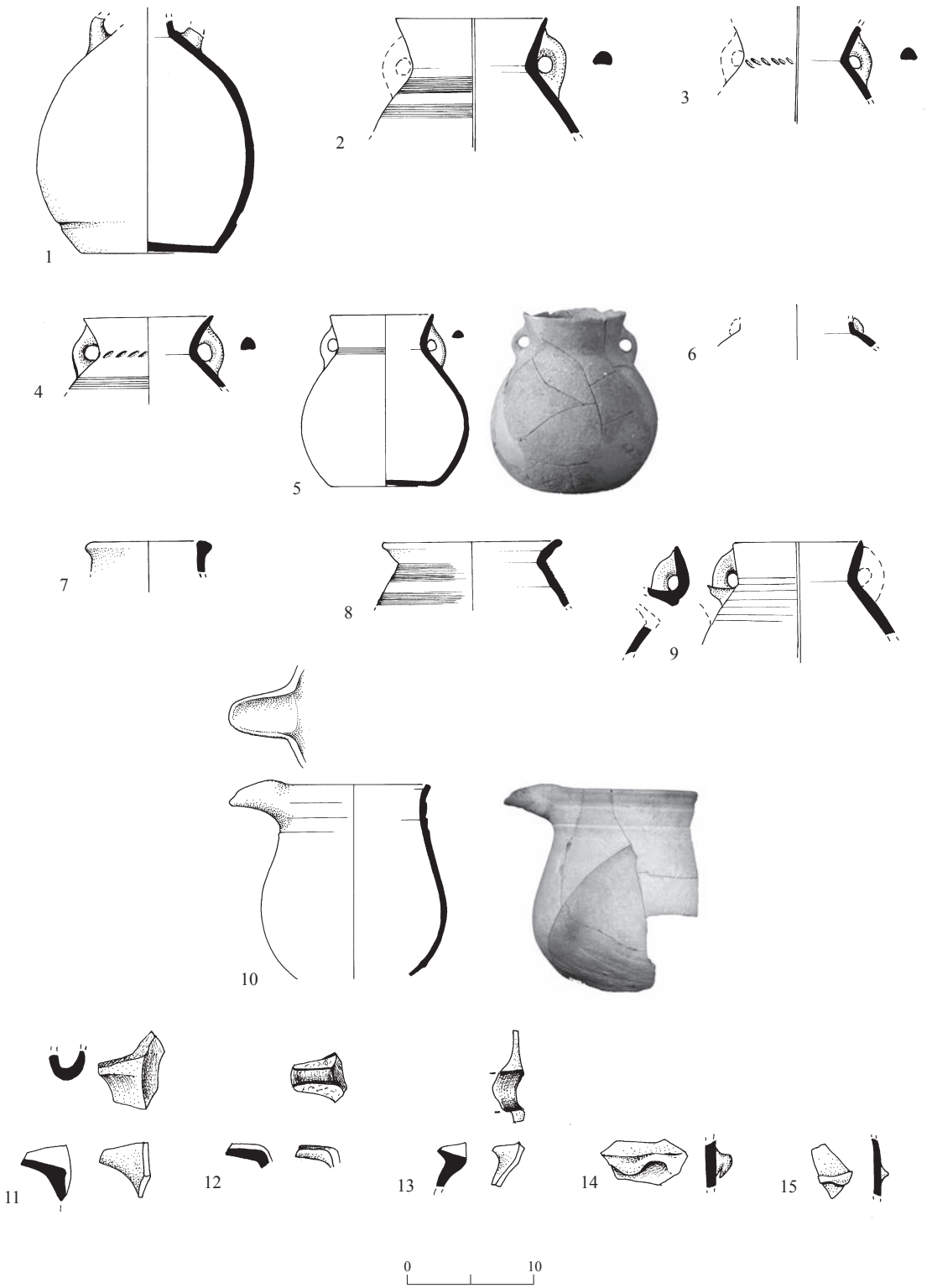


Fig. 23. Intermediate Bronze Age pottery: amphoriskoi, small jars, spouted vessels and handles.

(Fig. 23:7), and another with a low flaring neck (c. 2 cm in height), decorated with two bands of horizontal combing (Fig. 23:8; cf. Kenyon 1960: Figs. 98:9; 106:1). Unfortunately, neither is complete nor restorable, and both were found out of stratified context.

Spouted Vessels.— Two types of spouted vessels appear at Er-Rujum; however, only one sherd was recovered in Area F70.
Type 1: Spouted amphoriskoi (Fig. 23:9) represent a typical northern type that rarely appears in the south (Dever 1972:101–102, Fig. 2:6).
Type 2: An almost complete example of a small spouted jar was found in Area F70, with an ovoid body, a flaring rim and ribbing below it (Fig. 23:10). Several open spouts (Fig. 23:11–13) seem to belong to similar vessels (cf. Gitin 1975: Fig. 2:17).

Lamps.— Several fragments of lamps, characteristic of the Intermediate Bronze Age, were found in Area F70, only one of which is a diagnostic rim (not illustrated).

Vestigial Ledge Handles.— Several vestigial ledge handles were retrieved (Fig. 23:14, 15), which could not be related to any specific vessel type. The handle in Fig. 23:14 may belong to a small jar, while the example in Fig. 23:15 is similar to that in Fig. 19:7, and thus may be attributed to a basin.

Production Technology
Elisheva Kamaisky

Analysis of the Er-Rujum assemblage suggests the following steps in the ceramic production:

1. *Preparation of the Clay*: The raw material used for the pottery at Er-Rujum was first cleaned of stones, lumps and air bubbles, to achieve a relatively homogeneous mixture. The clay mixture used for making jars and bowls contained a considerable amount of non-clay particles of various sizes and colors. It cannot be ascertained whether these particles occurred naturally or were intentionally included by the potter.

The clay mixture used for making holemouth vessels is notably different, containing large, non-clay particles in larger quantities than in other vessel types. This gives the vessel greater strength and durability to withstand stress caused by rapid heating and cooling during the cooking process.

2. *Construction of the Vessel Base*: The bases of the earthenware vessels from Er-Rujum, both open and closed forms (excluding holemouth vessels), are flat, wide and thin, mostly c. 0.5 cm thick. No evidence was found for the use of coils; therefore, it is assumed that the bases were made by pressing a lump of clay between the hands until a slab of the desired size and thickness was obtained. The slab was then placed on a slow wheel (see below) for further processing. As neither imprints of mats nor leaves were discerned on the bases, it may be concluded that these were not used to prevent excessive adhesion to the work surface. However, the exterior of most bases, when examined closely, proved to be rougher than the walls and replete with hundreds of closely packed, minute indentations (Fig. 24). This may have been caused by sand or other similar particles placed on the wheel to prevent adhesion (e.g., London 1985:157), which is often the cause of damage when a vessel is detached from the surface.

Although no complete example of a cooking pot was found, it is clear that their bases were rounded. As it is very difficult to construct globular shapes, especially when vessel walls are as thin as those of the Er-Rujum cooking pots, the potters needed something to support the still-wet vessels. Therefore, it seems that the bases of these pots were constructed in molds in which several slabs of clay were pressed together. The upper portions of the vessels were then added by coiling.

Fig. 24. Indentations on a jar base (see Fig. 21:5).

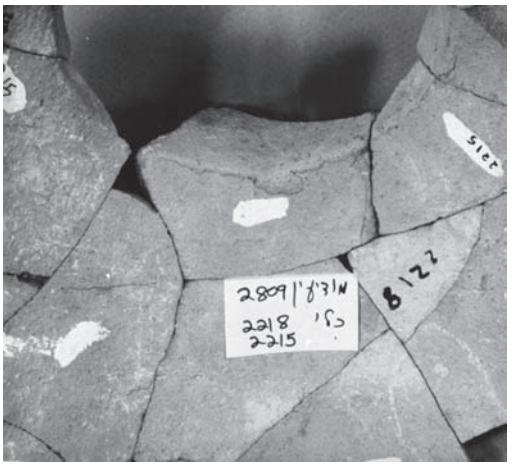


Fig. 26. Excess clay at juncture of neck and shoulder (see Fig. 20:1).

Fig. 25. Inner wall of a jar: diagonal and downward hand pressure to bond coils (see Fig. 20:2).

3. *Construction of the Body of the Vessel*: After completing the base, the potter would construct the body of the vessel, and finally, the neck and rim. All vessel bodies, both closed and open, were made by coiling (Hamer and Hamer 1986:69–70; Rice 1987:127–128) on a slow potter's wheel that doubled as a worktable. Thus, the potter turned the wheel in a slow fashion to match the pace at which the coils were added.

On the inner wall of a jar (Fig. 25), two methods of joining the coils can be detected. In the lower third of the body are signs of diagonal hand pressure applied upward, probably to ensure that the coils were well bonded. In the upper part of the same vessel, the coils were joined by vertical, downward hand pressure around the entire circumference of the jar. In closed vessels, coiling was used up to the top of the shoulder. A thick coil was then added to create the neck and rim. As the wheel was turned rapidly, the coil was pressed downward to join it to the body, then raised by pressing it between the fingers to form the neck and rim. This method is evident on the inner walls of some vessels, in the form of excess clay at the juncture of the neck and shoulder (Fig. 26; see London 1985:149–151).

The coiling method used in the manufacturing process can be detected in the many bulges and depressions on the inside walls of the vessels. The author of this section experimented with constructing a large amphoriskos by coiling (Fig. 27). After placing the base on a wheel, the body was built with coils and the neck and rim were formed directly on the vessel, as it was revolving rapidly. The results of this experiment produced a vessel that closely resembles the

Fig. 27. Joining the coils by the author.

Fig. 28. The author joining coils to shoulder and pulling up neck and rim while wheel is turning rapidly.

store jars from Er-Rujum, albeit considerably smaller (Figs. 28, 29).

The open vessels from Er-Rujum—cups, bowls and basins—have flat bases and usually flaring walls, some with upright or hemispherical walls. The walls were joined to the bases at sharp angles. Rims were shaped by means of a quick turn of the wheel with fingers pressing on the last coil to obtain a smooth, uniform rim.

4. *Drying to a 'Leather-Hard' State*: 'Leather hard' is a state in which clay is rigid and no longer plastic, but not completely dried out (Rice 1987:64–65). After the vessel has been formed, it is put aside until it becomes 'leather hard'. Care is taken by the potter not to allow the vessel to become too dry.

5. *The Texture of the External Surface*: Once the vessel is 'leather hard', the outer wall is smoothed with a piece of hide or cloth, or with the fingers, to remove excess material and achieve an even and uniform surface. This same smoothing also ensures that the coils are well-joined.

The walls of all the examined vessels have a smooth finish that has erased all external signs of manufacture. However, inside the closed vessels, the potter's finger marks and the bulges and depressions characteristic of coiling

Fig. 29. Interior view of the vessel made by the author, showing traces of different building techniques.

Fig. 30. Detail of jar (see Fig. 20:1).

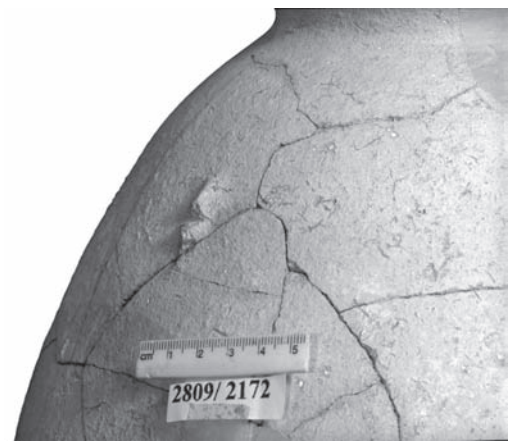


Fig. 31. Detail of pierced jar (see Fig. 21:5).

are clearly visible. An attempt to determine whether or not some vessels were made by a single potter, by means of comparing finger imprints, failed due to the poor state of the marks, which were too worn to allow sufficient comparison.

6. *Decorating the Vessel*: Pottery vessels in this assemblage were decorated with either raised, plastic applications or incisions. Four jars are decorated with a single knob, each located on the shoulder, about 1.5 cm below the neck. These knobs are conical (see Fig. 21:2) or, in one instance, in the form of a small lug without a hole (Fig. 30), below which are four short, incised vertical lines. The function of the knobs is unclear, as no rope can be attached to them. They could have been used for various uses, such as to support a tool or lid, or they may have been some form of identification, either of the potter or of the contents of the jar. Another jar had a tiny (1.5 cm long), pierced, vertical handle on the shoulder, approximately 5 cm below the neck (Fig. 31), which could have been functional—perhaps a thread was pulled through it to hold a lid in place. As the other side of the vessel is missing, we do not know if there was a second handle. Two jars and several of the amphoriskoi bear pairs of vertical lug handles. It should be noted that no ledge handles appear in this assemblage.

Decorating by incision was carried out with the aid of a three- to six-toothed instrument during the leather-hard stage. Several jars at the site are decorated on the shoulder with a pattern of two parallel horizontal combed lines, between which are short diagonal comb marks from top right to bottom left (Figs. 20:2, 3; 21:1, 2, 4). One of the vessels has an additional diagonal combing above the upper horizontal line (Fig. 21:2). Several jars are decorated with a row of short (c. 1 cm) vertical, horizontal or diagonal lines surrounding the shoulder below the neckline (e.g., Figs. 20:4, 8; 21:3, 11, 14).

It would appear that the incisions were made after the projections were attached to the vessel, as the comb marks stop near the projections. Occasionally, the decoration is discontinuous due to the cessation of the wheel's movement in the midst of the combing. This caused a break in the pattern, although the potter started turning the wheel again without lifting the comb.

7. *Final Drying*: During this stage, all the water added during the manufacturing process must be allowed to evaporate, leaving a completely dry vessel. The non-plastic components of the clay aid this process by leaving air passages that permit the water molecules to escape. Slow drying, which enables all segments of

the vessel to dry at an equal rate, is important for the prevention of cracking. This is a particularly delicate stage for the base, which is usually relatively large and thin. Thus, some vessels (especially large jars) may be laid on their sides so that the base can dry at the same rate as the walls of the vessel. In fact, some jars have flattened segments of walls that may be the result of having been laid on their sides to dry. Open vessels were placed on their rims to enable their bases to dry at the same rate as the walls. Only after a vessel was completely dry was it ready for firing. This stage can take days or even weeks, depending on the thickness of the vessel walls and the climate (Freestone and Gaimster 1997:14).

8. *Firing*: Vessels were presumably fired in groups, either in a pit or in a built kiln. All the vessels were uniformly fired through, with no black cores. However, the colors of the wares range from buff to orange, suggesting differences in firing conditions (i.e., location in kiln, temperature and duration of heating), or, equally, they could be indicative of slightly dissimilar clay compositions. Fire clouding was observed on four jars, which may be the result of proximity to an open flame, or touching another vessel. In summary, it would appear that the Intermediate Bronze Age potters were skilled in controlling the firing process.

A Comment Concerning Vessel Morphology: Jar shapes resemble a topped and tailed egg, a shape that lends the vessel strength to resist pressure from within and blows from without, without breaking. The weak point is the angular juncture between the neck and body, which has a tendency to break.

Cooking pots were probably designed to permit the uniform dispersion of heat during cooking. This shape is also relatively resistant to breakage as the energy of a blow is distributed throughout the vessel's surface.

Petrographic Analysis

Anat Cohen-Weinberger

Thirteen vessels of the Intermediate Bronze Age pottery assemblage from Er-Rujum were examined petrographically (Table 2). Petrographic examination of the thin sections under a polarizing microscope enabled identification of the minerals and rocks included in the clay, as well as the composition of the matrix. Identification of these components can

Table 2. The Analyzed Pottery Vessels

Basket	Type	Area	Locus	Level	Petrographic Group	Figure
2172	Store jar	F70	359	IIIc	1	21:5
2193/2	Holemouth	F70	366	IIIc	1	22:6
2198	Store jar	F70	367	IIIc	1	20:2
2199	Amphoriskos	F70	367	IIIc	2	23:1
2201/1	Basin	F70	367	IIIc	1	19:6
2202/1	Basin	F70	346	IIIc	1	19:5
2202/2	Cup	F70	346	IIIc	1	-
2209	Cup	F70	347	IIIc	1	-
2211/1	Holemouth	F70	366	IIIc	1	22:2
2213/2	Store jar	F70	369	IIIc	1	21:4
2215/1	Store jar	F70	369	IIIc	1	20:1
2218/1	Holemouth	F70	369	IIIc	1	22:3
7027/1	Basin	F82	707	IV	1	19:1

indicate the geographic region in which the source materials (i.e., geological formations and/or soils) are located. This study (updated to 2001) addresses questions regarding the provenance of the pottery assemblage. The analyzed vessels were arranged in petrographic groups according to the characteristics of the raw materials, and the provenance of these groups was determined according to their lithological 'fingerprints'.

For the present analysis, it was important to assess the geological setting of the excavated site. The site is located on the western slopes of the Ramallah Anticline, on chalk and chert outcroppings of the Menuḥa and Meshash formations surrounding the modern town of Modi'in. The region immediately to the north of the site is characterized by carbonatic rocks of the Turonian Bi'na Formation. There are no exposures of clayey formations suitable for pottery production within a radius of c. 6 km from the site. Further eastward, the Cenomanian Moẓa Formation is exposed (Sneh, Bartov and Rosensaft 1998). This formation is the most common raw material of the ceramic assemblages from the Central Hill Country and is exposed over vast areas on the Judea–Samaria anticlines (e.g., Goren 1996:51). At approximately the same distance to the south of the site, marl of the Paleocene Taqiye Formation is exposed, which was widely used for pottery production in southern Israel during ancient times (Goren 1996:53). Two petrographic groups were defined in the assemblage of Er-Rujum.

Group 1.— This group is characterized by a calcareous marl with some foraminifera and silty grains of mainly quartz and, rarely, other minerals such as mica and hornblende. In several vessels, the clay exhibits optic orientation and contains up to 30% non-plastic components. The non-plastic components consist mainly of rounded limestone, as well as chert, chalk, mollusk fragments, quartz geodes and foraminifera. Crushed calcite was added to two holemouth vessels (Fig. 22:2, 3). The marl of this group could be of the Taqiye Formation; however, for certain identification of this marl, further research of the microfossils is required. The non-plastic assemblage indicates that a local origin for the analyzed vessels cannot be ruled out. All the examined vessels, except one, are related to this group, exhibiting homogenous petrographic properties.

Group 2.— The matrix of this group is carbonatic, highly fired, rich in silty grains of mainly quartz and, rarely, other minerals such as mica and hornblende. The non-plastic components comprise about 30% of the paste and consist mainly of limestone and quartz, with some feldspar grains. The clay is unidentified, while the non-plastic components suggest a coastal origin. Only one amphoriskos (Fig. 23:1) is related to this group.

A Concluding Note on the Intermediate Bronze Age Pottery

The uniformity of the ceramic finds, as well as the technical analyses (see Kamaisky, above; Cohen-Weinberger, above), lead to the conclusion that the potters were highly skilled in all stages of production. Thus, it is clear that this was an industry with well-established traditions, practiced by professional potters—whether full-time or part-time, with a level of specialization beyond the domestic mode (e.g., Rice 1987:184). It seems that the assemblage derived from a local production center that catered to the needs of the surrounding population.

The Flint Assemblage
Hamoudi Khalaily

The technology and typology of the flint industry of the final stage of the Early Bronze Age (EB IV or Intermediate Bronze Age), is not well known. Only a few assemblages accredited

Table 3. The Flint Assemblage

Type \ Area	F70		F71		F82	
	N	%	N	%	N	%
Primary elements	75	18.4	234	34.8	16	23.9
Flakes	298	73.2	397	59.1	49	73.1
Blades	26	6.4	31	4.6	2	3.0
Bladelets	-	-	-		-	
CTEs	8	2.0	10	1.5	-	
Total Debitage	*407*	*100.0*	*672*	*100.0*	*67*	*100.0*
Chunks	706	86.3	1326	85.6	261	94.2
Chips	112	13.7	223	14.4	16	5.8
Total Debris	*818*	*100.0*	*1549*	*100.0*	*277*	*100.0*
Debitage	407	30.6	672	28.1	67	18.6
Debris	818	61.5	1549	64.8	277	76.9
Cores	44	3.3	84	3.5	7	2.0
Choppers	3	0.2	-	-	-	-
Tools	59	4.4	91	3.6	11	2.5
Total	*1331*	*100.0*	*2392*	*100.0*	*360*	*100.0*

to this period have been published, such as Jebel Qa'aqir (Dever 1970), Tell Iktanu (McCartney 1996), Bab edh-Dhra' (McConaughy 2003), Jericho (Crowfoot Payne 1983), Sha'ar Ha-Golan (Rosen 1983a) and the Central Negev sites (Cohen 1999:265–266). At some of these sites, a high degree of mixture between layers is common, especially where flint artifacts are concerned (Rosen 1997).

Generally, flint assemblages of this period show a marked continuity in technology with earlier assemblages and are thus considered a component of the Early Bronze Age lithic system (Rosen 1997). The nature of this continuity, however, is a matter of controversy. The post-EB technologies are completely different from the earlier Canaanean technologies for blade manufacture (Rosen 1983b; 1983a; Bankirer and Marder 2007:694), demonstrating a shift toward the production of large geometric sickle blades. In light of the present state of research, the flint assemblage from Er-Rujum had the potential to provide a clean assemblage from an EB IV/Intermediate Bronze Age occupation. Unfortunately, the nature of the excavation and its limited extent prevented a sufficiently detailed analysis.

During the processing of the flint assemblage, it became clear that there are only minor technological differences between the excavated areas, therefore the flint artifacts are presented as one assemblage. The waste frequencies are presented according to areas (Table 3).[6]

Raw Material

Most of the artifacts were produced from opaque, brecciated flint, ranging in color from brown to dark gray and containing white inclusions, a raw material probably of Senonian origin (Meshash Formation). The source may have been a north–south outcrop located at a maximum distance of 2 km from the site, south of the Turonian Formation (Picard and Golani 1975; Marder, Braun and Milevski 1995:65).

The Canaanean blades, however, were made on high-quality Eocene flint, brown to dark brown in color. Based on the type of raw material, and the absence of any Canaanean debitage at the site, we can assume that these

artifacts were imported to the site from one of the Eocene outcrops, the nearest being in the area of Tel Gezer. In the excavations at Tel Gezer, abundant Canaanean blades and a pyramidal core for the manufacture of Canaanean blades were recovered in the Early Bronze Age strata (Macalister 1912:126, Fig. 300; Rosen 1983a:23–24), and it has been suggested elsewhere (Milevski 2005:115) that during this period the site functioned as a production center for these blades.

Debris and Debitage

Due to the fact that the site is situated in the immediate vicinity of the raw material sources, and that some of the stone fills of the *rujum*s contained flints, the presence of chunks is high. The majority are natural chunks that were collected during agricultural activities, while a small number show intentional breakage that indicates the use of these pieces. As in the preceding Early Bronze Age industries, the flint assemblage is characterized by a high frequency of flakes (Table 3). Blades, however, are present in a smaller number, most of them Canaanean blades. The low frequency of blades is also reflected in the cores, where the vast majority are flake cores.

The most common core types are amorphous (Fig. 32:3), comprising 48% of the core assemblage, and cores with one striking platform (Fig. 32:1), comprising 18.5% of the cores (Table 4). Amorphous cores produced 6–20 flakes per core, and 68% of them bear cortex.

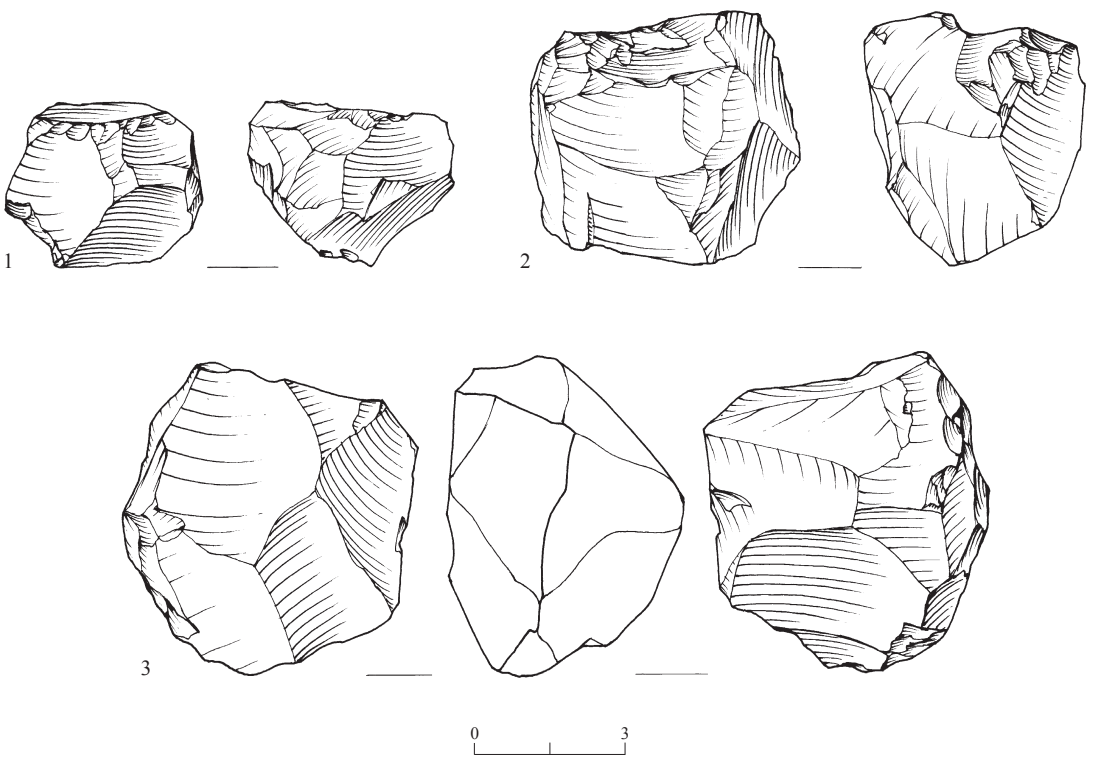


Fig. 32. Cores from Area F70.

No.	Description	Basket	Locus	Level
1	Single-platform core	2027	318	IIb
2	Two-platform core	2196	347	IIIc
3	Amorphous core	1005	106	IIc

Table 4. Core Frequencies

Type	N	%
One striking platform	25	18.5
Two striking platforms	13	9.6
More than two striking platforms	9	6.7
Fragments	16	11.9
Amorphous	65	48.1
Discoidal	4	3.0
On flake	3	2.2
Total	*135*	*100.0*

Table 5. Tool Frequencies

Type	N	%
Chalcolithic sickles and backed blades	2	1.2
Canaanean sickle blades	8	5.0
Canaanean retouched blades	4	2.5
Other sickle blades	2	1.2
Bifacials	2	1.2
Ad-Hoc Tools		
Notches and denticulates	62	38.5
Scrapers	23	14.3
Perforators	18	11.2
Burins	2	1.2
Retouched flakes	22	13.7
Retouched blades and bladelets	13	8.1
Varia	3	1.9
Total	*161*	*100.0*

Of the single-platform cores, 87% bear cortex and they produced an average of 3–6 flakes per core. Two-platform cores comprise c. 10% of all the cores, and each display 3–7 flake scars (Fig. 32:2). Discoidal cores (3% of assemblage) produced 7–14 flakes. It is worth mentioning that c. 5% of the cores exhibit signs of burning. Canaanean cores were completely absent.

Tools

A total of 161 tools were retrieved at the site. The majority are ad hoc, comprising 89% of the total tool assemblage (Table 5). A number of earlier intrusive elements were discerned, e.g., two Chalcolithic sickle blades and two bifacials. Although Canaanean sickle blades comprise a relatively modest percentage, they are important for understanding the chronology of the tool assemblage. Three choppers were retrieved, one made on a river cobble, the other two on flint nodules. All have one working edge.

Fig. 33 ▸

No.	Basket	Locus	Level
1	2030	319	I, II
2	2053	325	IIc
3	1011	106	IIc
4	2062	324	IIIb

Canaanean Sickle Blades.— Canaanean sickle blades comprise the most common formal tools in the EB IV/Intermediate Bronze Age assemblages (Figs. 33–35). The presence of sickle gloss on the working edges reflects their function in harvesting grains, such as barley or wheat (Rosen 1989). All items lack cortex on their surfaces, indicating that primary blades were never used as sickles.

Approximately 70% of the sickle blades are broken at both ends, almost 24% are broken at one end (distal/proximal) (Fig. 33:2–4), and only 6% are complete. Due to this small number, no length comparisons could be conducted. Among the Canaanean sickles, three are backed (e.g., Fig. 33:1). The working edges are usually retouched with fine, regular or irregular denticulation, less commonly by abrupt/semi-abrupt retouch. Retouch appears more often on the dorsal surface, although 30–40% of the sickles show retouch on both surfaces (e.g., Fig. 33:3).

The four complete sickle blades, measuring 9–15 cm long and 3–5 cm wide (e.g., Fig. 35), have facetted platforms and a pronounced bulb of percussion that exhibits small removals, possibly the result of direct percussion or an attempt to thin the bulb. This group has the same attributes as the retouched Canaanean

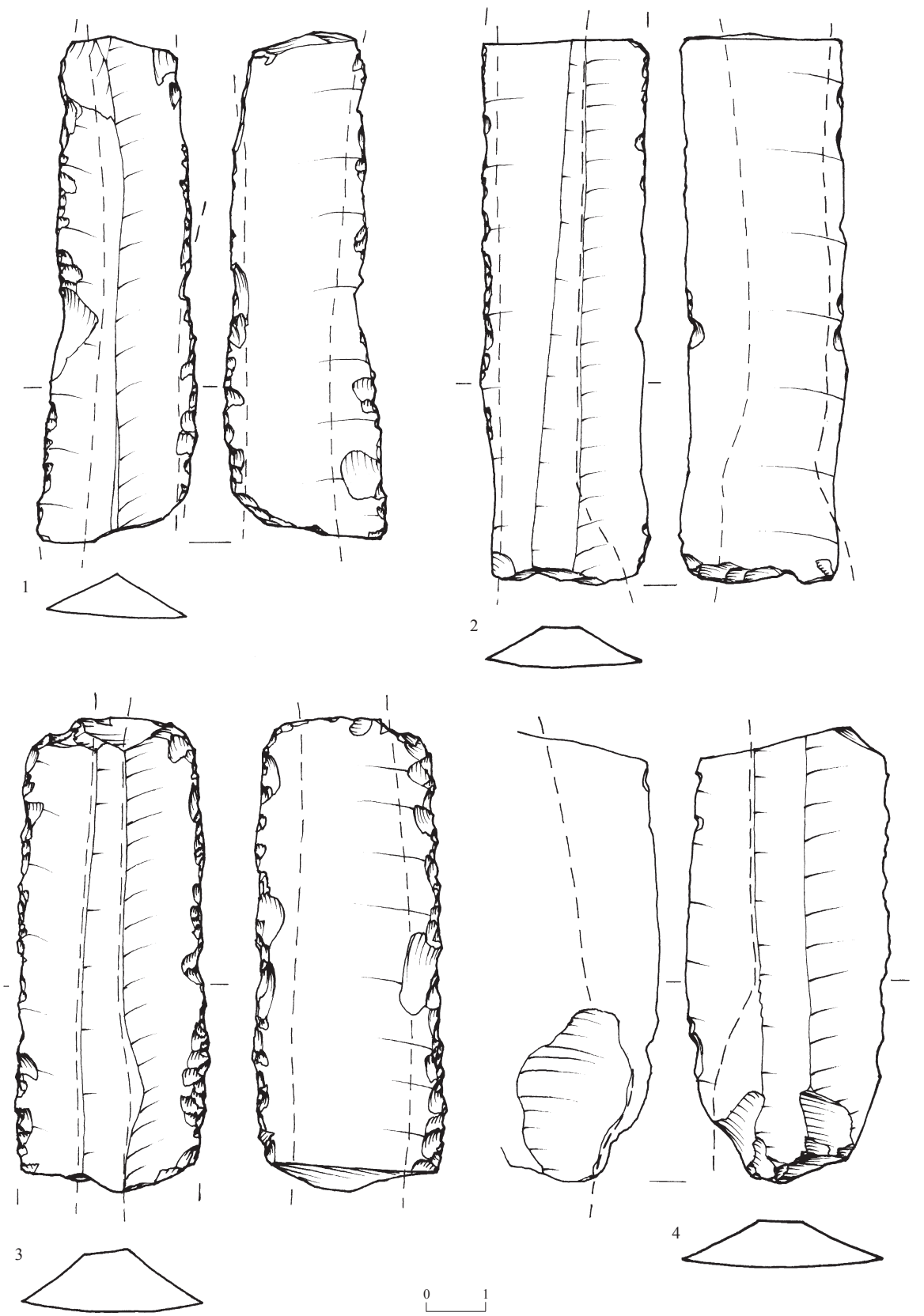


Fig. 33. Canaanean sickle blades from Area F70.

blades described below and apparently were used as reaping knifes (Rosen 1989).

Some of the Canaanean sickles were reused, mostly as burins, notches, endscrapers or retouched blades on one or both edges. It is uncertain whether these tools were modified after their primary function as sickle blades, or while the sickle was in the haft. It is clear, however, that the later retouch removed part of the gloss.

Canaanean Retouched Blades.— Four Canaanean retouched blades at Er-Rujum resemble sickle blades with the same type of retouch, and most probably were intended as such, although they lack any visible gloss. All are broken and missing either the distal or proximal end, but all show intentional retouch (not illustrated).

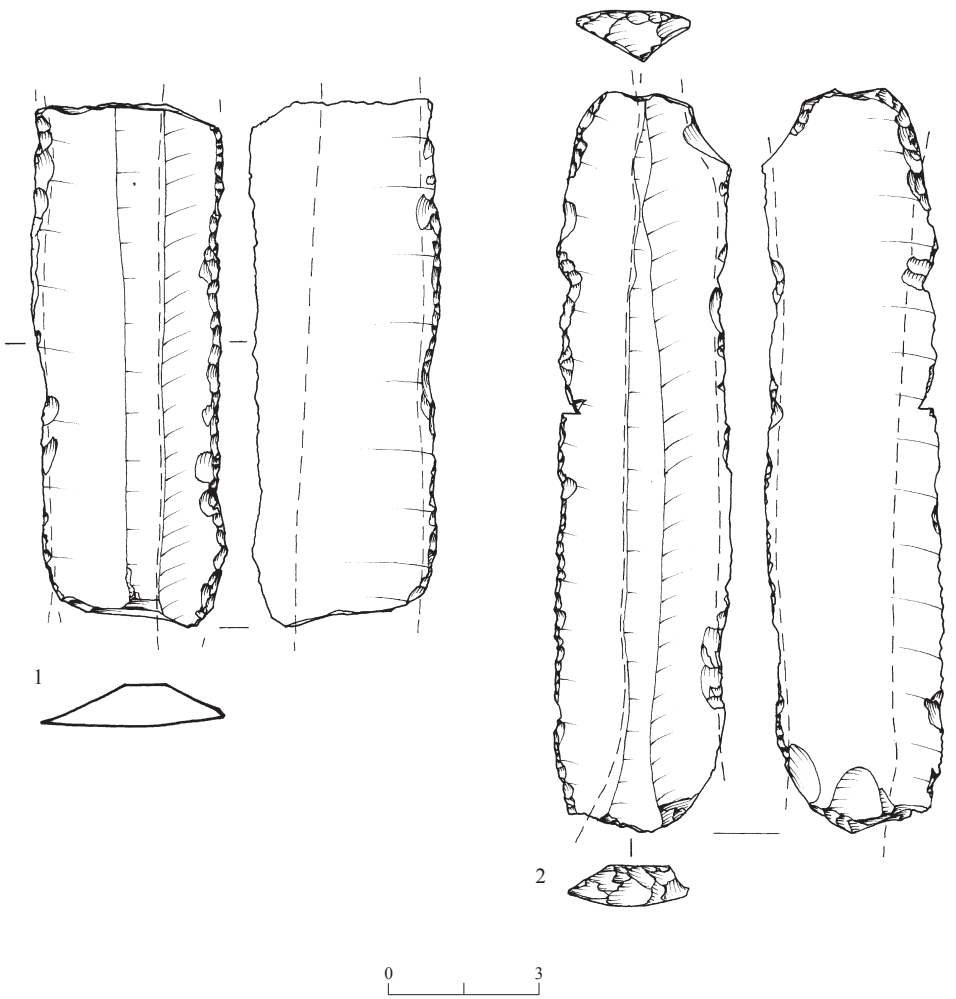


Fig. 34. Wide Canaanean sickle blades.

No.	Reg. No.	Area	Locus	Level
1	2079	F70	335	IIIa
2	10029	F70/1	1013	I

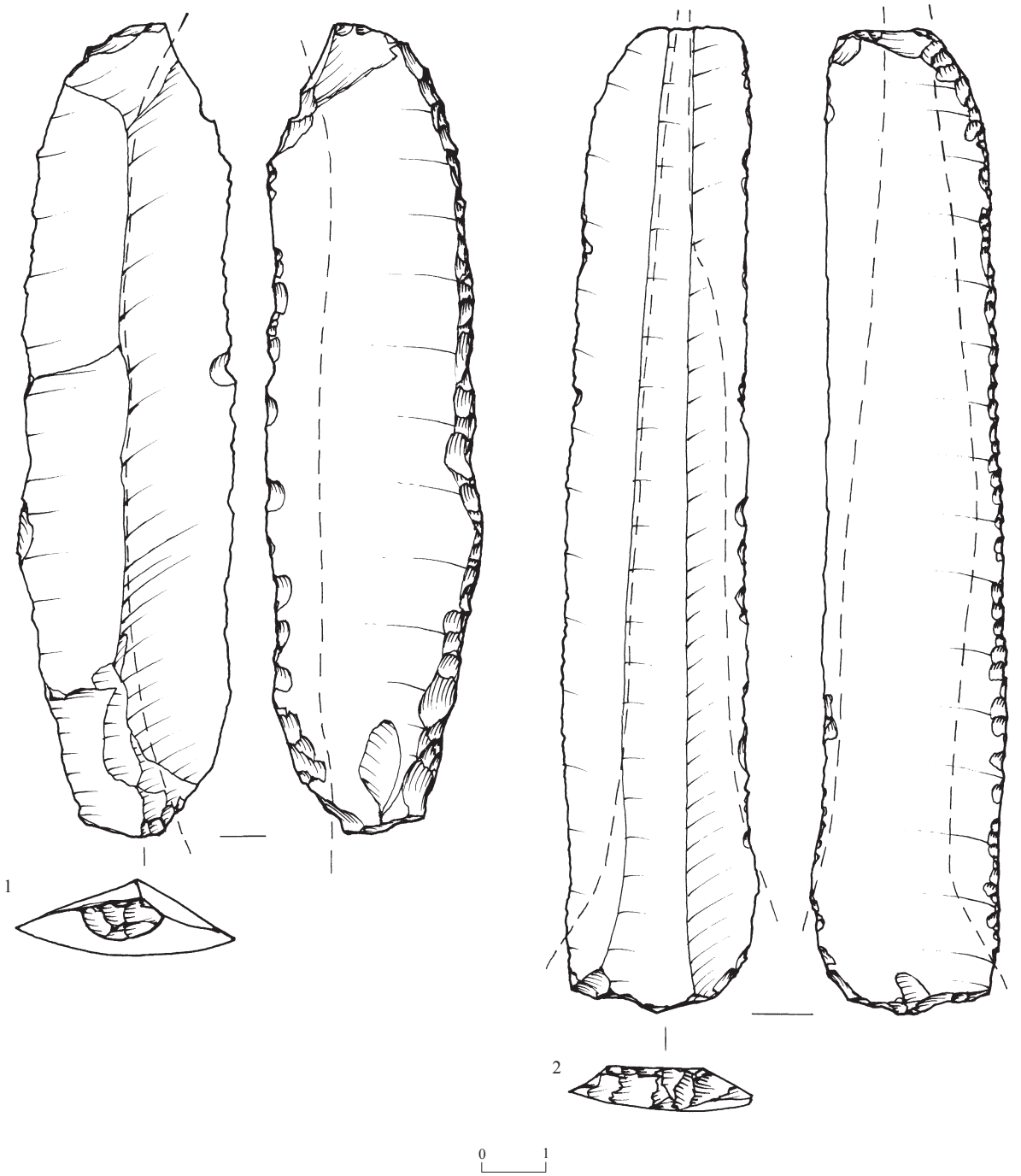


Fig. 35. Canaanean reaping knives from Area F70.

No.	Reg. No.	Locus	Level
1	2211	366	IIIb
2	1000	100	I

Other Sickle Blades.— Two sickle blades do not belong to the Canaanean or Chalcolithic types. One example (Fig. 36:1) was made on a blade of high-quality, light brown flint, one working edge shaped by fine denticulation, the opposing edge with fine retouch. Both edges display sickle gloss. The second example has a single working edge, is irregularly retouched on both edges (Fig. 36:2) and proximally broken. It is very worn and has no particular shape.

Ad-Hoc Tools.— This category comprises 89% of the tools (Table 5). Most of the ad-hoc tools were shaped on flakes of local raw material. The most common types are notches and denticulates (38.5%; e.g., Fig. 37) and scrapers (14.3%; Fig. 38:1, 2). One of the scrapers is a heavy-duty tool shaped on an elongated limestone blade (Fig. 38:2). The perforator category (c. 11%) comprises mostly awls (e.g., Fig. 38:3, 4). In contrast, retouched blades (8.1%) and burins (1.2%) are present in lesser quantities. The two burins are on a break, shaped on blades.

Chalcolithic Items.— Four Chalcolithic tools were found within the fill of the excavation, two of them are sickle blades shaped on backed and truncated blades with a triangular cross section. The other two are fragments of Chalcolithic adzes with a plano-convex cross section, the dorsal surfaces bearing bifacial flaking while the ventral sides are plain.

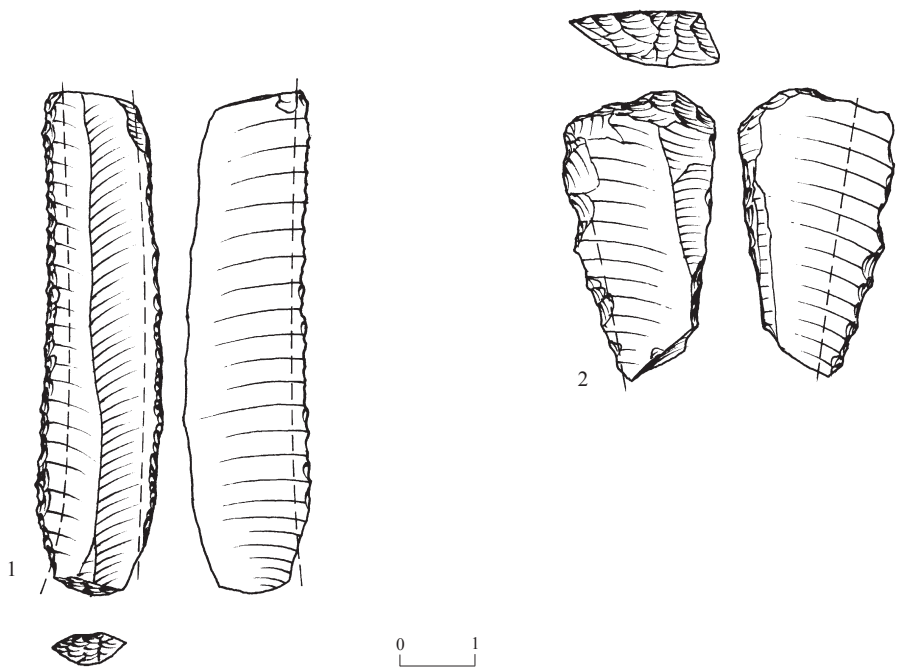


Fig. 36. Sickle blades from Area F70.

No.	Reg. No.	Locus	Level
1	2135	327	IIIa
2	2076	336	IIIa

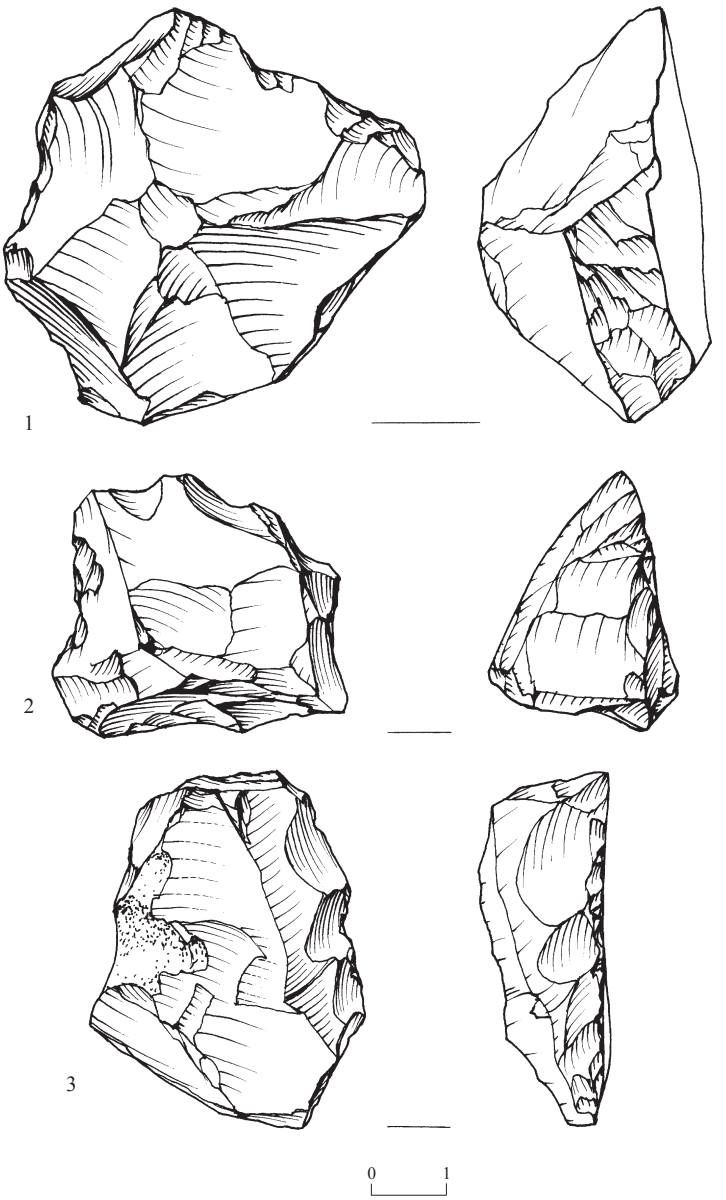


Fig. 37. Notches and denticulate from Area F70.

No.	Type	Reg. No.	Locus	Level
1	Notch	-	-	Unstratified
2	Notch	2057	324	IIIb
3	Denticulate	2004	308	IIb

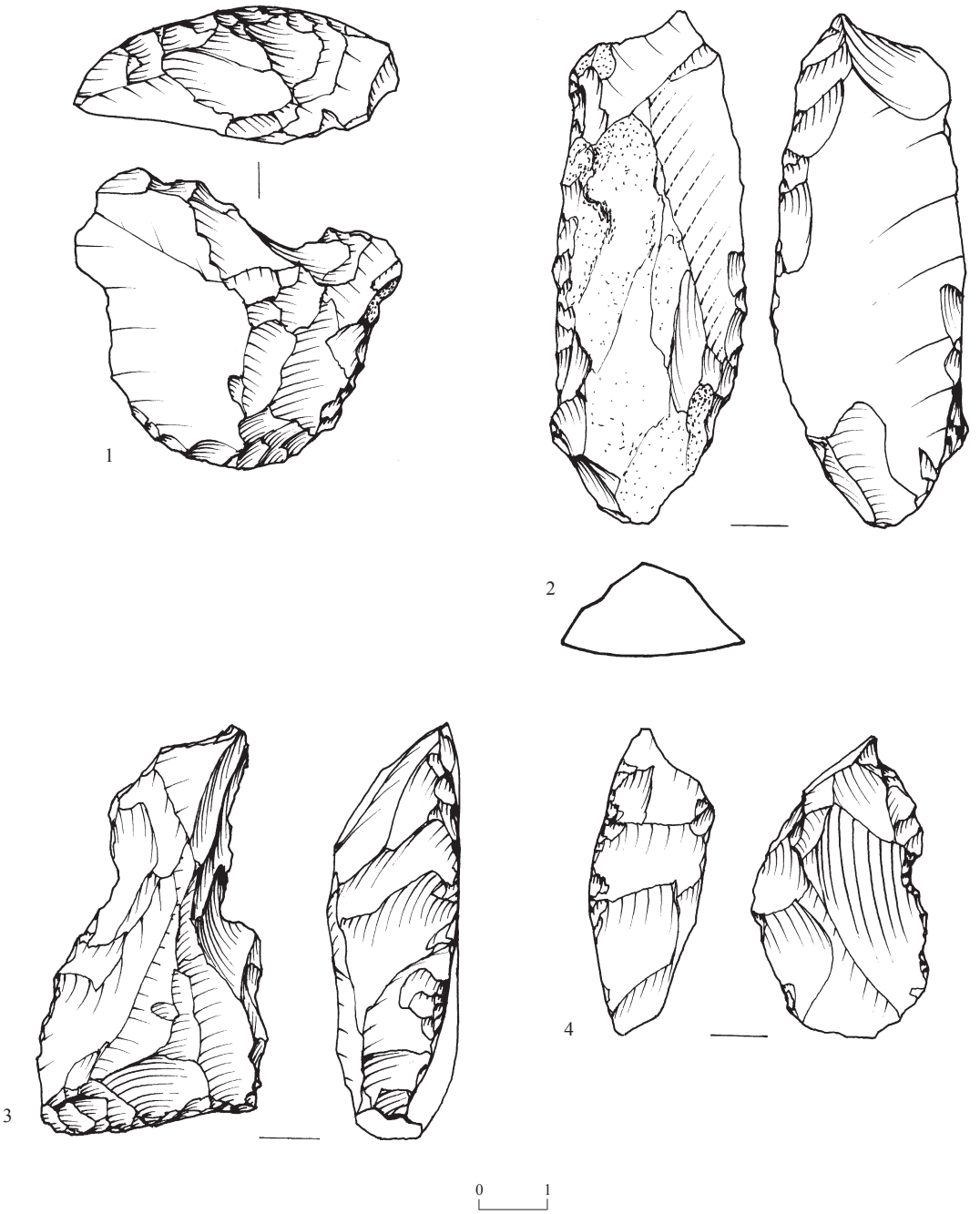


Fig. 38. Scrapers and perforators from Area F70.

No.	Type	Reg. No.	Locus	Level
1	Scraper	1015	107	IIc
2	Scraper	2019	315	II
3	Awl	1020	104	IIb
4	Awl	1002	104	IIb

Conclusions

In the lithic assemblage from Er-Rujum, two modes of production were discerned. Due to the fact that the site is situated in close proximity to a source of raw material in the Meshash Formation, the main industry is a local one, oriented toward flake production and used mainly for ad-hoc tools, such as notches, denticulates, scrapers and perforators. The second industry comprises the Canaanean technology that specialized in producing long, prismatic blades from fine-grained Eocene nodules. We assume that these tools were manufactured off-site (perhaps near Tel Gezer) and the blades imported. The absence of cores and their by-products within the assemblage of Er-Rujum reinforces this assumption.

There is a notable variability between the EB IV/Intermediate Bronze Age Cananean blades and those of the preceding periods at other sites (e.g., Rosen 1989; Zbenovich 2004). The EB IV/Intermediate Bronze Age blades are wider than those of EB I–III, which may be explained by function rather than by technological change, as most of the later blades were used as reaping knives rather than sickle segments. Thus, we can assume that the flint knappers of EB IV/ Intermediate Bronze Age were still using the Canaanean technology, and for this reason, we believe that the designation EB IV, rather than Intermediate Bronze Age, is more appropriate for the flint assemblages of this period.

The Groundstone Tools

The excavations produced a total of 58 identified groundstone tools and vessels, mainly from Intermediate Bronze Age contexts at the site. Three fragments of chalk cups from Areas F70 and F71 are dated to the Roman period (see Cahill 1992:207–209). In contrast to the quantitative analysis of the pottery assemblage, in the case of the groundstone tools we were able to determine the Minimum Number of Individuals (MNI), as in most cases each tool fragment represented one complete item. The MNI for each category was determined on the basis of typological differences and the state of preservation of the items.

Attention was paid to the distribution of the stone items within the structures and units in which they were found.

Typology and Technology

Typology and technological aspects of groundstone assemblages have been discussed elsewhere by the author (Milevski 1998; forthcoming a, b), based on previous studies of other researchers (e.g., Wright 1991; 1992; Hovers 1996; Adams 1998).

The typology presented here recognizes two main categories, tools and vessels, manufactured by similar methods of the same raw materials, but for different purposes. The types are generally defined by function (Table 6).

Raw Materials

The main raw materials used at Er-Rujum are limestone (43.1%) and flint (39.6%), while basalt (8.6%) and limestone river-rolled cobbles (5.2%) are relatively rare (Table 7). The use of chalk is limited to the two Early Roman cups. Frequencies vary according to area.

Limestone is a local raw material present in the Shephelah and the Ayyalon Valley (Buchbinder 1969). The flint derives from two sources: nodules, which were used mainly for hammerstones, and blocks that apparently derived from layered deposits, which were employed for larger tools (e.g., upper and lower grinding stones). Two different qualitites of basalt are represented in the assemblage: a coarse vesicular basalt and a fine-grained basalt that apparently originated in more distant regions.[7] Limestone cobbles, probably originating in Naḥal Ayyalon or its tributaries, were used for rubbing stones.

Tools

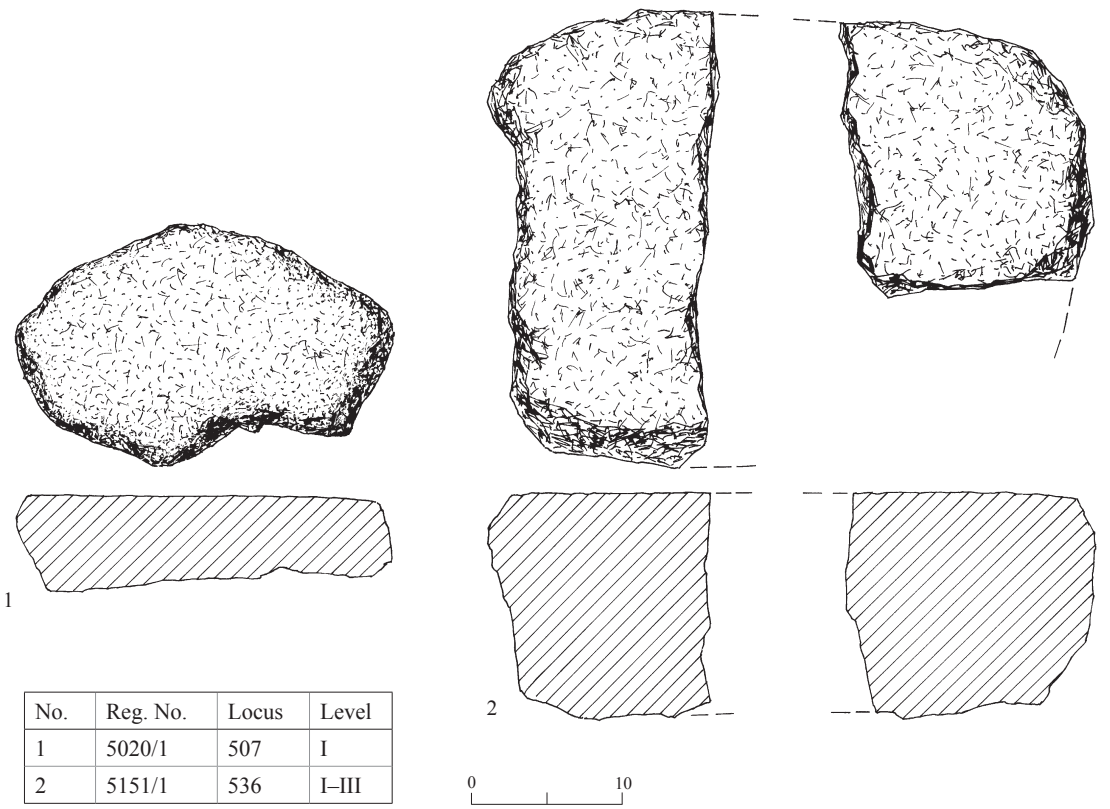
Lower Grinding Stones.— Twelve lower grinding stones were recovered at Er-Rujum, representing 20.7% of the groundstone assemblage. These objects are divided into two subtypes: slabs and saddle querns; five objects

Table 6. Groundstone Tool and Vessel Frequencies according to Areas and Levels

Type / Provenance	Lower Grinding Stones	Upper Grinding Stones	Mortars	Rubbing Stones	Hammer Stones	Pounders	Pierced Stones	Vessels	Varia	Sub-Total
Area F70										
Unknown	-	-	1	-	-	-	-	-	-	1
I	-	-	-	-	1	-	-	-	-	1
II	1	-	1	4	2	2	1	3	-	14
III	-	3	-	1	-	-	1	-	-	5
Subtotal	*1*	*3*	*2*	*5*	*3*	*2*	*2*	*3*	*-*	*21*
Area F70/1										
Surface	-	-	-	1	2	-	-	-	-	3
Ia	1	-	2	-	-	-	-	-	-	3
Ib	-	-	-	2	-	-	-	-	-	2
Subtotal	*1*	*-*	*2*	*3*	*2*	*-*	*-*	*-*	*-*	*8*
Area F71										
I	1	-	-	-	1	-	1	-	-	3
II	-	-	-	-	-	1	-	-	-	1
III	1	-	1	-	-	-	-	-	-	2
IV	2	1	1	-	1	-	1	-	-	6
I–IV	5	-	1	1	2	-	-	1	-	10
Subtotal	*9*	*1*	*3*	*1*	*4*	*1*	*2*	*1*	*-*	*22*
Area F82										
I	1	-	-							
II	-	-	-	-	-	1	1	-	1	4
III	-	-	-	-	-	-	-	-	-	
IV	-	-	1	-	-	-	-	-	-	1
Subtotal	1	-	1	-	-	1	1	-	1	5
Surface	-	-	-	1	-	-	-	-	-	1
Area F91/1	-	-	-	-	-	1	-	-	-	1
Subtotal	-	-	-	*1*	-	*1*	-	-	-	*2*
Total *%*	*12* *20.7*	*4* *6.9*	*8* *13.8*	*10* *17.2*	*9* *15.5*	*5* *8.6*	*5* *8.6*	*4* *6.9*	*1* *1.7*	*58* *99.9*

Table 7. Raw Material of Groundstone Tools according to Types

Type / Material	Lower Grinding Stones	Upper Grinding Stones	Mortars	Rubbing Stones	Hammer stones	Pounders	Pierced Stones	Vessels	Varia	Total	
										N	%
Limestone	2	2	8	3	3	1	5		1	25	43.1
Flint	10	1		1	6	3	1		1	23	39.6
Basalt		1		2				2		5	8.6
Limestone Cobbles				3						3	5.2
Chalk								2		2	3.4
Total	*12*	*4*	*8*	*9*	*9*	*4*	*6*	*4*	*2*	*58*	*99.9*



No.	Reg. No.	Locus	Level
1	5020/1	507	I
2	5151/1	536	I–III

Fig. 39. Lower grinding slabs of flint from Area F71.

could not be classified due to their fragmentary state. The majority of the lower grinding stones (n = 10) are made of flint, while two are made of local limestone.

Slabs (n = 6): This subtype is characterized by a flat, rectangular work surface without borders or raised edges, and a flat or rounded base (Fig. 39). One example has a lengthwise, slightly concave work surface (Reg. No. 2102/1; not illustrated).

Inclined or Saddle Querns (n = 3): These saddle-shaped lower grinding stones are well known from the Middle Bronze Age onward, but are already present in Early Bronze Age assemblages. They are characterized by a sloping work surface, generally concave in length and convex in width (Reg. No. 5053/1; not illustrated).

Upper Grinding Stones.— Only four upper grinding stones were found (6.9% of the Intermediate Bronze Age assemblage). One belongs to an elongated subtype with a semicircular cross section (Reg. No. 2211/1; not illustrated), which was burnt, possibly as a result of the burning of the wood in L366 (Unit 3, Area F70). The other three upper grinding stones are too fragmentary to be defined as to subtype. Two examples are made of limestone, one of flint and one of basalt.

Mortars.— Eight limestone mortars were retrieved (13.8% of the assemblage), which are divided into two main groups: fixed mortars (larger than 13 cm in diameter or length) and small, mobile mortars.

Fixed Mortars (n = 6): These mortars are relatively heavy and clearly not readily portable (cf. Prag 1991: Fig. 2); some of them were found *in situ* (see Figs. 9, 13). They can be further divided according to their work surfaces:

shallow U-shaped (n = 3; e.g., Fig. 40:1) and deep U-shaped (n = 3; e.g., Fig. 40:2). The majority of the bases are round, some are flat. Circular marks were discernable on several work surfaces. The work surface in Fig. 41 penetrated through the base. The average work surface measures c. 12 cm in diameter, taking up some 50% of the surface of the mortar. Blanks (i.e., the product of primary reduction of boulders or nodules prior to the shaping of the work surface) are of several shapes and degrees of finishing.

Mobile Mortars (n = 2): Mobile mortars have round bases, although the blanks differ in shape and finish, and are classified according to their work surface as dished (n = 1) and deep U-shaped (n = 1). One unfinished mortar (Reg. No. 7023/1; not illustrated) was found within the pottery dump of Area F82 (L707).

Rubbing Stones.— Ten rubbing stones were found (17.2%). These are hand-held tools used in rubbing, abrading and similar activities. Most of the work surfaces are flat or convex. Rubbing stones are classified according to their body shape: ovoid (n = 5; e.g., Fig. 42:1), hemispherical (n = 3; e.g., Fig. 42:2) and parallelepiped (n = 1; Fig. 42:3). Three are made of limestone, three of limestone cobbles, two of basalt and one of flint.

Hammerstones.— Nine hammerstones were found, representing 15.5% of the objects. These are hand-held tools, used in hammering or similar activities. The majority are cubical in shape with six work surfaces (n = 5), two are spherical subtypes (e.g., Fig. 42:4), while two are too fragmentary to be identified. Cubical hammerstones average 6.4 × 6.4 × 6.0 cm in size, while spherical examples are somewhat larger, 7.0 × 7.0 × 6.5 cm. Most of the

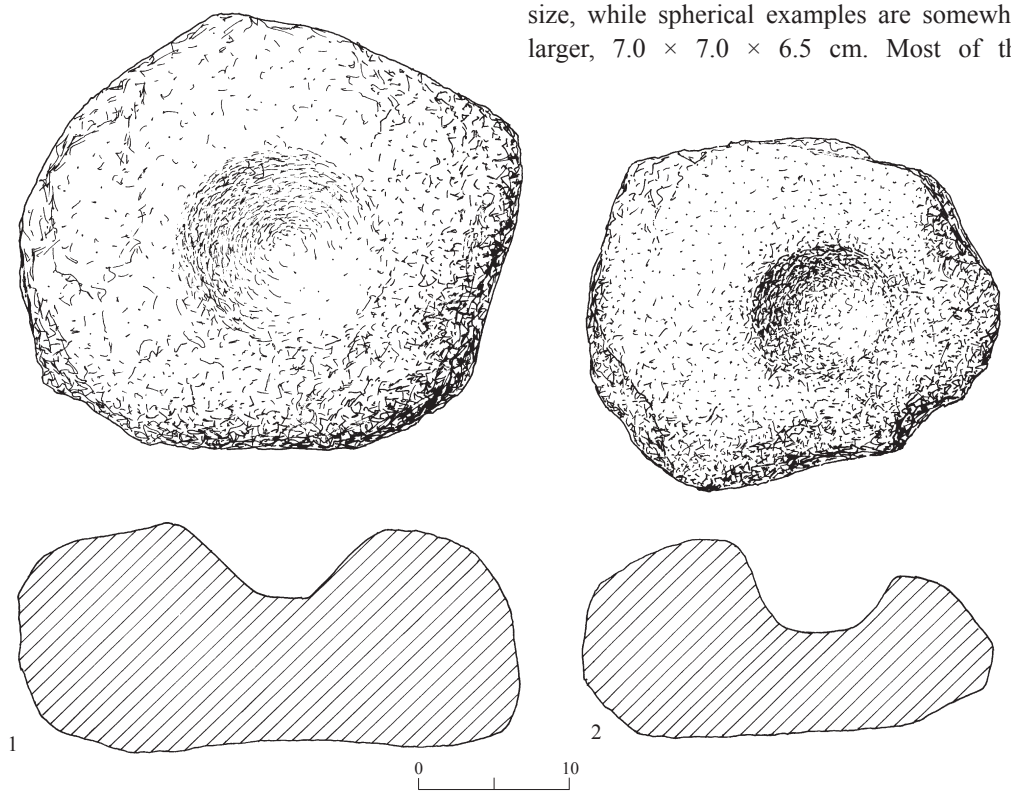


Fig. 40. Fixed limestone mortars.

No.	Reg. No.	Area	Locus	Level
1	10059/1	F70/1	1003	Ia
2	5181/1	F71	520	IV

hammerstones were made from flint nodules (n = 6), three of limestone.

Pounders.— Only five pounders were found (8.6% of the assemblage). Three are heavy tools made of flint or limestone: one is ovoid, another (incomplete) cylindrical with a height of 10 cm, while the third is only a fragment. The fourth example is a regular ovoid-shaped pounder made of flint, the fifth is amorphous, made of limestone.

Pierced Stones.— Five pierced stones were found (Fig. 42:5–9; 8.6% of the assemblage), four made of limestone, one of flint. Most of the pierced stones are rings, one of which has an ovoid body (Fig. 42:9). Figure 42:7 is an unfinished cylindrical blank of limestone, apparently intended to be fashioned into a ring, indicating that such tools were fabricated at the site. The average diameter of the rings is 11.8 cm, the average hole diameter is 5 cm. The reconstructed weights of the rings range from

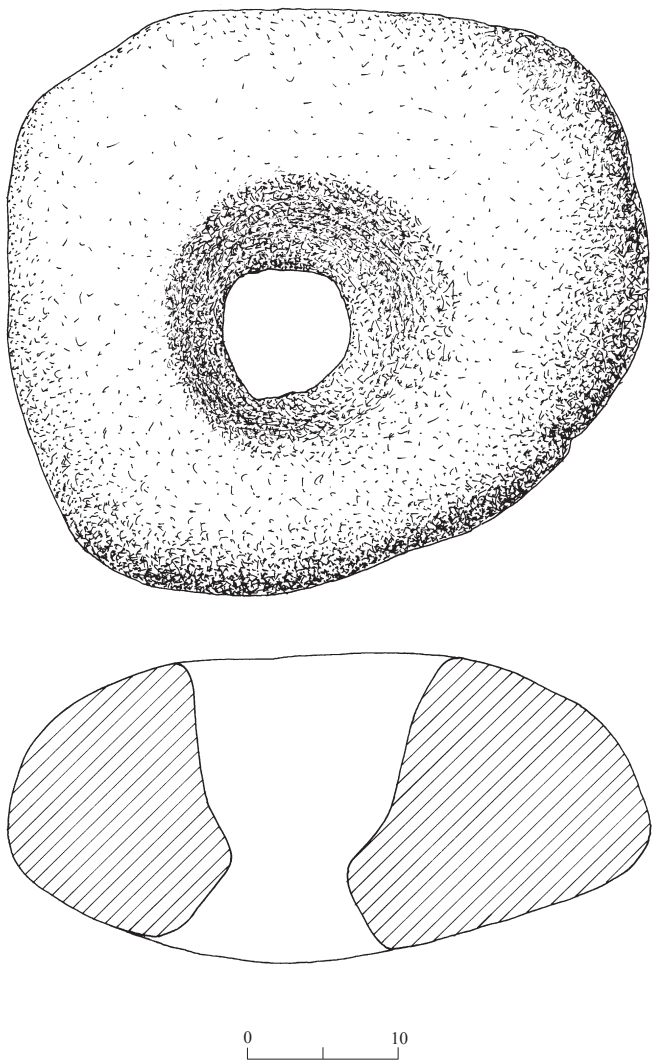


Fig. 41. A fixed limestone mortar from Area F71, Level III, L529.

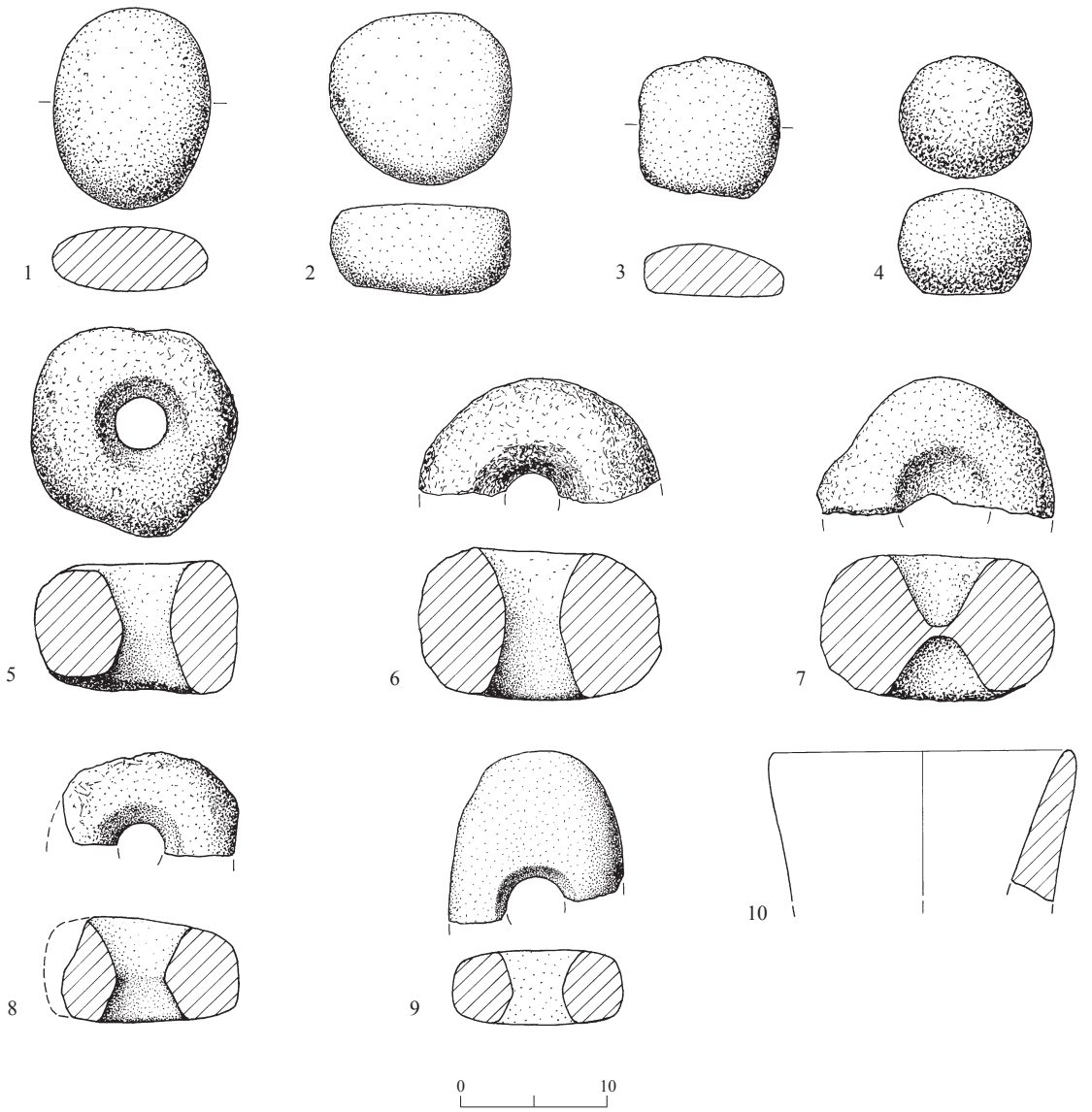


Fig. 42. Stone tools.

No.	Type	Reg. No.	Area	Locus	Level	Description
1	Rubbing stone	Surface	-	-	-	Vesicular basalt
2	Rubbing stone	10009/1	F70/1	Surface	-	Limestone
3	Rubbing stone	10049/1	F70/1	1018	Ib	Basalt?
4	Hammerstone	2012/1	F70	313	I	
5	Pierced stone	2061/1	F70	326	IIIa	Limestone
6	Pierced stone	1015/1	F70	107	IIc	Limestone
7	Pierced stone	5185/1	F71	520	IV	Limestone
8	Pierced stone	5048/1	F71	507	I	Limestone
9	Pierced stone	9000/1	F91/1	Surface	-	Limestone
10	Bowl	2007/1	F70	311	IIb	Basalt

c. 800 g (Fig. 42:8) to c. 1800 g (Fig. 42:7). The only complete example (Fig. 42:5) weighs 1234 g.

It has been suggested that stone rings functioned as weights or digging sticks (Palumbo 2001:258). Similar rings appear at Jericho and other Intermediate Bronze Age sites in Jordan (Prag 1971:267–268; Palumbo 2001:258). Smaller objects are ubiquitous at Early Bronze Age and MB II sites (Amiran et al. 1978: Pls. 76:19–23; 77:20–22; Milevski 1998: Fig. 5.16:1). The example in Fig. 42:9 has a sharpened edge and could be considered a sort of axe that was attached to a wooden stick. It was found on the surface of Area F91/1 and, as most of the parallels derive from Chalcolithic occupation levels (e.g., Levy 1987: Fig. 15.16; Milevski 2008; Eirich-Rose and Milevski 2008), it should be considered intrusive, originating at a nearby site.

Bowls.— Two fragments of basalt bowls were found in the fills of the *rujum* of Area F70. The example in Fig. 42:10 comprises part of a flaring wall with a pointed rim and probably had a flat base. This type is common at Early Bronze Age sites and has been classified by Braun as Type IB (Braun 1990:87, Fig. 2:8, 9) and by Rowan as Type 3C (1998:141, Fig. 23).

Discussion

The groundstone assemblage retrieved from Er-Rujum is small, most of the tools deriving from unstratified locations, i.e., the *rujum* fills above the occupation levels of Areas F70 and F71. However, despite the drawbacks, some conclusions can be drawn.

Lower grinding stones and mortars dominate the assemblage. In Area F70, most of the stone tools were concentrated in Units 1 and 4, while Units 2 and 3 in Area F71 also produced numerous objects (L503, L520, L532), including three fixed mortars. Rubbing stones and hammerstones were common in almost all the structures, corresponding to the evidence from other Early Bronze Age and MB II sites (Milevski 1998; forthcoming b). No relationship was discerned between the upper and lower grinding stones in quantity or find spots. In the absence of any stone examples, it is suggested that pestles for the large mortars were made of wood.

The ratio between lower grinding stones and mortars is c. 1.5:1, indicating that grinding activities predominated in the economy of the site (for further discussion of the ratio between grinding and pounding, see Milevski, forthcoming b). Wright (1994) noted a chronological tendency, from the Epipaleolithic onward, for increasing numbers of grinding stones in relation to mortars. PPNA Jericho has a ratio of c. 1:1.5 (Wright 1994: Table 9) and additional data available to the present writer seem to corroborate this general trend. For instance, at Lower Ḥorbat ʻIllin (EB I), the ratio between lower grinding stones and mortars is c. 1:1 (Milevski, forthcoming b), at Manaḥat (MB II–LB II) the ratio is c. 3:1 (Milevski 1998: Table 5.1), while in Iron I and Iron II strata at Tel Miqne (Strata VA–C and Strata IA–C), the ratios are 2:1 and 5:1 respectively (Milevski, forthcoming a).

Objects made of local raw materials, readily available to the inhabitants (limestone and flint), far outnumber the objects made of non-local basalt (see Table 7), and only two basalt bowl fragments were recovered at the site.

Small Finds

Copper Blade

A metal blade, measuring c. 4.0 × 6.0 × 0.5 cm (Fig. 43:1), was found in Area F70/1 in a clear Intermediate Bronze Age context (L1021, Phase Ib). It has a flattened cutting edge and an irregularly flattened butt. The blade thins from the center toward the cutting edge that expands slightly at the tip. This type of blade was classified by Miron (1992:6) as Type IId.

The flattening of the butt could be the result of the work performed with it, i.e., the constant hammering of the butt, while the cutting edge was on the worked material. From this, we could conclude that the blade was used as an

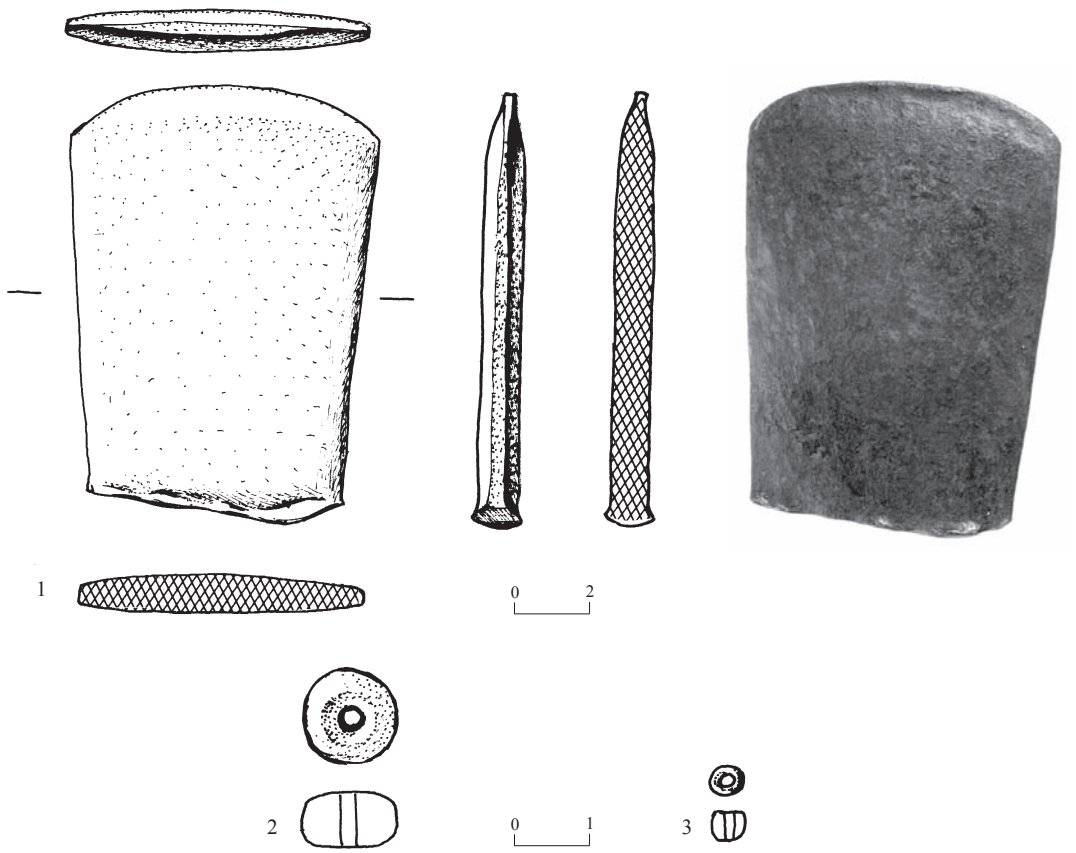


Fig. 43. Metal blade and beads.

No.	Type	Reg. No.	Area	Locus	Level	Description
1	Blade	10055	F70/1	1021	Ib	Copper
2	Bead	2123	F70	327	IIIa	?
3	Beads	5014/1	F71	504	I	?

adze, although the use of the tool also as an axe cannot be discounted (see discussion in Miron 1992:21–22).

Similar (but not identical) blades were found, *inter alia*, at Shillo (Brandl 1993:241, Fig. 11:5 = Miron 1992: Pl. 7:113) and Hebron (Miron 1992: Pl. 6:93).

Chemical Analysis of the Copper Blade

Sariel Shalev[8]

The metal blade was submitted for analysis to the archaeometallurgical laboratory of the Center for Archaeological Science, Weizmann Institute. The detection limit for the analyzed elements, using a wavelength dispersive spectometer (WDS), is 0.02 weight percent (wt%). The results of the quantitative chemical analysis derive from representative scanned areas of c. 20 μm each and are presented in Table 8.

It is evident from this analysis that the metal blade was made of copper alloy with 1.4% arsenic and impurities of iron antimony and lead, not exceeding 0.3%. This metal composition corresponds well with the known metallurgical practices of the Intermediate Bronze Age (Shalev 1995), and therefore, reinforces the archaeological date of this object.

Table. 8 Results of WDS Chemical Analysis of Samples from the Metal Blade (in wt%)

Sample No.	*Cu*	*Fe*	*Co*	*Ni*	*Zn*	*As*	*Sb*	*Sn*	*Ag*	*Pb*	*Bi*	*Au*	*S*
Mo 01-2:1	97.7	0.25	0.03	n.d.	0.03	1.53	0.25	n.d.	0.04	0.13	n.d.	0.02	0.01
Mo 01-2:2	97.8	0.26	n.d.	tr.	n.d.	1.47	0.29	0.06	n.d	0.11	n.d.	n.d.	0.01
Mo 01-2:3	97.7	0.24	0.01	n.d.	n.d.	1.42	0.26	0.01	0.04	0.24	n.d.	0.04	0.06
Mo 01-2:4	97.8	0.34	n.d.	0.04	n.d.	1.42	0.29	n.d.	0.02	0.08	n.d.	n.d.	n.d.
Mo 01-2:5	97.7	0.23	n.d.	0.01	n.d.	1.42	0.29	0.02	0.03	0.21	n.d.	0.10	n.d.
Mo 01-2:sum	97.7	0.26	tr.	tr.	n.d.	1.43	0.28	0.02	0.03	0.15	n.d.	0.03	0.02

n.d. = not detected; tr. = traces

Beads

Thirty-one beads were found at the site. In Area F70, a cylindrical bead with a cylindrical perforation (Fig. 43:2) was retrieved from the abandonment fill (L327) of Unit 2. In Area F71, 30 beads were recovered from the fill of the *rujum* (Level III), probably belonging to a bracelet (e.g., Fig. 43:3).[9] These beads have a barrel-shaped body and are also cylindrically perforated. Unfortunately, the material of the beads was not identified.

Botanical Remains[10]

Nili Liphschitz

During the excavation of Er-Rujum, charred pieces of wood and a single carbonized seed were gathered from the Intermediate Bronze Age (EB IV) occupation level of Area F70 (Level III).

Samples of 0.5–1.0 cu cm were taken from the wood for botanical identification. They were treated in absolute ethyl-alcohol, dipped in celloidin clove-oil solution for 24 hours, rinsed again in absolute ethyl-alcohol, and finally, transferred to 50–55° C paraffin for 72 hours. The paraffin blocks were sectioned by a microtome in three directions, creating cross, longitudinal tangential and longitudinal radial sections. Identification of the wood remains was possible up to the species level, based on microscopic examination of the three-dimensional structure of the wood. Comparison was made with reference sections prepared from recent, systematically identified species, and by comparison with anatomical atlases. The carbonized seed was identified on the basis of its morphology.

Table 9. Provenance of Wood Remains, Area F70, Level III

Basket	Locus	Unit	Tree species
2131	341	1	*Olea europaea*
2163	363	1	*Olea europaea*
2129	350	1	*Olea europaea*
2145	359	4	*Olea europaea*
2173	359	4	*Olea europaea*
2193	366	3	*Olea europaea*
2196	347	1	*Olea europaea*
2209	347	1	*Olea europaea*
2162	361	7	*Pistacia palaestina*
2119	327	2	*Quercus calliprinos*

Analysis of the wood samples revealed that they originated from three tree species: *Olea europaea* (olive), *Pistacia palaestina* (terebinth) and *Quercus calliprinos* (Kermes oak) (Table 9), olive constituting 80% of the wood assemblage, the other two species, 10% each. The single carbonized seed was an olive stone (Unit 3, L366, B2214).

The native arboreal climax vegetation that was dominant in the Mediterranean zone of Israel during antiquity was the *Quercus*

Table 10. Faunal Remains from Area F70

Species / Bones	*Ovis aries/ Capra hircus*	*Bos taurus*	*Spalax ehrenbergi*	*Levantina hierosolyma*	*Glycemeris violascens (Lamarck)*	*Total*
Cranium	1					1
Mandibula	1					1
Tongue bone	1					1
Molar	2					2
Premolar		1				1
Oscarpal	1					1
Tibia	1		2			3
Metapod	1					1
Vertebra			95			95
Vertebra lumbar			2			2
Costa	1		25			26
Total	*9*	*1*	*124*	*1*	*1*	*136*
%	*6.6*	*0.7*	*91.2*	*0.7*	*0.7*	*99.9*

calliprinos–Pistacia palaestina association (Liphschitz and Bigger 1990). *Olea europaea* trees were one of the components of this association. After its cultivation by man in the Early Bronze Age, olive orchards became part of the Mediterranean landscape and olive trees became prominent in the arboreal cover (Liphschitz et al. 1991). This is also evident in the results of the dendroarchaeological analysis of Er-Rujum.

Faunal Remains

Moshe Sade

A small number of animal bones (N = 138) were retrieved during the excavations at Er-Rujum, the majority (N = 136) originating in Area F70 (Table 10); one bone was found in Area F70/1 and another in Area F91, both belonging to *Bos taurus*. The faunal remains from Area F70 represent one caprovine, one bovid and an unspecified number of moles (*Spalax ehrenbergi*), certainly a modern phenomenon due to post-depositional activities. In addition, two mollusk shells were found in Area F70, one originating in the Mediterranean Sea and the second, a sand mollusk.

Unfortunately, no conclusions can be drawn concerning the fauna of the site. We assume that the reason so few animal bones were preserved at Er-Rujum is due to post-depositional activities or bone diagenesis, rather than the mode of subsistence at the site.

Radiocarbon Dates[11]

Elisabetta Boaretto

From the carbonized botanical remains recovered in the excavations, six samples originating in Area F70 were selected for radiocarbon dating, each sample represented by several pieces of wood material. Some of these pieces were identified by Liphschitz (Table 9).

The samples were pretreated following the acid-base-acid procedure in order to remove

Table 11. Results of Radiocarbon Dating from Area F70

Sample No.	Sample Provenance	Type	^{14}C Age ± 1 σ Year BP	Calibrated Age (BCE)*	δ13C ‰ PDB
RTT 4400	L359, B2145, Sq D6	Charcoal *Olea europaea*	3720 ± 50	68.2% probability 2200 (15.0%) 2160 2150 (53.2%) 2030 95.4% probability 2290 (95.4%) 1960	-23.5
RT 4401	L327, B2119, Sq E7	Charcoal *Quercus calliprinos*	3780 ± 40	68.2% probability 2290 (68.2%) 2130 95.4% probability 2350 (87.4%) 2120 2100 (8.0%) 2040	-23.9
RT 4402	L347, B2196, Sq F6	Seeds + charcoal *Olea europaea*	3845 ± 65	68.2% probability 2460 (20.3%) 2370 2350 (47.9%) 2200 95.4% probability 2480 (94.4%) 2130 2080 (1.0%) 2060	-23.2
RT 4403	L363, B2163, Sq E6	Charcoal *Olea europaea*	3745 ± 45	68.2% probability 2270 (3.3%) 2250 2210 (43.7%) 2120 2100 (21.2%) 2040 95.4% probability 2300 (95.4%) 2020	-23.0
RT 4404	L366, B2193, Sq D7	Charcoal *Olea europaea*	3815 ± 80	68.2% probability 2440 (9.5%) 2370 2350 (58.7%) 2140 95.4% probability 2480 (95.4%) 2030	-23.3
RTT 4405	L361, B2162, Sq E7	Charcoal *Pistacia palaestina*	3550 ± 50	68.2% probability 1960 (43.3%) 1860 1850 (24.9%) 1770 95.4% probability 2030 (95.4%) 1740	-23.6

* All calculated ^{14}C dates have been corrected for carbon isotope fractionation, so the results are equivalent with the standard δ13C value of -25 ‰ related to wood. The ^{14}C ages were calibrated using the 1999 version OxCal v.3.10 program of Bronk Ramsey 2005 (Bronk Ramsey 1995; 2001) based on the calibration data in Reimer et al. 2004.

any possible contaminants. The samples gave different yields after the pretreatment, indicating a varying state of preservation for the different charcoal samples.

Four samples were prepared as benzene for decay counting by Liquid Scintillation Spectrometry. Samples RTT 4400 and RT 4405 were particularly small (several hundred mg) and therefore prepared as graphite for Accelerator Mass Spectrometry measurement.

The results of the radiocarbon dating are summarized in Table 11 and Figs. 44 and 45. In Table 11, Carbon-14 age determination is reported in conventional radiocarbon years (before present = 1950) in accordance with international conventions (Stuiver and Polach 1977). The calibrated age is given for one and two standard deviations (±1σ and ±2σ respectively), which correspond to 68.2% and 95.4% probability that the true age falls within

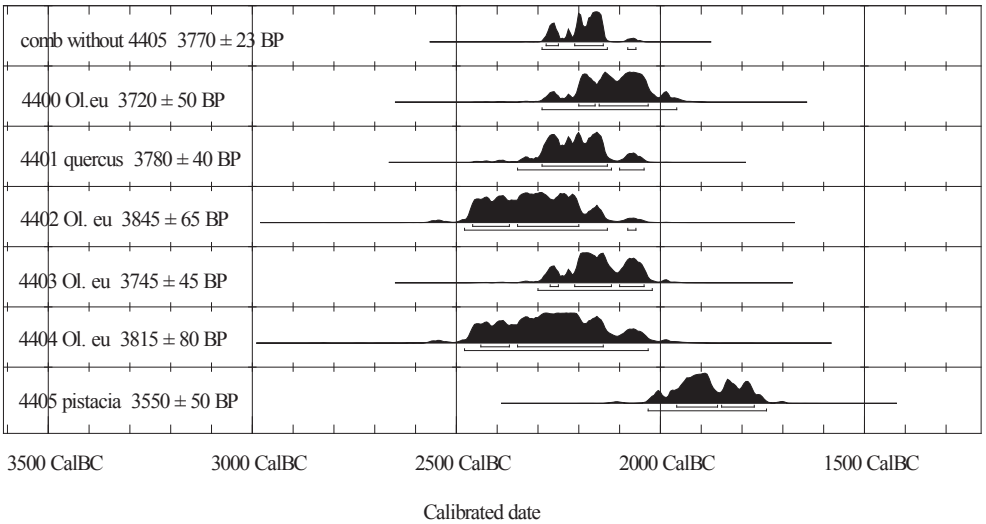


Fig. 44. Probability distribution of the radiocarbon samples.

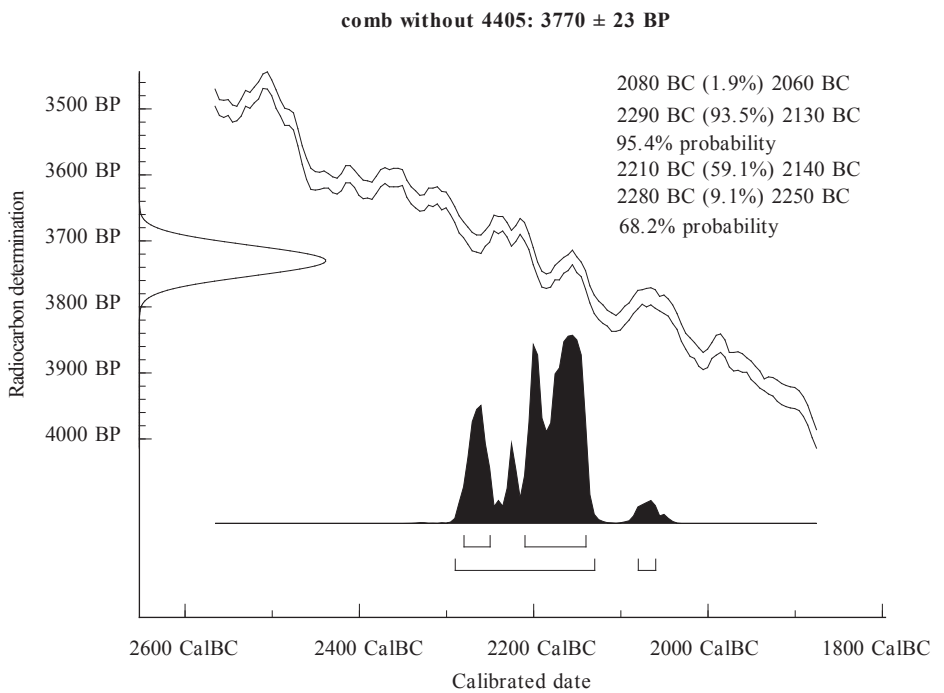


Fig. 45. Probability distribution of the calibrated age of the average of the samples, without RTT 4505.

the reported interval. If more than one interval is possible, then the relative probabilities are indicated as a percentage between the limits. The radiocarbon ages have been calibrated with the latest calibration curve Oxcal 3.10 of Bronk Ramsey 2005 (Table 11).

As each of the samples comprised several charcoal pieces of different sizes, every sample that was radiocarbon dated may have included more than one wood species.

The calibrated interval obtained for samples RTT 4400 and RT 4401–4404 dates the associated level between 2300 and 2000 BCE. Sample RTT 4405 produced a later date (1860–1740 BCE), which must be associated with MB II. The average of the samples, after exclusion of RTT 4405, presents a ±2σ calibrated age in the range of 2300–2100 BCE (Figs. 42, 43).

A more precise dating is not possible due to the nature of the material submitted. In addition, the 'old wood' effect, related to the inherent age of the wood before it was burnt, may influence the dates to some extent. This effect has been found to be significant (several hundred years) in cases where the wood was used for construction. In order to better interpret the results, the context of the samples in the stratigraphic sequence (e.g., domestic use, industrial activity or construction, etc.) must be identified.

CONCLUSIONS

The discovery of an Intermediate Bronze Age site below *rujum*s is further confirmation of the importance of understanding the relationship between ancient sites and landscape modifications (see Edelstein and Milevski 1994; Gibson 1995). Er-Rujum, a here-to-far unknown site from this period in the area of Modi'in, provides additional data toward an understanding of the nature and settlement patterns of this controversial period in the archaeology of the southern Levant (see, e.g., Dever 1985; Palumbo 1990; 2001; Finkelstein 1991; Gophna 1992). The site of Er-Rujum can be interpreted as a rural community with a subsistence strategy comprising an association of agriculture with some cattle herding, together with manufacturing workshop activities.

The Ayyalon Valley should now be included with other regions in the center of the country where Intermediate Bronze Age sites have been surveyed and excavated, namely Ramat Bet Shemesh in the Shephelah (e.g., Dagan 2010: Sites 136, 160.2, 222, 237, 248) and Bet Neḥemya near Naḥal Nevallaṭ, one of the tributaries of Naḥal Ayyalon in the northwestern portion of the valley (Yuval Yekutieli, pers. comm.). Within the Ayyalon Valley, some 4 km southwest of our site, another Intermediate Bronze Age settlement was discerned at 'En Yered, close to Tel Gezer, during a survey conducted by Shavit (2000:207–209). In addition, an Intermediate Bronze Age burial cave was excavated by Kogan-Zehavi and Zelinger (2007:22*–25*; Milevski and Khalaily 2007), c. 10 km northwest of Er-Rujum, indicating the presence of another settlement in proximity to the cave.

The architecture of the main excavated areas at Er-Rujum (F70 and F71), comprising a series of broadrooms, a central space and passages between them, demonstrates similarities with other Intermediate Bronze Age buildings excavated in the Jordan Valley and the Judean Hills (see Prag 1974; 1997; Palumbo 2001:244–246), although the plan of the village at our site cannot be determined. At Sha'ar Ha-Golan (Eisenberg, this volume), a developed village was revealed with broadroom structures and passages between them. At Naḥal Refa'im, House No. 818 (Stratum III) comprised two large rooms or courtyards and a smaller room between them, as well as three small storage compartments. Cooking and storage facilities were found along the walls, and pillar bases and a mortar were discerned on the floor of one of the large rooms (Eisenberg 1988–89:86, Figs. 72, 73).

At Tell Iktanu, a rectangular building of the Intermediate Bronze Age was excavated in Area A, c. 10 × 11 m, consisting of a large courtyard in the northeast, a large room in the west, a

smaller rectangular room in the northwestern corner and a corridor in the south with a storage compartment at one end (Prag 1989:35–38, Figs. 2, 3). Two phases of occupation were discerned in this building. A second building of similar dimensions comprised three rectangular rooms or courtyards containing sets of grinding stones (mortars and querns) and postholes in the floors (Prag 1991:55–57, Figs. 1, 2).

The pottery assemblage found at Er-Rujum closely resembles the Family S repertoire as defined by Amiran (1960; 1969) and Dever (1980), which is known from the sites of Naḥal Refa'im and Jebel Qa'aqir. No differences were discerned between the assemblages of the various excavated areas, nor was there any perceivable development of the pottery repertoire through the stratigraphic phases of the Intermediate Bronze Age. Therefore, it is assumed that the pottery of Er-Rujum belongs to a single occupational horizon. The study of the distribution of the pottery types in Area F70 reveals a certain pattern of activity, with storage jars, cooking and serving vessels in Units 1–4 and, to a lesser extent, in Unit 10.

The petrographic results, the pottery technology and the uniformity of the vessels lead to the conclusion that the potters who produced these wares were highly skilled, beyond the domestic mode, and these pots were probably manufactured in a production center. Considering that no kilns were uncovered at the site, and that the raw material probably came from a distance of over 6 km, one cannot, for the moment, conclude that Er-Rujum was the locale of that center.

On the other hand, the ad-hoc flint artifacts were knapped on site, probably due to the fact that Er-Rujum is situated upon Meshash Formation sources. However, the more specialized artifacts, especially the long blades produced from high-quality Eocene flint in Canaanean technology, were surely acquired by exchange with sites such as 'En Yered, located on the Eocenian sources. During the Early Bronze Age, Canaanean blades were produced in several centers and distributed by exchange (see Rosen 1997:46–60; Milevski 2005:112–128). It is probable that 'En Yered replaced Tel Gezer as the center of production and distribution during the Intermediate Bronze Age, as no indication of settlement was found at Gezer from this period (Shavit 2000).

In the groundstone assemblage, a clear preference for local raw materials is evident (only two basalt bowls were found at Er-Rujum). Although the Er-Rujum assemblage continues the chronological trend of an increase in the number of grinding stones in relation to mortars (Wright 1994; Milevski, forthcoming b), it must be stressed that the ratios here are similar to those at Lower Ḥorbat 'Illin, dated to EB IB. Grinding and pounding activities seem to have been distributed throughout the site, with some specialized locales in Units 1 and 3 of Area F71, where one mortar and three related cupmarks were uncovered.

The wood remains found in Area F70, which probably originated in the ceiling of the building, reveal the same native arboreal climax vegetation that dominates the southern Levant today, i.e., the *Quercus calliprinos–Pistacia palaestina* association, of which olive trees were one of the components. Other uses of wood were certainly related to the hafting of tools such as the sickle blades, reaping knives, stone rings, weights and probably also the copper blade. The area of Faynan in Jordan is suggested as the source of the copper for this blade (Hauptmann 1987:424–426). As no metallurgical activities are attested at the site, we can presume that this copper artifact arrived by trade, or was the work of nomadic metalsmiths, as suggested by Beit-Arieh (1985:115).

The radiocarbon determinations provide an average calibrated date (±2σ) in the range of 2300–2100 BCE for Area F70, which is consistent with the dating of Family S, considering that the Intermediate Bronze Age began in approximately 2300 BCE (according to Dever 2003), or 2250 BCE (according to Stager 2002), and came to an end around 1950–1925 BCE (according to Stager 2002) or 1920 BCE (according to Marcus 2003). However,

the radiocarbon dates derive from wood that may have been used in the construction of the building and thus, could be several hundred years older than its context. Gophna (2009) has discussed the short-lived Intermediate Bronze Age settlement system in the coastal plain where, according to the stratigraphy, the sites existed no longer than one hundred years. Such is also the case at Er-Rujum, where a single Intermediate Bronze Age occupation level was found. At any rate, the radiocarbon dates indicate that the site did not survive the end of the twenty-first century BCE, most probably existing during the twenty-second century, i.e., during the middle of the period.

It is clear that Sample RTT 4405 (1860–1740 BCE) falls within MB II. As a significant quantity of pottery from this period was recovered in the fill of the *rujum* in Area F70 (see Appendix I), it is probable that activities took place here during that period. The occurrence of burnt wood of MB II date in an Intermediate Bronze Age context could be explained by post-depositional activities after the abandonment of the building. It is worth mentioning that this is the only wood sample of terebinth. In a similar way, the presence of Chalcolithic flint items in the fill of the *rujum* in Area F70, and the pierced stone (Fig. 40:9) on the surface in Area F91/1, could have originated at the nearby site of Ḥorbat Ḥamim South (Gorzalczany 2008) or Ḥorbat Ḥadat (van den Brink, pers. comm. 2011) located 2 km to the northwest and northeast of Er-Rujum respectively (see Fig. 1).

Although petrographic evidence points to a nearby, almost exclusive source for the clay from which the ceramics at the site were manufactured, components of Petrographic Group 2 suggest a coastal origin for one of the amphoriskoi. A relationship with the Mediterranean coast is also evident in the discovery of a *Glycemeris violascens* shell in Area F70, Level III. As opposed to other sites containing Family S pottery (Goren 1996), Er-Rujum seems to have been less influenced by inter-regional exchange.

* * *

APPENDIX 1: MIDDLE BRONZE AGE II POTTERY

The MB II pottery was collected from fills, mainly from the *rujum* of Area F70. However, this assemblage is important for any clues it may reveal as to the gap between the abandonment of the Intermediate Bronze Age site and the foundation of the MB II settlement at nearby Tel Sha'alabim (Bahat 1981; Singer-Avitz and Levy 1993). For this reason, it is breifly described below.

Cooking Pots.— Two types of cooking pots were discerned. Figure 46:1 represents an open, wheel-made cooking pot with an everted rim, which is the prototype of the cooking vessel that continued throughout MB II and the Late Bronze and Iron Ages. A similar vessel was found at Tel Lakhish, dated to MB IIA (Singer-Avitz 2004:914, Fig. 16.9:14). The second and more common type at Er-Rujum is the straight-walled, handmade cooking pot, with applied rope decoration below the rim and holes between the plastic decoration and the rim (Figs. 29:2–4). Both these types are present in MB IIA–B assemblages, with the second type first appearing in MB IIA–beginning of MB IIB (e.g., Loud 1948: Pls. 9:19; 30:5; Dever 1986: Pls. 4:15; 6:11; Eisenberg 1993; Edelstein, Milevski and Aurant 1998: Fig. 4.5:1–7; Singer-Avitz 2004: Fig. 16.9:15).

Store Jars.— Store jars are represented mainly by rims, shoulder sherds (Fig. 46:5–8) and loop handles (not illustrated). Unfortunately, bases were poorly preserved. The rims vary from simple flaring to thickened profiles. Jars with such rims can be dated to MB IIA or MB IIB, with numerous parallels in the southern Levant (e.g., Pritchard 1963: Fig. 69:7; Seger 1974: Fig. 3:9; Kenyon and Holland 1983: Fig. 136:3; Beck 1985:194; Dever 1986: Pl. 2:20; Edelstein, Milevski and Aurant 1998: Fig.

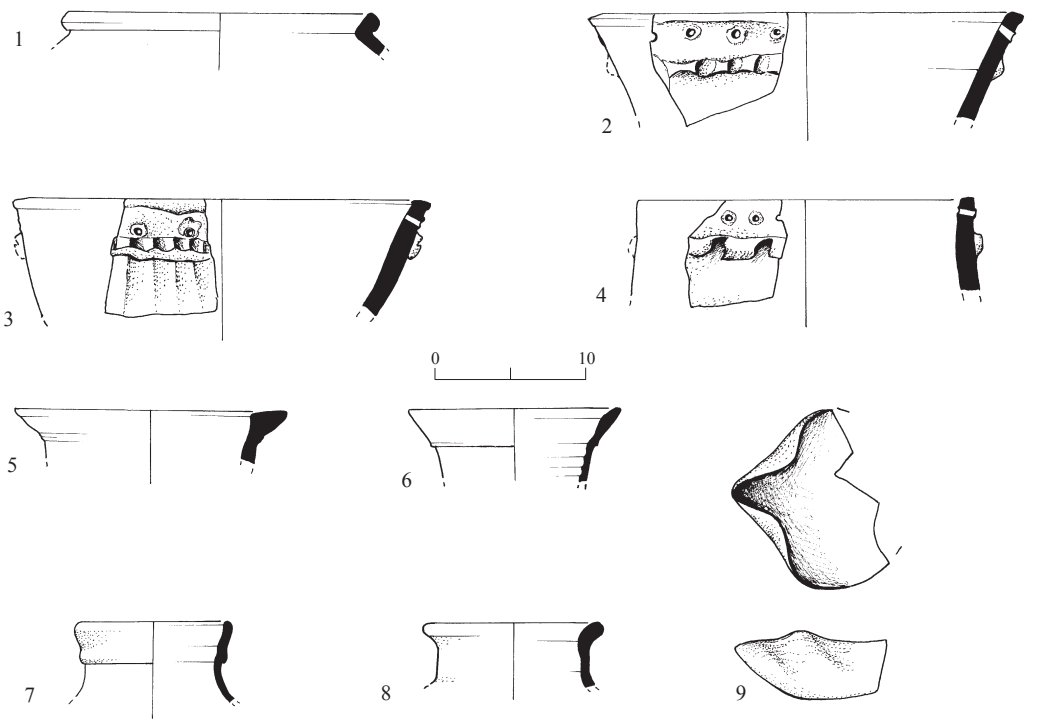


Fig. 46. Middle Bronze Age II pottery.

No.	Type	Reg. No.	Area	Locus	Level
1	Cooking pot	2007/11	F70	311	IIb
2	Cooking pot	2010/9	F70	311	IIb
3	Cooking pot	1019/1	F70	108	IIc
4	Cooking pot	2010/2	F70	311	IIb
5	Store jar	2015/8	F70	312	IIb
6	Store jar	1031/1	F70	108	IIc
7	Store jar	7019	F82	702	II
8	Store jar	2077/3	F70	332	-
9	Lamp	10047	F70/1	1018	Ib

4.6:5–16), including the nearby tombs of Tel Sha'alabim (e.g., Singer-Avitz and Levy 1993: Figs. 3:1–4; 4:6).

Lamp.— A single lamp was found in Area F70/1 (L1018; Fig. 46:9), within the fill of a floor dated to the Intermediate Bronze Age, and must be considered intrusive in this context. It is a characteristic shallow lamp, with a pinched spout and a hemispherical profile, dated to MB IIB and perhaps LB I (e.g., Loud 1948: Pl. 47:1; Gadot, Yasur-Landau and Ilan 2006: Figs. 12.1:8; 12.3:13–15).

In conclusion, the MB II pottery represents a period extending through MB IIA–B, and perhaps into the beginning of LB I. The pottery must be related to the settlement at Tel Sha'alabim or to a squatter occupation at Er-Rujum, dozens or even hundreds of years after the abandonment of the Intermediate Bronze Age settlement.

APPENDIX II: LIST OF LOCI

Locus	Square	Level	Description
Area F70			
100	D6	I	Topsoil of *rujum*
101	E6	I	Topsoil of *rujum*
102	F6	I	Topsoil of *rujum*
103	D6	IIb	Fill of *rujum*, stones and dark brown soil
104	E6	IIb	Fill of *rujum*, stones and dark brown soil
105	F6	IIb	Fill of *rujum*, stones and dark brown soil
106	F6	IIc	Fill of *rujum*, stones and light brown soil
107	D6	IIc	Fill of *rujum*, stones and light brown soil
108	E6	IIc	Fill of *rujum*, stones and light brown soil
109	D6 , E6	I, II	Balk
110	F6	IIc	Fill of *rujum*, stones and light brown soil
111	E6	IIc	Fill of *rujum*, stones and light brown soil
300	D4	I	Topsoil of *rujum*
301	D5	I	Topsoil of *rujum*
302	D7	I	Topsoil of *rujum*
303	D4	IIa	Fill of *rujum*, stones
304	D5	IIa	Fill of *rujum*, stones
305	D7	II	Fill of *rujum*
306	D4	IIb	Fill of *rujum*, stones and soil
307	D5	IIb	Fill of *rujum*, stones and soil
308	D4	IIb	Fill of *rujum*, stones and soil
309	D4	IIb	Fill of *rujum*, stones and soil
310	D4	IIb	Fill of *rujum*, stones and soil
311	D5	IIb	Fill of *rujum*, stones and soil
312	D7	IIb	Fill of *rujum*, stones and soil
313	D8	I	Topsoil of *rujum*
314	D5	IIb	Fill of *rujum*, stones and soil
315	D8	II	Fill of *rujum*, stones and soil
316	D5	IIb	Fill of *rujum*, stones and soil

Locus	Square	Level	Description
317	D7	IIc	Fill of *rujum*, stones and light brown soil
318	D5	IIb	Fill of *rujum*, stones and soil
319	D6, D7	I, II	Balk
320	D7, D8	I, II	Balk
321	D5	IIb	Fill of *rujum*, stones and soil
322	D8	IIc	Fill of *rujum*, stones and yellow-brown soil
323	D7	IIc	Fill of *rujum*, stones and yellow-brown soil
324	D8	IIIb	Light brown living surface
325	D8	IIc	Fill of *rujum*, stones and yellow-brown soil
326	E6	IIIa	Light brown soil, abandonment fill
327	E7	IIIa	Light brown soil, abandonment fill
328	E8	IIc	Fill of *rujum*, stones and red-brown soil
329	F7	IIIb	Light brown soil, occupation level
330	E7	IIIb	Gray-light brown soil on floor (=L367)
331	D7, E7, F7	-	Bulldozer debris
332	D6	-	Cleaning sections
333	D7	-	Cleaning sections
334	D6	IIIa	Stones and soil, collapse
335	D7	IIIa	Stones and soil, collapse
336	E6	IIIa	Collapse?
337	F6	IIIb	Light gray soil, above floor
338	F6	IIIb	Same as L337
339	F7	IIIb, c	Light gray living level on floor, above bedrock and small stone fill
340	D6	IIIb	Light gray living level above floor
341	E6	IIIb, c	Light gray soil on floor
341.1	E6	IIIb	Pillar base
342	D6	IIIb	Dark gray soil, living level
343	D6	IIIb	Same as L342

APPENDIX II (cont.)

Locus	Square	Level	Description
344	D5	-	Bulldozer debris
345	F8	II	Fill of *rujum*?
346	F7	IIIb	Light gray soil on floor
347	F6	IIIb	Light gray soil on floor
348	E8	IIIb	Light gray soil above floor?
349	F8	II	Same as L345?
350	D6	IIIa	Collapse
351	D6	IIIb	Wall
352	F7, F8	IIIb	Wall
353	F6	IIIb	Wall
354	F6	IIIb	Wall
355	F6	IIIb	Wall
356	F6	IIIb	Wall
357	D7	IIIa	Collapse
358	D7	IIIb	Gray soil above floor, L366
359	D6	IIIb	Fill of floor, light gray packed soil above bedrock
360	E7	IIIb	Wall
361	E7	IIIb	Fill on floor, gray-brown soil
362	E7	IIIb	Fill on floor, gray soil above bedrock
363	E6	IIIb	Fill on floor, gray-brown packed soil above bedrock
364	D6	IIIb	Fill on floor, gray soil
365	D7	IIIa	Collapse
366	D7	IIIb	Fill on floor, dark gray soil
367	E7, F7	IIIb	Fill on floor, light gray packed soil above bedrock
368	E7, F7	IIIb	Wall
369	E6, E7	IIIb	Same as L363 and L367
370	D7	IIIb	Wall
371	E8	IIIb?	Wall
372	E7	IIIb	Wall
373	D8	IIIb	Wall
374	D8	IIIb	Wall
Area F70/1			
1000	B3	-	Bulldozer debris on surface
1001	C3	-	Bulldozer debris on surface
1002	B3	Ib	Fill above floor, hard-packed light gray soil
1003	C3	Ia	Debris
1004	E8	-	Bulldozer debris on surface
1005	B3	Ic	Construction fill, small stones
1006	C3	II	Fill below floor
1007	C3, C4	-	Bulldozer dump
1008	B3	Ib	Fill of floor
1009	C4	I?	Bulldozer debris and fill above floor
1010	C4	Ia	Fill above floor
1011	B4	I?	Bulldozer debris and fill above floor
1012	C3	II	Reddish brown layer
1013	B4	Ib	Fill on floor
1014	B3	Ic, II	Construction fill, small stones and reddish brown layer
1015	C4	II	Reddish brown layer
1016	B3	II	Reddish brown layer
1017	B3	II	Reddish brown layer
1018	B3	Ib	Fill of floor
1019	B3	II	Reddish brown layer
1020	C4	II	Reddish brown layer
1021	C3	Ib	Fill above floor
1022	C4	-	Stones from terrace?
Area F71			
500	C4	I	Topsoil of *rujum*
501	C5	I	Topsoil of *rujum*
502	C4	III, IVa–b	Fill of *rujum*, collapse and fill above floor
503	C4	IVb	Fill above floor
504	B4	I	Topsoil of *rujum*
505	D4	I	Topsoil of *rujum*
506	C5	IVb	Fill above floor
507	B5	I	Topsoil of *rujum*
508	D5	I	Topsoil of *rujum*
509	B4	III	Fill of *rujum*
510	D4	III	Fill of *rujum*
511	C5	IVa	Fill, light brown-yellow soil

APPENDIX II (cont.)

Locus	Square	Level	Description
512	A4	II	Terrace fill
513	A5	I	Topsoil of *rujum*
514	E5	I	Topsoil of *rujum*
515	E4	I	Topsoil of *rujum*
516	E4	I	Topsoil of *rujum*
517	C5	V	Pit?
518	B4	IVb	Fill above floor, light brown soil
519	B4	IVb	Fill above floor, light brown soil
520	D4	IVa–b	Collapse and fill, light brown soil
521	D4	IVa–b	Collapse and fill, light brown soil
522	D5	IVb	Fill above floor
523	A4	II	Terrace fill
524	C8	I	Topsoil
525	B3	I	Bulldozer trench on terrace
526	A5	III, IVa–b	Fill of *rujum*, collapse and fill above floor
527	A5	II	Terrace fill
528	C5, D5	I, II	Balk
529	B5	III	Fill of *rujum*
530	B4	IVa–b	Collapse and light brown fill
531	B4	IVc	Fill below floor, above bedrock
532	E4	III, IVa–b	Fill of *rujum*, collapse and fill above floor
533	C8	IVb	Fill above floor
534	C7	IVb?	Fill above floor?
535	C6	I–IVb	Topsoil down to probable floor
536	B4, B5	I–III	Balk
537	A5, B5	I–III	Balk
538	B4, B5	I–III	Balk
539	B5, C5	I–III	Balk
540	C8, D8	I	Topsoil
541	C4	IV	Wall
542	B5, C5	IV	Wall, same as W549
543	B4	II	Wall
544	B4	IV	Wall
545	A4	II	Wall
546	B4	IV	Wall
547	D4	IV	Wall
548	A4	II	Wall
549	D5	IV	Wall, same as W542
550	A5	II? IV?	Wall
551	C8	IVb	Fill on floor
552	C8	IV	Wall
553	D7	IVb	Fill on floor
554	C8, D8	IVb	Fill on floor
555	C5, D5	IVa	Collapse
556	D7	IV	Wall
Area F82			
700	D4	I	Topsoil of *rujum*
701	C4	I	Topsoil of *rujum*
702	D4	II	Fill of *rujum*
703	D4	II	Fill of *rujum*
704	E4	I	Topsoil of *rujum*
705	E4, D4, F4	III	Fence wall?
706	E4	I	Topsoil of *rujum*
707	E4	IV	Pottery dump
708	E4	IV	Debris
709	E4	IV	Wall
710	D4	II	Fill of *rujum*

APPENDIX III: LOCI ACCORDING TO ARCHITECTURAL UNITS IN AREA F70, LEVEL III

Unit	Phase	Square	Locus
1	a	E6	326
	a	D6	334
	a	E6	336
	b	E6	341
	b	D6	342
	b	D6	343
	c	F6	347
	a	D6	350
	c	E6	363
	c	D6	364
	c	E6–E7	369
2	a	E7	327
	b	E7	330
	c	E7	360
	c	E7	362
	c	E7–F7	367
3	a	D7	335
	a	D7	357
	a	D7	365
	c	D7	366

Unit	Phase	Square	Locus
4	a	D6	334
	b	D6	340
	c	D6	359
5	b	D7	358
6	b	D8	324
7			
	b	E8	348
	c	E7	361
8	a	F8	349
9			
	b	F7	329
	b	F7	339
10			
	b	F6	337
	b	F6	338
	c	F6	353
	c	F6	354
11	c	F7	346
1, 4	a	D6	334
3, 5	a	D7	335

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NOTES

[1] The excavations were directed by Ianir Milevski on behalf of the Israel Antiquities Authority (IAA; Permit No. A-2628) with the assistance of Suair Ayoub, Deborah Sklar-Parnos and Rina Bankirer (field supervisors), Avraham Hajian and Viatcheslav Pirsky (drafting of plans) and Yair Rahamim and Ronen Yehuda (administration). Further assistance in the field was provided by Reuven Mordechai, IAA regional inspector of Modi'in. Elisheva Kamaisky restored the pottery vessels. The authors are also

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[2] The authors are indebted to Nuha Agha for her help with the Arabic meaning of *rujum*.

[3] Thanks are due to Yael Gorin-Rosen for identifying the glass vessels.

[4] In order to estimate the MNI from diagnostic sherds, a 'vessel equivalent' must be established, i.e., the relationship between a certain rim fragment and the rim circumference of the vessel from which it originated, thus calculating for each sherd the fraction it represents of the whole vessel (Orton 1993:172–173).

[5] The same deformations are noted in store jars from the Negev (Cohen 1999: Fig. 149:4) and Cave G26 in Jebel Qa'aqir (Dever 1981: Fig. 4:7).

[6] As only five items were recovered from Area F70/1, they are included in the statistics of Area F70.

[7] Trace-element analyses were not performed on the basalt objects from Er-Rujum. From the works of Philip and Williams-Thorpe (1993; 2001) and Rowan (1998) we know that at least five sources of basalt were exploited in the Early Bronze Age assemblages, including Umm Qeis and Salt, the area of the Yarmuk River, the Jordan Plateau and the Tafila/Dana area.

[8] The analysis was conducted in the Department of Materials at the University of Oxford on a Jeol JXA 8800R electron microscope, by Sariel Shalev, of the Center for Archaeological Science, Weizmann Institute of Science, Reḥovot, with the assistance of Chris Shalter.

[9] The findspot precludes attribution of the beads to the Intermediate Bronze Age phase of occupation.

[10] The botanical remains were analyzed in the Botanical Laboratories of the Institute of Archaeology, Tel Aviv University.

[11] The samples were analyzed in the Radiocarbon and Cosmogenic Isotopes Laboratory, Weizmann Institute of Science, Reḥovot.

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