TALL FENDI, A LATE CHALCOLITHIC SETTLEMENT IN THE LOWER WĀDĪ ZIQLĀB, JORDAN

by

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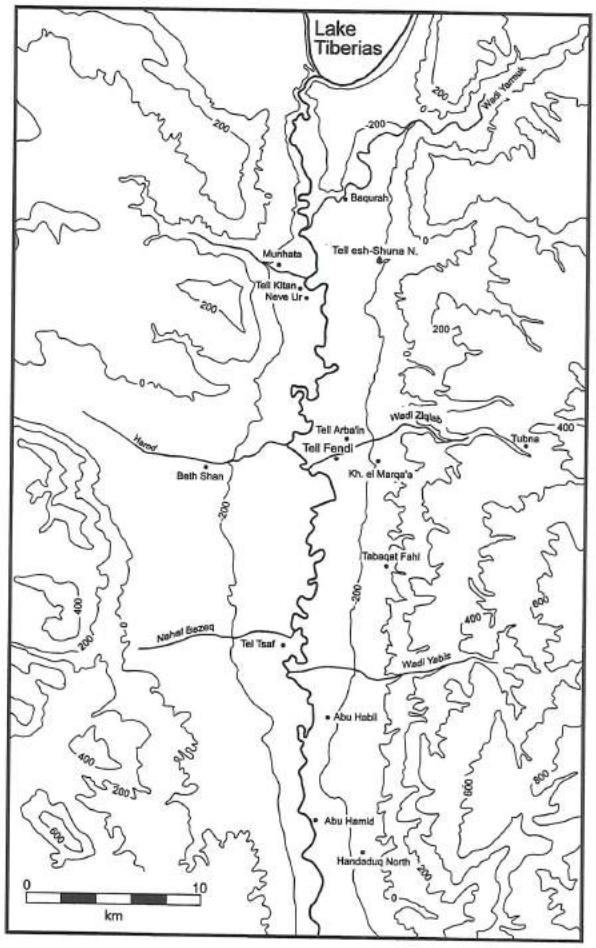
Introduction

Six weeks of excavations were carried out at Tall Fendi from September through November of 1996 as part of a research project investigating Chalcolithic chronology and settlement in the northern Jordan Valley. This project is affiliated with, and draws material support from, the Wādī Ziqlāb Project at the University of Toronto (Banning and Fawcett 1983; Banning 1985; Banning *et al.* 1987, 1989, 1992, 1996). Tall Fendi has been reported in a number of surveys (de Contenson 1964; Glueck 1951; Ibrahim *et al.* 1976; Kafafi 1982; Kareem 1989; Lenzen *et al.* 1987; Mellaart 1962; Yassine *et al.* 1988). While no previous excavations had been carried out at this site, Kareem (1989) did conduct an intensive surface pickup of artifacts in 1986, as part of the Jisr ash-shaykh Hussein Project (Lenzen 1987).

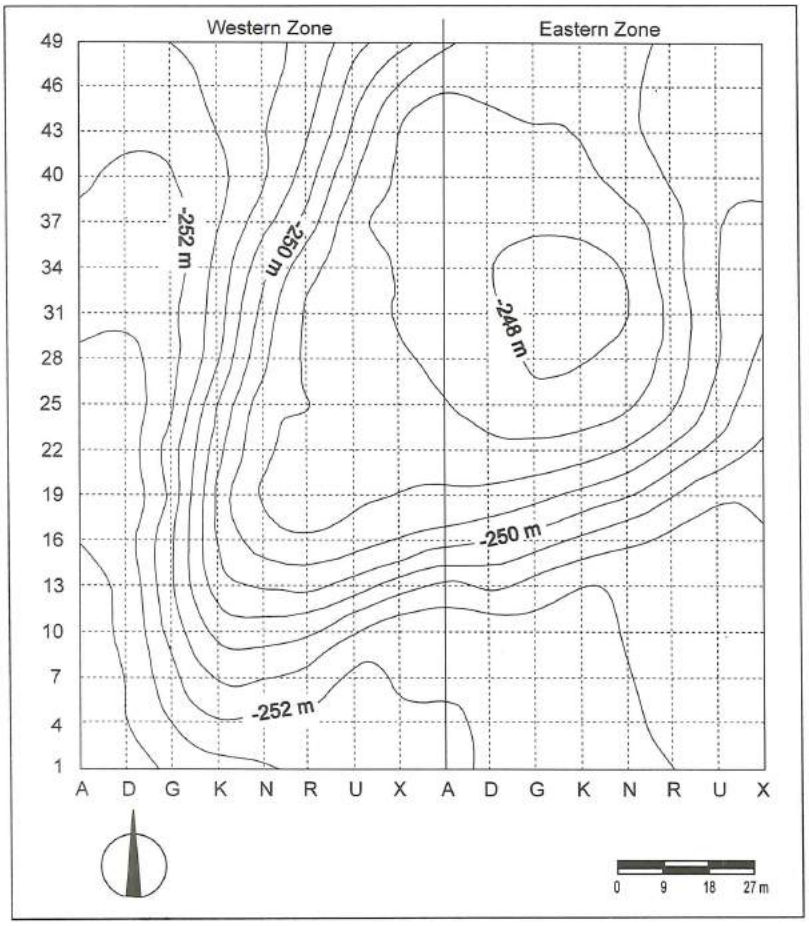
The site is located in the Baysān depression of the northern Jordan Valley, at an elevation of -248 m asl. The site is approximately 2 km west of Khirbat Marqa'a and 7 km east of Beth Shan, at Palestine Grid co-ordinates 205.030/212.650 (Fig. 1). The tall is a low mound rising 4 m above the surrounding alluvial plain, measuring approximately 130 m east-west by 140 m north-south, covering roughly 2 ha (Fig. 2).

Geological Setting

The mound was not formed entirely by the deposition of cultural sediments. Deep probes reaching to a depth of 2.4 m indicate that cultural deposits range in thickness from 0.4 m on the southern slope, to 1.0 m on the top of the site, and rest on a mound of naturally deposited clay. The cultural deposits are a grey-brown clay loam, while the underlying natural sediments consist primarily of a fine white-grey calcareous clay or marl, remarkably free of inclusions. These marls form part of the al-Lisān Beds, sediments deposited by Lake al-Lisān, and the remnant Lake Baysān, during the Upper Pleistocene and early Holocene (Bender 1974; Koucky and Smith 1986). The formation of the mound might well be the result of an accumulation of these lacustrine sediments over an underlying oolitic limestone formation, as appears to be the case at near-



1. The Baysān Region.



2. Topographic Map of Tall Fendi (D. Lasby).

by Tall al- 'Arba'īn, where outcrops of limestone are clearly visible.

Environmental Setting

The modern course of the Wādī Ziqlāb lies immediately north of the site, continuing southwest for 1.7 km, where it drains into the Jordan River. Wādī Ziqlāb is fed by several springs and, today, its drainage is controlled by a modern dam but, during the Chalcolithic (4500-3500 BC), it was probably a perrenial water source for Tall Fendi. These water resources would have been augmented by those originating from Wādī Abū Ziyād, which is also spring-fed and lies only 1.4 km south of the site. The water sources, in conjunction with the fertile valley soils that surround the site, would have made Tall Fendi a potentially productive location for a farming community during the Chalcolithic.

According to Koucky and Smith (1986: Fig. 6), Tall Fendi was situated adjacent to an extensive marshland, the last vestige of the receding Lake Baysān, during the Chalcolithic period. If this were the case, the mound would have been an attractively dry location for settlement at that time. It seems that the environment of Tall Fendi may well parallel that of Tulaylāt al-Ghassūl , as interpreted by Webley (in Hennessy 1969), but more will be known when soil analyses are complete.

The Site

Kareem (1989) reports that a mud-brick building was built in the southwest corner of the site in 1955, and was destroyed in 1970. Since that time, the site has not been occupied. The former location of this building is now marked by modern debris, including large fragments of concrete foundations. The tall, like the surrounding fields, is currently ploughed twice yearly, once be-

fore the planting of barley in December and again after the harvest in May. Because the cultural deposits at the site are not deep, this farming activity has damaged the site to some extent. Such disturbance is quite evident on the southern slope of the site, where many large cobbles have been dislodged by plowing, and are strewn over the field. During our excavations, workmen were removing these cobbles in order to facilitate the next season's plowing. In an attempt to avoid the most disturbed areas on the southern and western margins of the site, we decided to excavate near the summit, on the eastern portion of the tall.

The material culture represented at this site is primarily Late Chalcolithic. There are no Bronze Age or Iron Age deposits, but Persian, Byzantine, and Ayyubid/Mamluk ceramics were found in small quantities. Excavations uncovered the foundations of a Chalcolithic house, several associated architectural features, and a large quantity of stone and bone tools, and abundant Chalcolithic pottery. The artifacts and features suggest that the site was once a small farming community, whose inhabitants were exploiting the rich valley-bottom soils. On the basis of ceramic parallels, we suggest that Tall Fendi was contemporary with the larger Chalcolithic settlement at Pella, also known as Ṭabaqat Faḥl (Hennessy *et al.* 1983; McNicoll *et al.* 1982, 1986; Smith and McNicoll 1986). The community at Tall Fendi may have been associated socially and economically with this larger neighbour, whose size is estimated to have been 30 ha at this time (Smith and Hanbury-Tenison 1986:24).

The Excavations

The baseline of the site was set to the west of the site's centre and aligned along current magnetic north.[1] The baseline divides the site into eastern and western zones, both of which are independently labelled. A 3 x 3 m grid was superimposed over the site, creating excavation areas labelled alphabetically from west to east and numerically from south to north (see Fig. 2). In the 1996 season, excavations were carried out only in the eastern zone. Within each area, loci are defined on lithological criteria, and are used to designate coherent provenience units. Loci are identified using three digits (i.e., 001). Loci are further subdivided into 'bags', which are used to give greater spatial or vertical control within the individual locus. As an example, a specific provenience area may be designated as Area F29, locus 006, Bag 12, expressed in short form as F29.006.12.

Once the plow-zone sediments were removed, excavations proceeded using either a trowel or a small handpick. The sediments of all loci were dry-screened, partially or in full, through a 3mm mesh in order to gather data on pottery, lithics, faunal, and botanical remains. In general, fill layers were screened 50% and other contexts 100%. Soil samples were taken at selected locations for pedological and microbotanical analyses.

Stratigraphy

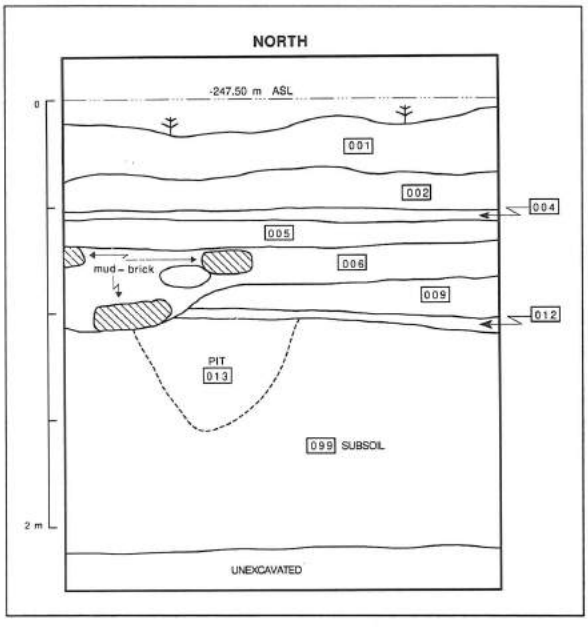
During our general survey of the site, we observed that a cut had been made into the west side of the mound. This 2 m wide gouge extended from the top of the mound, to about 0.5 m below the level of the surrounding fields, at a depth of more than 4 m. This exposure showed less than 1 m of cultural deposits on top of the mound and, below this, lay 4 m of clay marl deposits. To confirm this exposure, several test trenches were dug on the east and south sides of the mound. These trenches confirmed that cultural deposits were confined to a thin layer on top of the site, and suggest that settlement at the site was primarily limited to the Late Chalcolithic, although some human activity

1. The annual change in magnetic declination is estimated at 2 minutes easterly as of 1960 (1:50,000 map series).

did occur during later periods.

The stratigraphy of the site is shallow but complex. Many areas have been subjected to post-depositional disturbances, including pit digging, plowing, and the constant burrowing activity of the Palestinian mole-rat (*Spalax ehrenbergi*).

The small scale of excavation in the 1996 season did not permit the time or resources to take all horizontal exposures down to natural deposits. Only in Areas F29, G29, and E31 were unit excavations taken down to culturally sterile clay. Based on the sequence in these squares, there appear to have been three main construction events, possibly interpreted as phases of occupation. A section drawing of the north wall of Test Trench 2 (Fig. 3), which forms a part of Area F29, shows that the first human activity at the site (locus 012) occurred directly over the lacustrine marls (locus 099). Subsequent occupation surfaces occurred at the interface of locus 006 and locus 005, as well as at locus 004, the latter surface corresponding to the occupation of the house. The intervening layer, locus 006, was composed of fill and debris, including several mud-bricks. Locus 009 was a hard-packed clayloam, and may have been formed by a continuous and rapid accumulation of sediment on a well-used surface. A number of flat-lying sherds were found within this locus, although no changes in either soil colour or texture could be discerned.



3. Site WZ 126, Area F29 - Test Trench 2. Site Stratigraphy at Unit F29. Pit 013 does not form part of this section but is situated 30 cm to the north of this section cut. It is shown here to illustrate the depth of deposits.

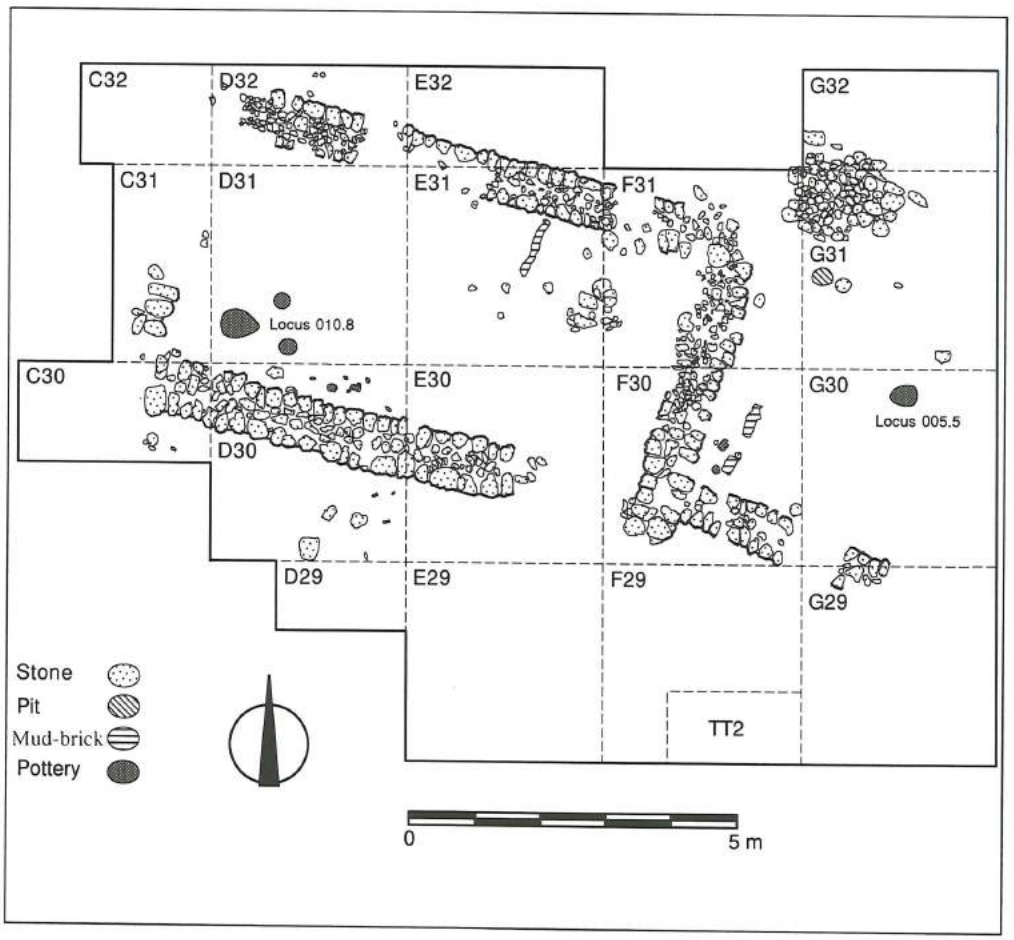
Separate features were observed in locus 005, but are not shown on the top plan (Fig. 4) because they were deposited at an earlier time. These features include a small oval platform made from rounded cobbles that projects into the north wall of F29 and extends into Area F30, just below the southeast corner of the building. At the same level in Area F29, an isolated line of stones was found in the northwest corner.

The pit feature, locus 013, shown with a dotted outline (see Fig. 3), is not visible in section because it was located 30 cm to the north of the section.

Architecture and Features

Several mud-bricks averaging 37 x 25 x 12 cm were found at a depth ranging from 0.6 to 1.0 m in the northwest corner of Test Trench 2 (Area F29). It was anticipated that these mud-bricks would lead to other architectural remains, and excavations were begun in Areas F29, E29 and F30. During the course of excavations, the cluster of mud-bricks proved to be isolated, and does not seem to have been associated with any other architectural remains.

No architecture was found in Area E29, but in F30, the remains of a stone wall foundation were uncovered just below the plow zone. Excavation in surrounding areas exposed the well preserved remains of a Chalcolithic 'broad-room' house (Fig. 4). By the end of the excavation season, complete and relatively intact foundations of the building were exposed. This structure was comparatively small, measuring approximately 9 x 5 m in external dimensions, with the long axis



4. Plan of the Chalcolithic broad-room house and associated architectural features (plan by E. Banning).

oriented generally east-west.

A broad-room house, as defined by Dothan (1959:14) and Porath (1985:14) usually has at least two rooms, the smaller of which is as wide as the house and 2 to 4 m in length. No stone foundations were found that would delineate a smaller room but we did locate the remains of a 1 m mud-brick wall or divider situated about 3 m from the outer wall, which suggests that a similar spatial logic guided construction. Porath suggests that the larger rooms were courtyards but this is unlikely in the Tall Fendi case.

Most of the plans of broad-room houses published for this period show the doorway situated in the long wall and entering the larger room. But site disturbances, especially at the northwest corner of the house where a wide pit was dug in Byzantine times, make it impossible to determine the exact location of the house doorway. One possible location is in the north wall in Area D32 and another is in the southeast corner in Area E30. Despite the structural patterns seen at other sites, the wall opening at E30 seems the most likely location for the doorway as the break is distinct, and in an area which appears to have been relatively free of disturbance.

The wall foundations were single-course, double-leaf stone walls with rubble fill, ave-raging 85 cm in width. The surface on which these stones were laid varies less than 15 cm in elevation, suggesting that the area was filled and levelled before construction began. Presumably these foundation stones served as footings for a more substantial mud-brick wall, as at Tulaylāt al-Ghassūl (Koeppel 1940; Mallon *et al.* 1934; North 1961) and Abū Ḥāmid (Dollfus and Kafafi 1986, 1987, 1988; Dollfus *et al.* 1988); likely destroyed by plowing.

The stone foundations of an external

wall projected eastward from the southeast corner of the building. This wall continued for only a few meters before ending in a jumble of wall collapse (Area G29). As originally constructed, this wall was probably much longer, but was destroyed by later digging or modern plowing activity. It is possible that this wall bounded an outer courtyard space on the eastern side of the house.

The building at Tall Fendi is similar in construction to Chalcolithic buildings found at Rasm Harbush (Epstein 1978:27), Abū Ḥāmid (Dollfus and Kafafi 1988: fig. 18), Tall Kitan (Eisenberg 1993:878), Meser (Dothan 1959: fig. 2), and Tulaylāt al-Ghassūl (Hennessy 1969: fig. 4). Unfortunately, the structures at Pella XIV (McNicoll *et al.* 1982: fig. 4) are not complete enough to enable comparisons. The structures at Abū Ḥāmid are the most similar in terms of construction techniques and size, whereas those at Tulaylāt al-Ghassūl and Rasm Harbush are similar in width but longer (about 12 m). In general, the structure at Tall Fendi is smaller than its counterparts.

Near the northeast corner of the building was a circular pavement of medium-sized, rounded cobbles. Nearly all cobbles were flat on the upper side, forming a relatively level working surface. Stone pavements of this sort are a common feature at Tulaylāt al-Ghassūl (Bourke *et al.* 1995: fig. 8; Mallon *et al.* 1934:44-46; North 1961: fig. 8), and were also found at Meser (Dothan 1959: fig. 2) and Pella (Hanbury-Tenison 1986:228). The function of these pavements remains uncertain. Mallon suggested that they were work places for processing grains or for cleaning but, at Abū Maṭar child burials were found under similar structures (Perrot 1955). Subsequent excavation underneath the pavement revealed no other features. Soil samples were taken from between and below the stones for phosphate, micro-refuse and micro-morphological analysis in the hopes of being able to determine the use of the platform. Adjacent to this pavement was a blackened area containing a thin layer of ashy clay-loam deposits, perhaps the remains of a hearth, but no associated construction or charred remains were found to confirm this.

Inside the building, in Areas E31 and F31, was an enigmatic cluster of stones founded on a semi-circle of large cobbles interspersed with traces of mud-brick detritus. We suspect the underlying stones are the disturbed remains of a stone-lined pit, but are uncertain about the cluster of large stones above that appear to be unrelated. Many small pieces of what appears to be a mud plaster were found, but no plaster-lined features or floors.

Just below the oldest surface in Area F29 (F29.012, fig. 3), dug into sterile subsoil, was a 0.5 m deep pit (F29.013) containing what appears to have been the remains of a jar burial. The vessel was a medium-sized, open-mouthed storage jar with a slightly everted rim, 26 cm in diameter. The jar was associated with a number of human deciduous teeth, a mandible, and other unidentified bone fragments. The deposit was disturbed but the context suggests that it was originally a jar burial, a common means of internment for infants at Tulaylat al-Ghassūl (Mallon *et al.* 1934). This jar is presently being reconstructed and is not shown below in Figures 5 or 6.

In the southwestern corner and near the south wall of the structure, were the *in situ* remains of several crushed pottery vessels. Among these were the remains of a number of large storage jars (Fig. 4: D31.010.8). The upright remains of another large storage jar were found in the eastern 'courtyard' (G30.005.5).

There is little evidence to suggest that Tall Fendi was occupied as a permanent settlement in either the Persian or Ayyubid/Mamluk periods. It is possible, however, that the site was put to some use during the

Late Roman or Byzantine periods. In the northwest corner of the building, where there was considerable post-depositional disturbance, relatively high percentages of Byzantine sherds were found. In addition, five post-holes (15-20 cm in diam) were dug into the Chalcolithic deposits at a later time, although there is no evidence to suggest that the post-holes were contemporary with the disturbance of the house foundations.

Ceramics

Several periods were represented in the upper plow-zone. These included, as noted above, Persian, Roman/Byzantine, and some Ayyubid/Mamluk sherds. The only diagnostic example of Persian period ceramics recovered was a rim sherd of a Phoenician "sausage jar" (Fig. 5: 1) (Bikai 1978; Paice 1987:97). While Persian period ceramics are common along the Levantine coast, they are an unusual find east of the Jordan River. In fact, no recognizable Persian period pottery was found in the entire Wādī Ziqlāb Survey (Banning and Fawcett 1983). The jar recovered at Tall Fendi would date between 525 to 400 BC (Paice, pers. comm).

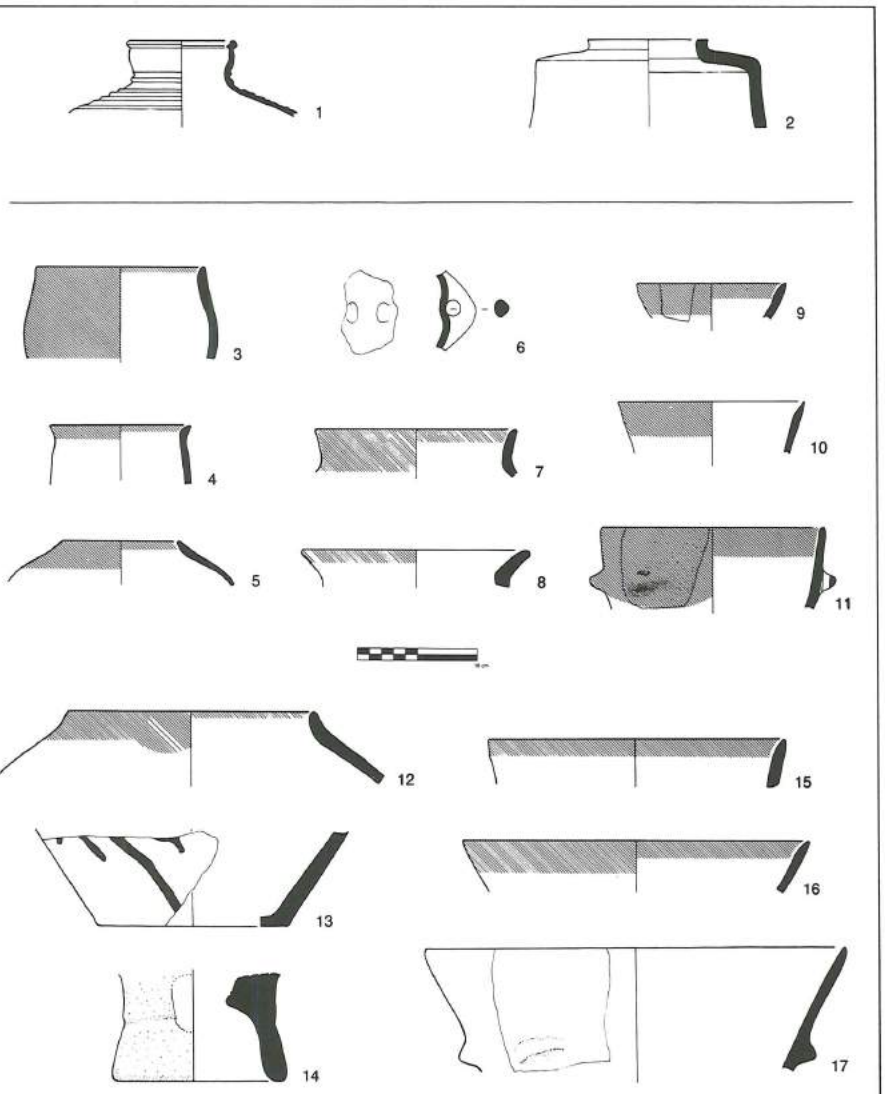
Roman/Byzantine pottery was found in greater quantities. Almost all of the sherds found consisted of thin red (2.5YR 5/6) ware with a ribbed body. The example shown in Figure. 5:2, is the complete rim and neck of a large bell-shaped storage jar. It is likely that many of the recovered sherds were part of these large jars, as no other rim types were found.

Recognizable Ayyubid/Mamluk material was confined to two small sherds with green and blue glazing.

The composition of the Chalcolithic pottery fabrics is generally consistent, not surprisingly considering the abundant amounts of fine grey clay available on the site itself. Exploitation of the site as a clay source continues even today. During our excavations, local residents were observed removing clay deposits from the west cut (mentioned above) for manufacturing domestic pottery and *ṭābūn* ' ovens'. When fired thoroughly, this clay produces a pottery fabric very pale brown or pink in colour (Munsell terminology), often described as buff. The clay in most vessels appears well-levigated, and variations in fabric composition are largely due to the type of temper used. For the most part, inclusions consist of either crushed limestone or chert (size fraction), but a few sherds contain shell. This shell temper would have been readily available, as indicated by the ubiquity of land and water snail shells found throughout the site. A number of the larger vessels contained inclusions of small (4-5 mm), rounded pebbles, suggesting that gravels from nearby stream channels were sieved for use as temper.

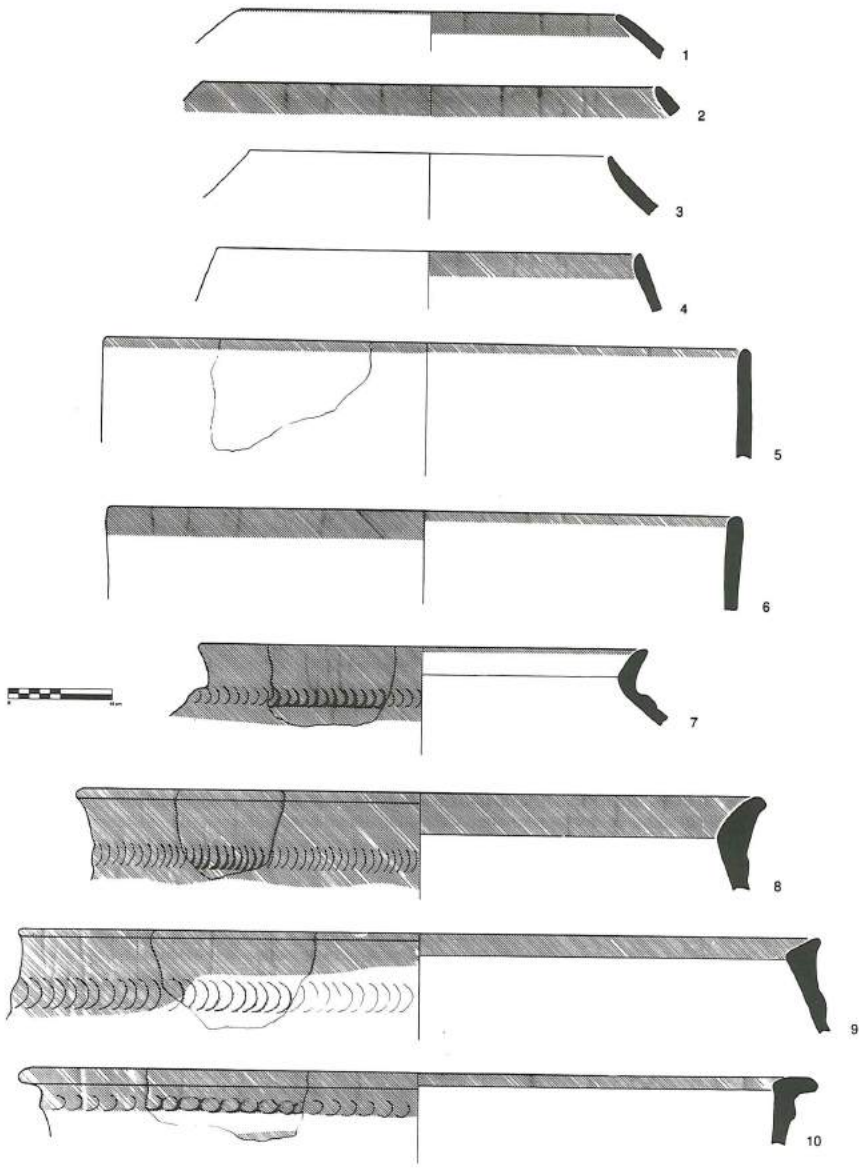
Vessel forms vary considerably, and the examples shown in Figures 5 and 6 do not represent the entire assemblage. No complete vessels were found, but on the basis of sherds and handles recovered, the following types of Chalcolithic vessels were present: small, open-mouth jars with vertically-pierced lug handles; V-shaped bowls (ranging from 12 to 17 cm in diameter); small hole-mouth jars, some with slightly everted rims; large hole-mouth jars with plain rims; small jars with outflaring rims (beakers); large storage vessels with heavy, short, everted rims; large vessels with plain rims and upright walls; and large, plain rim basins with thick bases.

Pottery decoration consists mainly of red slip (2.5YR 4/6), and the application of horizontal clay strips, or mouldings. Most vessels have some form of red slip decoration. Slip decoration is applied in three ways: covering the entire outside of the vessel, as outer and inner rim bands of varying thickness, and as painted swaths or roughly parallel lines on the outside of the vessel. Applied strips of clay are moulded with either a scalloped design or with finger impressions. Scalloped designs could be made by pressing a finger or thumb into the clay and



No.	Artifact No.	Description	Diam	D±	%	S±	Fabric Colour		Inc Sz
1	D31.12.201	Roman/Byzantine jar	9	0.2	100	0	2.5YR 5/6	Red	N
2	G29.12.201	Persian Period jar	9	0.5	15	2	5YR 6/4	Light reddish-brown	3
3	F29.2.201	Small jar	13	0.5	13	1	10YR 7/4	Very pale brown	1.5
4	G29.15.203	Small jar - beaker	11	1	15	3	7.5YR 6/6	Reddish yellow	1.5
5	G30.2.203	Small hole-mouth jar	9.5	0.5	10	2	10YR 7/3	Very pale brown	1.5
6	G29.1.202	Large eye-handle					10YR 7/3	Very pale brown	1.5
7	F29.3.220	Jar	16	0.5	15	1	10YR 6/1	Gray	3.5
8	B13.1.207	Jar	18.5	1.5	5	2	10YR 7/2	Light gray	3.5
9	G29.14.219	Bowl	12	1	7.5	5	7.5YR 7/4	Pink	1
10	F29.2.204	Bowl	15	1	7.5	3	7.5YR 8/4	Pink	0.5
11	00.0.201	Bowl	18	1	10	1	10YR 7/3	Very pale brown	2
12	G29.1.201	Hole-mouth jar	20	1	5	4	10YR 7/3	Very pale brown	1
13	F31.12.207	Jar base	15.5	0.5	18	0	10YR 7/4	Very pale brown	2
14	00.0.205	Basalt pedastal	14	1	17	0			
15	C31.2.201	Medium bowl	24	5	2.5	3	10YR 7/3	Very pale brown	0.5
16	E29.5.204	Medium bowl	28	2	5	2	10YR 7/3	Very pale brown	1
17	F30.10.201	Medium bowl	34	1	9	2	10YR 7/4	Very pale brown	1

5. Selected pottery from Tall Fendi, all levels. Headings: Diam, diameter in cm; D±, diameter range; %, percent of rim diameter preserved; S±, stance range in degrees; Inc Sz, maximum inclusion size in mm. Fabric colour descriptions are Munsell.



No	Artifact No.	Description	Diam	D±	%	S±	Fabric Colour		Inc Sz
1	B11.1.203	Hole-mouth jar	35	2.5	4	3	7.5YR 7/4	Pink	1.5
2	B13.1.206	Hole-mouth jar	42	5	4	5	10YR 7/4	Very pale brown	2
3	F31.5.203	Hole-mouth jar	34	5	5	4	7.5YR 7/4	Pink	2.5
4	B13.1.209	Hole-mouth jar	40	3	5	3	10YR 6/1	Gray	2
5	G30.2.202	Large jar	62	3	7	4	10YR 7/4	Very pale brown	5
6	D31.10.203	Large jar	50*	5	7	4	10YR 7/5	Very pale brown	3
7	D32.3.202	Large jar	42	2	10	2	5YR 5/1	Gray	5
8	G30.7.203	Large jar	60*	5	3.5	2	7.5YR 7/4	Pink	5
9	F31.4.202	Large jar	75	5	7	4	7.5YR 8/4	Pink	4
10	F31.5.201	Large jar	75	5	6	2	7.5YR 7/4	Pink	5

* Corrected diameters

6. Larger vessels found at Tall Fendi, all levels. Headings: see Fig. 5.

rolling it to the right to create a series of quarter-moon shapes or by using a small spatula. Scalloped designs average 30 mm in width, whereas finger-impressed mouldings average 15 mm. Few sherds show incisions, but where these do exist, they are 1-2 cm in length and arranged in a horizontal series.

All vessels are handmade, although some may have been finished on a tournette. Many of the smaller vessels are thin-walled, smoothly finished and show fine striations, but wall thicknesses are variable and striations are discontinuous and horizontal, rather than continuous and spiralled, as on wheel-turned pots. These manufacturing characteristics suggest that vessels were first coil or slab built and then finished on a turntable, or tournette, using interrupted rotation (Rye 1981:64). Vessel bases are either smooth or have a circular impression, sometimes concave, that forms a thin ring about the circumference. Commenge-Pellerin (1990:12) suggests that these types of ring bases were formed by circular supports centred on tournettes. There are no mat-impressed bases in the assemblage. Most of the small vessels have red slip applied outside and a band painted on the inside rim.

Considering the small area excavated, the assemblage appears to contain a relatively high percentage of large storage jars (Fig. 6), of which there are three basic types: hole-mouth jars with plain rims, jars with upright walls and plain rims, and jars with short, heavy everted rims. All rim sherds of the large jars have red slip applied to the upper lip of the rim and to the outside. In some cases, the slip covers the applied bands.

Strap handles, lug handles, and pierced lug handles are present in the assemblage. Strap handles are approximately 80 mm long by 35 mm wide with flat or oval cross sections. Pierced lug handles vary in size, ranging from 40 to 120 mm in length. There is only one example of an unpierced lug handle (Fig. 5: 17).

Absent from the ceramic assemblage, as of the 1996 season, are cornets, spouted vessels, churns, pedestalled vessels (although a ground stone pedestal was found), and painted pattern decorations.

The Chalcolithic pottery recovered at Tall Fendi closely parallels that found at Pella in Areas XIV and XXV (Hennessy *et al.* 1983; McNicoll *et al.* 1982, 1986), Tall Abū Hābil North (Contenson 1960:31-49; Leonard 1992:64-76), and at the recently excavated site of Tubna, in the hills of the Wādī Ziqlāb (Banning *et al.* 1997). There are fewer typological parallels with the assemblages at Neve Ur (Perrot *et al.* 1967), Tall Tsaf (Gopher 1988; Gophna and Kislev 1979; Gophna and Sadeh 1989) and Abū Ḥāmid, which appear to be more similar to the Ghassulian assemblage.

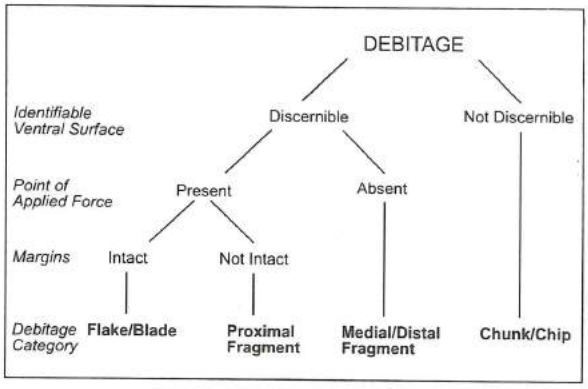
The Chipped Stone Assemblage

The chipped stone assemblage recovered totals over 4600 artifacts. At this time, only the material recovered from the contiguous excavation area has been analyzed. Given the short occupation span at the site, it is unlikely that the unanalysed material from the deep probes is substantially different from that recovered in the contiguous excavation area.

Two classification schemes were applied to the assemblage. One approach, for the formed tools, is typological and, for the debitage and *ad hoc* tools, a technological approach was used. The formed tool classification is based on those developed by Rosen (1983, 1997), Lee (1973), and Gopher (1989). The classification scheme used for the debitage is based on one originally developed by Sullivan and Rosen (1985), for differentiating between bifacial and core reduction strategies. As it was applied here, the classification scheme is intended to permit a gross assessment of the stage and intensity of core reduction. As detailed in

Figure 7, the classification is a hierarchical one, based on the presence or absence of specific technological attributes. Flakes and blades are defined as elements that are complete, having both a striking platform and complete medial/distal margins. Proximal elements are defined as those that have striking platforms, but incomplete medial/distal margins. Medial/Distal elements are those without a striking platform, but with an identifiable ventral surface. Chunks are elements of two cm, or larger, in maximum dimension, with neither a striking platform, nor a ventral surface. Chips are elements with the same criteria, but less than 2 cm in maximum dimension.

As is typical of Chalcolithic sites, the density of extensively retouched, formed tools is very low; at no point do they comprise more than two percent of the chipped stone assemblage. The overwhelming bulk of the assemblage is comprised of debitage



7. Debitage Classification Scheme (after Sullivan and Rosen 1985).

or *ad hoc* tools. Attempts to discriminate between utilized and unutilized lithic elements on the basis of macroscopically visible criteria alone have proven to be generally unreliable (Young and Bamforth 1990). As a consequence, only those elements continuously retouched and distinct along their entire margins were identified as utilized. Further work using microscopic criteria will be carried out in order to produce a more reliable assessment of what proportion of the debitage was utilized as *ad hoc* tools.

For the purposes of chronological analysis, the occupation of the site was divided into four stratigraphic phases (Table 1). Generally, assemblage composition appears to be fairly consistent throughout, suggesting that there were no major changes in chipped stone production strategy during the period of occupation, although there seem to have been changes in the intensity of reduction (Tables 2 and 3).

Formed Tools

The range of formed tool types is generally consistent with other Chalcolithic sites known from the region. Adzes, tabular fan scrapers, sickle blades, backed blades and perforators make up the bulk of the assemblage (Table 2). The adzes are generally plano-convex in shape, with a high hog-backed cross-section. Most of the adzes are core tools, but one specimen was made on a large flake. Bits are formed by

Table 1. Stratigraphic Phasing.

Phase	Description
Indeterm.	Strata where phasing is indefinite.
Plow-zone	Plow-zone, modern site surface. Heavily disturbed.
1	Pit, square F29, dug into clay subsoil, associated with probable jar burial.
2	Strata below the level of the house walls.
3	Strata contemporary with the house walls.
4	Hardened layer above the level of the house walls, and below the plow-zone. Moderately disturbed.

Table 2. Formed Tool Assemblage Composition.

Tool	Phase 1	Phase 2	Phase 3	Phase 4	Plowzone
Adze	-	-	1	1	-
Adze Fragment	-	-	1	1	-
Adze Preform	-	-	1	-	-
Axe Fragment	-	-	1	-	-
Backed Blade	1	2	6	-	-
Chopper	-	1	-	-	-
Notch	-	1	3	-	1
Perforated Disc Fragment	-	-	2	-	-
Perforator	-	1	-	1	-
Perforator Fragment	-	-	-	1	-
Retouched Element	1	1	6	5	1
Scraper	-	-	1	1	-
Sickle Blade	-	-	8	1	2
Tabular Fan Scraper Fragment	-	1	1	1	-
Weight	-	-	1	-	-
Total:	2	7	32	12	4

longitudinal removals on the dorsal surface of the tool, and removals from the lateral margins on the ventral side of the tool. Tabular fan scrapers are represented by three small fragments, which makes identification of the sub-types difficult. The fragments are thin, with fairly steeply retouched edges. Two of the fragments have the rounded edge profiles of oval or round scraper forms, while the other seems to be from a rectangular form, as demonstrated by the near 90 degree angle in the edge profile. The sickle blades and backed blades are fairly narrow, with minimally retouched and somewhat irregular cutting edges. Backing is abrupt to semi-abrupt, and ends are truncated or retouched. Sickle blades are differentiated from backed blades by the presence of sickle gloss. Perforators are steeply unifacially retouched, with elongated triangular bit profiles. All specimens bear signs of significant edge rounding. The perforated disc fragments both seem to come from examples of the round sub-type. Both specimens appear to have broken approximately in half. No trace of a notch is present on either specimen. The perforations are slightly offset from center, biconical in form and smoothed by grinding, with a diameter of approximately 1.5 cm. The edge profile is round, and retouch is flat and bifacial, although there is far more retouch on the dorsal surface of the tool than the ventral.

Debitage (see Table 3)

As at other Chalcolithic sites (Rollefson 1992), the debitage assemblage reflects a strong emphasis on the rapid production of generalized flakes. The reduction strategy employed is probably best described as "amorphous", as the term has come to be used by North American researchers dealing with New World assemblages. Platforms are large, and the amount of platform preparation is minimal; flakes generally have only one or two large platform scars. Flake cores are single- or multiple-

Table 3. Debitage Assemblage Composition.

Element	Phase 1	%	Phase 2	%	Phase 3	%
Flake	10	23.8	103	19.6	286	18.1
PF	7	16.7	47	9.0	188	11.9
MDF	19	45.2	236	45.0	729	46.1
SDF	3	7.1	55	10.5	172	10.9
SDPF	0	0.0	18	3.4	35	2.2
SDMDF	3	7.1	66	12.6	173	10.9
Total:	42		525		1583	

Element	Phase 4	%	Plowzone	%	Indeterm.	%
Flake	77	15.2	48	16.2	24	17.7
PF	57	11.2	23	7.7	11	8.1
MDF	249	49.1	123	41.4	75	55.2
SDF	42	8.3	29	9.8	9	6.6
SDPF	11	2.2	9	3.0	4	2.9
SDMDF	71	14.0	65	21.9	13	9.6
Total:	507		297		136	

Element	Phase 1	%	Phase 2	%	Phase 3	%
Blade	0	0.0	8	28.6	25	26.9
PB	1	16.7	5	17.9	22	23.7
MDB	4	66.7	11	39.3	33	35.5
SDB	0	0.0	1	3.6	3	3.2
SDPB	0	0.0	1	3.6	3	3.2
SDMDB	1	16.7	2	7.1	7	7.5
Total:	6		28		93	

Element	Phase 4	%	Plowzone	%	Indeterm.	%
Blade	2	25.0	1	12.5	0	0.0
PB	1	12.5	2	25.0	0	0.0
MDB	0	0.0	3	37.5	2	50.0
SDB	1	12.5	0	0.0	1	25.0
SDPB	2	25.0	0	0.0	0	0.0
SDMDB	2	25.0	2	25.0	1	25.0
Total:	8		8		4	

Element	Phase 1	Phase 2	Phase 3	Phase 4	Plowzone	Indeterm.
Chunk	18	158	342	124	65	39
Core	0	21	45	8	7	3
CTE	0	5	2	3	0	1
Tool	2	7	31	12	4	0
Total:	20	191	420	147	76	43

platform, with striking platform location not being spatially structured to produce a particular geometric form. Instead, platforms are distributed almost randomly, with the sole criterion for selection apparently being the viability of flake removal at a given location. Given the absence of cores used specifically for blade production, it would seem that blades were struck from mixed blade-flake cores. Cores are not generally reduced to the point of complete exhaustion.

Preliminary analyses suggest an increasing intensity in lithic reduction over time. Excluding the small sample from Phase 1, the heavily disturbed plow zone, and the unassignable remains, there was a progressive increase in the ratio of flakes to secondary decortication flakes (SDF), the ratios of flakes and SDF to cores, as well as the ratio of chunks to cores (Table 4). This increase in the number of elements per core, and the reduction of cores to the point that they are classified as chunks suggests that reduction intensified as time progressed. The motivation for this increase in reduction intensity is not clear at present, and will be a focus of future investigations.

Other Material

All bone was highly fragmented and bone preservation appears to have been poor, despite the calcareous nature of the soil. The poor preservation may be due to a high degree of rodent activity within the deposits. Few bone tools were found, although some bone fragments show signs of polishing. A preliminary analysis suggests that the faunal assemblage contains sheep, goat, pigs, a significant number of land and water snails, as well as some human teeth and bone fragments.

Several fragments of groundstone vessels, made from either basalt or phosphorite, were recovered, including several rim pieces and one base fragment of a pedestalled bowl (see Fig. 5:14).

Although mace-heads and figurines occur at other regional Chalcolithic sites, such as Abū Ḥāmid and Abā Hābil, they have yet to be recovered at Tall Fendi.

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Table 4. Debitage Assemblage Ratios.

Elements	Phase 1	Phase 2	Phase 3	Phase 4	Plowzone	Indeterm.
Flakes per Blade	17.0	11.5	10.1	44.7	23.7	-
Flakes per SDF	5.7	2.1	2.3	2.5	1.9	2.7
Flakes per Core	-	7.1	10.5	16.8	10.1	11.7
SDF per Core	-	3.5	4.6	6.6	5.4	4.3
Flakes per Chunk	0.9	1.0	1.4	1.1	1.1	0.9
SDF per Chunk	0.2	0.5	0.6	0.4	0.6	0.3
Chunks per Core	-	7.5	7.6	16.0	9.3	13.0

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