

**APPENDIX****ARCHAEOLOGICAL RESEARCH IN THE BISHRI REGION****— REPORT OF THE EIGHTH WORKING SEASON —**

(To be added on Page 111 of *Archaeological Research in the Bishri Region: Report of the Eighth Working Season* (Preliminary Reports of the Syria-Japan Archaeological Joint Research in the Region of Ar-Raqqa, Syria, 2009, *Al-Rāfidān* XXXI: 97–207, 2010))

**3. SONDAGE AND SURFACE RESEARCH AT TELL GHANEM AL-ALI**

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**Introduction**

This season's work at Tell Ghanem al-Ali mainly consisted of two operations; Sondage of Square 2, and surface survey in the eastern half of the mound. The purpose of the former operation was to determine a local chronology of the Early Bronze Age layers. We began this operation at the beginning of our research at Tell Ghanem al-Ali, and at last, we reached virgin soil this season. Now, we have recovered material that establishes a good sequence from the EBIII to EBIV. The result of this sounding also indicates that almost all of the cultural deposits, except the modern cemetery on top of the mound, belonged to the EB period. Therefore, we recognize again that Tell Ghanem al-Ali played an important role in the emergence of Semitic nomads, which appeared during the late third and the early second millennia bc. The aim of the latter operation was to understand the town layout through surface observation. We began this operation in the northern part of the mound last season, and continued in the eastern part of the mound this season. The result of this research indicates that the townscape of the EB period at Tell Ghanem al-Ali was not planned and that the town was constructed in a relatively haphazard manner.

**Surface research in the eastern half of the mound**

From the beginning of our first visit to Tell Ghanem al-Ali, we noticed that a considerable number of buildings could be detected by surface observation. It seems that this condition gave us a unique opportunity to study town planning of the last stages of occupation, probably the EB III–IV period, without the need for excavation. Therefore, we started this operation on the northern slope of the mound during our 7<sup>th</sup> season. The surface layer was removed and then each structure was cleaned and recorded. However, removing the surface layer sometimes disturbed the building outlines. Therefore, we decided to record the building outlines directly using a total station system. The whole mound surface was divided into 100 m × 100 m squares along the four cardinal points, centering on the Bench Mark (0, 0). In this season, building traces in the areas of the eastern four 100 m × 100 m squares were surveyed. We temporarily named them Area A to D (Fig. 1). Most of the buildings, except those in the northern half of Area A, which had been surveyed in the previous season, were traced.

As the summit of the mound is covered with the modern graves of Ghanem al-Ali villagers (green-colored area in Fig. 1), Bronze Age buildings couldn't be observed in the southwest of Area A and the northwest of Area C. Therefore, EB buildings were most evident in the southeast of Area A and the southwest of Area B, especially south of Square 1. However, we did detect some building traces here and there in all areas (Fig. 2). Let us introduce the most recognizable buildings.

**Str.901** A rectangular plan building, measuring  $6 \times 5$  m, located just south of Square 1 in Area A. The long axis of the building is orientated WNW-ESE. Beside the north wall, a parallel wall runs in the same direction. A series of five *tannors* were built into this parallel wall at its northern side (Figs. 3, 4). Another large *tannor* was also installed near this series. Therefore, it seems that this building was not merely a kitchen, but a bakehouse. The potsherds collected in and around Str.901 belong to the EB III – EBIVA varieties (Fig. 5).

**Str.902, Str.903** These rectangular rooms, measuring  $6.5 \times 4.5$  m and  $5 \times 4$  m each, were supposed to be part of a large multi-roomed building, which is located c. 10 m south of Str.901 (Figs. 6, 7, 8). The building probably consists of five rectangular rooms and a courtyard. It seems that this kind of building was one of the main house types in the EB period at Tell Ghanem al-Ali. Most of the potsherds collected from this building belong to the EBIII-EBVIA varieties. However, a small ring-based jar (Fig. 9), having a MB profile, was also collected from the room north of Str.903. This is rare evidence indicating the existence of a MB cultural layer at Tell Ghanem al-Ali.

**Str.905** This is another type of large building, consisting of a series of small square rooms in two rows (Fig. 10). It is located in the northwest of Area C. One of the rooms of this building measures  $4 \times 4$  m. As the next room includes a *tannor*, the building was for used for domestic purposes. Potsherds from this building belong to the EB varieties (Fig. 11).

**Str.907** A multi-roomed building, consisting of five or more rectangular rooms in a row, located in the southeast of Area B (Fig. 12). Its external form, measures 20 m long from east to west and 5.5 m wide from north to south. Some EB potsherds were collected from this building.

**Str.909** This is the sole circular structure detected by our surface survey (Fig. 13). It consists of a cluster of limestone measuring 2.5 m in diameter. It seems to have been a grave cover. A broken clay animal figurine was collected from this structure (Fig. 14).

**Str.912** It is one of the largest buildings detected from the surface. It is located in Area D, measuring  $18 \text{ m} \times 14 \text{ m}$  (Fig. 15). It consists of five or six rooms with a large courtyard.

**Str.913** It is a multiple-roomed rectangular building, located in Area B, near the foot of the mound.

It is notable that almost all of the potsherds collected from the surface survey at Tell Ghanem al-Ali are EB varieties, especially those from the BIII and EBIVA periods. Though we collected EBIVB and MB potsherds, their number is limited. We did not collect potsherds from any later periods, such as the Iron Age or Byzantine period. This evidence indicates that almost all of the building traces observable from the surface of the mound belong to the late EB periods.

Almost all of the buildings detected by surface survey are multi-roomed houses consisting of a series of rectangular small rooms. Therefore, we can conclude that these types of houses were the main dwelling structures at that time. The axes of the houses are orientated almost east to west, especially in the southeast of Area A. Some buildings in peripheral areas, such as Areas B and D, point WSW.

The differences between these two building groups were probably caused by time or building characteristics. We identified many *tannors* fixed to the outer house walls, and they indicate the domestic nature of the buildings. No public buildings were identified by our surface survey.

Although the building traces were not always clearly detectable, they show us a general settlement plan at least in the last phases of EB occupation. On the whole, we could not identify straight streets or well-defined blocks. Many vacant plots came to a dead end bounded by building walls. Though there were some rough similarities in building layout, such as direction and structure, the late EB people at Ghanem al-Ali built their houses one after another without any town planning.

## Sondage of Square 2

To confirm the chronological sequence of Tell Ghanem al-Ali, we set Square 2 on the northern slope of the site in the first season, 2007. The 4 (east-west) × 26 (north-south) m trench had been excavated previously, and it extended to the northern foot of the mound. We dug this trench in six stages, and identified seven building levels (Fig. 16). This season, we continued the operation and mainly dug the lowest, 6th stage, because we wished to reveal the earliest cultural deposits at Tell Ghanem al-Ali. The excavation lasted for two weeks from March 8 to 21, 2009. Though the excavation period was very short, the 7<sup>th</sup> and 8<sup>th</sup> building levels were uncovered. Then, at last, we reached virgin soil at below the 8<sup>th</sup> building level.

### Level 7

The sixth stage was located in the northern end of Square 2. The three rooms divided by walls, which we reported last season, were removed. The walls were constructed by piling mud-bricks, measuring ca. 30 × 60 cm. Each wall was ca. 60 cm wide and ran north-west and south-east (Fig. 17). In contrast to the walls of level 6, they did not have stone foundations. This is to say, mud-bricks were piled directly on the ground. At the south-west part of the room, which is located in the south part of the sixth stage, a pit was found. It measured 60 cm in diameter and 50 cm in depth.

### Level 8

Three rooms were identified at about 40 cm below level 7 (Fig. 18). The walls extended north and south. In a similar way to the building walls of level 7, walls were constructed by using mud-brick. The size of mud-bricks was also similar. However, the arrangement of mud-bricks was different. In level 7, mud-bricks were placed side by side longitudinally, and the wall was 60 cm wide. By contrast, in level 8, they were placed transversally and the wall was 30 cm wide.

This wall did not have a stone foundation either. A quern and Canaanean blade were found in the room. It is notable that traces of bitumen were visible on the edge of this blade (Fig. 19).

### Below level 8

After removing the structure of building on level 8, we excavated further. Below the building on level 8, a thick ash layer, including a lot of charcoal, extended in a layer ca. 40 cm thick. In this layer, a badly broken hearth was discovered. Except for this, we did not find any structures.

Below the ash layer, we encountered a brown soil layer. This layer included a few potsherd fragments of and charcoal. There were not any structures in this layer. The next layer consisted of more dark colored soil. It was a homogeneous wet silt-like soil. No potsherds and no other remains were recovered. It is certain that this layer was the virgin soil of Tell Ghanem al-Ali (Fig. 20). The altitude of virgin soil in Square 2 is ca. 226.80 m. It was found at a depth of 3.4 m from the mound surface at the north end of Square 2. We dug until a depth of 3.6 to verify this virgin soil layer.

During the four seasons' excavations at Square 2, we accomplished our main objective. We do not have a definite chronology at present because pottery classification is ongoing. However, we can indicate that Tell Ghanem al-Ali lacks cultural deposits prior to the Early Bronze Age, because we did not collect any diagnostic potsherds older than those of the EB periods. According to the results obtained from our work, we can safely say that Tell Ghanem al-Ali has the cultural deposits from the middle of third millennium to the beginning of second millennium. In other word, this site flourished during the Early Bronze Age. Therefore, Tell Ghanem al-Ali provides a unique environment for the study of emergence of nomadic people.

### Notable Object

We collected a clay figurine from the mound surface during the last season (Fig. 21). Together

with the excavated specimens, we have many clay figurines. Most of them were typical figurines as the Euphrates EB specimens. However, this specimen is unique. It should be noticed that a similar figurine was found at Abu Hamed (Falb et. al. 2005, Abb.41). Abu Hamed is an EB cemetery, located at the edge of Bishri Plateau, south of Tell Ghanem al-Ali. Discovery of this same peculiar type clay figurine at two sites indicates a strong relationship between them. Tell Ghanem al-Ali was a settlement and Abu Hamed was a cemetery, and these types of figurines are important materials when considering the people buried at Abu Hamed.

### References Cited

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 2005 *Gräber des 3. Jahrtausends v. Chr. im syrischen Euphrat: 4. Der Friedhof von Abu Hamed*. Saarländische Druckerei & Verlag, Saarwellingen.

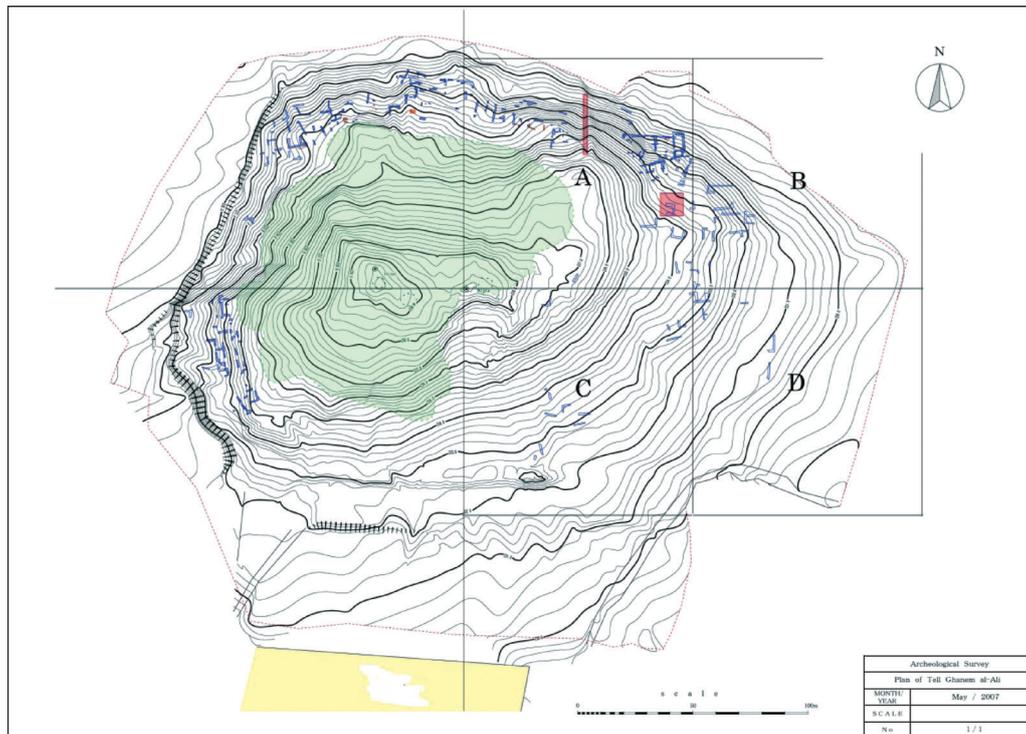


Fig. 1 Map of Tell Ghanem al-Ali and the areas of surface research.



Fig. 2 Result from surface research.

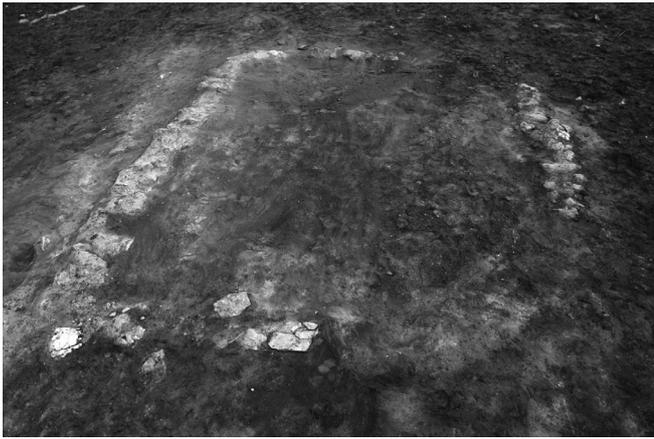


Fig. 3 Str.901.



Fig. 4 Str.901 north, a series of *tannors*.



Fig. 5 Potsherds from Str.901.

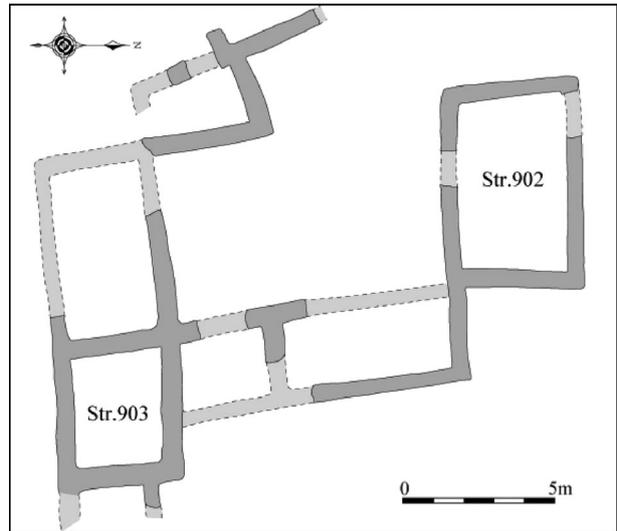


Fig. 6 Plan of the building including Str.902 and 903.

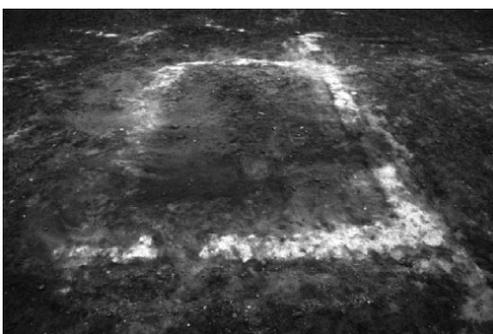


Fig. 7 Str.902.

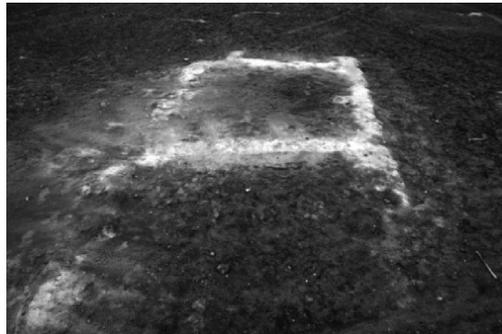


Fig. 8 Str.903.



Fig. 9 MB small jar.



Fig. 10 Str.905.



Fig. 11 Pottery from Str.905.



Fig. 12 Str.907.



Fig. 13 Str.909.



Fig. 14 Clay animal figurine from Str.909.

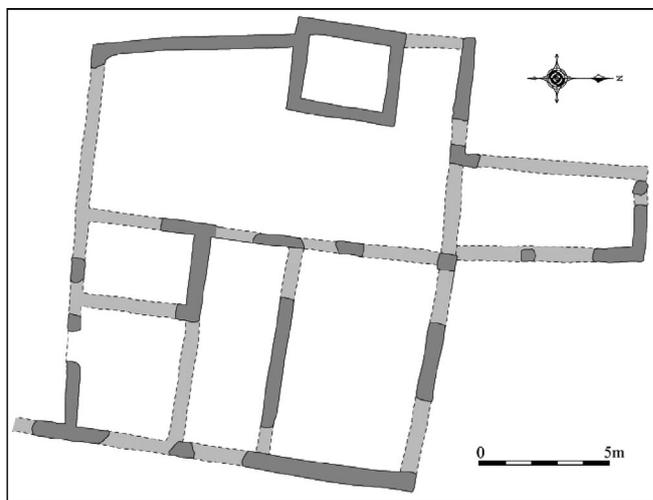


Fig. 15 Plan of Str.912.

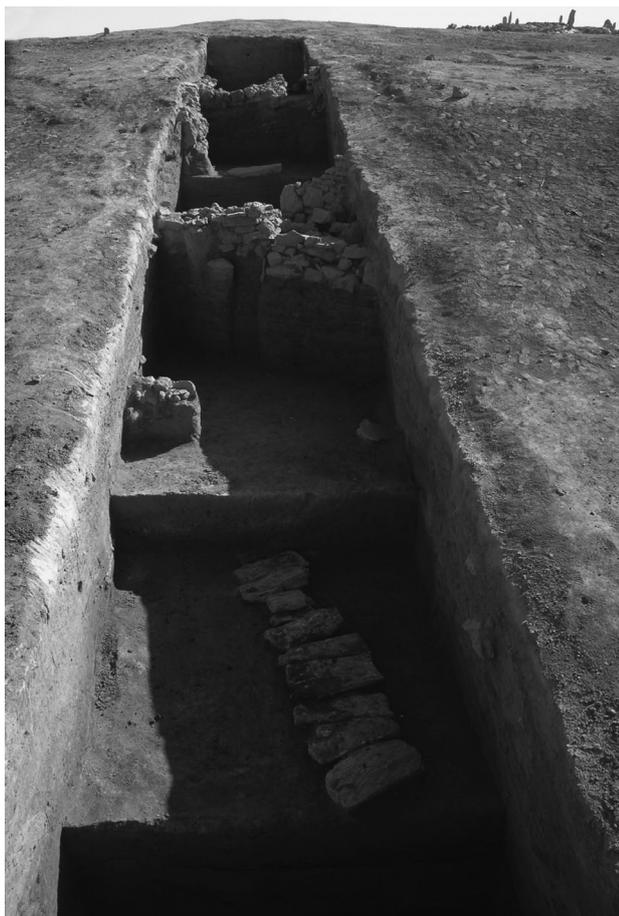


Fig. 16 Square 2, from the north.



Fig. 17 Three rooms, level 7, from the south.



Fig. 18 Three rooms, level 8, from the south.



Fig. 19 Cannanean blade.



Fig. 20 West section showing the virgin soil.



Fig. 21 Clay figurine.

#### 4. Archaeological Survey around Tell Ghanem al-‘Ali (II)

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#### Introduction

The eighth working season in the Bishri region involved an archaeological survey (February 23 to March 10, 2009) that covered an area with a radius of 10 km around Tell Ghanem al-‘Ali, a main site for excavations in this project. With this area as the target, the survey aimed at an intensive reconnaissance of archaeological sites in order to obtain insights into settlement and land-use patterns in the past. The initial season of our survey, which was in the spring of 2008, resulted in (1) the collection of artifacts of a wide chronological range—from the Paleolithic to the Islamic period, (2) the discovery of occupational sites in the Paleolithic period and the Early-Middle Bronze Age, and (3) the recording of the distribution of Bronze Age tombs at the northern fringes of the Bishri Plateau.

While building on these previous results, the eighth season focused on unexplored areas in order to discover more archaeological sites.

Earlier archaeological investigations in the middle Euphrates indicate that the lowlands along the Euphrates were the central loci of tell-based communities, including Early Bronze Age (EBA) settlements such as Tell Ghanem al-‘Ali and Tell Hammadin (Kohlmeyer 1984, al-Maqdissi and Ohnuma 2008). On the other hand, the northern edges of the Bishri Plateau, which overlook the Euphrates lowlands, contain areas that are densely distributed with tombs and appear to have belonged to EBA communities that were based at the tell settlements (Falb et al. 2005, Ohnuma and al-Khabour 2008a: 136, Ohnuma and al-Khabour 2008b: 185–187). Drawing on these earlier insights into the contrasting use of the Euphrates lowlands and uplands during the EBA, our survey aims to examine land-use patterns during this time period by recording the locations and nature of settlements, activity areas, and tombs in this region. The survey also aims to uncover a wide range of archaeological sites since the Paleolithic period in order to provide basic information on the long-term population history. This in turn should facilitate a better understanding of the historical background of the EBA communities in this region.

### **1. Survey area**

The survey area is a circular one with a radius of 10 km around Tell Ghanem al-‘Ali (Fig. 1). This area encompasses green agricultural fields in the lowlands of the Euphrates, its river terraces, and the steppe environment at the northern edges of the Bishri Plateau. Focusing on the southern bank of the river, our survey mainly examined the transitional area ascending from the Euphrates lowlands to the Bishri Plateau. The northern fringes of the plateau are incised by a series of wadis that are tributary valleys of the Euphrates. While these wadis usually stretch over at most a few kilometers, Wadi Kharar, which is located between Tell Ghanem al-‘Ali and Tell Hammadin, stands out for its length (ca. 20 km) and well-developed terraces. We surveyed the plateau primarily by walking along these wadis and in the areas between the wadis.

In the last season, we surveyed the western and central parts of the survey area. The western end, which was used as a modern cemetery, is a protruding terrace located in the village of Jibli, while the eastern border is at Jezla. By focusing on the areas that were not explored in the last season, this season aimed to investigate four locations with different surrounding environments. The first was the area further east of Jezla: there are four main wadis between Wadi Jezla East and Wadi Beilune at the eastern end. The second target was the southern extension (upper reach) of Wadi Kharar. The third was Tell Mugla as-Saghir, which is located in the Euphrates lowland, ca. 5 km to the east of Tell Ghanem al-‘Ali. The former survey in this area (Kohlmeyer 1984) dates Mugla as-Saghir to the Bronze Age, and its occupational period may overlap with that at Ghanem al-‘Ali. The fourth location was the area further south (ca. 5–6 km) on the plateau. This area gently slopes down toward the north; it has a few, shallow wadi channels that are covered with very sparse vegetation.

### **2. Objectives of this season**

The survey of these new areas allowed us to test some of our insights from the last season. For example, the results of the last survey indicate that Paleolithic occupations are relatively well preserved on the terraces of Wadi Kharar; however, we could find only dispersed, probably re-deposited, remains of Paleolithic occupations in other areas. In addition, we encountered only a few artifacts that date to the Neolithic or Chalcolithic period in the last survey. We could identify three site types from the Bronze Age: long-term occupations, temporary camps, and tombs. The first type includes tell sites such as Tell Ghanem al-‘Ali in the Euphrates lowland and a small tell that our last survey discovered at the location of 23H in Wadi Jezla West. The temporary camps only consist of chipped-stone clusters without architecture or pottery that would usually provide chronological evidence.

However, the patterns in the selection of raw material and the core reduction technology at these sites and Tell Ghanem al-‘Ali are rather similar. This suggests their chronological proximity. These temporary camps from the Bronze Age were probably abandoned as a result of some activities that were performed periodically on the plateau at some distance from the sedentary settlements. However, the exact nature of the activities that were performed at these camps remains to be investigated. The third site type, tombs, was most frequently encountered in the last survey, indicating their dense distribution at the edge of the plateau. This view was already proposed by previous studies at Abu Hamed, Jezla, and Tell Shabout (Falb et al. 2005; Ohnuma and al-Khabour 2008a: 136; Ohnuma and al-Khabour 2008b: 185–187). However, our last survey revealed a dense distribution of mound tombs in two distinct areas on the plateau around Tell Ghanem al-‘Ali and Tell Hammadin (few tombs were found in Wadi Kharar, which separates the two tells). This suggested that tombs tend to be concentrated particularly in the areas close to the tell settlements in the Euphrates lowland. Thus, one of the main purposes of this season was to test whether the above site types and the patterns of their spatial distribution are observable in the area around Tell Mugla as-Saghir that is roughly contemporaneous with Tell Ghanem al-‘Ali and Tell Hammadin.

### 3. Survey methods

To achieve an intensive reconnaissance of archaeological sites, our survey was primarily conducted by walking. We navigated the area using high-resolution satellite images and a compass. This allowed us to record the locations of survey paths and discovered sites. The surveyed wadis and areas were assigned numbers (nos. 1 to 28). We named the survey paths and discovered sites within each area by attaching an alphabet. Thus, survey paths and sites are identified as the combination of an area number and alphabet, such as 20A and 16K.

A survey path fundamentally corresponds to a single topographic unit, such as a terrace or wadi. The identification of archaeological sites was primarily based on the density of artifacts, as apart from tomb mounds and cairns, we rarely encountered features on the ground surface. We collected artifacts from the survey paths and archaeological sites. At the archaeological sites, we measured the extent of artifact distribution and general topography around the sites. When we encountered mound tombs, the extent of their distribution was sketched on hard copies of high-resolution satellite images.

### 4. Sites and finds

Employing the above methods, we conducted our survey from February 23 to March 7 and recorded 85 sites and 61 survey paths. The discovered sites mainly consist of tombs and sites from which artifact scatters were recovered. The former site type usually dates to the Early to Middle Bronze Age, while the dates of the latter type range from the Middle Paleolithic to the Bronze Age. We shall now provide an areawise description of the discovered sites and finds.

#### 4.1. Tell Mugla as-Saghir

This tell was originally reported in Kohlmeyer (1984). The site is located in the Euphrates lowland, ca. 5 km to the east of Tell Ghanem al-‘Ali. It measures 110 m [N–S] × 120 m [E–W] × 6 m [Height] (Fig. 2). The tell is currently covered with modern graves; many pottery shards and lithics lie scattered on the surface. This collection of artifacts indicates that the tell was mainly occupied during the EBA; however, the recovery of a Neolithic arrowhead also suggests the presence of Neolithic occupation at or near the site. We also noted several alignments of gypsum stones that are exposed on the surface (Fig. 3). Some of them seem to represent foundations of rectangular building structures. On the whole, like Tell Ghanem al-‘Ali and Tell Hammadin, the tell appears to have functioned as a sedentary settlement during the EBA. Given the apparently regular distance (ca. 5–6 km) between the three sites, it is possible that their occupational periods overlapped at some point.

## 4.2. On the plateau above Tell Mugla as-Saghir (Areas 24, 25, 26, and 27)

### Bronze Age Tombs

We surveyed the edge of the Bishri Plateau, which overlooks Tell Mugla as-Saghir, in order to investigate prehistoric land-use patterns from the Paleolithic period to the Bronze Age. The area was divided into four spatial units (Areas 24, 25, 26, and 27 from west to east) according to the major wadis. Area 24 mainly covers the drainage of Wadi Jezla East, while Area 27 corresponds to Wadi Beilune.

The lower part of Wadi Jezla East is deeply incised and flanked by steep slopes. There were very few finds in the lower part. On the other hand, surface finds became more frequent in the upper parts of the wadi. Although we found a rain of chipped stones that apparently date to the Middle Paleolithic, there was no clear concentration. Area 24I refers to a site on the eastern bank from where a small scattering of Middle Paleolithic artifacts was recovered (Fig. 4). The scarcity of Bronze Age tombs in the areas adjacent to Wadi Jezla East, which contrasts with their dense distribution in Jezla (a few hundred meters to the west), is truly remarkable.

We noted that the number of Bronze Age tombs increased again as we moved eastward to Area 25, where hundreds of shaft tombs were densely distributed on the low bank (4–5 m in height) that stretches over several hundred meters around a drainage basin (Areas 25D and 24Z, Fig. 5). Most of the tombs have been plundered and are scattered with pottery shards that date to the EBA (Fig. 6). Shaft tombs were also found in Area 26E, which is a large rectangular depression measuring 160 m [E–W] × 63 m [N–S] × 10 m [Depth] (Fig. 7). The depression opens to the northern edge of the plateau. Given its rectangular shape and the absence of a water channel in the basin, the depression could have been formed through the construction of prehistoric earthworks. Because the southern and eastern slopes of this basin are covered with shaft tombs, the rectangular basin may have been created to imitate the low banks that naturally occur in the neighboring areas and were used as locations for shaft tombs. In addition, the recovery of apparently Bronze Age chipped stones within the rectangular basin suggests that other activities were also performed there, although their exact nature is still unknown.

To the east—namely, in Areas 26 and 27—the dense distribution of shaft tombs in the above areas is suddenly replaced by mound tombs with stone chambers (Fig. 8). The western side of the wadi (Areas 26A and 26F) contains more than one hundred mound tombs that are ca. 2–3 m in diameter and 1 m in height. The distribution of mound tombs with stone chambers continues eastward with sporadic concentration near the northern fringes of the plateau or on hilltops (Areas 27F–M, Q–U, and Y). The number of mound tombs suddenly decreases in the areas along Wadi Beilune, which seems to represent a break in their distribution. On the eastern side of Wadi Beilune, we suddenly encountered numerous cairns over a wide area on a plateau (ca. 1 km [N–S] × 0.5 km [E–W]) (Area 27AL, Fig. 9). More than 100 cairns are distributed over this area. They are built with gypsum rocks and contain stone chambers. Some cairns form large mounds (up to 35 × 10 × 2 m at Area AI) containing several stone chambers that are linearly placed. Most of them have been plundered. Using the pottery shards that were scattered around the mounds, we dated the cairns to the Early Bronze Age (Fig. 11). However, we found that some of the cairns with low mounds have not been plundered (Fig. 10). Thus, it seems that this cairn field has suffered less looting as compared to other burial areas such as Abu Hamed and Shabout, which are more accessible from modern roads. The unprecedentedly large scale coupled with the fairly good preservation can make this cairn field rather important for the study of Bronze Age burial customs in this region as well as in wider areas.

### Flint sources and Knapping sites

The area north of the cairn field (Area 27AL) is densely covered with river pebbles/cobbles (Areas 27V and 27AG). Such areas stretch over hundreds of meters on both the eastern and western sides of Wadi Beilune (Fig. 12). This was unexpected as the area is located on top of the Bishri Plateau,

which is tens of meters above the Euphrates river. The area was visited by the geologist team in the Bishri mission. They noted that the deposit of pebbles is at least ten meters thick, and suggested that it was probably created by the Euphrates in ancient times. The area is also archaeologically significant as it yielded a number of flint cobbles, some of which measure 10–20 cm. Such flint cobbles must have been important raw materials for chipped stone tools in the past. In fact, many chipped stones collected in the survey area retain a cortex of rolled cobbles; however, such cobbles are rarely available in wadi bottoms because Tertiary gypsum beds form the Bishri Plateau. Thus, this gravel area was possibly exploited as a local source for flint.

We found five locations where split cobbles and flakes were strewn over an area 5–10 m in diameter (Areas 27W, AD, AE, AF, and AM). As these locations contain more split cobbles than flakes or cores, we initially suspected that they may have been created naturally. In fact, Areas 27W and 27AD are located near a stream at the foot of gravel hills, and Areas 27 AE and 27 AM are situated on the wadi terrace at the foot of the hill (Fig. 13). However, we encountered a similar distribution of split cobbles with flakes and cores on top of the gravel hill (27AF). This spot also contained a hammerstone that was lying next to a split flint cobble (Fig. 14). In addition, most flakes from these locations and their surrounding areas have a cortex on their side and/or striking platform. The high proportion of cortical flakes in debitage is also observable in the assemblage from Tell Ghanem al-‘Ali and lithic scatters that appear to represent Bronze Age temporary sites (e.g., 20A).

Another example of temporary occupation was discovered at Area 24AA (Fig. 15), which is adjacent to the linear concentration of shaft tombs in Area 24Z, to the south of Tell Mugla as-Saghir. This area is ca. 4 km to the west of the cobble deposits at Wadi Beilune. In Area 24AA, chipped stones are densely distributed over a stretch of 30 × 20 m. We collected 167 pieces from a 1 × 1 m square at the center of the area where the stones were concentrated. The sample includes 11 cores and 135 cortical flakes (over 80% of the total) that are made of flint cobbles (Fig. 16). Because such a large amount of flint cobbles is not available in nearby wadi bottoms, they were probably extracted from the sources at Wadi Beilune.

#### Land Use prior to the Bronze Age

In addition to the Bronze Age sites, Middle Paleolithic artifacts were also frequently collected (Fig. 17). Although no clear concentration of these finds was discovered, they suggest that this area has a long history of settlement. We encountered Mousterian artifacts more often in the areas close to the pebble/cobble deposits near Wadi Beilune, and some of the collected lithics retain a cortex of rolled cobble. This suggests that the flint sources at Wadi Beilune already existed by the Middle Paleolithic period and could have been used in the subsequent periods.

### **4.3. Wadi Kharar**

In the survey of the southern part of Wadi Kharar, we collected some blades that date to the Pre-Pottery Neolithic B period (Areas 16AV and 16AU) as well as some Mousterian artifacts (Area 16AR) from the survey paths. However, no clear evidence of occupational sites was discovered in this part of the wadi.

In the last season, we found more substantial traces of Paleolithic occupations in the lower part of the wadi, particularly at the spot where a spring is located (Areas 16M–Q). Apparently, Paleolithic inhabitants were attracted to water sources such as the spring and the Euphrates river. In order to obtain greater insight into the land-use patterns of these Paleolithic hunter-gatherers, we revisited some sites for the systematic collection of surface finds. We selected some sites near the spring and its downstream area (Areas 16 I–K, 16M–Q, 16R) in order to collect surface finds from a 10 × 10 m square. During this work, two additional sites (Areas 16AR and AT’) were discovered. While Area 16AR appears to contain lithics from several different time periods (including the Middle Paleolithic), Area AT’ contained a clear concentration of lithics over a stretch of 16 × 13 m. The collection of

surface finds from a  $3 \times 3$  m square comprised 311 pieces, including a wide range of debitage and some retouched tools. Owing to the recovery of geometric microliths, it may be possible to date this site to the Middle Epipaleolithic (Fig. 18).

#### 4.4. Wadi Jezla West

We also returned to Wadi Jezla West in order to conduct systematic sampling of the surface finds from Areas 23H and 23J. Area 23H is a small mound on the western terrace of the wadi, while Area 23J is an area inside the large Islamic stone building (ca.  $150 \times 100$  m) on the plateau. In the last season, we found Bronze Age pottery shards and lithics in both the areas. To perform a more controlled recovery of artifacts, we collected surface finds from two  $10 \times 10$  m squares at Area 23H and from a  $3 \times 3$  m square at Area 23J. In addition, we prepared a detailed record on the distribution of Bronze Age tombs that are spread over this area (Ohnuma and al-Khabour 2008a: 136).

Further upstream from the wadi, we collected Epipaleolithic artifacts from the western terrace. Area 23AB is located 8.5 m above the wadi bottom, while Area 23AR is 2.5 m higher than the former terrace. Although the lithic scatter is sparse, the recovery of geometric microliths and a microburin shows that Epipaleolithic occupation is not restricted to Wadi Kharar; rather, other areas were also inhabited during that time.

#### 4.5. Other areas

##### Abu Hamed and Tell Hammadin

In addition to Jezla, we checked the exact locations of some other Bronze Age cemeteries in the survey area (Fig. 1). One of them is Abu Hamed, an area that was excavated by the German mission (Falb et al. 2005). We also returned to the plateau near Tell Hammadin in order to revise the distribution map of Bronze Age tombs in the area. We confirmed that the scale of this burial ground, which was almost comparable to that of Abu Hamed and the cairn field near Wadi Beilune, was larger than we had expected.

##### Southern area in the steppe

As our survey focused on the transitional area from the lowland to the Bishri Plateau, the southern steppe on the plateau was largely unexplored. In order to test whether any sites are distributed in this steppe environment, we walked through the areas 5–6 km south of the northern end of the plateau (Areas 10O–S, 28A and 28B, and 24AD and 24AF).

Although no clear concentration of artifacts was discovered, we continued finding a sparse distribution of chipped stones from various time periods, including the Paleolithic, Neolithic, and the Bronze Age. This suggested the use of these southern areas over a long period of time. We also encountered some Bronze Age mound tombs in such isolated locations (Fig. 19). These discoveries raise questions about who was buried and for what purpose. One possibility is that the mounds served as landmarks for indicating a claim over a territory; however, further collection of data and study of comparable archaeological and ethnographic examples is necessary to examine this issue.

#### Concluding remarks

The second season of the survey intensively explored the northern edge of the plateau, conducted systematic sampling at Wadi Kharar and Jezla, and examined some of the southern part of the survey area. This helped us develop our database of archaeological sites in the survey area for examining prehistoric land-use patterns. Regarding the Bronze Age, our data show that a spatial unit consisting of a tell settlement with grave areas in the vicinity is common in Tell Mugla as-Saghir, Ghanem al-'Ali, Hammadin, and Jezla, although there is some break in the distribution of tombs between the settlements. Such spatial patterns in sites indicate that the inhabitants of the sedentary settlements

in the Euphrates lowland were responsible for the creation and maintenance of the neighboring tomb areas on the plateau.

The discovery of flint sources and knapping areas near Wadi Beilune in this season also clarified another aspect of Bronze Age land use. These sources were used over a long period of time, from the Middle Paleolithic to the Bronze Age. This long-term use suggests that the plateau was not only used as a cemetery but was also used for performing other activities, including the acquisition of raw material for flint tools. We also found a number of chipped stones that appear to date to the Bronze Age in various locations on the plateau. This may indicate that the production and use of chipped stones were practiced on the plateau. However, the nature of the activities that were performed by using these tools is still unclear.

In the areas near flint sources at Wadi Beilune, we mostly found Middle Paleolithic and Bronze Age lithics. These findings may reflect long-term patterns in the exploitation of flint sources. For example, the occasional finds of Neolithic artifacts are usually made of flint that is available further south in the El Kowm basin. However, this may also be a result of our inability to identify Neolithic lithic technology that used flint cobbles in this region. To solve this problem, it would be useful to find and excavate Neolithic occupations in this area and collect samples from dated deposits. One possible location is Tell Mugla as-Saghir, from where a Neolithic arrowhead was recovered.

Further research is necessary to shed greater light on prehistoric land use in the middle Euphrates. We plan to continue analyzing the collected finds in order to determine the dates of discovered sites and to examine a wide range of issues, including the nature of occupations, functions of sites, technology of tool production, and burial customs.

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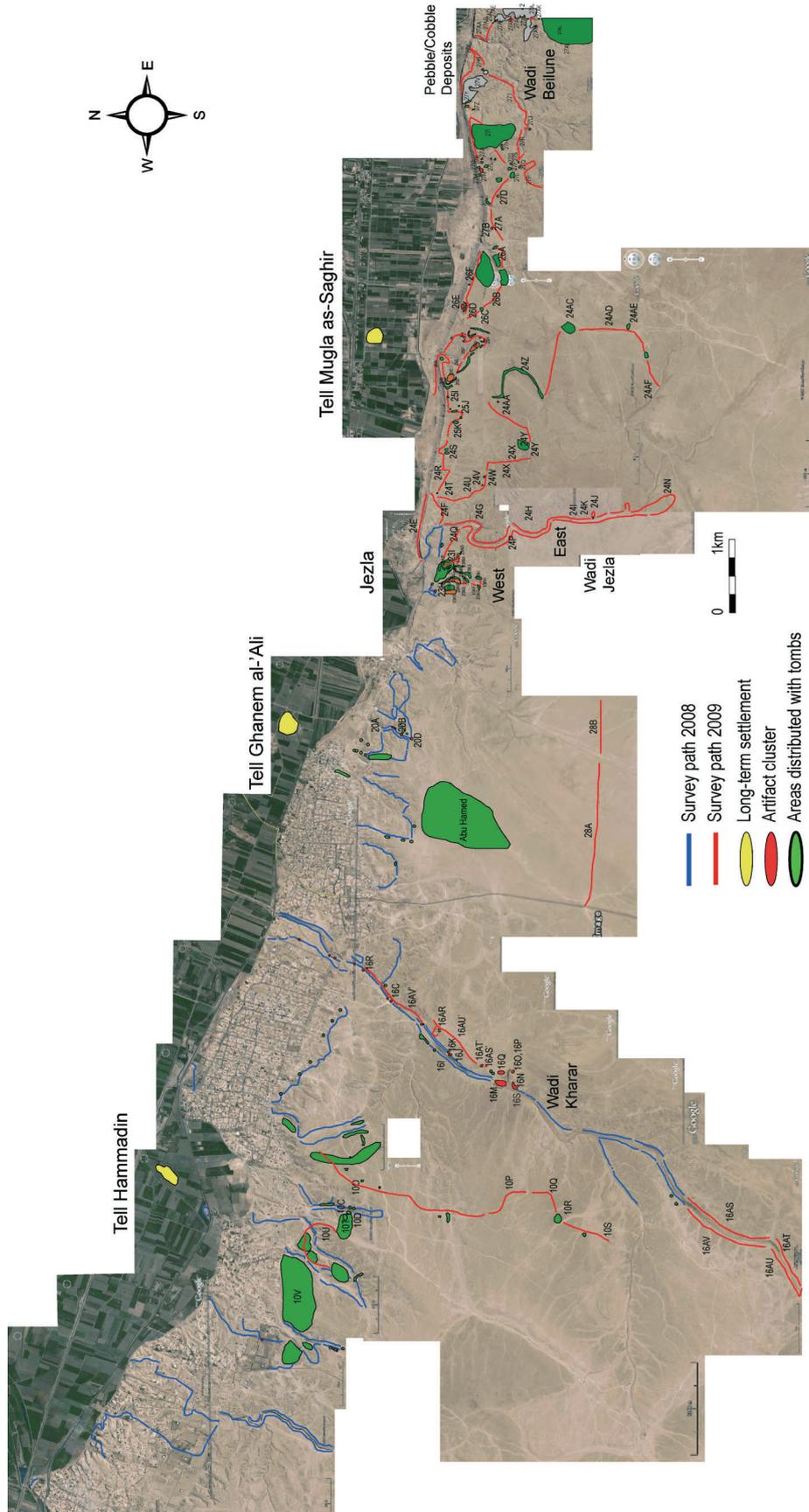


Fig. 1 Satellite image of the survey area, showing the survey paths and discovered sites.



Fig. 2 Tell Mugla as-Saghir, looking south. The tell is densely covered with modern graves. The survey of the plateau behind the tell discovered the dense distribution of Bronze Age tombs.



Fig. 3 Rectangular stone foundations exposed on the surface at Tell Mugla as-Saghir.



Fig. 4 Area 24I in Wadi Jezla East. Middle Palaeolithic artifacts were recovered on the slope of the eastern bank of the wadi.



Fig. 5 Cluster of shaft tombs on the plateau above Tell Mugla as-Saghir, looking west. Early Bronze Age pottery sherds were scattered besides the graves.



Fig. 6 Pottery sherds collected on the surface near shaft tombs in Area 24Z.



Fig. 7 Rectangular depression at the northern edge of the plateau, looking west. The eastern and southern slopes are densely distributed with shaft tombs (Area 26E).



Fig. 8 Mound tombs in Areas 26A and 26F on the western side of the wadi.



Fig. 9 Overview of the cairn field (Area 27AL) near Wadi Beilune, looking south.



Fig. 10 A series of intact cairns, linearly distributed over ca. 60 m in length, looking north (Area 27AL).

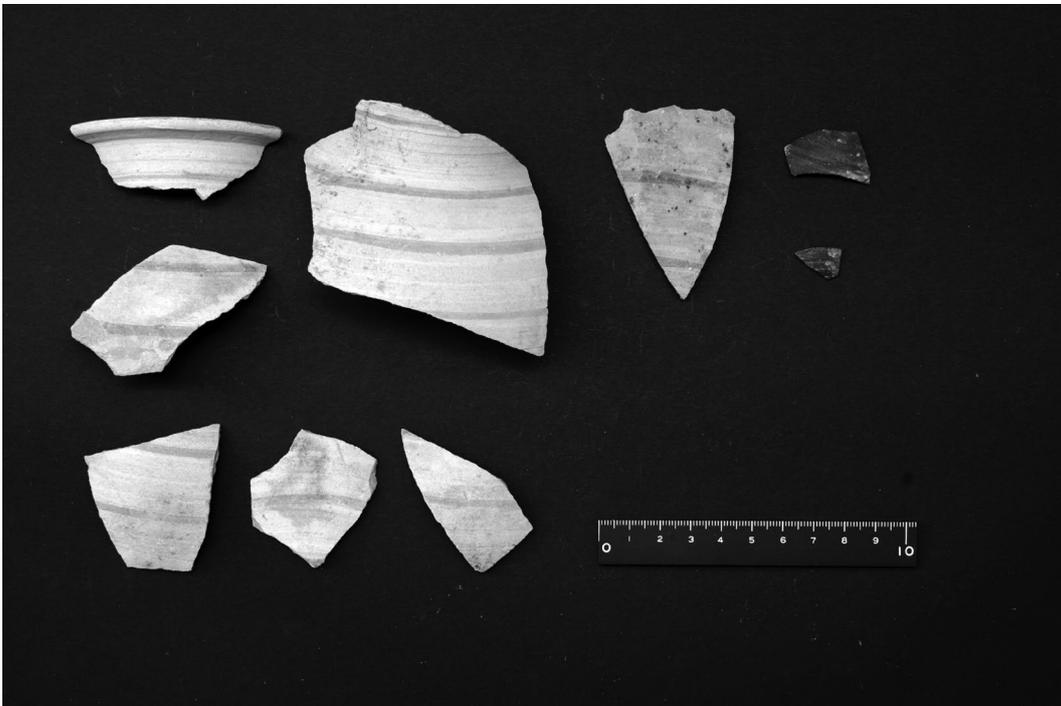


Fig. 11 Fragments of Euphrates Fine Ware and Black Euphrates Fine Ware, collected besides the looted cairns in Area 27AL.



Fig. 12 Pebble/cobble deposits at the lower part of Wadi Beilune (Area 27 V), looking northwest.

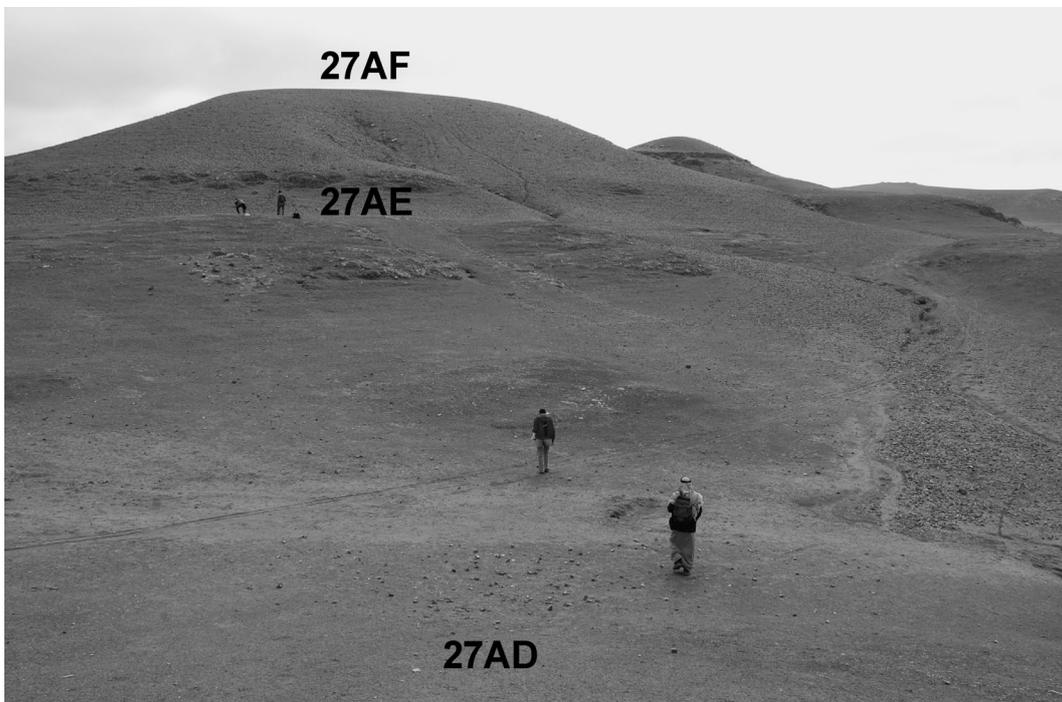


Fig. 13 Flint knapping areas near the cobble deposits (27AD, AE, and AF), looking south.



Fig. 14 Close view of the knapping area (27AF), where a number of split cobbles, cores, and flakes were distributed. The scale in the middle is 15 cm.



Fig. 15 Concentration of chipped stones (24AA) besides the Bronze Age shaft tombs (24Z), looking east. The lithic cluster is located at the foot of the gentle slope (ca. 4.5 m in height).



Fig. 16 Cores and a possible hammerstone collected from a 1 × 1 m square in Area 24AA.

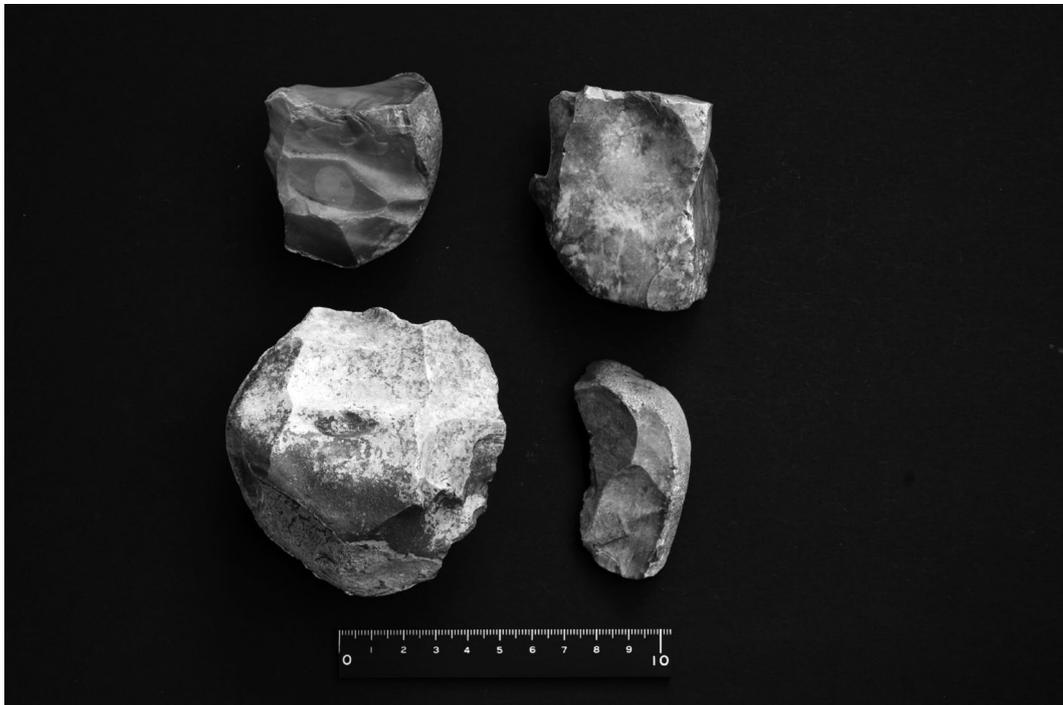


Fig. 17 Cores and a core-edge flake collected in Area 27AJ. The lower two pieces are diagnostic of the Middle Palaeolithic period. The both retain cortex of rolled cobbles.



Fig. 18 Epipalaeolithic chipped stones from 16AT'. The site is located at the edge of the plateau near the spring on Wadi Kharar.



Fig. 19 Southern area in the steppe (Area 10S, ca. 5 km south to the northern end of the Bishri Plateau). At the centre is an isolated Bronze Age mound tomb.

## 5. Geological and Geographical Field Survey in the Eighth Working Season

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### Introduction

In this working season, we concentrated the sample collections (1) for  $^{14}\text{C}$  dating, (2) for pollen analyses and (3) for chemical analyses. Samples for  $^{14}\text{C}$  dating and pollen analyses were collected mainly from the Square-2 trench at Tell Ghanem al-Ali and from the upstream of the Wadi el-Kharar, and samples for chemical analyses were from the asphalt deposit in the depth of the Bishri Mountains. Possibility of boring for collecting the sediment samples to a depth of 5 meters was also examined.

### Collection of Charcoal Samples for $^{14}\text{C}$ Dating

At the site:

By the latest excavation of the Square-2 trench at Tell Ghanem al-Ali site conducted by archaeologists in March 2009, several dark-coloured layers consist of charcoal and fired carbonaceous soil were clearly recognized. For laboratory study on radiocarbon dating of these layers, we have collected systematically more than thirty samples that consist mainly of charcoal and fired carbonaceous soil additionally, from the uppermost to the deepest sediment layers excavated so far (Fig. 1).

At the lowest terrace of the Euphrates:

In order to elucidate the age of formation of the base sediment on which Tell Ghanem al-Ali site is situated, we have already conducted the survey of terraces formed by the Euphrates during the



Fig. 1 Western side wall of the 4<sup>th</sup> level, Square-2 trench. Dark-coloured layers are charcoal and fired carbonaceous soil intercalated in the brownish-coloured silt/sand layers. Width of the picture is ca. 1.5 m.

previous surveys. This time, we have collected a few sediment samples from the outcrops of the lowest terraces exposed along Euphrates. The samples are used for laboratory study on radiocarbon dating as well as for pollen analysis to elucidate the period and palaeo-environment during the lowest terrace formation.

**Collection of Sediment Samples for Pollen Analyses**

We investigated the geology and topography around Palaeolithic period sites. The sites are located around the spring, 16 M-Q (Kadowaki et al., 2008), upstream of the Wadi el-Kharar. In and around Tell Ghanem al-Ali, the <sup>14</sup>C ages of the sediments are younger than 5,000 y. B. P. (Nakamura et al., in prep.). It is important to examine the Palaeolithic sites to reconstruct the long environmental history in this area. The age of the stone tools of the sites is Late Palaeolithic to the first half of the Epipalaeolithic period, i.e., ca. 20,000 y. B. P.

We encountered the modern wells of which walls show good geologic sections near the spring (Figs. 2 and 3). The wells are on the hilly area along the Wadi el-Kharar (Fig. 4). Gypsum beds are cropped out in the wadi and hilly area, and most of surface of the gypsum beds are covered by younger sandy sediments (Fig. 5) of presumably late Pleistocene and Holocene.

Contrast of the water permeability between gypsum and younger, loose sandy sediments probably

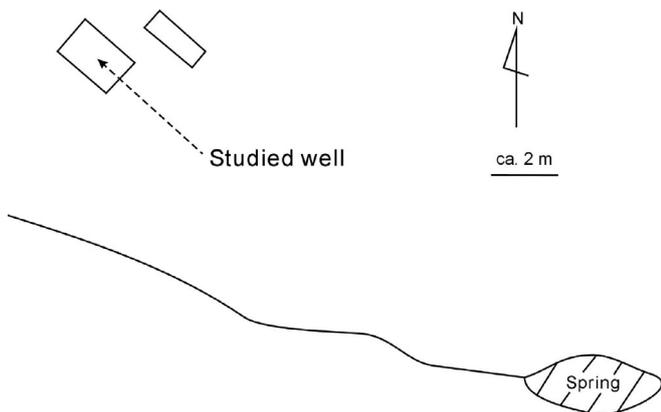


Fig. 2 Rough sketch map of modern wells and spring.



Fig. 3 Walls of studied well.

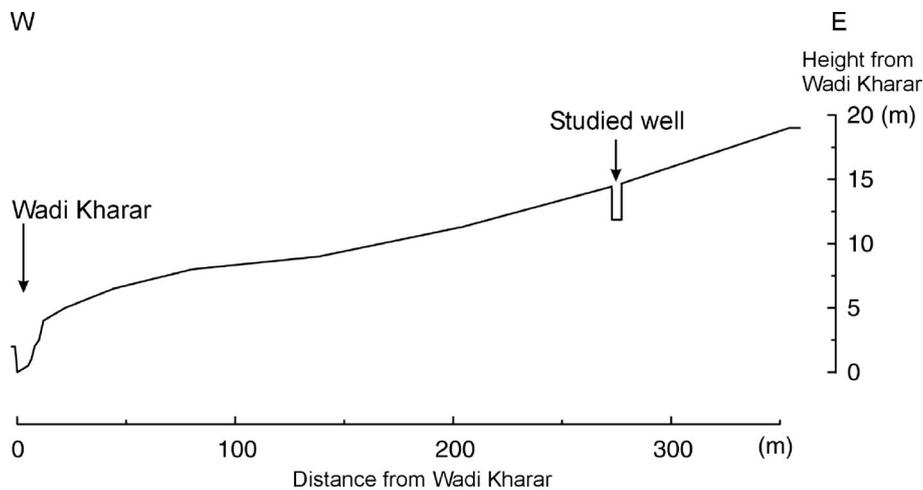


Fig. 4 Topographic profile from Wadi Kharar to studied well.



Fig. 5 Gypsum beds (stratified rocks) and younger sandy sediments (massive brown part).

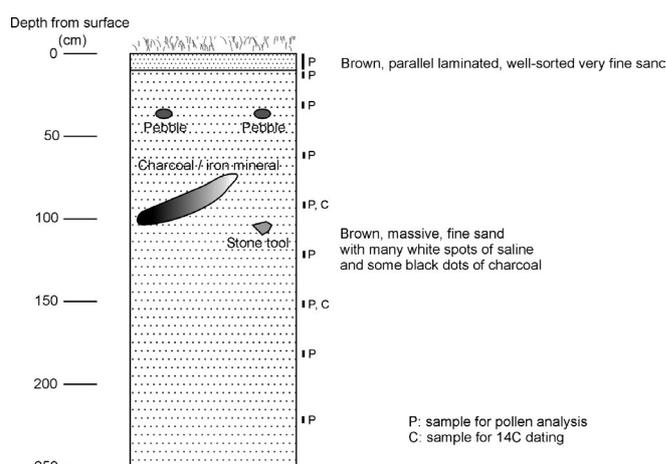


Fig. 6 Geologic profile of northwestern wall of the well.



Fig. 7 Sandy sediments of wall of the well (sickle 30 cm long).



Fig. 8 Stone tool (ca. 3 cm width) in the wall (105 cm depth).

controls groundwater level. Top horizon of the gypsum beds could stop water sinking down, making the spring which Palaeolithic men utilized.

Southern well (140 × 200 cm wide, 260 cm depth) was investigated. The geologic profile of northwestern wall of the well is shown in Fig. 6. The sediments are sandy (Fig. 7), and consist of two parts. The upper part (0–10 cm depth) is likely to be modern sediments, and the lower part is older sediments. A stone tool was found in the lower part (Fig. 8). We took nine samples for pollen and other microfossil analysis. Two charcoal samples for <sup>14</sup>C dating are also taken (Fig. 6).

### Collection of Natural Asphalt Samples for Chemical Analyses

Two blocks of asphalt (bitumen) were found with archaeological materials in Tell Ghanem al-Ali. The asphalt has been used as a waterproofing agent and/or adhesive material of archaeological pottery. It is interesting to know where these asphalts were collected and transported from.

One of the possible methods to discriminate the asphalt from various places is to compare its organic compound. Asphalt contains various organic compounds with straight chain and cyclic chain. The

isotope ratios of  $^{13}\text{C}/^{12}\text{C}$  of the compound also differ from sample to sample. These are effective methods to discriminate the asphalt.

We collected the natural asphalt samples from two areas in the area. The one place is asphalt mine in the Bishri Mountains. This mine situates far from Euphrates, but produces asphalt with good quality. We sampled three asphalt (T09030901~3) from natural stream bed (Fig. 9). We also surveyed work faces of the asphalt mine in detail as shown in Fig. 10. The asphalt constitutes three layers. The top layer is about 1 m thickness and the 2<sup>nd</sup> layer has a thickness about 3 m. The 3<sup>rd</sup> layer is the thickest and the bottom of the layer is not clear. Muddy sandstone or mudstone cover these three asphalt layers. The mudstone may worked as a cap rock. We sampled asphalt at the mining outcrop from top to bottom layers (T09030904~07).

The other sampling place is in 3<sup>rd</sup> terrace at Zor Shammar, 5 km west of Tell Ghanem al-Ali. The asphalt formation is small and has about 50 cm thickness. The asphalt had permeated into gravel bed. One asphalt sample (T09030908) was collected from there. These naturally occurring asphalts and two asphalt samples from Tell Ghanem al-Ali will be examined their organic compound, elemental compositions and isotopic ratio at Nagoya University, as soon as the samples will be posted.



Fig. 9 Natural asphalt outcrop in the stream bed.

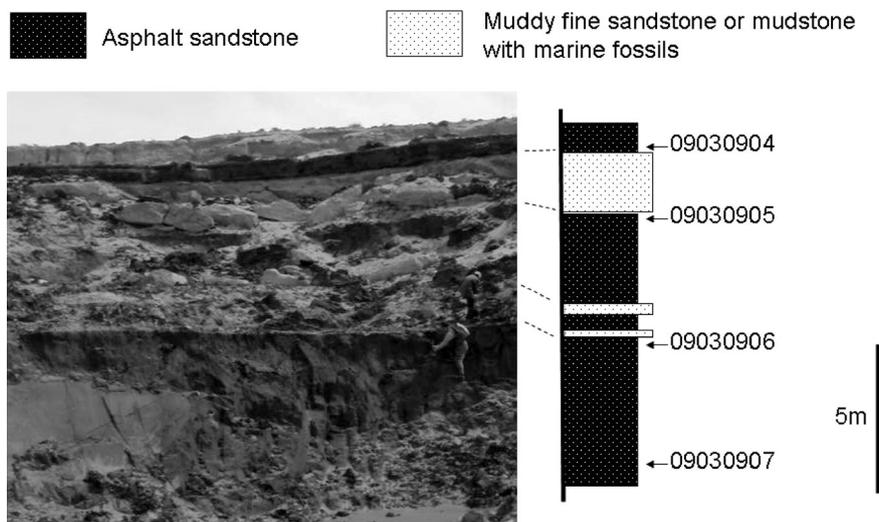


Fig. 10 Work faces of the asphalt mine and its columnar section.

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