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EXCAVATIONS AT QALAT SAID AHMADAN, SLEMANI, IRAQ-KURDISTAN: FIRST INTERIM REPORT (2014 SEASON)

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1. Introduction

At one point in time, the Iraq-Kurdistan region, located along the eastern part of the Fertile Crescent, was one of the most fascinating archaeological zones for the study of human history. The first systematic archaeological research in Iraq-Kurdistan was initiated in the 1920s by foreign archeologists such as Ephraim A. Speiser in the Slemani region and Dorothy Garrod at the Zarzi and Hazarmerd caves near Slemani [Speiser 1926–1927; Soleki 1952]. This reached a peak during the 1940s and 1950s, following Word War II. The region was renowned for two remarkable research projects. The first comprises the discovery and excavation of Jarmo in Chemchemal, by Robert J. Braidwood of the Chicago University [Braidwood and Howe 1960]. The second consisted of excavations at Shanidar Cave, a famous Paleolithic site in the Zagros Mountains, by Ralph Soleki, beginning in 1951 and continuing for over a decade [Soleki *et al*. 2004].

Iraq-Kurdistan became one of the most promising archaeological regions for the study of Neolithization after Braidwood's research. This Jarmo Prehistoric Project was the first comprehensive scientific research investigating how and why people adopted a new way of life, *i.e*., of farmers and herders. The team excavated Jarmo, Karim Shahir, Matarrah, Tell M'lefaat, and other important prehistoric sites in Iraq-Kurdistan. Their research resulted in constructing fundamental data on the process of Neolithization and on subsequent social developments in Near Eastern prehistory [Braidwood and Howe 1960; Braidwood *et al*. 1983]. Danish excavations at Shimshara in the Ranya Plain in 1957 and 1959, also yielded information on developed farming societies, termed the Hassuna culture [Mortensen 1970]. Based on these results, most scholars believed that the eastern part of the Fertile Crescent in the Zagros region, especially Slemani and Iraq-Kurdistan, was the most important archaeological region for studying the great transition from hunter-gatherers to farmer-herders in prehistory.

In addition to these prehistoric investigations, one should note important work on later periods, including extensive surveys and some excavations around Slemani. Extensive surveys of the Ranya Plain in the Slemani region were carried out by the Iraqi Directorate of Antiquities and Heritage as a part of a salvage project prior to the construction of dams and reservoirs at Dokan in the 1950s. Some sites, such as Basmusian, Shimshara, Kamarian, ed-Dem and Qarashina were excavated. A Danish expedition collaborated in the project at Shimshara [Ingholt 1957; Laessøe 1959; Soof 1970]. The Shahrizor area was also surveyed by the Iraqi Directorate of Antiquities and Heritage, initially in 1943 and 1946–48. Subsequently, in 1960–1961, some sites were subjected to salvage operations by the Iraqi Directorate General of Antiquities, when the Darband-i Khan dam was constructed [Altaweel *et al*. 2012; Soof 1964]. However, from the 1960s onwards until 1974, few archaeological

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excavations were undertaken in Iraq-Kurdistan, including the Slemani region [Salmon 1973; Hijara 1975].

The political situation in Iraq became a major obstacle for further scientific activities in Iraq-Kurdistan, from the middle of the 1970s onwards. Most foreign archeologists had to shift their research and fields of study to other regions in the Near East such as the Levant and Anatolia. Concerning about the Neolitization studies, archeologists actively excavated many important Epi-Paleolithic and Neolithic sites in these regions. The Levant and southeast Anatolia, especially the Levantine Corridor [Bar-Yosef and Meadow 1995] and the Golden Triangle [Kozlowski and Aurenche 2005], became the focus for the study of the Neolithization. Prehistoric archeologists discovered the "oldest" evidence of farming settlements with domesticated plants and animals in these regions. Therefore, scholars were motivated to believe that the western and northern parts of the Fertile Crescent were the original zones for a new way of life involving farming.

However, there was no definite evidence as to the accuracy of this new hypothesis, as the eastern part of the Fertile Crescent, the Zagros region, remained unexplored from the middle of the 1970s onwards. After a long struggle, Iraq-Kurdistan experienced significant changes in last few decades. The end of the Gulf War in 1991, followed by the Kurdish uprising against the Iraqi government, resulted in the establishment of the Kurdistan Regional Government (KRG) in 1992 [MacDowall 2004]. In particular, after the fall of the previous regime in 2003, Iraq-Kurdistan began to enjoy a high degree of autonomy, and to achieve social and political stability. At the same time, it has been a definitive moment for archaeological research in the region under the initiative and support of the Directorate-General of Antiquity of the KRG.

After 2010 a new page of archaeological research opened in Iraq-Kurdistan. Due to political stability of the region, many archaeological regional surveys and excavations begun to initiate in the region (Kopanias *et al.* 2015). The period in focus was in a wide range from the Neolithic to the Ottoman period. Apart from the Neolithic period, Bronze Age (3^{rd}-2^{nd} millennia BC) has been one of the main focuses of the investigation. For example, large city-scale sites like Bakr Awa in the Shahrizor plain (Miglus *et al.* 2013), Tell Shimshara in the Ranya plain (Eidem 2012), and Qasr Shemamouk in the Erbil plain (Rouault *et al.* 2014) have been excavated. The regional surveys in the Erbil, Slemani, and Dohuk regions have been conducted utilizing various sophisticated methods including satellite images and systematic sampling of surface scattered artifacts (*e.g*. Altaweel *et al.* 2012, Ur *et al.* 2013). Kuridish archaeologists also began new excavations at some important sites, including Tell Sitak which produced Assyrian inscriptions (Saber, Hamza and Altaweel in press). The past few years saw the "boom" of Kurdistan archaeology which are now considered by many scholars as a new frontier of Near Eastern archaeology.

New archaeological investigations, which focused on the question of Neolithization, were also started in the Zagros area, including Iraq-Kurdistan, in the late 2000s. A team from Tübingen University excavated Chogha Golan in the Iranian Zagros, and reported one of the oldest evidences of domesticated cereal grains dating back to 10,000–8000 BC [Riehl *et al*. 2013]. A team from the University of Reading and Tehran University excavated the site of Sheikh-e Abad near Kermanshah and revealed an old farming settlement [Matthews *et al*. 2013]. The team from the University of Reading also started a new project in Iraq-Kurdistan, in collaboration with the Slemani Directorate-General of Antiquities, for excavations at the site of Bestansur in the Shahrizor Plain. Results of these new investigations in the Zagros region inform us that the eastern part of the Fertile Crescent provides evidence of farming villages, as old as and contemporary with, their western counterparts in the Levant and Southeast Anatolia.

Therefore, if we wish to understand the whole Neolithization process in the Near East, we would need to expand archaeological investigations into the eastern part of the Fertile Crescent. Iraq-Kurdistan is not only located at the heart of this part, but also constitutes an area where the study

of the Neolithization process was started for the first time in the 1940s. We believe that numerous well-preserved Neolithic sites will be discovered in Iraq-Kurdistan, especially Slemani area, providing further information on the Neolithization process and of succeeding complex societies.

(A. Tsuneki, K. Rasheed and M. Makino)

2. Archaeological surveys

The purpose of our research is to investigate a series of Neolithic sites in Slemani region, in order to study the Neolithization process and subsequent social development in the heart of the eastern part of the Fertile Crescent. To achieve this aim, we initiated a preliminary survey in Slemani region (Fig. 2.1). Owing to the kind permission and support of the Slemani Directorate of Antiquities, we investigated prehistoric sites from March 3–12, 2014.

The survey was mainly conducted in two areas, the Ranya-Pshdar Plains in the north and the Shahrizor Plain in the south. The survey was conducted by visiting sites previously recorded by the Iraqi Government in the 1970s and by the Slemani Directorate of Antiquities with Erbil-Institut français du Proche-orient in the early 2010s. We visited 19 tell sites during our survey with our colleagues at the Slemani Directorate of Antiquities (Figs. 2.2, 2.3). In addition to excavated sites in the surveyed area such as Bestansur, we identified material cultural remains of the Neolithic period, especially the Hassuna period, at four sites: Tell Raza (No. 7) and Shakar Tepe (No. 12) in the Shahrizor Plain, and Boskin (No. 17) and Qalat Said Ahmadan (No. 19) in the Ranya-Pshdar Plains (No. 19). In general, as per our survey, Neolithic occupation is rare in tell sites in the surveyed areas. Three of the four tell sites are located in the plains and not in the foothill zone of the mountains. Thus, we presume that in order to identify the earliest Neolithic sites we should intensively investigate

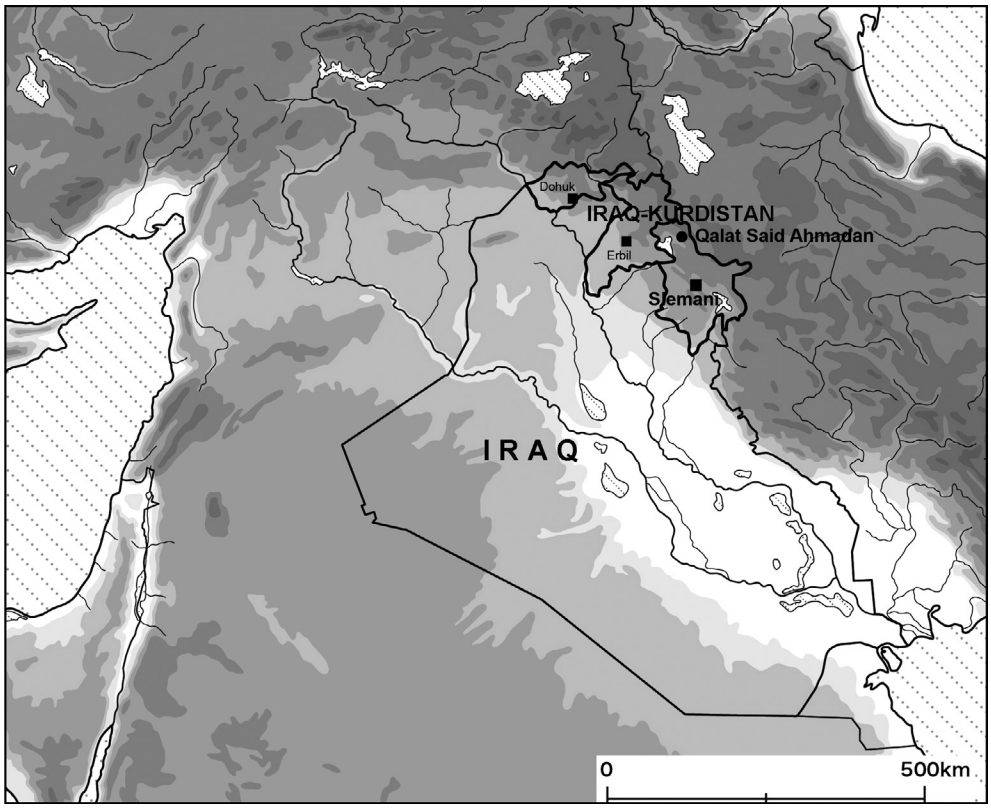


Fig. 2.1 Location of Iraq-Kurdistan and Slemani district

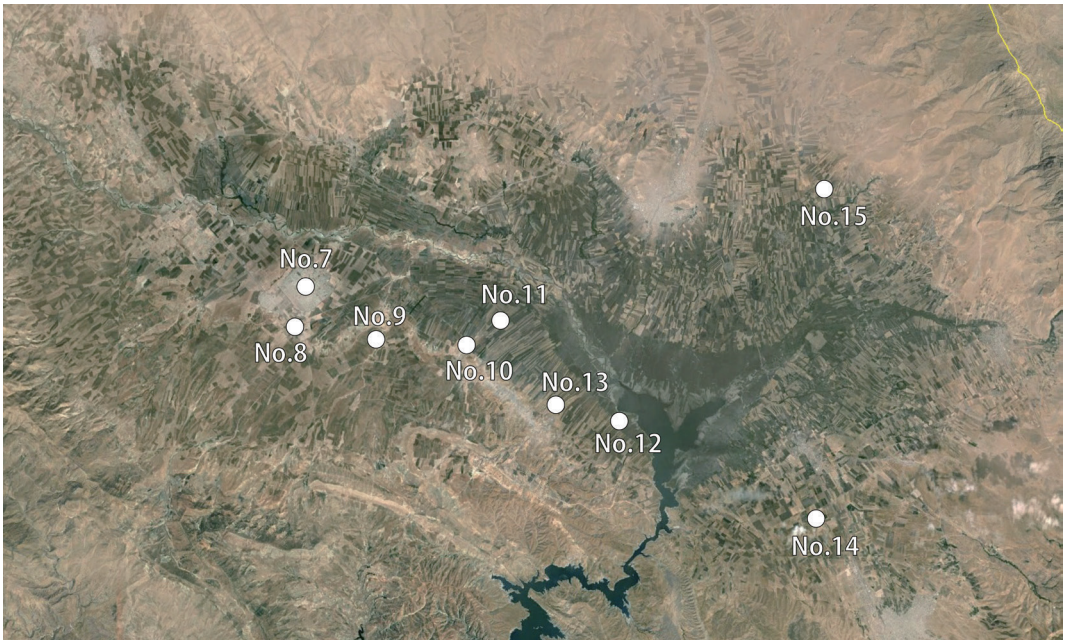


Fig. 2.2 Surveyed sites in the Shahrizor Plain (image from Google Earth)
No. 7. Tell Raza; No. 8. Caani Rash; No. 9. Quchika Tepe; No. 10. Tell Hassil; No. 11. Tell Haji; No. 12. Shakar Tepe; No. 13. Qalbaza Tepe; No. 14. Bakr Awa; No. 15. Tell Qulkhurd

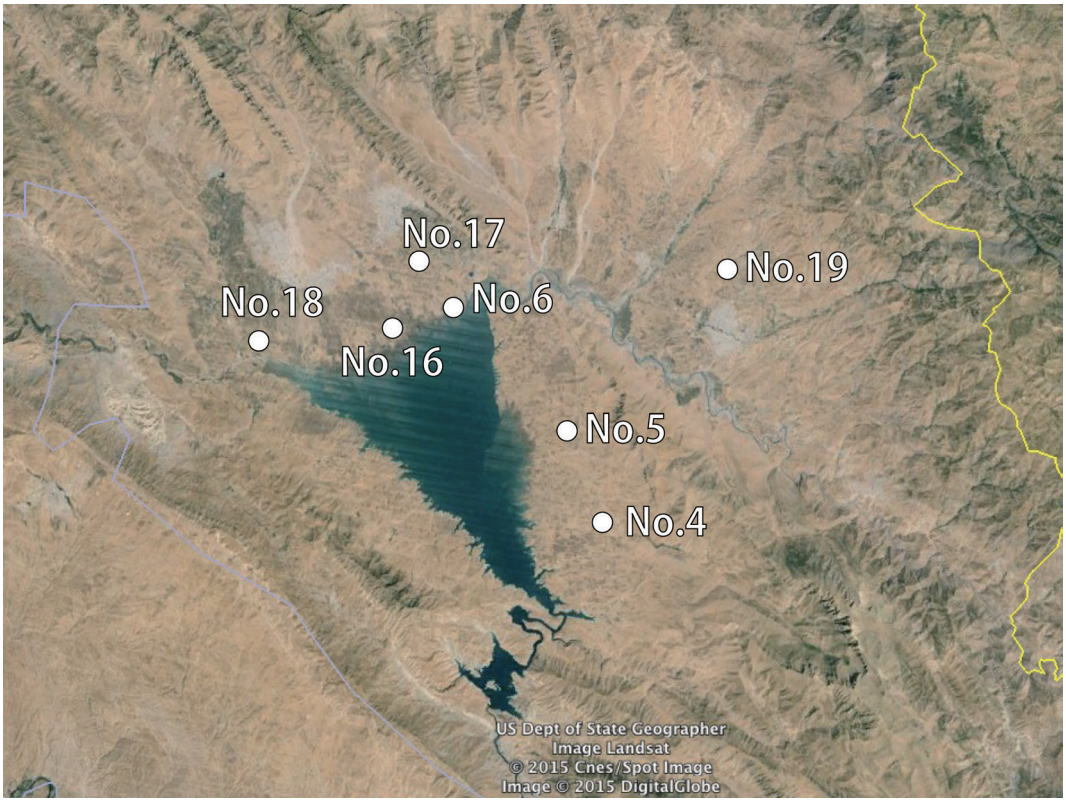


Fig. 2.3 Surveyed sites in the Ranya – Pshdar Plains (image from Google Earth)
No. 4. Tell Bengel; No. 5. Qala Tepe; No. 6. Tell Shimshara; No. 16. Ibrahim Kachal; No. 17. Boskin; No. 18. Ali Awa; No. 19. Qalat Said Ahmadan

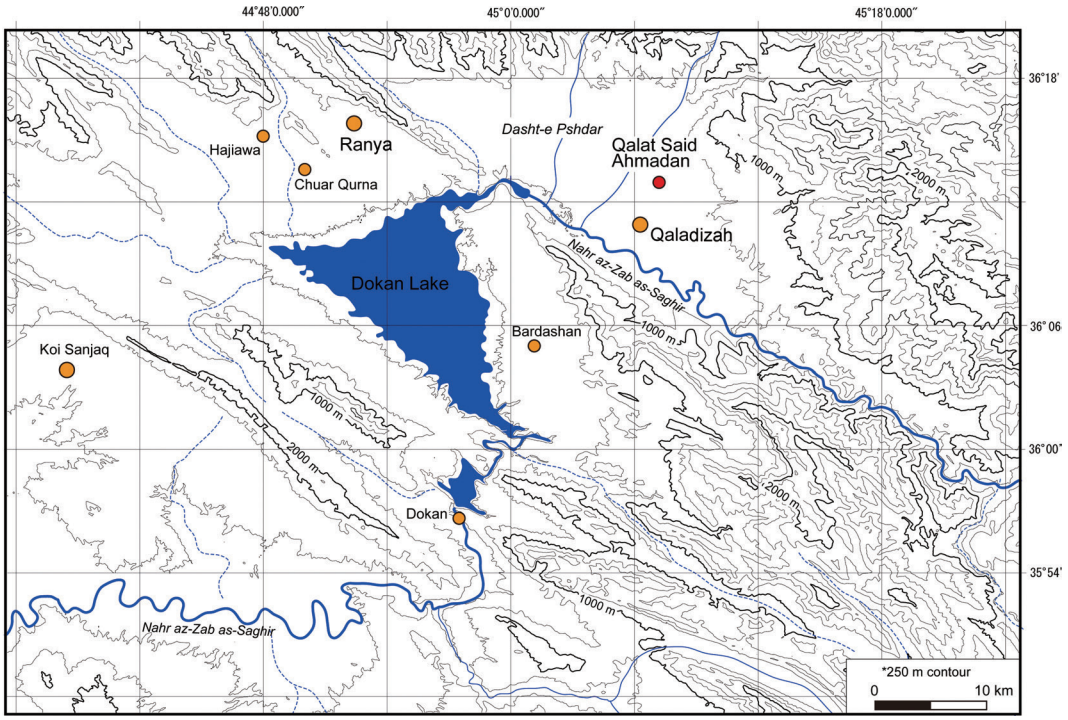


Fig. 2.4 Location of Qalat Said Ahmadan in the Dokan Lake area

Fig. 2.5 General view of Qalat Said Ahmadan (from the east)

open-air sites along the foothills. Most early tells discovered by us appear to be well-developed farming villages.

Amongst these Neolithic sites, only Qalat Said Ahmadan (No. 19) near Qaladizah is located in the foothills (Figs. 2.4, 2.5). We could collect considerable quantities of Neolithic potsherds, as also those of the Chalcolithic, Bronze and Iron Ages. Most prehistoric potsherds were collected on the southern slope, and this part of the mound appears to have been occupied mainly during the Neolithic. A topographic map of this site was prepared using a total station and GPS.

We presumed that initiation of archaeological investigations at Qalat Said Ahmadan, would result in obtaining a good cultural sequence of the Neolithic, with the possibility of pre-dating the Hassuna period, and later periods, as well as considerable information for the study of the Neolithization process and development of early farming societies. A good strategy is to begin with trial trench excavations along the southern slope of the mound.

These investigations would contribute to constructing a local chronology, not only for the Ranya-Pshdar plains, but also for the Slemani region as a whole. The establishment of a local chronology is very important for any further investigations, including general surveys and regional studies of the Slemani region.

Unfortunately, the northern part of the mound at Qalat Said Ahmadan, is facing rapid destruction, owing to expansion of the village of Said Ahmadan located to its south. Therefore, our investigations at the site are not only an academic research exercise but also constitute salvage operations.

The aims of our archaeological investigations at Qalat Said Ahmadan are summarized as follows:-

1) Promotion of studies on the Neolithization process and the development of early social complexity in Kurdistan.
2) Establishment of a local chronology following the Neolithic.
3) Initiating efforts at site conservation to protect it from ongoing destruction.

(A. Tsuneki, S. Nishiyama, S. A. Saber and A. Hasegawa)

3. Geomorphological, sedimentological and paleo-environmental reconnaissance around the Qalat Said Ahmadan

Qalat Said Ahmadan (QSA in Fig. 3.1) was built near the hinge of a broad alluvial fan, with its slope dipping gently to the southwest. Because of its high elevation, the site has an open view to the southwest, to the gorge where the Lower Zab River transects a NW-SE-trending ridge and winds its way into the Ranya basin. Several terraces of unknown age were observed around Qalat Said Ahmadan.

Three terraces (HTs, and T_1 to T_3 in Fig. 3.1.a and b, respectively) at different levels are distributed on the lee-side (southwest) of the alluvial fan, and have higher elevations than the down-slope surface of the fan. Streams north and south of the mound meet in front of these terraces and dissect them to meet with the main stream of the Lower Zab River to the south.

There seems to be two possible accounts for the presence of the high-level terraces in the west: one is sedimentary, and the other tectonic. The sedimentary hypothesis for the high terraces requires several large aggradation events along the Lower Zab River, or its tributaries. This would require a high rate of sediment supply due to high precipitation and/or rapid uplift of the Zagros Mountains. In contrast, the tectonic hypothesis assumes that an NNW-SSE trending active fault uplifted the western block, which was later incised by the westward flowing streams. Further investigation is necessary to understand which mechanism was involved.

Streams on both sides of the mound incised the alluvial fan deposits, and formed a narrow terrace (T_4) in the incised valley. The T_4 terrace is the flood-plain deposit of a meandering stream that incised

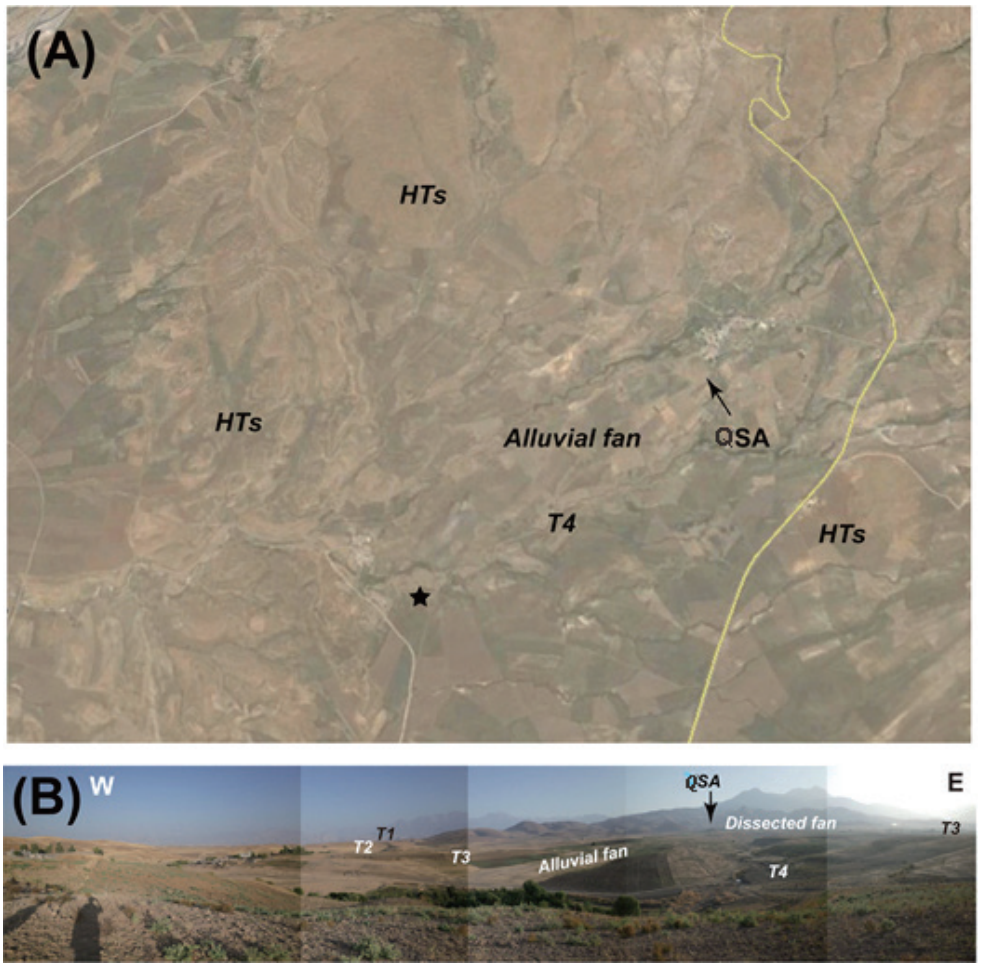


Fig. 3.1 Location of Qalat Said Ahmadan (QSA) and distribution of alluvial fan deposits and terraces (a). A panoramic photo (b) was taken from the location marked by star. The figure was modified based on a satellite image from Google Earth

Fig. 3.2 Carbonate crust covering the T_3 surface

Fig. 3.3 Virgin soil underneath the building stones, with plastic cubes for anisotropy of magnetic susceptibility measurement

the alluvial fan deposits. Sediments underneath the T_4 terrace were observed to be mostly conglomerates, occasionally interbedded with sandy layers. The stream valley southeast of the mound is asymmetrical, with a gently dipping north slope and steeply dipping southern slope. Such asymmetry implies that the channel recently migrated from north to south, and that the most recent incision took place mainly in the southern part of the T_4 terrace, leaving point-bar sediments behind (on the northern slope). Thus, it was suspected that the stream was located closer to the Tell when the first settlement occurred in this area.

Pore spaces of conglomerates are often cemented by carbonate minerals near the surface of the Quaternary deposits (Fig. 3.2). Such carbonate crusts, referred to as caliche, are common in arid regions, and are formed due to interaction between groundwater saturated with Ca and atmospheric CO_2. The presence of a carbonate crust implies that the surface was exposed for a relatively long period, under conditions of aridity and relatively high water table.

Carbonate crusts were observed at the top of the alluvial fan deposits underneath Qalat Said Ahmadan. Coring through virgin soils from the base of the Operation A, a caliche layer was reached 60 cm below the base. Impermeable carbonate crusts near the surface of the alluvial fan deposits may have worked as good barriers preventing rainwater from penetrating the soil and moving underground. The virgin soils consist of rather massive, dark-brownish clay materials (Fig. 3.3), and contain no archaeological remains. This implies sedimentation in a still-water environment. Thus, the Operation A remains were built during, or just after, a rather wet period that followed the dry period during which the carbonate crusts formed.

(Ryo Anma)

4. The site of Qalat Said Ahmadan and the first season of excavation

The site of Qalat Said Ahmadan (N36° 13′ 30.32″ E45° 08′ 48.75″) is located at the foothill of a mountain, immediately to the south of Said Ahmadan village, around 3.5 km north of Qaladizah town, in the Pshder Plain (Fig. 4.1). It is locally referred to as Qalat (castle), and was registered with the name Qalat Said Ahmadan. The cultural horizons appear to rest on natural fan deposits, sloping from the northeast to the southwest (Fig. 4.2). The mound has an oval plan, measuring 160 × 170 m, with a trapezoidal profile and steep slopes (Fig. 4.3). The height at the surface of the mound is 719 m asl and the base is at 697 m asl. Therefore, the mound rises to a height of 22 m above the surrounding plain. The surface is flat and slopes slightly towards the north. The northern part of the foot of the mound is intensively destroyed by houses of the modern village. However, the southern part of the mound is almost completely preserved. On the southern slope, we were able to collect a fairly large number of potsherds indicative of a chronological sequence ranging from the prehistoric to historical periods, and including Hassuna-Samarra wares.

Therefore, we chose the southern slope of Qalat Said Ahmadan for our excavations. To proceed in a scientific manner, we excavated sounding trenches along the north-south axis of the southern slope of the mound. We set the Bench Mark 0 (BM 0) on the southern edge of the flat summit of the mound. The piles of BM 20, 40 and 60 were set at 20, 40 and 60 m south of this. Three trenches

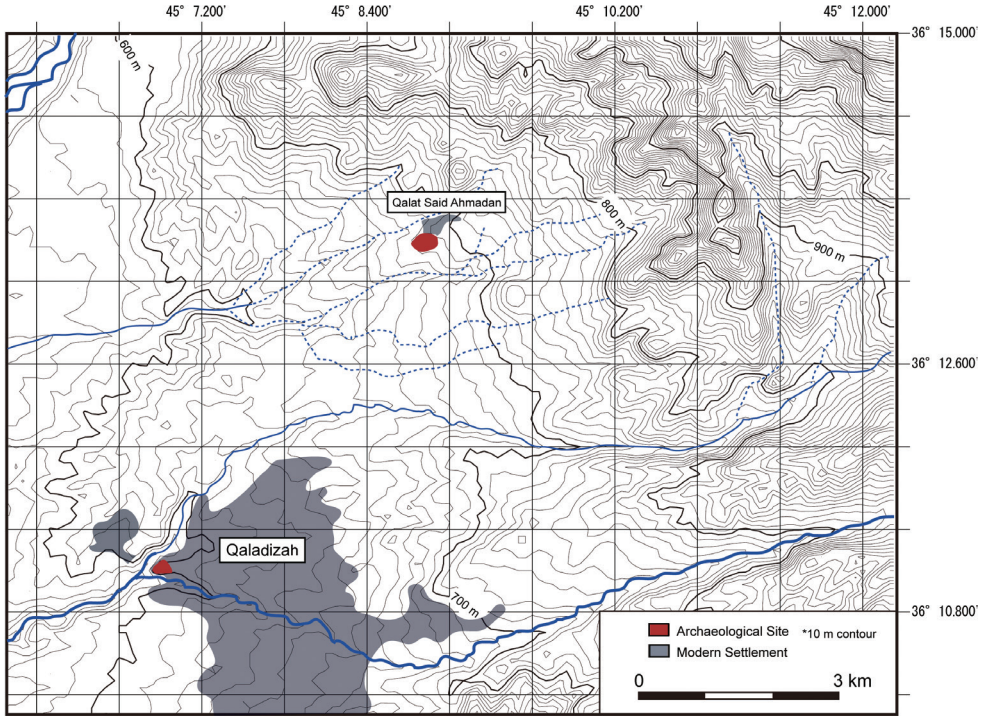


Fig. 4.1 Topographic map around Qalat Said Ahmadan

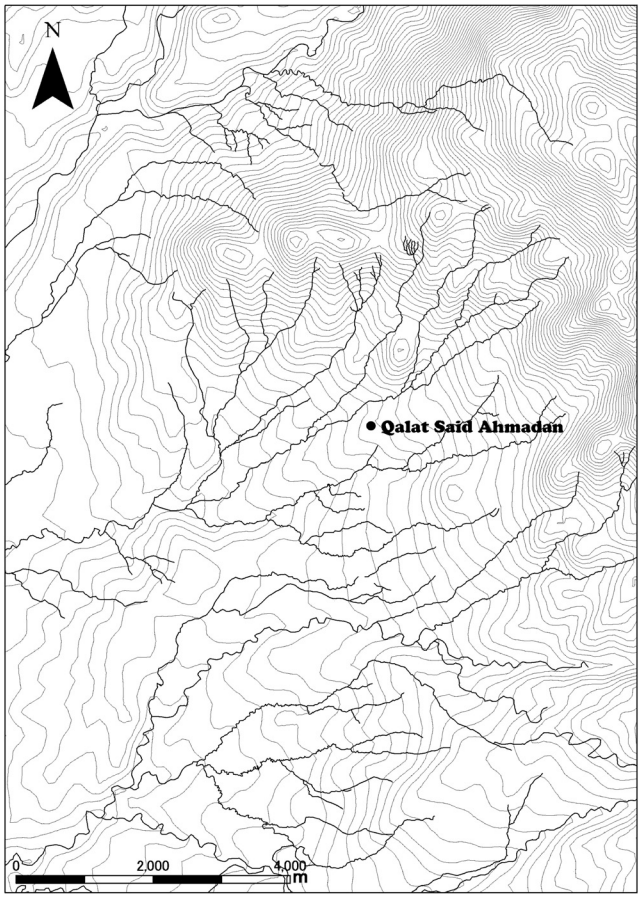


Fig. 4.2 Detailed topographic map around Qalat Said Ahmadan, which shows its location on the fan deposits inclining from the northeast to the southwest

Fig. 4.3 General view of the excavations at Qalat Said Ahmadan (from the south)

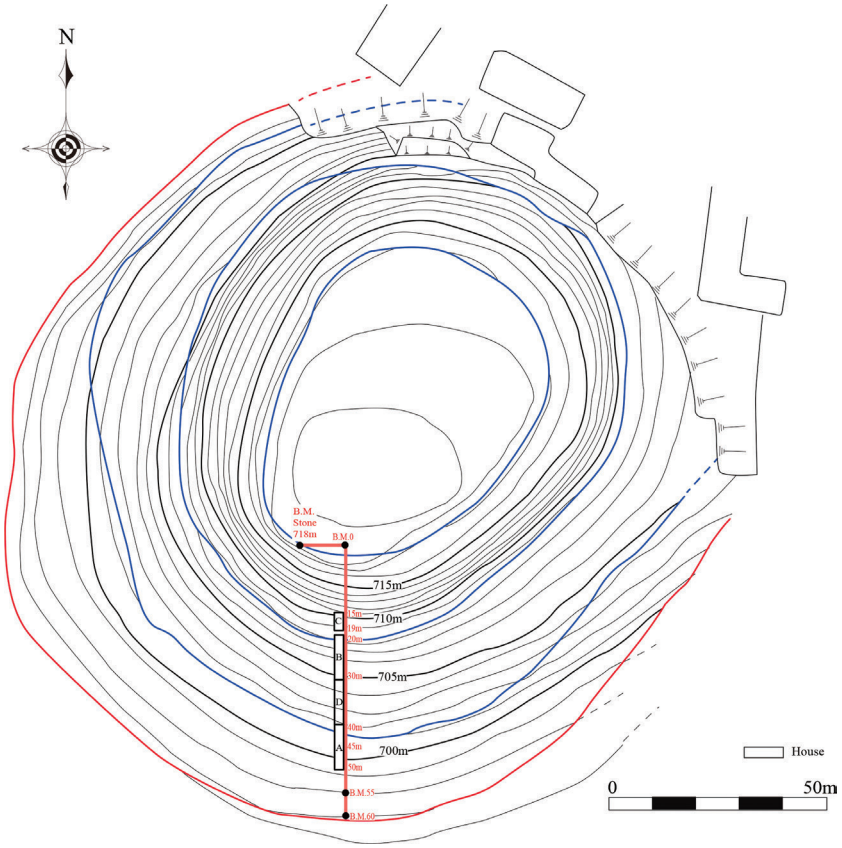


Fig. 4.4 Topographical map of Qalat Said Ahmadan and the locations of Operations

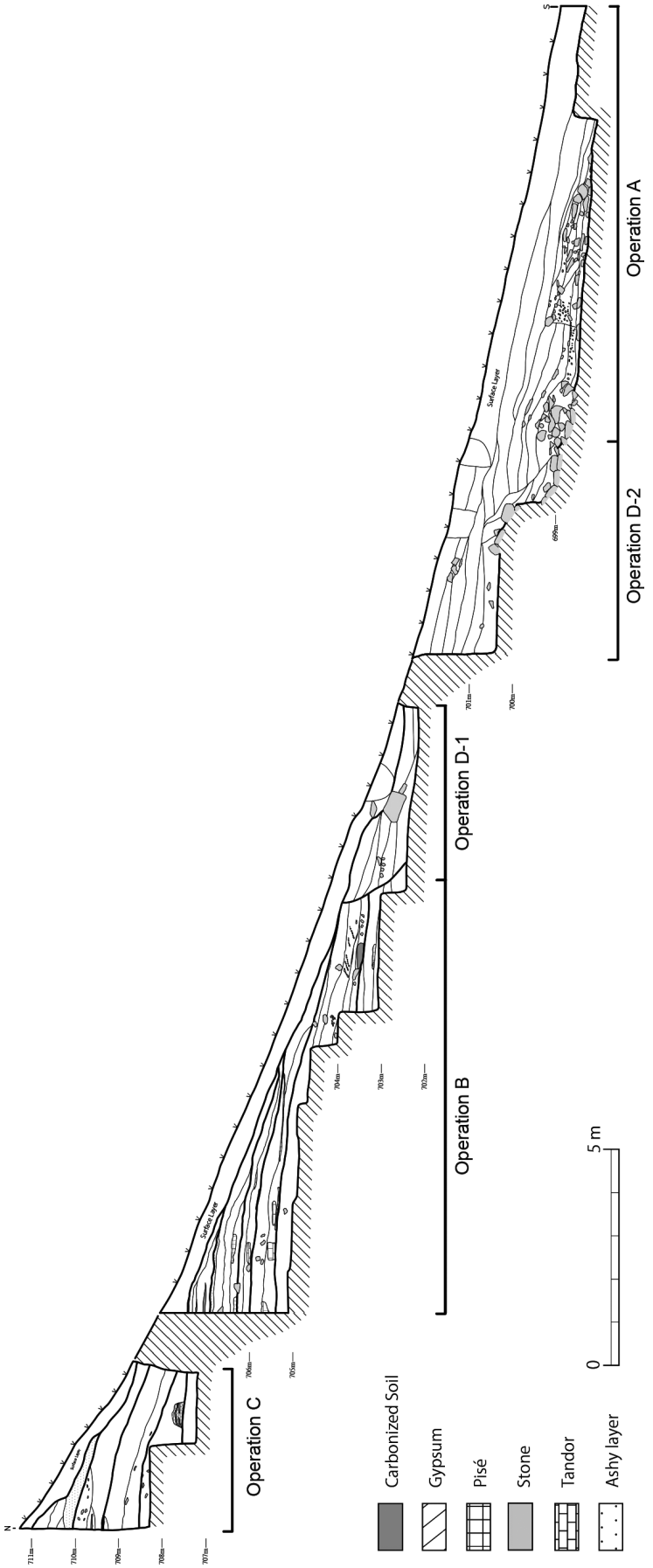


Fig. 4.5 East wall section of the Operations C, B, D, and A

of 2 × 10 m each and one trench of 2 × 4 m, termed "Operations" A, B, D and C were laid out and dug down (Figs. 4.4, 4.5). The first archaeological investigation at Qalat Said Ahmadan extended from August 20 to September 30, 2014. The results of the excavations are discussed below.

(A. Tsuneki, S. A. Saber, S. Nishiyama, B. B. Ismail and S. Jammo)

5. Operation B

Operation B was a 2 m (EW) × 10 m (NS) trench excavated in the middle of the southern slope. It was excavated with the aim of investigating the nature of transition from the prehistoric to historic phases. However, almost all material discovered from this trench, belongs to the Neolithic. The northern edge of the trench was excavated to a depth of 2.9 m (708.1–705.2 m asl) and its southern edge was dug to a depth of 1.7 m (704.2–702.5 m asl) below the surface. At the southern end of this trench, we reached natural fan deposits, consisting of dull greenish-brown soil, at an altitude of 702.85 m. This suggests that the first Neolithic settlement at Qalat Said Ahmadan was established on natural fan deposits sloping from north to south, around 703 m asl (Fig. 5.1). As mentioned below, the southern edge of this Neolithic settlement was dissected by large stone constructions of the Iron Age. Excepting for this Iron Age construction and a mixed surface layer, all cultural layers in this excavation yielded only Neolithic material.

Stratigraphy and structures

The surface of Operation B was covered with a modern mixed surface layer, measuring 0.3–0.5 m in thickness. Below this surface layer, thick Neolithic cultural deposits accumulated on the natural fan. These cultural deposits of Operation B were divided into many sub-layers in the eastern and northern sections. However, these deposits were categorized into six cultural layers based on the nature of the structures found (Fig. 5.1).

Layer 1 is the topmost layer just below the modern surface. Owing to the angle of the slope, this layer was detected only at the northern end of Operation B. The layer is 0.6–0.7 m thick and consists of alternating horizontally deposited dark-soft ashy layers and orange clay layers. No remarkable structures were found in this layer.

Layer 2 is c. 0.5 m thick and consists of brown hard soil and grayish soft soil. Although we noticed fragments of pisé walls in the sections, we could not clearly identify their plan during excavations. We presume that the pisé wall structures were seriously damaged and poorly preserved in this layer.

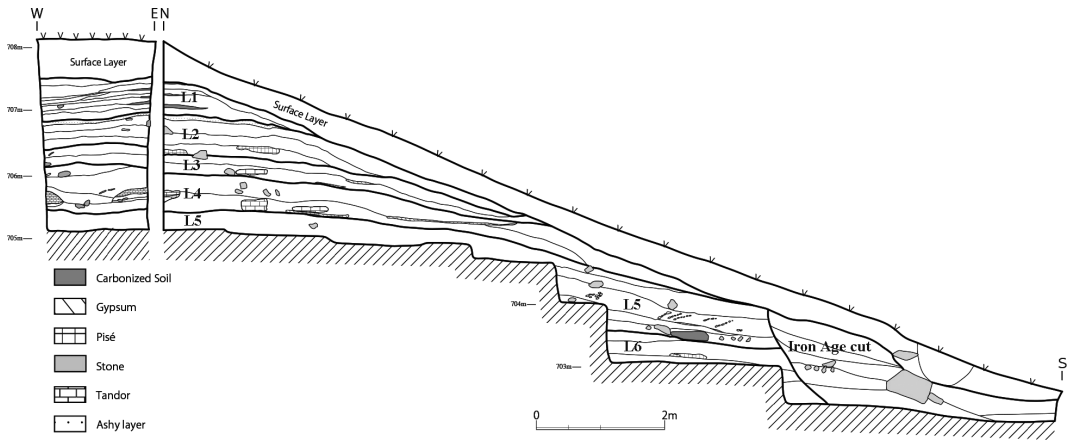


Fig. 5.1 East wall section, Operations B and D-1

Layer 3 is a relatively thin layer, measuring about 0.3 m in thickness. It consists of light gray ash and dull brown soil. We discovered a pisé wall (Str. 1) at the northern end of the trench. This structure marked the western corner of a rectangular pisé building (Figs. 5.2 left, 5.3). The wall is about 0.4 m wide, but we could not locate a floor inside this building. Another pisé wall, Str. 5, was discovered just below and besides Str. 1 (Figs. 5.2 left, 5.4, 5.5). This wall measures about 0.4 m in width and is over 0.3 m in height, running parallel to Str. 1. Besides these pisé walls, small patches of white gypsum were found in the same layer, and possibly indicate floor remnants.

Layer 4 is a dull brown and orange soil, c. 0.6 m thick, with various structures, such as pisé walls, *tandors*, and shallow pits. As imposed structures were discovered in this layer, the layer was divided into two upper and lower sub-layers. Structure 2 is a 0.4 m thick and c. 0.3 m tall pisé wall, running from northeast to southwest (Figs. 5.2 left, 5.6). At the northern end of Operation B, we found a series of *tandors* (Strs. 6, 7) (Figs. 5.2 left, 5.7, 5.8). They were oval or semi-rectangular in plan. Their surfaces were burnt and hard, comprising a thick orange burnt soil fringed by a yellowish orange soil. These *tandors* were certainly used for cooking in the manner of ovens. Just below Str. 6 another *tandors* was discovered (Str. 9, Fig. 5.8). East of this *tandors*, a small round gypsum floor was discovered (Str. 10, Fig. 5.8). This measures c. 1.0 m–0.8 m, being a few centimeters thick. In the middle part of the Operation, the southern corner of pisé wall (Str. 8) was discovered (Figs. 5.2 left, 5.8). Thus, we can state that layer 4 had abundant and imposed various structures.

Layer 5 is the lowermost layer in the northern part of Operation B, where we did not reach virgin soil. As we excavated only to a depth of c. 0.3 m, no remarkable structures were discovered here. We just found a shallow pit rimmed with a row of small stones (Str. 4, Fig. 5.2 right). At the southern end of Operation B, layer 5 is c. 0.9–0.8 m thick, consisting of dark-brown to reddish-brown soil. The southern end of this layer and the lowest layer 6 of Operation B, were dissected by Iron Age structures (Figs. 4.5, 5.1), which are discussed in section dealing with Operations A-D. Here, a pisé wall mixed with stones (Str. 3) was found (Figs. 5.2 right, 5.9). This wall is 0.4–0.7 m wide and had a right angled bend. The direction of the wall, the material used for construction (mixed with stones), and its width, differ from that of other pisé walls discovered in the upper layers.

Layer 6 was detected only in southern part of Operation B, where excavations were continued deeper. This layer is c. 0.4 m thick, comprising brown-grayish soil deposited just above the virgin soil. Besides fragments of the pisé wall, there was a single row of stones running from the northeast to the southwest (Str. 11). To its west, a patch of black carbonized soil was identified (Figs. 5.2 right, 5.10). The function of these structures is unclear. As mentioned above, layer 6 was deposited over the virgin soil, with a gradual transition from brown to greenish-brown in color (Fig. 5.11). The soil was sticky with many white inclusions. It was archaeologically sterile and comprised natural fan deposits.

Artifacts

With the exception of layers 5 and 6, potsherds were the most abundant artifacts discovered throughout the excavations. Layers 1–5 produced a total of 1917 potsherds (Table 5.1). The majority are dark-colored chaff-tempered thick coarse-ware body fragments (n = 1084). Fine-ware body fragments were also recovered, most of which were light-colored grit-tempered and lacking decorations (n = 223). Amongst the diagnostic potsherds, different characteristic decorations were recognized, *i.e.*, painted (n = 81) (Fig. 5.12:1–4), incised (n = 291) (Fig. 5.12:5), and painted-and-incised (n = 7) (Fig. 5.12:6). Preliminary studies led to the division of painted ware into three categories. Potsherds with a series of fine black or dark-red designs painted on a cream slip or greenish buff surface, may be classified as Samarra painted pottery (Fig. 5.13). These potsherds were discovered mainly in the upper layer 1. This layer also yielded a small quantity of another type of painted pottery,

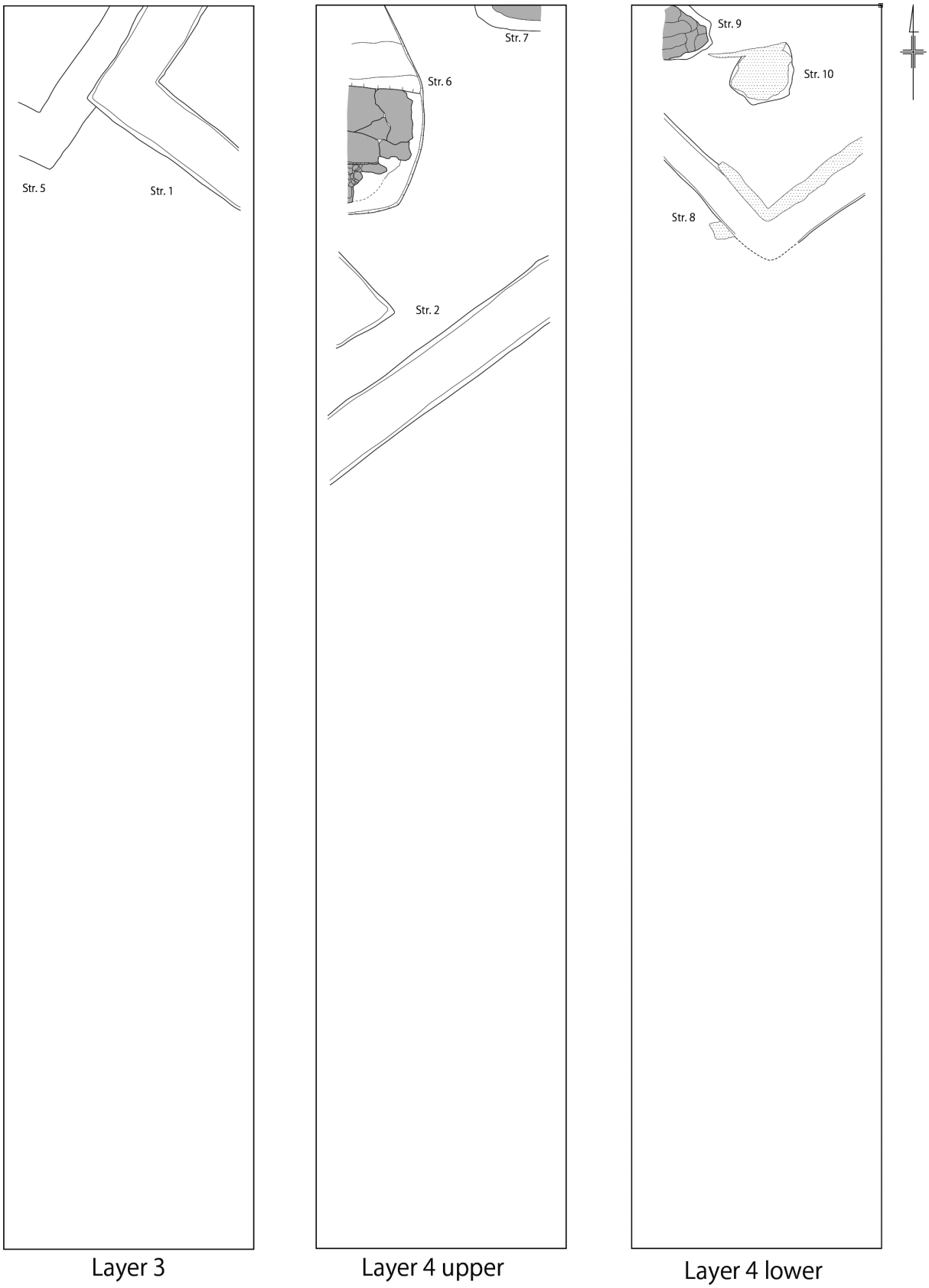
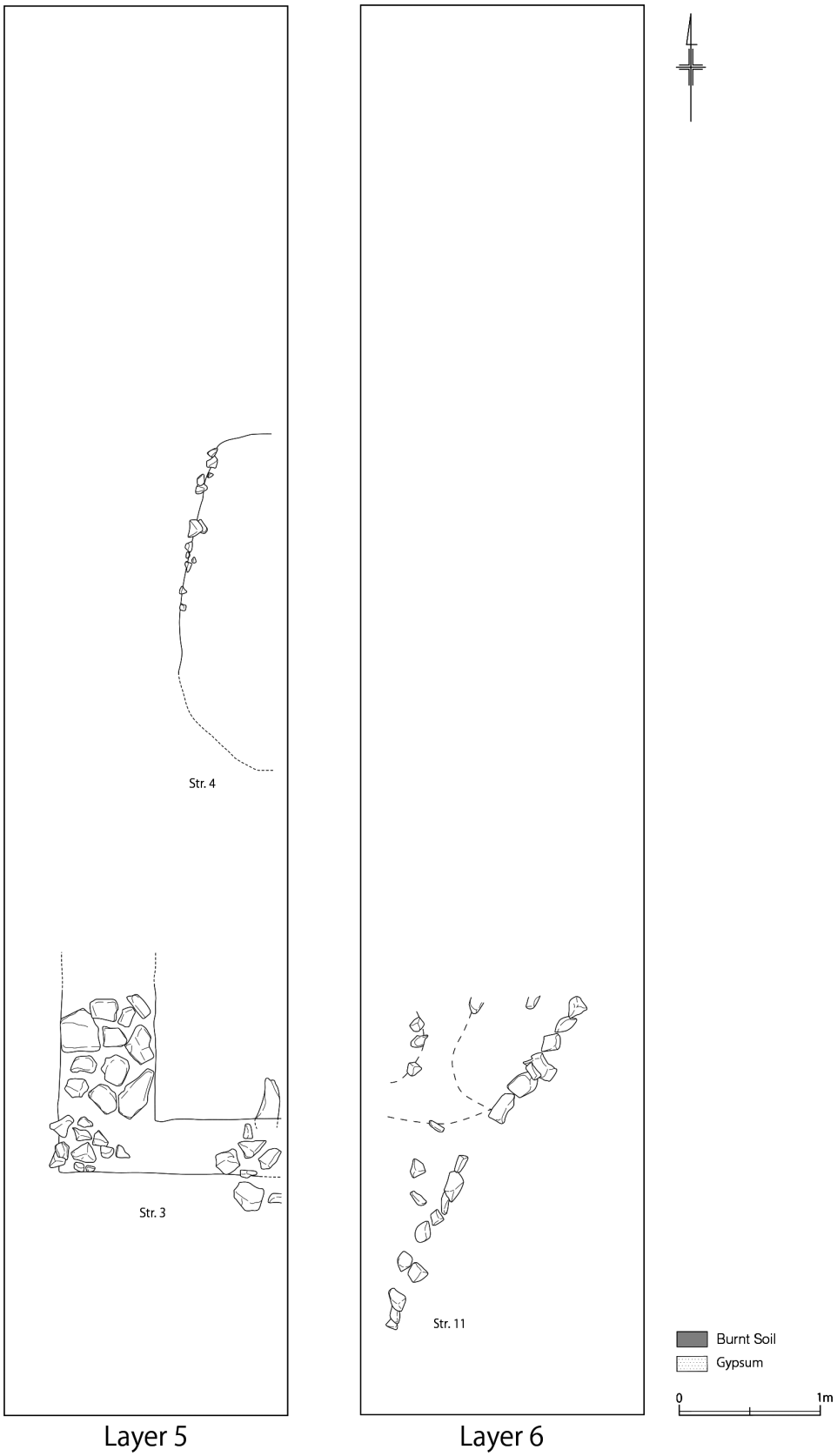


Fig. 5.2 Structures in



each layer, Operation B

Fig. 5.3 Str. 1 (pisé wall) in layer 3, Operation B (from the east)

Fig. 5.4 Str. 5 (pisé wall) in layer 3, Operation B (from the west)

Fig. 5.5 Str. 5 (pisé wall) in layer 3, Operation B (from the south)

Fig. 5.6 Str. 2 (pisé wall) in layer 4 upper, Operation B (from the east)

Fig. 5.7 Strs. 6 and 7 (*tandors*) in layer 4 upper, Operation B (from the east)

Fig. 5.8 Str. 8 (pisé wall), Str. 9 (*tandor*), and Str. 10 (gypsum floor) in layer 4 lower, Operation B (from the east)

Fig. 5.9 Str. 3 (a pisé wall mixed with stones) in layer 5, Operation B (from the east)

Fig. 5.10 Str. 11 (a row of stones and a patch of carbonized soil) in layer 6, Operation B (from the north)

Fig. 5.11 layer 6 deposited over the virgin soil, with a gradual transition from brown to greenish-brown in color (from the south)

Table 5.1 Number of classified potsherds in each layer of Operation B

Layer	Non Diagnostic potsherds		Diagnostic potsherds									
	fine	coarse	Painted	Painted and incised	Incised	Plain		Coarse plain				
						rim	bottom	rim	bottom	stand	husking tray	total
Layer 1	74	222	46	4	10	12	0	18	4	0	0	390
Layer 2	41	122	8	1	41	10	0	14	1	0	4	242
Layer 3	81	576	14	1	171	33	7	60	16	2	1	962
Layer 4	26	161	13	1	67	24	3	16	5	0	1	317
Layer 5	1	3	0	0	2	0	0	0	0	0	0	6
	223	1084	81	7	291	79	10	108	26	2	6	1917

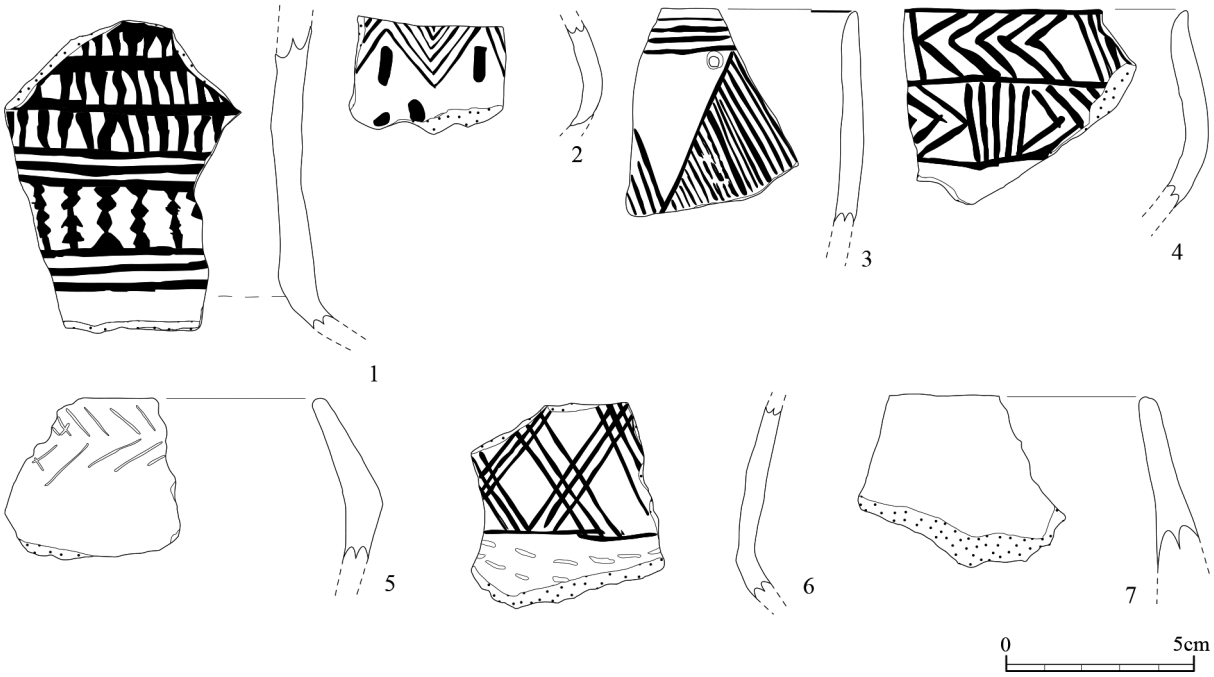


Fig. 5.12 Various type of pottery discovered from layers 1–4, Operation B
1–4. painted pottery; 5. incised pottery; 6. painted-and-incised pottery; 7. burnished pottery

decorated with fine parallel zigzag or chevron motifs on a buff surface or lustrous cream slip (Fig. 5.14). In layers 1–4, a greater number of roughly painted potsherds were noted (Fig. 5.15). Potsherds with incised decorations increased in number, in particular, in layer 3 (Figs. 5.16, 5.17). Potsherds with painted-and-incised decorations (Fig. 5.18) were also present in layers 1–4, although in small numbers. We suggest that these decorated potsherds (rough painted ware, incised ware, painted and incised ware) resemble the Hassuna pottery. However, in the lower layer 4, besides these Hassuna-type decorated potsherds, orange/light colored burnished potsherds (Figs. 5.12:7, 5.19) and chaff-tempered coarse plain potsherds were conspicuous. It is also notable that six pieces of a "husking tray" were discovered, four of which were from layer 2 (Fig. 5.20).

In addition to tiny chips obtained by sieving and floatation, 943 pieces of chipped stone were discovered in excavations of Operation B. Over half of these (n = 501) were from layers 5 and 6. Chipped stone artifacts discovered from layers 1 to 4 are relatively sparse. Flint formed the predominant raw material used for lithics, with less than 17% comprising obsidian. Flint flakes predominated in layers 1–4. A few lithic tools were recognized. Scrapers and sickle elements (Fig. 5.21:5, 6) were most conspicuous in these layers. Microblade cores and core fragments (Fig. 5.21:7, 8) and obsidian microblades (Fig. 5.21:9–13) were also discovered. A greater variety of flint and obsidian lithic tools were found in layers 5 and 6, including sickle elements (Fig. 5.21:4), scrapers (Fig. 5.21:1,2), serrated blades (Fig. 5.21:3), and points. Blade cores and hammer stones were also discovered in these layers, which certainly indicates on-site knapping at Qalat Said Ahmadan. Although five small potsherds were discovered in layer 5, they are probably intrusive. We suggest that the cultural deposits of Operation B, below layer 5, belong to the Pre-Pottery Neolithic period. The lithic industry is far richer and more varied in layers 5 and 6, as compared with that in the overlying layers 1–4. ^{14}C results (see appendix 2 in this report) also support the hypothesis that layer 5 belongs to the PPN period. Small objects discovered from Operation B will be discussed later.

Fig. 5.13 Samarra painted pottery

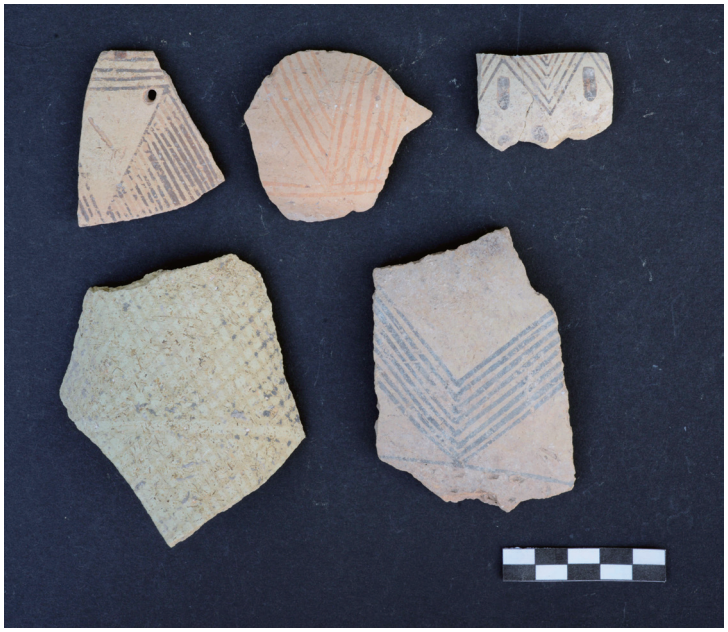


Fig. 5.14 Painted pottery with fine decoration

Fig. 5.15 Hassuna painted pottery

Fig. 5.16 Coarse incised pottery

Fig. 5.17 Fine incised pottery

Fig. 5.18 Painted-and-incised pottery

Fig. 5.19 Orange/light colored burnished pottery

Fig. 5.20 Coarse ware including so-called husking trays

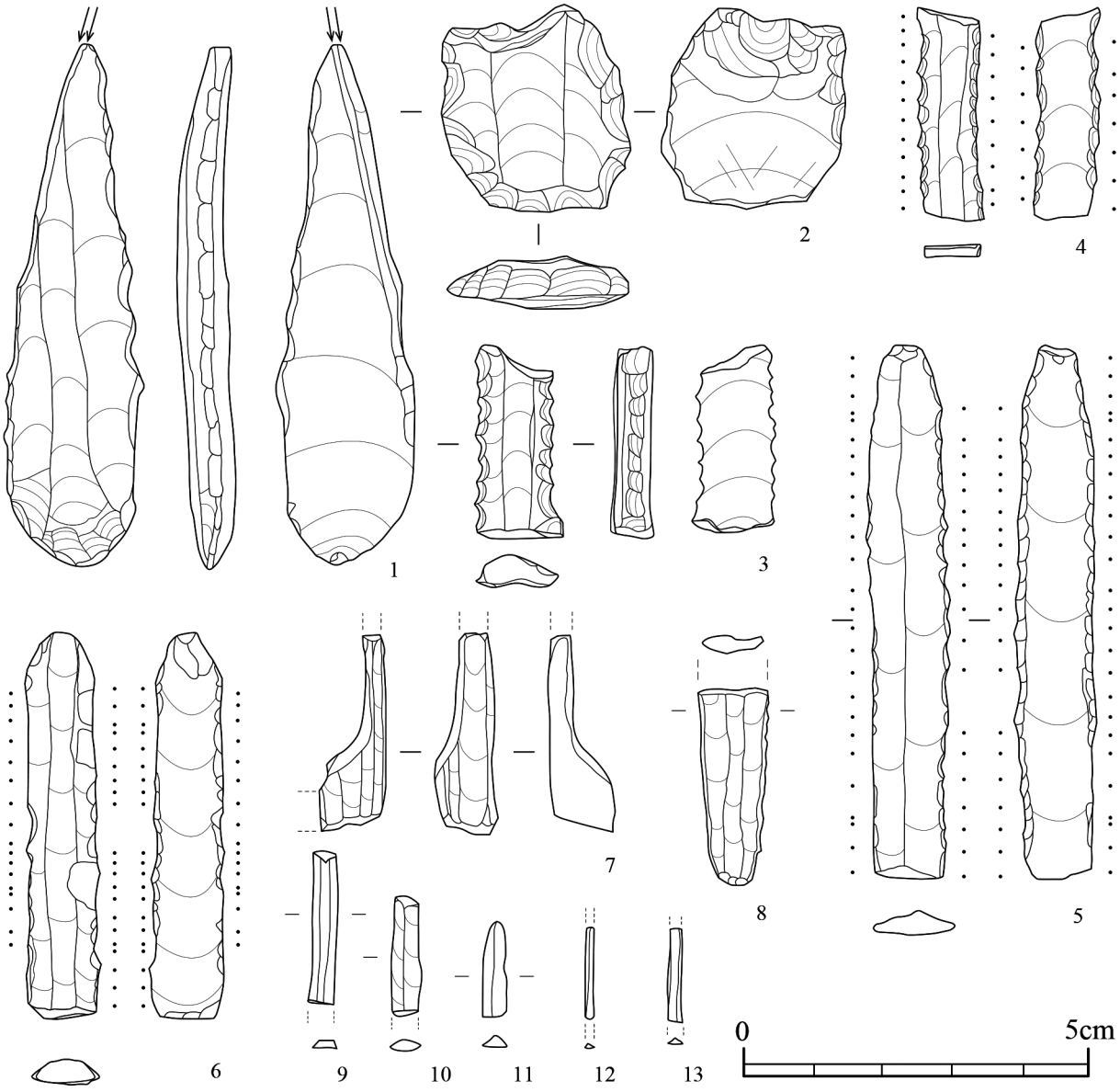


Fig. 5.21 Chipped stones discovered from Operation B
1–2. scrapers (obsidisan); 3. serrated blade (obsidian); 4–6. sickle elements (flint);
7–8. core fragments (obsidian); 9–13. Microblades (obsidian)

Remarks

The middle terrace on the southern slope of Qalat Said Ahmadan was densely occupied by people of the PPN and the Pottery Neolithic periods. The cultural deposits and their contents are generally similar to those of the Hassuna period of Tell Shimshara, which is located 12km west of Qalat Said Ahmadan and was excavated in 1957 [Mortensen 1970]. Tell Shimshara seems to have the cultural sequences of the PPN and Hassuna-Samarra period, though Mortensen never asserted the existence of PPN cultural deposits in his report. He named the Neolithic layers of Shimshara, levels 16–9, as from the Hassuna period. However, the earliest levels 16–14 did not produce pottery and I suggest that these layers belong to the final phase of the PPN period. Operation B - layers 6 and 5 at Qalat Said Ahmadan are probably comparable with these layers, though our layers may date to older than Shimshara levels 16–14. ^{14}C dating results from layer 5 of Qalat Said Ahmadan (see appendix 2) indicate that they belong to the PPN in the middle of 8th millennium BC.

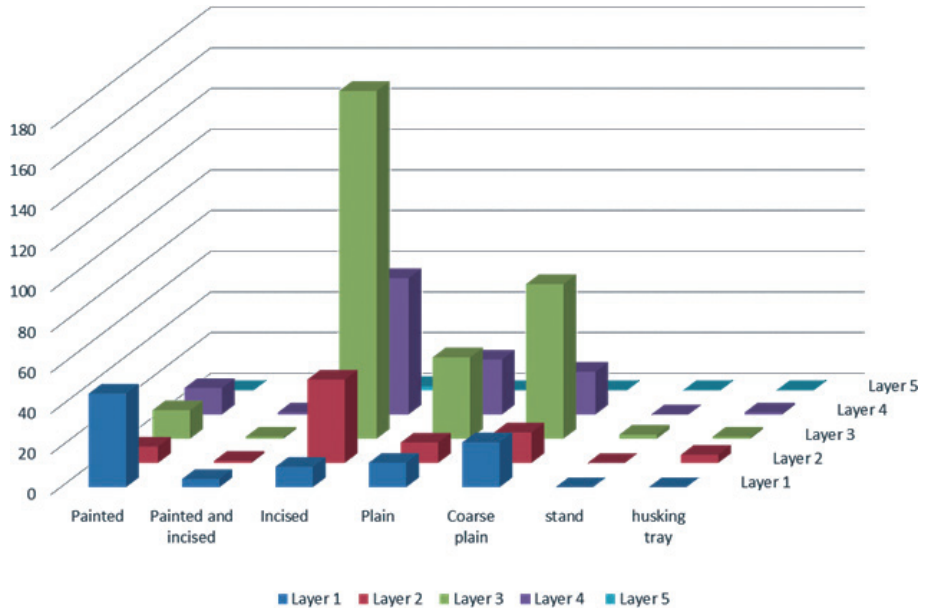


Fig. 5.22 Transition of pottery varieties in layers 1–4, Operation B

Shimshara levels 13–9 produced various kinds of pottery, including coarse ware (Undecorated Coarse Ware), burnished ware (Burnished Coarse Ware), painted ware (Archaic Painted Coarse Ware, Hassuna Painted Standard Ware, Samarra Painted Standard Ware, Samarra Painted Fine Ware), incised ware (Hassuna Incised Standard Ware), and painted and incised ware (Hassuna Painted-and-incised Ware, Sammara Painted-and incised Standard Ware). The Neolithic pottery varieties from Operation B layers 4–1 at Qalat Said Ahmadan can be compared with these pottery. In a broad sense, they are comparable with pottery varieties of Tell Hassuna levels VI - I [Lloyd and Safar 1945], too. Though the transition of these pottery varieties at Tell Shimshara and Tell Hassuna is not clear, a general tendency is that the incised ware was more numerous in lower layers and painted ware, especially so-called Samarra ware increased in the upper layers. The same tendency occurs at Qalat Said Ahmadan (Fig. 5.22). ^{14}C dating results indicate that Operation B layers 4–1 date to the last quarter of the 7th Millennium BC (see appendix 2). Therefore, we suggest that layers 4–1 belong to the Hassuna and Samarra periods.

However, as mentioned above, in addition to these Hassuna-type decorated potsherds, orange/light colored burnished potsherds and chaff tempered coarse ware were also present in layer 4. In northern Mesopotamia and Zagros, the Proto-Hassuna phase has been recognized in many sites, such as Tell Hassuna [Lloyd and Safar 1945], Matarra [Braidwood *et al*. 1952], Umm Dagachiyah [Kirkbride 1972, 1973, 1975], Yarim Tepe I [Merpert and Munchaev 1987], Tell Sotto [Bader 1989], Ginnig [Campbell and Baird 1990], Tell Kashkashok II [Matsutani ed. 1991], and Tell Seker al-Aheimar [Nishiaki, Y. and M. Le Mière 2005]. These Proto-Hassuna sites mainly produced light-colored chaff-tempered coarse ware. Therefore, we must further investigate the relationship between the Proto-Hassuna coarse ware and the chaff-tempered coarse ware from Qalat Said Ahmadan. For the moment, we recognize the chaff-tempered coarse ware of Qalat Said Ahmadan as the coarse ware variety from the Hassuna period. Though the orange/light colored burnished pottery seems similar to the Undecorated Fine Ware of Tell Shimshara [Mortensen 1970], we must further analyze this pottery to determine its chronological position.

In regard to the Neolithic lithic industry of Qalat Said Ahmadan, we point out the similarities and differences with that of Tell Shimshara (*ibid.*). The tool components between the two sites are similar, especially obsidian blades with a regular step, lamellar retouch (Fig. 5.21:3), [Mortensen

1970: Figs.36, 37] and long sickle elements with straight sickle gloss (Fig. 5.21:5–6), [Mortensen 1970: Fig. 27:9]. The evident difference between these industries is the material percentages. In Shimshara, mostly obsidian was used for chipped stones and less than 15% was flint [Mortensen 1970: 27]. In contrast to Shimshara, flint formed the predominant raw material used for lithics, with less than 17% comprising obsidian at Qalat Said Ahmadan. However, as flint dominates most Hassuna sites, such as Tell Hassuna [Lloyd and Safar 1945], Matarrah [Braidwood *et al*. 1952], material use at Shimshara was exceptional.

On the basis of the pottery and lithics, we tentatively assign each layer in Operation B to the following chronological phases:

Layers 1–4: Hassuna-Samarra phases
- Layer 1: Samarra painted sub-phase.
- Layer 2: Hassuna painted sub-phase.
- Layer 3: Hassuna incised sub-phase.
- Layer 4: Hassuna incised sub-phase mixed with Proto-Hassuna? materials.

Layers 5–6: Pre-Pottery Neolithic phases

As the Pre-Pottery Neolithic cultural deposits (layers 5–6) were discovered resting on natural fan deposits, we suggest that the PPN people first established their settlement at Qalat Said Ahmadan. At the very least, this PPN layer in Operation B may date back to the middle of the 8th millennium BC. Subsequently, the site was used intermittently, as a settlement by Neolithic people, especially in the last quarter of the 7th millennium BC. It is quite probable that Qalat Said Ahmadan provides us with a good cultural sequence for Neolithization and development of complex societies in Slemani region.

(Akira Tsuneki)

6. Operation C

Occupations after the Neolithic period were identified in Operations A, C and D. Here we first describe the earlier occupation in Operation C, followed by a discussion of the later occupation in Operations A and D.

The trench was laid out one meter to the north of Operation B and aimed at investigating the occupations after the Neolithic period. The trench was located on the steep slope of the mound, approximately 15 m from the edge of the mound top. The trench measured 2 × 4 m (EW-NS) and reached ca. 3 m deep at the northern edge of the trench.

The stratigraphy of the trench can be summarized as follows (Fig. 6.1).

- Layer 1 (surface layer): Soft and loose soil with abundant pebbles. A white ash layer is noted towards the base of this layer.
- Layer 2: Slightly packed reddish brown soil containing ash, charcoal, and gypsum grit.
- Layer 3: Packed dull brown soil containing charcoal. Some amount of painted ware is observed here.
- Layer 4: Packed dark brown soil containing ash and charcoal fragments.
- Layer 5: Correspond with layer 1 in Operation B. It contains Painted Samarra ware.

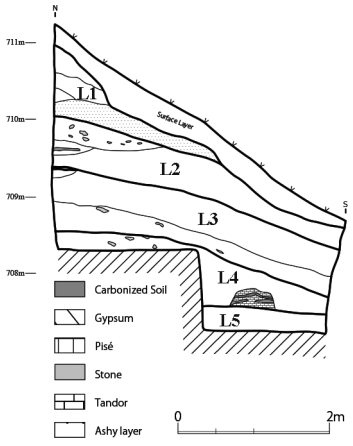


Fig. 6.1 East wall section, Operation C

Fig. 6.2 A hearth from layer 3, Operation C (from the west)

Fig. 6.3 Potsherds from Operation C presumably dated to the Bronze Age

Fig. 6.4 Deep bowl with an S-shaped profile and cross-hatched pattern

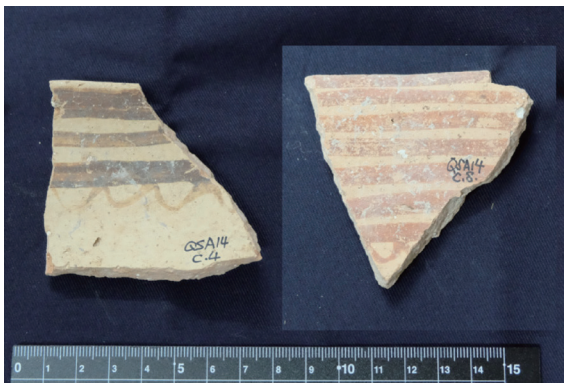


Fig. 6.5 Shallow bowl with horizontal bands and a wavy line

Structures

With the exception of three hearths, no major structures were found here. Two hearths was found in layer 3, and one in layer 4. One hearth in layer 3 was found in the western part of the trench, while the other was identified in the eastern part (Fig. 6.2). The former hearths measured 70 cm in diameter, while the latter had an oblong shape (ca. 80 × 40 cm) with ash pit placed in front of the fire-pit. The hearth in layer 4 was only identified in the eastern section.

No walls were found around the hearths. This may be owing to two reasons: 1) the excavated area was too narrow (ca. 2 m) to identify walls, and 2) as the trench was situated at a slope of the mound, the excavated area was obviously outside the residential zone. Further excavations are required to expose building structures in this part of the mound.

Artifacts

Most artifacts from the trench comprise potsherds. Since we have not studied the artifacts in detail, the description and interpretation given below should be regarded as tentative. Layers 1 and 2 contain a chronologically mixed assemblage. This comprise painted ware that may probably be assigned to the Neolithic (Incised Hassuna, Painted Hassuna and Samarran wares), which are intrusive and derived from layer 5 or even earlier. It also contains wares from the Chalcolithic period and Bronze Age. The volume of painted ware increases in layers 3 and 4. Painted ware from these layers bear both monochrome and bichrome decorations with motifs such as horizontal bands, cross-hatching, triangles and other geometric shapes. Motifs are painted in brick red, orange, reddish brown, and dark brown, while the fabric is often orange to buff/greenish buff in color. The fabric mostly contains

sand and white grit, but coarser chaff-tempered fabric also exists. Painted ware mainly consist of open-forms, *e.g*., bowls, cups, and dishes. Unfortunately, the majority of potsherds from Operation C are not derived from a secure archaeological context, such as floor levels, pits and graves. Thus they are unsuitable for establishing a ceramic typology and chronology that limit their analyses.

We first assumed that the majority of potsherds from layers 3 and 4 belong to the Bronze Age (*i.e*. 3rd–2nd millennia BC). However, the radiocarbon dating suggests that layer 3 belongs to the mid-6th to early 5th millennia cal. BC (see appendix 2). Therefore, there is a contradiction between the age estimates inferred from the sherds and the radiocarbon dating analyses. Although we have not as yet studied the excavated sherds in detail, with many remaining unidentified, bibliographic survey on this topic suggest that some may be dated to the Early Chalcolithic period (ca. 5500–5000 cal. BC) of the Central Zagros region [Henrickson 1991; Moghaddam and Javanmardzadeh 2013]. On the other hand, there are some sherds which can be placed within the Bronze Age, owing to the presence of wheel marks and distinctive painted motifs. If these may be dated to the Bronze Age, the question remains as to why they occur mixed with Chalcolithic sherds. One reason for this might be the effects of soil removal cultivation occurring on the surface and slope of the mound, owing to which Bronze Age sherds penetrated into Chalcolithic levels. Having said this, we require further studies to explain this contradiction, since it is related to the important issue of site formation process of Qalat Said Ahmadan.

Brief observations on the ceramics for each period are summarized below. Bronze Age sherds were often wheel-made and have an orange to buff/buff green fabric. Painted ware bears both monochrome and bichrome geometric motifs (Fig. 6.3). Although we assume that some sherds belong to the early second millennium BC (*i.e*. Middle Bronze Age/Old Babylonian Period), no parallels have been found so far in existing literature. This is largely due to the fact that few publications exits on Bronze Age ceramics for the region around Qalat Said Ahmadan. Excavated sites located in the Dokan dam salvage area, remain largely unpublished. Thus, it is essential to describe and establish the nature of the Bronze Age ceramic assemblage and ceramic chronology of the Ranya and Pshdar plains.

In the Chalcolithic period, some specimens resemble to Halaf painted ware. Radiocarbon dating suggests situating this in the Early Chalcolithic period. Current research of the Iranian Chalcolithic period in the Central Zagros region, indicates that the Early Chalcolithic ceramic assemblages are not well described apart from the Mâhîdasht-Kermânshâh valley system and the Kangâvar, Nehâvand, and Malâyer valleys [Henrickson 1991; Moghaddam and Javanmardzadeh 2013: 96–97]. Two distinctive wares of the above-mentioned areas are Shahnabad and J ware assemblages. However, these assemblages differ greatly from the Operation C sherds in form, fabric, and painted motifs. In addition, recent investigations at Lavin Tepe, West Azerbaijan province, Iran, ca. 50 km north of Qalat Said Ahmadan have revealed Dalma wares. However, so far no specimens that resemble Dalma wares, were identified in Operation C. In sum, based on this tentative observation, it seems that no Chalcolithic sherds, influenced from the Iranian side, were preset at Qalat Said Ahmadan.

On the other hand, some similarity is noted with the Halaf painted ware excavated in the Hamrin basin, ca. 200 km south of the Dokan Lake. The Halaf painted ware from Tell Songor A and B, appears to contain similar motifs. These include the following similarities: 1) deep bowl with an S-shaped profile and cross-hatched pattern in an oval shape, inverted triangles, and vertical bands (Fig. 6.4; *cf*. Kamada and Ohtsu 1993: Fig. 6. P.11, Fig. 7. P.20, 23, 27, Fig. 8. P.33; Matsumoto and Yokoyama 1995: Fig. 101. 616, and 618), and 2) shallow bowl with horizontal bands and a wavy line applied on the upper part of interior and exterior of the walls (Fig. 6.5; *cf*. Matsumoto and Yokoyama 1995: Fig. 103.636, and 637). The former, often has some thin horizontal bands on the interior lip. Halaf painted ware from Songor A and B are generally dated to the Late to Terminal Halaf periods [Tsuneki 2004: 132 Table 4.4]. Hijara [1980, Fig. 96] reports that there are nine sites in the Ranya plain,

which yielded Halaf painted ware. This may indicate that the area around Qalat Said Ahmadan is presumably well within the extent of the Halaf painted ware horizon. Furthermore, Tsuneki [2004: 133–34], who surveyed the Halaf sites in North Syria and North Mesopotamia, points out that the western foothills of the Zagros mountains seems to be the limit for the distribution of the Halaf painted ware with most sherds dating to the Late to Terminal Halaf periods. If layers 3 and 4 can be firmly dated to the Early Chalcolithic period, the Operation C sherds can contribute to the largely unknown ceramic assemblage of the western foothills of the Zagros.

Finally it is important to bear in mind that we are dealing with both distinctly local and interregional ceramic assemblages that developed in the border area of various ceramic cultural spheres. The foothills of the Zagros consist of complex valley systems and communication routes and various interactions occurred between both settled and nomadic populations [*cf.* Hole 2011]. Future investigations of the Qalat Said Ahmadan ceramic assemblage should consider such a complexity of interactions, keeping our perspectives open to a wide range of possibilities.

Conclusion

Operation C resulted in addressing the difficult issue of dating layers after the Neolithic. If we assume that radiocarbon dating is correct, then the Early Chalcolithic layer, which may include Halaf painted ware, lies above the Samarra occupation. However, there are some sherds which could be assigned to the Bronze Age. As we have only conducted a preliminary observation of excavated finds, further studies will hopefully provide better interpretations and explain the significance of layers revealed in Operation C.

(S. Nishiyama and A. Hasegawa)

7. Operations A and D

Here we describe and discuss the Iron Age and Post-Iron Age occupation revealed in Operations A and D. There were laid out below Operation B, along the lower terrace of the mound (Figs. 4.4 and 4.5). Two Operations were located next to each other and each measured 2 × 10 m (EW-NS). The maximum depth reached was ca. 2 m below the surface.

Operation A was originally aimed at identifying the Neolithic occupation. This is the reason it was laid out along the lower part of the mound. However, as mentioned below, we encountered unexpected structures dating to a much later period (Iron Age and Post-Iron Age). During the excavation, it became apparent that the structures were constructed on virgin soil and that Neolithic occupation was absent over most of lower terrace of the mound.

The stratigraphy of the two Operations can be summarized as follows (see the eastern wall section in Figs. 4.5, 5.1 and 7.1).

Layer 1 (surface layer): Soft and loose soil with abundant pebbles. This layer yielded heavily weathered Post-Iron Age sherds.
Layer 2: Fairly packed reddish brown soil containing charcoal and gypsum grit. Some stone clusters appeared in this layer.
Layer 3: Fairly packed layer containing gravel and small stones. Stone clusters dating to the Iron Age began to appear here.
Layer 4: Very hard layer containing abundant gravel and heavily weathered potsherds. A second stone structure dating to the Iron Age was excavated here.
Layer 5: Very hard reddish brown clay layer, which had a greater viscosity than any of the upper layers. Foundations of the third stone structure were seen in this layer.

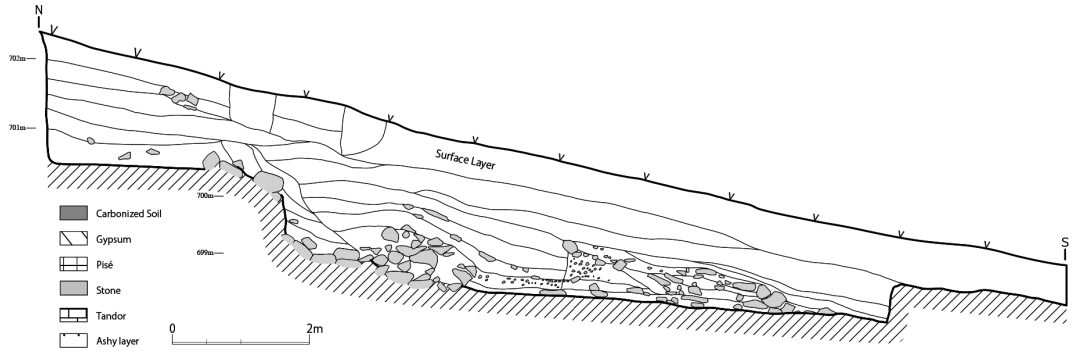


Fig. 7.1 Eastern wall section, Operations A and D-2

Fig. 7.2 First stone structure in Operation A (from the south)

Fig. 7.3 Third stone structure in layer 5, Operations A and D-2 (from the south)

Stone Structures

(1) First Stone Structure

The first stone structure was encountered in both Operations A and D, and consists of stone clusters comprising stones, ca. 30–40 cm in size. The stone clusters were unearthed ca. 50–60 cm below the surface (Fig. 7.2). The clusters do not seem to be arranged in the form of a wall. Between the clusters there seem is a gap of ca. 40–70 cm. The length of each cluster varies from ca. 80 cm to 2.5 m. In Operation A, at least four stone clusters were identified within the 2 m wide trench.

If we look close, it seems that the stone clusters appear to form a belt pattern resembling bunds on the slope of the mound. Presumably these stone clusters formed parallel belts, and functioning as retaining walls for preventing soil erosion on the lower skirts of the mound. These stone clusters

have not left traces on the NS sections of the trench. This indicates that the structure was constructed with a low profile, *i.e.*, no more than one or two rows of stones. Thus, these clusters were certainly not meant for defense of settlement.

(2) Second Stone Structure

After removing the first stone structure, the second stone structure appeared in layer 3, at ca. 1.2 m below the surface. This structure again consists of belts of stone clusters. A relatively large ditch (ca. 4 m wide and ca. 60–70 cm deep) was observed just below the stone clusters (see the eastern wall section in Fig. 7.1). This ditch may have functioned as a "moat" for protecting the occupation on the mound. The lower layers of the "moat" consist of numerous pebbles and sand. In addition, potsherds found in the lower part of the layer were heavily weathered and fragile. Base on this, we suggest that it is highly probable that the moat once held water, or was in a water-logged condition for some time. We still do not know whether this moat surrounded the entire mound or not, but it is suggested that there was some defense system present during the time of layer 3.

(3) Third Stone Structure

Below the second stone structure, we encountered the final or third stone structure in Layer 5 (Figs. 7.3, 7.4). This structure consists of walls and stone pavements. We do not know the entire extent of the structure, but at least two major walls run parallel in a NW-SE direction (Fig. 7.4). One is located at the northern end of the structure in the southern part of Operation D. The wall measures ca. 80 cm in thickness. Adjacent to the south of the wall, a stair-like structure (consists of five steps) was identified, continuing down to the south, ca. 1.7 m below the northern wall described above (Fig. 7.5).

Some partly damaged stone pavements were unearthed extending to the southern wall, which was found in the northern part of Operation A. The wall measures ca. 80 cm in thickness, and runs in a similar direction to that of the northern wall. The distance between the two walls was ca. 4.1 m. There appears to be a partition-like wall, ca. 30 cm in thickness and made up of a single row of stones, perpendicular to the southern wall, forming at least two rooms/spaces within the structure. The floor of the west room was paved with stones, ca. 20–30 cm in size.

Immediately to the south of the southern wall, a kiln (*tandor*) was unearthed (Figs. 7.4, 7.6). It was constructed directly on a flat stone and had a round plan with a diameter of ca. 70 cm. Within the kiln, fragments of wall and pottery were found in cluster. Another kiln was found further to the southeast of the first kiln (Fig. 7.4). Both kilns were constructed to the south of the southern wall, implying that, this space lay outside the structure, and was thus in the open. Although it was in the open, we observed a stone cluster, extending at least ca. 2.3 m south of the southern wall. Owing to time constraints, we were not able to determine the extent of this stone cluster. However, as we were able to observe bedrock outcrop ca. 10 m south of Operation A, we presume that the stone cluster did not extend this far.

As mentioned above, layer 5 consists of a large stone structure which seems to extend towards the east and west. When we reached layer 5, the soil became clayey and very compact. Potsherds buried in this soil were heavily weathered and very fragile. In order to investigate the earlier phase, underlying the stone structure, we decided to remove the stone cluster which extends to the south of the southern wall. The stones were placed directly on the compact clayey soil. No larger stones were identified below the stone cluster. We took a core sample just to the south of the southern wall, and noted that the bedrock lay ca. 3 m below the surface. It seems likely that the compact clayey soil below layer 5 is virgin soil, and that the stone structure was built directly on it.

Data from the northern part of Operation D has revealed the relationship between the Iron/Post-Iron Age occupations and the Neolithic layers in Operation B. The Neolithic occupation was dissected

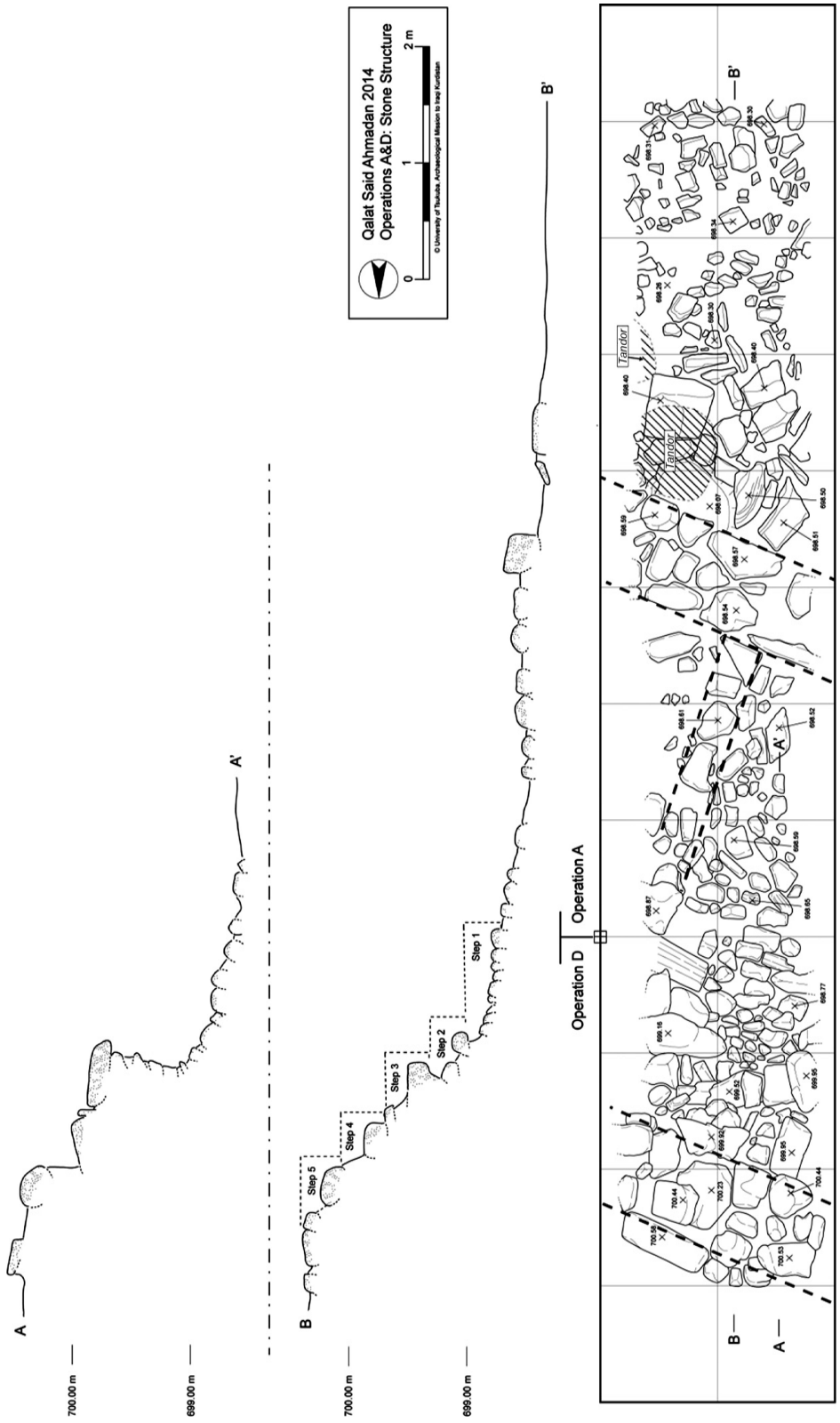


Fig. 7.4 Plan and elevations of the third stone structure in layer 5, Operations A and D-2

Fig. 7.5 Northern wall of the third stone structure (left) and the stair-like structure to the right in Operation D-2 (from the west)

Fig. 7.6 A kiln (*tandor*) found just to the south of the southern wall of the third stone structure in Operation A (from the west)

by layers 2 and 3 of Operations A and D. This fact suggests that the Iron Age stone structures were constructed by cutting into Neolithic layers. Nevertheless, it seems that this was not significant. This is because layers in Operations A and D did not contain abundant Neolithic sherds and other artifacts. If Neolithic layers were greatly disturbed by the Iron/Post-Iron Age construction activities, we would expect more Neolithic artifacts mixed within the Iron/ Post-Iron Age layers. This fact also suggests that the Iron Age stone structures were constructed by digging into the virgin soil which surrounds the mound.

Artifacts

Artifacts from Operations A and D, largely comprise potsherds. Few flaked stone artifacts in flint and obsidian were collected, although these appear to be intrusive from the Neolithic layers further up the slope. Other than potsherds and flaked stones, a large stone saddle quern (Fig. 7.7), spindle whorls, and a few metal objects were unearthed.

As mentioned above, most potsherds were heavily weathered and very fragile. Although further analysis is required, the pottery can be dated to the Iron Age (first half of the first millennium BC) and Post-Iron Age (Persian/Hellenistic Period). The chronology was largely confirmed by radiocarbon dating which suggested an age of 8^{th}–5^{th} centuries BC (see appendix 2).

Potsherds from Layer 1 contain mixed sherds including Neolithic, Iron Age, and Post-Iron Age, it seems that layers 2 and 3 potsherds consist of more Post-Iron Age sherds. Types include a large storage jar with a squared profile rim, an unguentarium-like bottle with a pedestal, and some thin-walled fine ware.

Potsherds from layers 4 and 5 mainly consist of Iron Age pottery (Figs. 7.8, 7.9). The types include large storage jars with thickened rims (both flattened and squared in profile), storage jars with a large ridge on the exterior, out-turned rim cooking pots, thickened rim cooking pots, flattened rim bowls , jars with a ridged handle, and grooved rim jars. Most sherds have an orange colored fabric with sand and white grit inclusions. There are very few painted wares, but some sherds show possible traces of a red slip. We do not, as yet, have parallel types from the surrounding region, but some forms are similar to the Iron Age pottery of North Mesopotamia [*cf*. Hausleiter and Recihe 1999].

Note on the Iron Age Stone Structure

The above mentioned impressive Iron Age stone structure consists of two parallel walls. It seems that this structure was part of the “defense system” to protect what was constructed on the mound top, probably a fort. According to the geophysical survey (see Section 10 in this report), the stone structure appears to extend over the southern foothill of the mound, if not the entire surroundings. It is still unknown whether the stair-like structure in the northern part functioned as the entrance to an enclosed inner space, surrounded by the structure. At the moment, we infer that the structure had a roof supported by the two walls, somewhat resembling “casemate walls” encountered in the Iron Age of the southern Levant. The construction of the stone structure must have required a large labor force, probably transporting stones from the surrounding *wadi* beds.

It is indeed improbable to believe that this Iron Age structure, that was time-consuming to construct, functioned as a defense system, as Qalat Said Ahmadan is a small mound (ca. 2 ha). If this structure was constructed for military purpose, it must have a strong reason to place it at Qalat Said Ahmadan. The center of the defense system must have been located on the top of the mound, and we suggest that the Iron Age occupation of Qalat Said Ahmadan was a highly military character.

According to textual sources, during the Iron Age, especially between the 8th–7th century BC, the region around Qalat Said Ahmadan was probably under the rule of the Neo-Assyrian Empire. In the first regnal year of Ashurnasirpal II (884/883 BC), the conquest of Tummu is mentioned (RIMA

Fig. 7.7 Saddle quern (lower stone) from layer 3, Operation A (from the east)

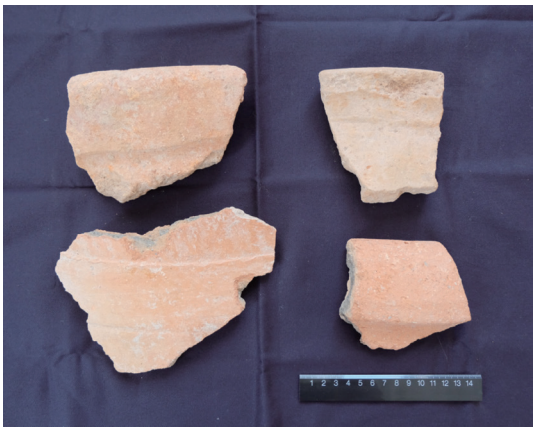


Fig. 7.8 Iron Age large storage jar rims and a ribbed shoulder, Operaton

Fig. 7.9 Iron Age cooking pot and jar rims, Operation A

2: 196–7). Liverani [1992: 19] argues that the location of Tummu was in the Ranya plain. Thus, it is highly possible that the Assyrians arrived in the area around Qalat Said Ahmadan. Later textual evidence is from the reign of Sargon II (722–705 BC). Lanfranchi [1995: 136] proposed that the town of Anisu was in the Pshdar plain, while the town of Harrania should be modern Ranya. Therefore, during the 8th century BC, the Pshdar plain was presumably under the Assyrian control.

Despite this evidence, we still do not know for what reason the settlers of Qalat Said Ahmadan constructed such stone structures around the mound. Taking into consideration the location of Qalat Said Ahmadan in the foothills of the Zagros, overlooking the Pshdar plain as well as the Darband-i Ramkhan pass towards the Ranya plain, we suggest that the settlement probably had a strategic character, as a vantage point for observing people moving between the Zagros and from the Ranya plain. At the moment, it is too premature to speculate on the nature of the population and political force of the Iron Age Qalat Said Ahmadan. Nevertheless, we argue that the strategic location of

Qalat Said Ahmadan was important for both local as well as interregional political forces.

Conclusion

Operations A and D revealed the Iron Age and Post-Iron Age occupations, that dissected the Neolithic horizons to some extent, but which were largely constructed on natural soil surrounding the mound. Such large scale structure was probably used as part of the defense system to protect the fort constructed on the top of the mound. Although it is difficult to identify who constructed the fort, the site was strategically located and undoubtedly important for controlling communication routes connecting the Zagros and the Ranya plain. The Iron Age stone structure was probably destroyed by the end of the Iron Age (7–6th century BC), but was transformed into a "moat" or "retaining wall for soil" and continued to be used into the Post-Iron Age.

(Sin-ich Nishiyama)

8. Small objects

Small objects discovered in excavations at Qalat Said Ahmadan (2014 season) were classified into the following categories: 35 stone objects, 8 bone objects, 15 clay objects, and 5 metal objects. Most were found in Operation B, and a few small objects were found in other Operations. The majority of the post-Neolithic objects have not yet been studied in detail. Thus, we mention only the selected objects here.

Stone objects: There are 5 hammer-stones (Fig. 8.1:1), 5 stone vessels, 8 stone bracelets (bangles), 3 beads, 1 quern (Fig. 8.1:2), 1 spindle whorl, 1 axe, 4 polished stones, and 7 unspecified objects. Two hammer-stones were found at Operation B in the Neolithic layer and three hammer-stones were found at other Operation grids in mixed layers. Stone vessels were of marble or pink marble and were of variable thickness (Fig. 8.1:3). A flat base fragment of a stone vessel, had oblique, thick-walled sides. This form is similar to some stone vessels found from level 15 of Tell Shimshara [Mortensen 1970] and layers 7–8 of Operation J-I of Jarmo [Braidwood *et al*. 1983]. Neolithic sites of northern Mesopotamia and Syria, such as Tell Sotto, Tell Maghzaliyah, Yarim Tepe I and II, Kultepe [Yoffee and Clark 1993], Tell Thalathat [Fukai, Horiuch and Matsutani 1970, Fukai and Matsutani 1981], Tell Arpachiyah [Mallowan and Rose 1935], Umm Dabaghiyah [Kirkbride 1973], Tell Kashkashok [Matsunati 1991], Tell Seker al-Aheimar [Nishiaki and LeMière 2005], Umm Qseir [Tsuneki and Miyake 1998], and Tell Sabi Abyad [Akkermans 1996], also produced many stone vessels. However, these had round bases quite unlike those found at Qalat Said Ahmadan.

Some fragments of stone bracelets were found, mainly from layers 3, 4 and 5 of Operation B. Most were made of marble, having well-polished surfaces. Their cross-sections varied in shape, *i.e*., circular, oval, ovoid and flattened. The circular or ovoid cross-section bracelets had a diameter of 9–12 mm. Similar stone bracelets were found from other sites such as Tell Shimashara, Jarmo, Karim Shahir, Tell Maghzaliyah, Tell Sotto, Kul Tepe, Yarim Tepe I, and Tell Seker al-Aheimar. Stone bracelets with circular or ovoid cross-sections found at Qalat Said Ahmadan, are remarkably similar to those discovered at Tell Shimshara, Jarmo, Karim Shahir and Tell Maghzaliyah.

Some small objects discovered from Neolithic layers of Qalat Said Ahmadan are similar to those found from Neolithic sites in this region, such as Shimshara and Jarmo. Therefore, we may suggest that these were typical of the Neolithic period of Kurdistan.

Bone objects: Eight bone antiquities were found, and all were partly broken. From the remaining fragments, they appear to represent 3 spatulae, 4 awls (Fig. 8.1:6) and 1 unspecified object. A spatula

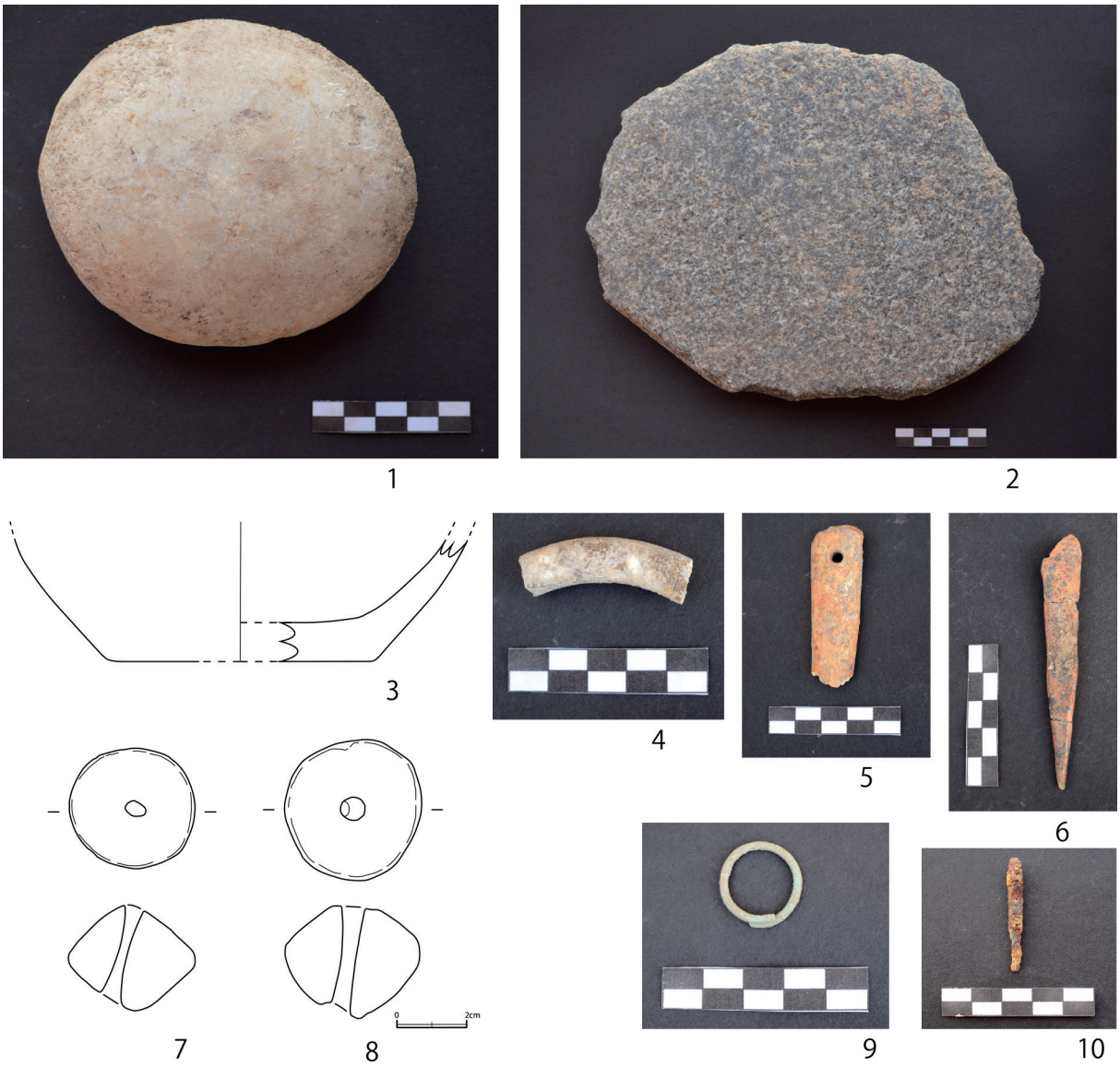


Fig. 8.1 Miscellaneous small objects found from Operations

found from Operation B had a hole near one end (Fig. 8.1:5), and is similar to that found at Shimshara [Mortensen 1970].

Clay objects: Fourteen clay objects were found. They include 7 rings, 5 spindle whorls, 2 figurines (heads) and 1 unspecified object. The diameter of the clay rings varies, with the outer diameter falling between 14.5–29 mm and the inner one between 4–13 mm. All spindle whorls were double conical in shape and similar in size (Figs. 8.1:7, 8.1:8). One of the two clay figurines comprised a broken human head. It had typical applique eyes, common to the Samarra clay human figurines. The other clay figurine appears to be an animal head.

Metal objects: Five metal objects were found. These include 1 bronze ring (Fig. 8.1:9), 2 nails (Fig. 8.1:10) and 2 pieces of slag. There were found in Operation D-2. The existence of metal slag may indicates the presence of metal smelting at the site.

(Yudai Kudo)

9. Animal bones

More than 2400 fragments of animal bones were found from Qalat Said Ahmadan. All layers, except layer 1 of Operation C, contained animal bones, but more than 1700 were found from the Neolithic layers of Operation B.

A preliminary analysis at the site pointed to various body parts, with long bones predominating. The bones were mostly fragmented and species-level identification was difficult.

Identified animals comprised caprine, cervus, bos, sus and canis. Artiodactyla predominated in the sample. They were observed from all layers. Turtles, fish bones, and bivalves were also found, although in smaller numbers. It appears that aquatic resources were not greatly consumed by the people of Qalat Said Ahmadan.

The fauna found from each Operation is listed below. Animal bones from Operation A have not been analyzed. Further archaeozoological studies are required in this respect.

Table 9.1 Number of animal bones excavated from each layer

	Layer	Number of bones
Operation B	1	119
	2	78
	3	263
	4	168
	5–6	1162
Total		1790
Operation C	1	0
	2	104
	3	54
Total		158
Operation D-1	1	103
	2	45
	3	8
Total		156
Operation D-2	1	9
	2	139
	3	44
	4	35
	5	13
Total		240
Total of all		2344

Operation B

Various body parts of artiodactyla were noted. Turtle remains were found from only layers 1 and 3 of Operation B. Only three fragments of bivalves were found in layer 1. Layers 5–6 yielded more than 1700 animal bones, with numerous large vertebrae. Large numbers of bones were found from the upper levels of layer 5, including large and well preserved remains. Identifiable fauna were artiodactyla. A large quantity of burnt bones was found from the concentration of carbides. They were mostly fragmented and difficult to identify.

Operation C

No bones were observed in layer 1. Various body parts of artiodactyla were noted.

Operation D-1

Here too, various body parts of artiodactyla were noted.

Operation D-2

We noted various body parts of artiodactyla.

Table 9.1 provides the number of animal bones excavated from each layer.

(**Yuko Miyauchi**)

10. Geophysical surveys at Qalat Said Ahmadan

Introduction

As a part of the archaeological research project at Qalat Said Ahmadan, Ground Penetrating Radar (GPR) and magnetometric surveys were conducted at the site. Magnetometric surveys form one of

the non-destructive geophysical techniques recently being used to investigate archaeological sites. This technique can reveal the existence, position, or plan of structures by examining magnetic anomalies measured from the surface of the site. GPR surveys also form a useful non-destructive technique in archaeological research. This technique measures differences in the degree of reflection and time taken for a radar pulse to reflect off subsurface archaeological artifacts and features, occurring at varied depths, and accordingly aids in revealing and mapping them. We used a Fluxgate Gradiometer FM256 by Geoscan Research for the magnetometric surveys, and a Pulse EKKO Pro 500 MHz antenna by Sensors & Software for the GPR surveys.

The condition of the site for the survey

This site is an artificial mound surrounded by modern structures and roads. The northern slope of the mound is close to modern houses, and some areas, especially on the western slope, are used as modern garbage pits. Over most of the surface of the mound, and along the foot of the southwestern slope, there are huge pits that were once used as military missile or antenna bases. This condition is not suitable for magnetometric and GPR surveys. Therefore, we surveyed the surface that was not greatly disturbed by pits, and also the western part of the southern and southeastern slope.

In preparation for this investigation, we first laid down grids with a north-south axis parallel to the excavation trenches, and then carefully cleaned the surface of the area to be surveyed.

Results of the magnetometric survey

The magnetic plan of the mound from the Magnetometric survey is illustrated in Fig. 10.1. Essentially, high contrast black and white colors display a magnetic anomaly. Along the slope of the mound, we obtained relatively good results, although there were some modern iron spikes left at the site. On the northern edge of the southwestern area, in the northern part of the southeastern area and on the southern edge of the southeastern area, there are high magnetic anomalies in belts. This seems to represent huge ancient walls, such as a rampart, comprising large stones, along the contour lines of the site. Moreover, a relatively high anomaly can be seen in some parts of the middle of the southeastern area. This result indicates that at least more than two ancient walls surrounded the mound in the past.

The result on the surface of the mound is not so clear because of the presence of modern garbage containing iron. However, it is noted, that there are some anomalies in the eastern part that seem to be archaeological remains. In the northeastern part, there are some anomalies indicating a rectangular-like shape extending from the northwest to southwest. And there are linear anomalies in the middle of the eastern part. We cannot accurately identify what they are, but considering the degree of the anomalies, it is possible that they represent some remains of walls of rectangular stone buildings.

Results of the Ground Penetrating Radar survey

The radar reflection plan of the whole mound is shown in Fig. 10.2; while Figs. 10.3 and 10.4 display time slice maps of the southern slope and of the surface, respectively. The degree of reflection is shown with a contrast of black and white colors.

Along the slope, we can see some lines of high reflection, similar to the results of the magnetometric survey. In the southeastern area, three such lines are clearly seen from 0.3 m to 0.7 m below the surface. The first one is in the center, the second is north of the southern edge, and the third is on the southern edge of the survey area. These reflections seem to correspond to tall parts of stone steps that were discovered in the excavated trench.

In the southwestern part, on the other hand, reflections of the walls are not clear, although they can be slightly identified. They are detected at a shallow depth of up to 0.4 m below the surface.

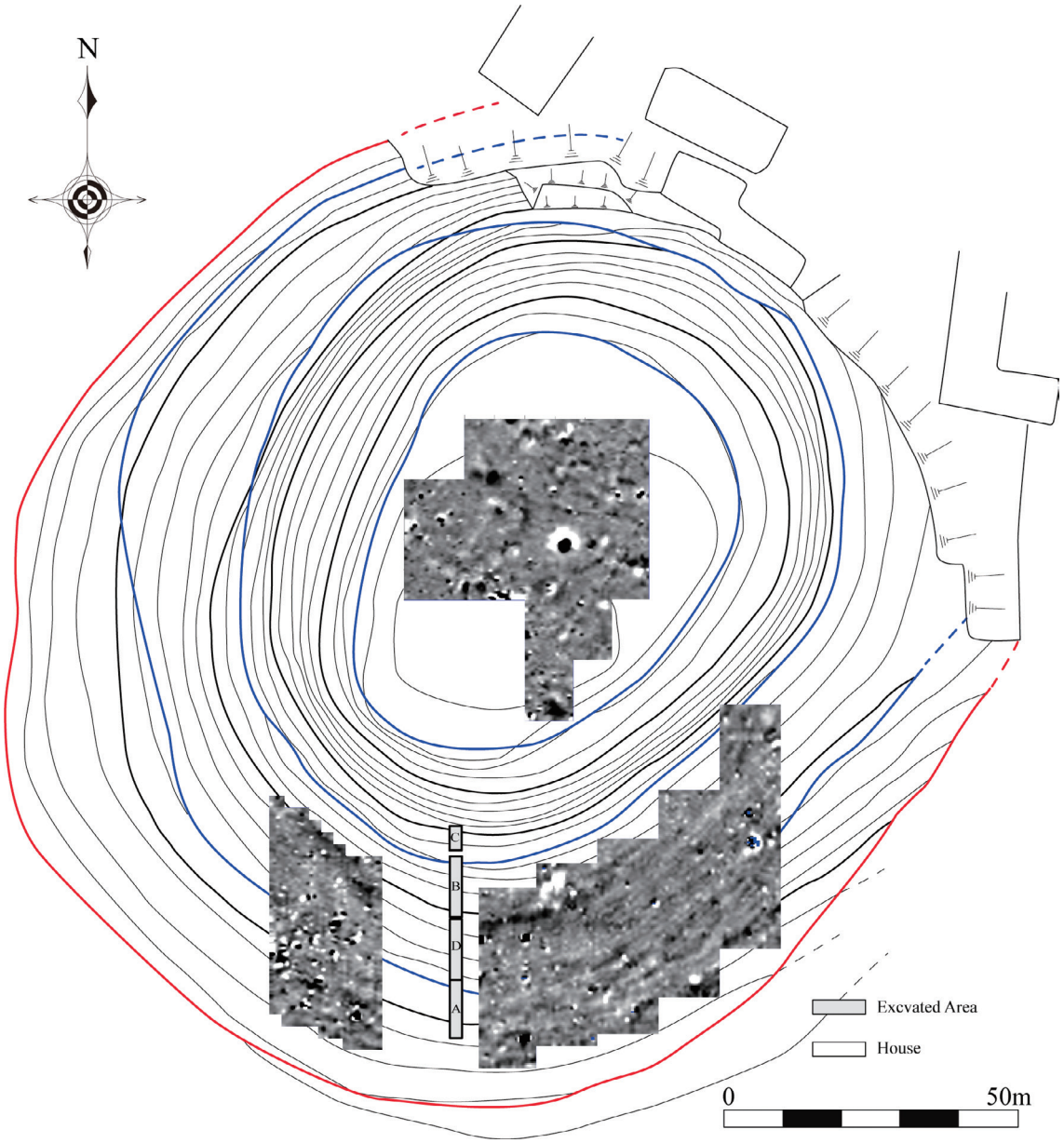


Fig. 10.1 Magnetic map of Qalat Said Ahmadan

This indicates that when the walls were built, the original level of the eastern part was lower than the western part. Further, over long time periods, the western walls were destroyed and the eastern walls were covered with soil; thus, both parts occur at almost the same level today. Therefore, the western walls may not appear very clearly because of the background "noise" of stones scattered from the original walls. Thus, the extension of the walls surrounding the southern slope of the mound, can be recognized clearly, although some parts of the walls were destroyed or disturbed.

On the surface of the mound, the GPR results also show many reflections, which have a linear-shaped plan along the northwest-southeast axis, and its orthogonal axis, at depths of 0.3 to 1.0 m not only in the eastern but also in the western part. Further, a circle-like reflection can be seen near the northern edge of the survey area at the same depth. It is suggested that all structures were constructed using relatively large stones, as inferred from the strength and shape of the radar reflection. We may regard them as representing the remains of ancient buildings. One rectangular room measures around 7 × 7 m. A circular one has a diameter of 5 m. However, many parts of

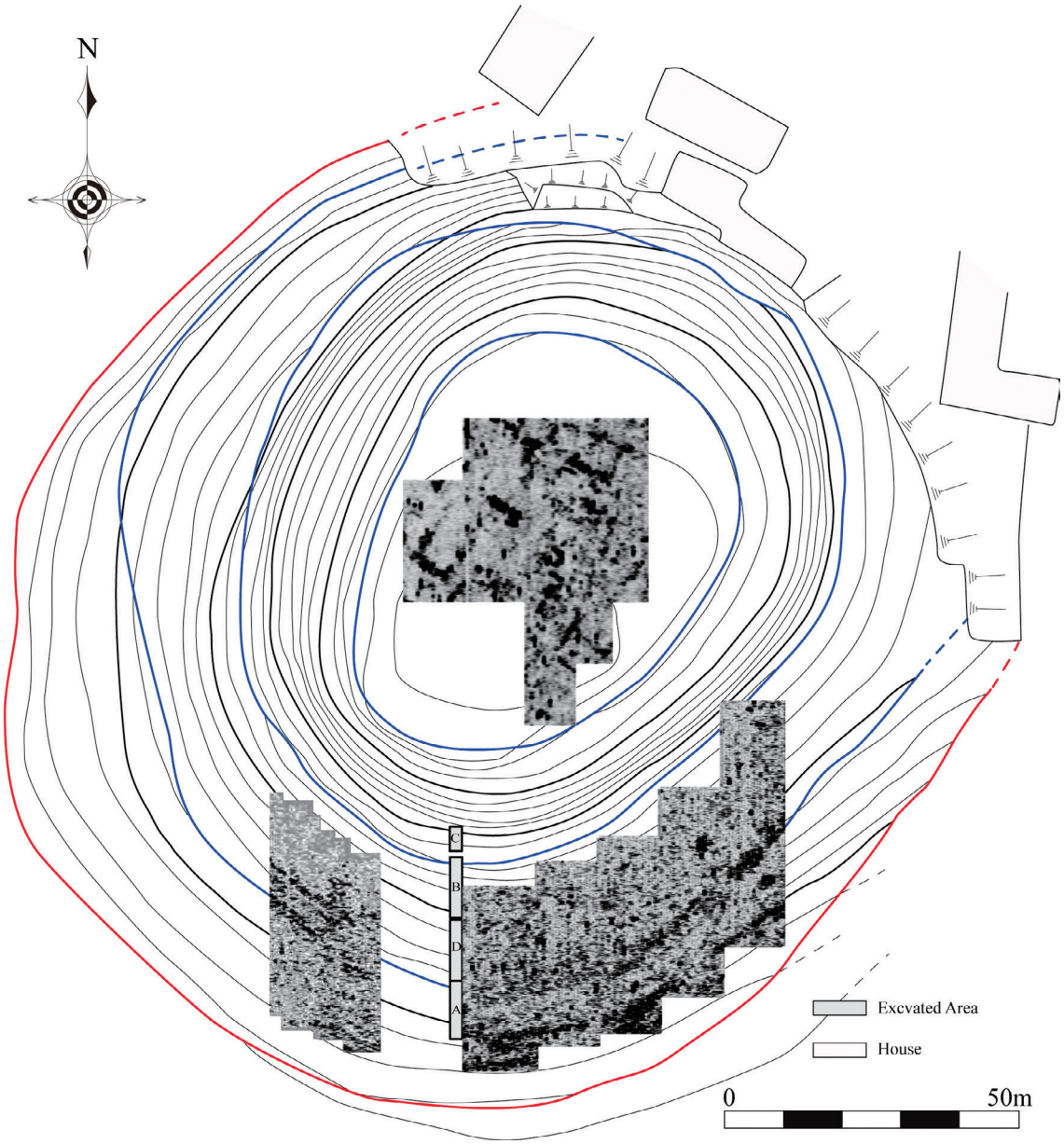


Fig. 10.2 GPR reflection of the map of Qalat Said Ahmadan (in optional depth in each area)

these buildings were unfortunately destroyed at the surface, so that we cannot recognize all their plans.

Conclusion

From our geophysical surveys at Qalat Said Ahmadan, we propose two possibilities. First, this mound was surrounded by three or more concentric rampart-like stone walls or steps, at least along the entire southern slope. Geophysical surveys could not reveal large stone pavements that were excavated along the southern slope. This is due to the depth of the pavement below the surface, which rendered it difficult for magnetometric and GPR surveys to measure weak anomalies or reflections from deeply buried features. Therefore, it is possible that the stone pavement also extended along the stone walls.

Second, the results at the surface indicate that some ancient buildings had rectangular plans along the same axis as each other. There was also one contemporary circular building that had a different

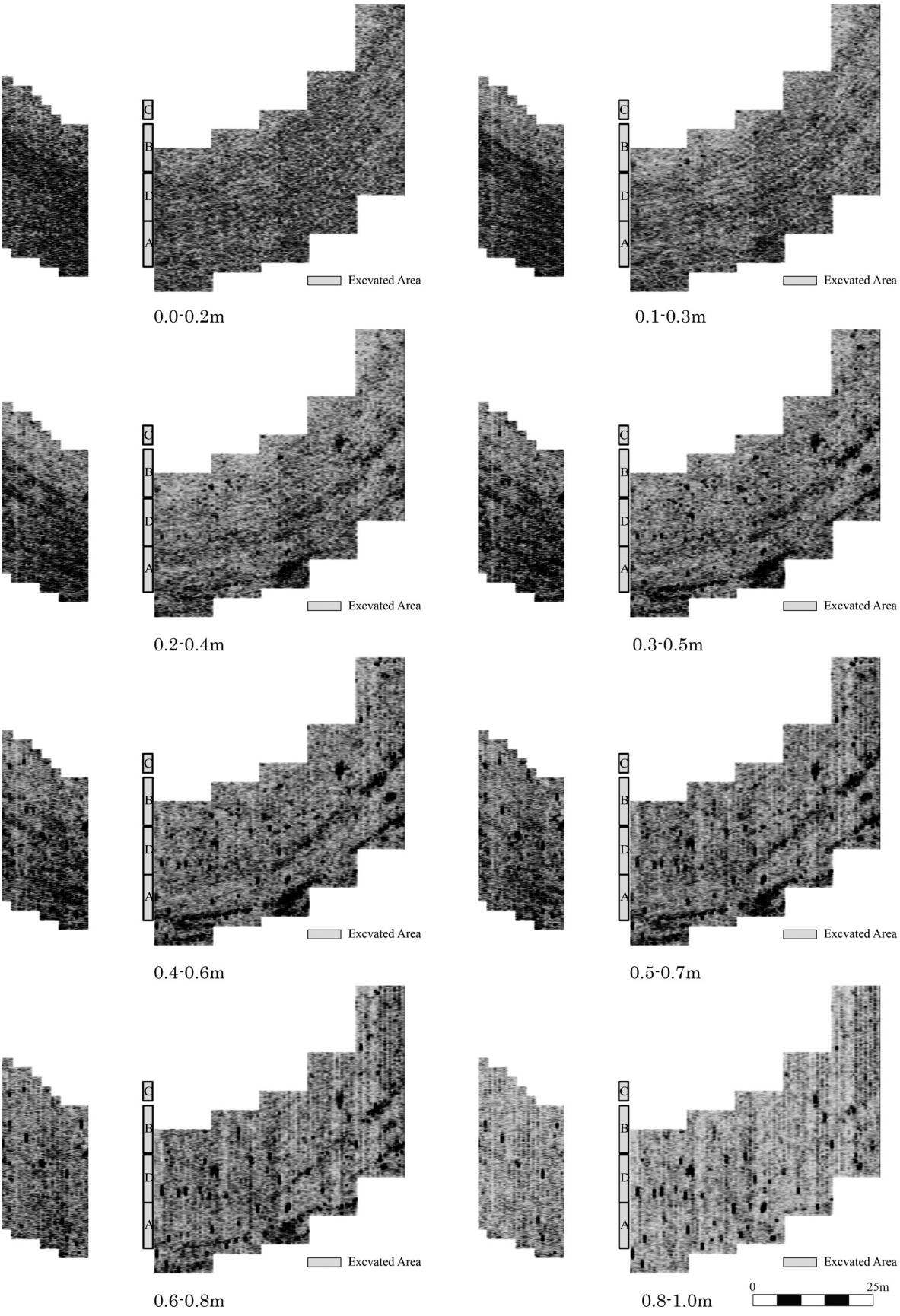


Fig. 10.3 GPR time slice of the southern slope (the dimension in meters below each slice indicates the depth below the surface)

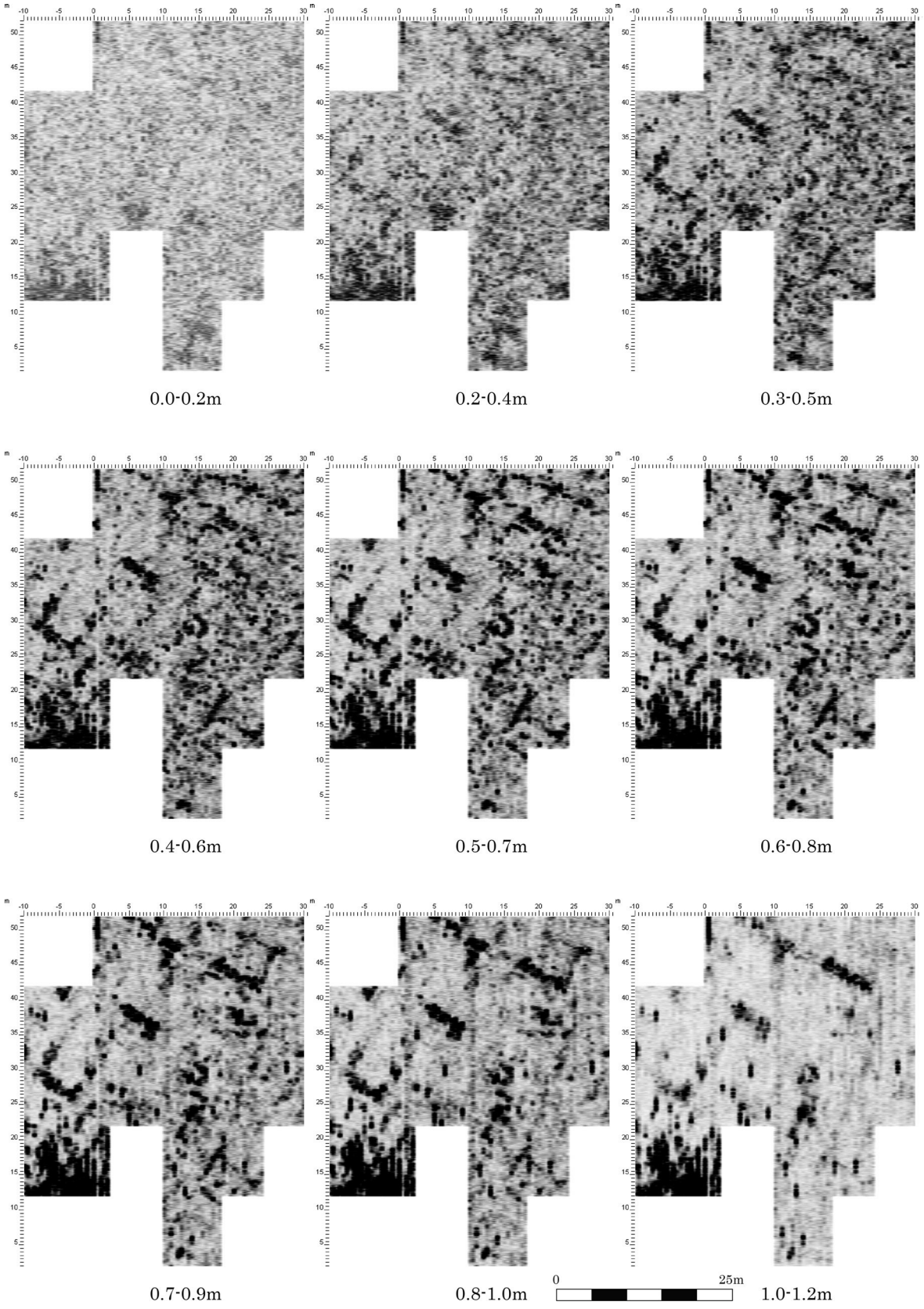


Fig. 10.4 GPR time slice of the surface (the dimension in meters below each slice indicates the depth from the surface)

function from the others in the mound. These buildings probably belonged to the Iron Age, based on studies of surface collections. During this period, however, there are no examples of similar circular buildings in this region.

Though Qalat Said Ahmadan was relatively small in size, it must have been a very important site, as it was defended by triple barriers. Further archaeological research would reveal the nature of facilities in these buildings, and the functions of the site of Qalat Said Ahmadan in the ancient period.

(Yuki Tatsumi)

11. Concluding remarks

The results of the first season's excavations at Qalat Said Ahmadan exceeded our expectations. These studies led to the following conclusions:

1) Acquisition of materials for research on the development of early farming societies in Iraq-Kurdistan.

As mentioned in the introduction, study of Neolithization in the Near East is not complete without explication of the Neolithization process in Iraq-Kudsistan, one of the heartlands of the eastern part of the Fertile Crescent. We discovered an intermittent cultural sequence, ranging from the late phase of the Pre-Pottery Neolithic up to the Pottery Neolithic period in Operation B at Qalat Said Ahmadan. This sequence does not seem to include the earliest Neolithic deposits, but it covers the sequence from the middle of the 8th millennium BC to the early 6th millennium BC. It provides us with materials for study of the development of early farming societies in Iraq-Kurdistan, and we will contribute to understanding of the Neolithization process by undertaking further study on this cultural sequence.

2) Discovery of large Iron Age stone architecture and its possible function as a defense system.

One of the unexpected finds of the excavation was the Iron Age grand stone structure in Operations A and D at the foot of southern slope of the mound. This is at least 9 m long and about 2 m high, comprising two parallel walls, steps, and pavements. It seems that this structure was part of a "defense system" to protect other structures on the mound top, probably a fort. A geophysical survey indicates that the stone structure appears to extend over the southern foothill of the mound. If this is the case, the top of the mound was fortified by double / triple defensive systems. Therefore, we suggest that this defense system was made and utilized for military purposes. Qalat Said Ahmadan is located where its inhabitants could view the Darband-i Ramkhan pass between the Ranya Plain and Pshdar Plain, which lead to the Zagros highland from the Mesopotamian lowland. Such a strategic location certainly pushed the people to build a fort at Qalat Said Ahmadan during the Iron Age. At present, it is premature to speculate on the nature of the population and political authority in the Iron Age at Qalat Said Ahmadan. However it may relate to military conflicts between Media and Assyria, and this large stone construction stimulated our theorization of Kurdistan history.

3) Materials for establishing a long local chronology from the Neolithic to the Iron Age.

Operations A–D provided us with material for establishing a local chronology from the PPN through the Chalcolithic, Bronze Age to the Iron and Post Iron Ages in the Ranya-Pshdar region. After carrying out further material analysis, we will establish a local chronology for Iraq-Kurdistan. We believe that this chronology can support other archaeological missions who are now undertaking general surveys to determine the history of Iraq-Kurdistan.

We have just begun our excavations at Qalat Said Ahmadan, and further research will provide excellent material on the prehistory and history of this region. We hope to continue our research in collaboration with Kurdish and Japanese colleagues.

(A. Tsuneki and K. Rasheed)

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APPENDIX 1
STONES USED IN THE QALAT SAID AHMADAN AND THEIR SOURCES

Ryo ANMA*

On the virgin soils at the base of Operation A of Qalat Said Ahmadan site lie walls made from blocky stones. Most of such building stones excavated from the site are of marbles and metamorphosed silici-clastic sedimentary rocks (mainly pelites and psamites), except for two pieces found at the bottm of Operation A: one is purple-colored metabasalt, and the other is an ultramafic rock (probably, a dunite that is partly serpentinized) with black and smooth, naturally polished surfaces. Some silici-clastic wall stones from Operation A were cordierite-bearing biotite schists. Furthermore, a stone quern around 30 cm in diameter, made of gabbro, was excavated from an iron-age stratum (see the main text Fig. 7.7) of Operation A.

Qalat Said Ahmadan is located in a Quaternary basin of Qaladizah developed in the NW-SE-trending fold-belts of the Zagros range (Fig. 1). The basement rock of the Zagros range is exposed in the hills west of Said Ahmadan village and composed mainly of pelitic and calcareous metamorphic rock reported to be of Cretaceous to Jurassic ages (Fig. 1). The basement rock was covered by conglomerates of Quaternary river terraces and alluvial fans. Qalat Said Ahmadan was built on an alluvial fan that dips gently to the west. Pebbles and cobbles of the alluvial fan deposit are also composed mainly of pelitic and calcareous metamorphic rock, with minor amounts of fine-grained

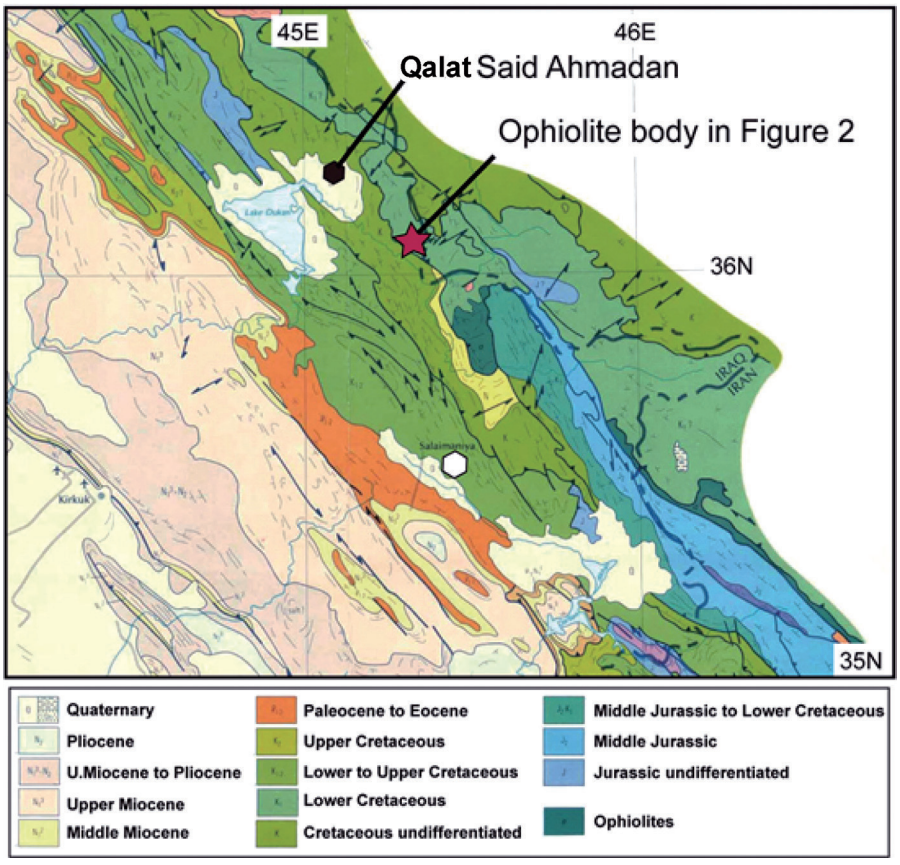

Fig. 1 Map modified based on "Geological Map of Iraq and Southwestern Iran", Robertson Research (1987)

* University of Tsukuba, Japan

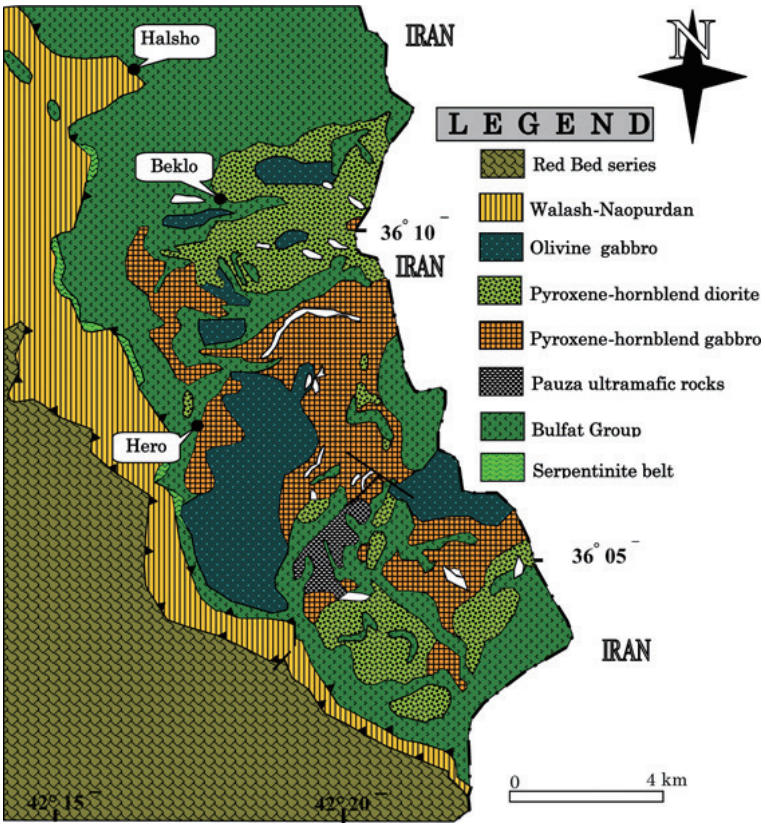

Fig. 2 Geology of the ophiolite exposed in the Hero area. The map was produced by Prof. Yousif Mohammad of the University of Slemani (Courtesy of Prof. Mohammad)

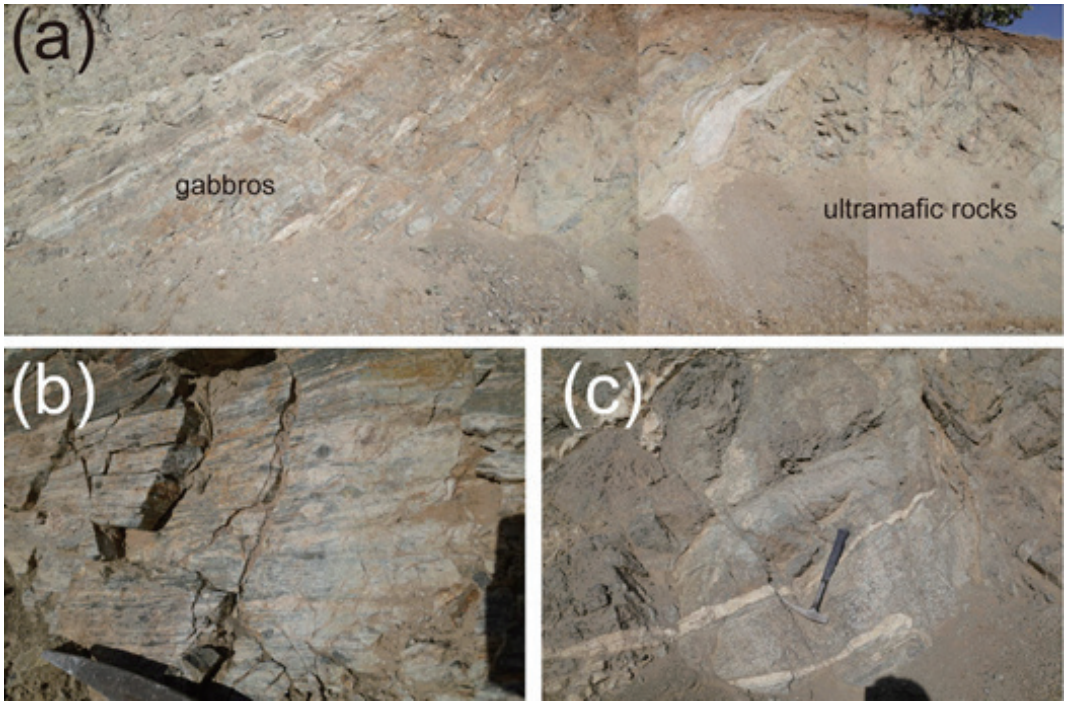

Fig. 3 (a) Boundary between the ultramafic rock and gabbro units of the ophiolite in the Hero area. Both deformed (b), and undeformed (c), gabbros were distributed

amphibolites and friable siltstones. These are very similar to the building stones used in Qalat Said Ahmadan. Thus, most of the building stones must have been mined from the basement and/or alluvial fan deposits. Because they are sub-rounded or sub-angular blocks, they are most likely mined from the fan deposits. However, no caliche was found in the building stones.

A few of the rock types found in Qalat Said Ahmadan, were not observed in the fan deposit. These included ultramafic rocks, gabbros and basaltic rocks. The assemblages of the missing rock types coincide with the fundamental components of ophiolitic rocks. Ophiolites are parts of oceanic crust now exposed on land, and they are commonly distributed along plate boundaries of the Arabian and Eurasian plates. They typically consist of, in ascending order, ultramafic rocks, gabbros, dolerites of sheeted-dike intrusions, and basaltic rocks, typically with pillow structures developed during sub-aqueous eruptions. The nearest known location of such ophiolite is in the Mawat region (the area marked in Fig. 1 by dark-green in the north of Slemani). The Mawat ophiolite is composed, in structurally descending order, of ultramafic rocks, gabbros, and pillow lavas; hence, the sequence is stratigraphically completely overturned [Aziz *et al*. 2011]. The geochemical characteristics of this ophiolite were reported by several authors [Mohammad 2008; Azizi *et al*. 2013]. More recently, a new record of ophiolite occurrence in the Hero area, in the southeast of Qaladizah, was reported by Prof. Yousif Mohammad of the University of Slemani. The approximate location is marked by a red star in Fig. 1, and a detailed geological map is shown in Fig. 2 (courtesy of Prof. Hohammad). The ophiolite in the Hero area is a part of the same tectonic unit as the Mawat ophiolite (Fig. 1). It is composed of a continuous sequence of ultramafic rocks and gabbros with various textures (Fig. 3), and dolerite and basaltic rocks. In the ultramafic-gabbro sequence, both lithologies are similarly interlayered and deformed, but the lithology sequence changes gradually from one to the other. The ophiolite stratigraphy seems normal from limited observation.

Both ophiolites have ultramafic rocks, gabbros, and microcrystalline basaltic rocks, and are located in the upstream portion of the Little Zab River. Thus, they are potential sources of the stones found in Qalat Said Ahmadan. The basaltic and ultramafic building stones were sub-angular to sub-rounded cobble, and the size of the gabbroic quern was ~30 cm in diameter. The rounded shape of the building stones implies that they must have been taken from a deposit of cobbles/boulders transported by the river. The large size of the building stones imply that the source was not far from their origin. Especially, the large core-stone from which the quern was made, is less likely to have been transported by the river from the Mawat ophiolite, and more likely from the ophiolite in Hero. Further petrochemical analyses are required to determine the place of origin of these materials. It is also noteworthy that such ophiolites commonly accompany radiolarian chert, which is commonly used for stone tools.

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APPENDIX 2
RADIOCARBON DATING OF CHARCOAL REMAINS EXCAVATED FROM QALAT SAID AHMADAN

Masayo MINAMI* and Shinji TOMIYAMA**

Abstract

Radiocarbon (^{14}C) dating of 17 samples of charcoal remains from various layers of Operations B, C, and D-2 of Qalat Said Ahmadan (QSA), Iraq-Kurdistan, were performed with the Tandetron accelerator mass spectrometer at Nagoya University. The calibrated ^{14}C dates were 7570–7385 cal BC for the Operation B layer 5 (Pre-Pottery Neolithic), and 6230–6010 cal BC for the Operation B layers 4–2 (Hassuna), and 6065–5930 cal BC for the Operation B layer 1 (Samarra). The Bayesian modeling for the dates of these layers produced the range of 6210–6035 BC among layers 4–2 (Hassuna), following by the boundary of 6180–6005 BC between layers 2 (Hassuna) and 1 (Samarra). Meanwhile, the calibrated ^{14}C dates for the Operation C were 5475–5325 cal BC for layer 3 (Chalcolithic) and 4995–4845 cal BC for layer 1 (Middle Bronze Age). In addition, the calibrated ^{14}C dates for the Operation D-2 were 805–430 cal BC for layers 5 and 3 (Iron Age). The obtained dates were in agreement with the periods as derived from the archaeological contexts, expect the dates for the Middle Bronze Age, which were obviously older than expected.

1. Charcoal samples

Twenty-seven charcoal samples were collected from the Operations B, C, and D-2 (Table 1). Four of the samples were too small for analysis. In addition, three other samples were not analyzed because they contained significant amount of sediment. The other samples were subjected to acid-base-acid (ABA) pre-treatment to measure ^{14}C.

2. Analytical method

First, the samples were ultrasonicated in Milli-Q water (ultra-pure water produced by "Gradient A10" of Millipore Corporation), and treated twice with 1.0 M HCl at 60°C for 12 h to remove carbon contaminants such as carbonates and fulvic acid. Then, the samples were treated once with 0.1 M NaOH solution at 60°C for 1 h to remove humic acid. After the base-treatment, the samples were treated again with 1.0 M HCl at 60°C for 12 h, rinsed thrice with Milli-Q water to remove the acid completely, and then dried in an electric oven at 90°C.

The ABA-treated samples were vacuum-encapsulated in a quartz tube with CuO, Cu, and Ag and combusted by stepwise heating at 600°C for 2 h and 900°C for 3 h [Minami *et al*. 2013]. CO_2 gas produced from the reaction was purified cryogenically and then reduced to graphite by H_2 with Fe catalyst at 620°C for 6 h in a sealed quartz tube. The graphite was packed in an aluminum holder, and ^{14}C-dated with the Tandetron accelerator mass spectrometer (AMS, 4130-AMS by HVEE) at Center for Chronological Research, Nagoya University. The obtained ^{14}C ages were calibrated with OxCal 4.2 [Bronk Ramsey 2009a] based on the calibration curve data of INTCAL13 [Reimer *et al*. 2013].

3. Results and discussion

The results from the charcoal samples are shown in Table 2. The calibrated ^{14}C ages of charcoal samples collected from Operation B (north wall section) were 6065–5930 cal BC at layer 1 that

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Table 1 Samples from Qalat Said Ahmadan, Iraq-Kurdistan

Sample site	Layer		Sample No.	Sample description
Operation B (north section)				
	1	upper	No. 1	charred material and sediment
			No. 2	charcoal fragments
		middle	No. 3	(sample is too small for analysis)
		bottom	No. 4	charcoal fragments
	2	upper	No. 5–1	charcoal fragments
			No. 5–2	charcoal fragments
			No. 6	charcoal fragments
		middle	No. 7	charcoal fragments and sediments
			No. 8	charcoal fragments
	3	upper	No. 9	(sample size is too small to analyze)
		lower	No. 10	(sample size is too small to analyze)
	4		No. 11	charcoal fragments
			No. 12	charcoal fragments
			No. 13	charcoal fragments
		bottom	No. 14	charcoal fragments
Operation B				
	3		No. 1	sediments
	5		No. 2	charcoal fragments
			No. 3	charcoal fragments
Operation C (east section)				
	1	lower	No. 1	charcoal fragments
	3	upper	No. 2	charcoal fragments and sediments
		lower	No. 3	charcoal fragments
			No. 4	charcoal fragments
		middle	No. 5	charcoal fragments
	4	bottom	No. 6	(sample size is too small to analyze)
Operation D-2				
	3		No. 5	charcoal fragments
			No. 6	charcoal fragments
	5		No. 4	charcoal fragments

contains the Samarra pottery, 6215–5895 cal BC at layer 2 that contains the Hassuna pottery, and 6230–5905 cal BC at layer 4 that contains the Hassuna and Proto-Hassuna potsherds. The ^{14}C ages of the samples seemed consistent with the succession of archaeological strata. Therefore, we have used Bayesian modeling to identify the outliers and to analyze the overall sequence of the section, employing the OxCal 4.2 software [Bronk Ramsey, 2009a, b] and the INTCAl13 calibration curve [Reimer *et al*., 2013]. We first tested the fit of individual ^{14}C dating results using overall agreement

Table 2 Radiocarbon determinations of charcoal samples from Qalat Said Ahmadan, Iraq-Kurdistan

Sample	Used, mg	Yield, mg (%)[1)]	%C	$\delta^{13}C_{PDB}$[2)], ‰	^{14}C age, $\pm1\sigma$, BP	Calibrated age[3)] $\pm2\sigma$, cal BC	Lab. No. NUTA2-	Supposed period
Operation B (north section)								
Layer 1								Samarra
No. 4	63.5	16.7 (26.2)	63.0	–26	7140 ± 33	6065–5930	22599	
Layer 2								Hassuna
No. 5–1	75.6	30.3 (40.0)	66.9	–28	7272 ± 28	6215–6070	22600	
No. 5–2	55.2	35.4 (64.2)	69.5	–29	7230 ± 28	6210–6025	22601	
No. 6	61.3	24.5 (40.0)	63.7	–30	7207 ± 28	6205–6010	22602	
No. 8	26.1	4.6 (17.7)	47.5	–31	7084 ± 33	6020–5895	22603	
Layer 4								Hassuna
No. 12	57.2	10.9 (19.1)	17.6	–34	7104 ± 37	6055–5905	22604	(Proto-
No. 13	70.8	38.0 (53.6)	64.5	–25	7312 ± 27	6230–6085	22606	Hassuna)
No. 14	56.1	18.3 (32.7)	63.7	–24	7293 ± 27	6220–6080	22607	
Operation B								
Layer 5								PPNB
No. 2	58.2	24.7 (42.5)	66.5	–28	8418 ± 30	7570–7385	22608	
No. 3	48.5	30.5 (62.9)	64.3	–27	8436 ± 29	7570–7480	22609	
Operation C (east section)								
Layer 1								Bronze Age
No. 1	48.5	19.9 (40.9)	62.5	–26	6023 ± 26	4995–4845	22610	
Layer 3								Chalcolithic
No. 3	39.3	11.5 (29.2)	61.9	–28	6409 ± 27	5470–5325	22611	(Early, Middle
No. 4	46.9	24.0 (51.2)	65.0	–29	6423 ± 27	5475–5340	22612	Bronze Age)
No. 5	107.2	42.3 (39.4)	27.8	–26	7054 ± 27	6000–5890	22613	
Operation D-2								
Layer 3								Iron Age
No. 5	75	21.8 (29.2)	36.2	–27	2491 ± 23	770–540	22616	
No. 6	69.7	16.8 (51.2)	38.0	–24	2562 ± 22	805–590	22617	
Layer 5								Iron Age
No. 4	63.3	18.2 (39.4)	56.8	–31	2468 ± 29	765–430	22615	

1) Parenthesized figures show values of sample yield %.
2) The $\delta^{13}C$ values were measured by a Tandetron AMS system on graphite material synthesized from CO_2, with one sigma uncertainty of ±1‰.
3) Calibrated ages were calculated using the calibration program OxCal 4.2 [Bronk Ramsey 2009a] and the INTCAL13 data set [Reimer *et al*. 2013], with two sigma uncertainty.

indices for each series of Bayesian models, but the test resulted in a low posterior probability of 60% because of two outliers, sample No. 8 in layer 2 and sample No. 12 in layer 4 (Fig. 1). Furthermore, they showed low carbon yields of 47.5% and 17.6%, respectively, lower than the other samples of the section (63.0–69.5%). Since typical carbon yields are 50–70% for normal charcoal samples [Braadbaart and Poole 2008; Braadbaart *et al*. 2009], these samples could not give accurate ^{14}C ages, and therefore, were removed in the next Bayesian analysis, resulting in a model with an acceptable agreement of 85% (Fig. 1). The modeled dates showed that the sequence of the section

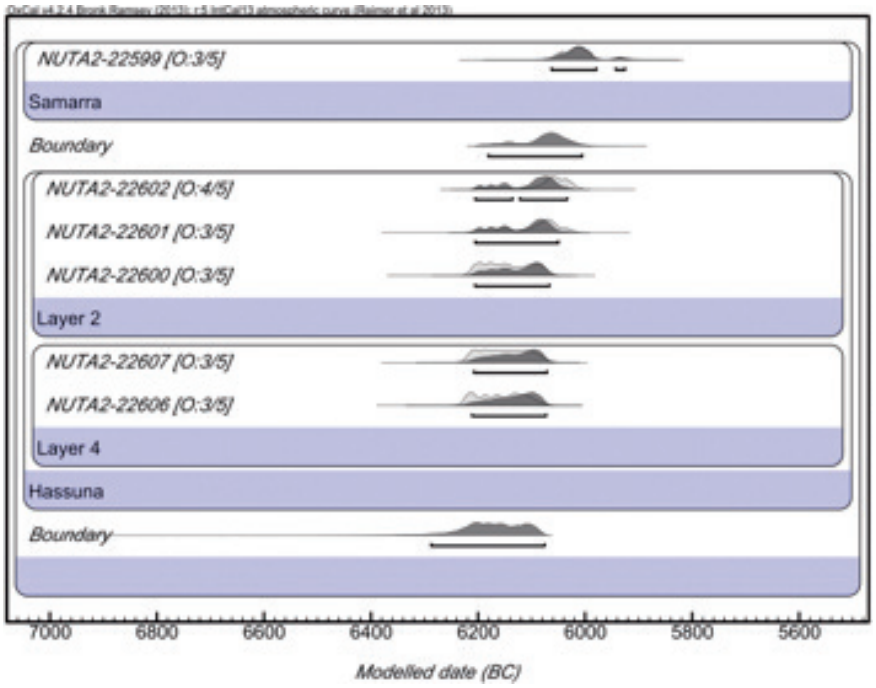

Fig. 1 Bayesian model for the ^{14}C ages ($\pm 2\sigma$) obtained at the Qalat Said Ahmadan sequence. Lighter shaded distributions are calibrated ^{14}C dates, and darker outline distributions are posterior probabilities after modeling the sequence. The outlier posterior and prior probabilities are shown in brackets next to the NUTA2- numbers

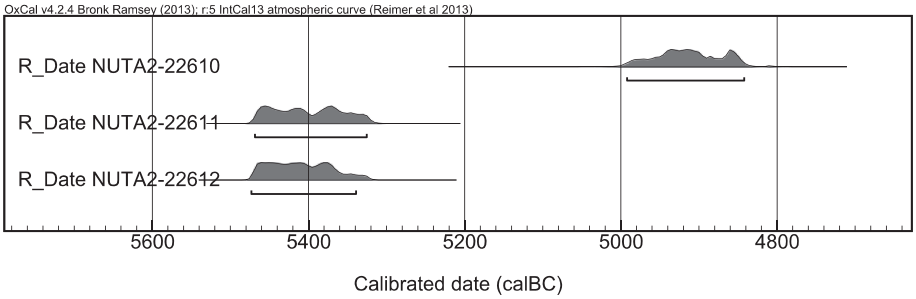

Fig. 2 Calibrated ^{14}C ages ($\pm 2\sigma$) of charcoal samples from the Operation C (east wall section) of the Qalat Said Ahmadan

is 6210–6035 BC for the Hassuna (Proto-Hassuna and Hassuna), following by the boundary of 6180–6005 BC between the Hassuna and the Samarra periods.

Nishiaki and Le Mière [2005] reported that the charcoal samples from the Proto-Hassuna sites of Telul eth-Thalathat II (Iraq) and Tell Kashkashok II (Syria) were ^{14}C-dated at 6600–6000 cal BC. The obtained ^{14}C dates for Operation B layer 4 of QSA (Iraq) tend to be slightly younger but within the ^{14}C range.

The calibrated ^{14}C ages of charcoal samples from Operation B layer 5 (Pre-Pottery Neolithic) were 7570–7385 cal BC. Nishiaki and Le Mière [2005] reported that the charcoal samples from the Late-PPNB and Pre-Proto-Hassuna levels of Tell Seker al-Aheimar (Iraq) were ^{14}C-dated at 7300–6800 cal BC and 7100–6800 cal BC, respectively. The ^{14}C dates obtained in this study were older than the ^{14}C date of the Late PPNB level in Nishiaki and Le Mière [2005]. They can be compared with and thus the long sequence of Operation B at Qalat Said Ahmadan can provide new and important evidence for cultural changes of the long periods probably from the PPNB to the Samarra periods

of Iraq-Kurdistan.

The calibrated ^{14}C ages of four charcoal samples from layers 1 and 3 of Operation C (east wall section), containing painted pottery from the early Chalcolithic and the Early and Middle Bronze Age (see section 6 in this report), were 6000–4995 cal BC (Fig. 2). The sample No. 5 indicated 6000–5890 cal BC, corresponding to the Samarra. However, the carbon yield of sample No. 5 was a little lower (27.8%), and thus it is possible that the sample produced a little older ^{14}C age than expected. Meanwhile, samples No. 1, 3, and 4 are supposed to provide accurate ^{14}C ages because their carbon yields range from 61.9% to 65.0%. Therefore, the layer 1 age is determined as 4995–4845 cal BC and the layer 3 age is determined as 5475–5325 cal BC. In either case, the ^{14}C ages indicated that these layers belong to the early Chalcolithic period. As layers 4 and 3 produced some late/terminal Halaf potsherds, the dates of layer 3 fit the evidence. However, the dates of layer 1 did not agree with the expected ones.

The charcoal samples of Operation D-2 site provided the ^{14}C age of 805–430 cal BC, which is in rough agreement with the period based on archaeological contexts, *i.e*. Iron Age and Post-Iron Age.

Acknowledgments

We wish to thank Prof. Toshio Nakamura of Center for Chronological Research at Nagoya University for AMS ^{14}C measurement and Dr. Yuka Jomori and Ms. Hikari Mukumoto for their technical supports. This work was supported by the Japan Society for the Promotion of Science, Grant-in-Aid for Scientific Research on Priority Areas (Project 25101501).

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APPENDIX 3
ARCHAEOBOTANICAL STUDIES AT AND AROUND QALAT SAID AHMADAN

Ken-ichi TANNO*, Taihachi KAWAHARA** and Kanenori TAKATA***

The purpose of this archaeobotanical study at Qalat Said Ahmadan was to clarify how people subsisted at this site in the past. This study 1) sampled the plant remains from the site and identified the plant species; 2) undertook field observations of the current vegetation, identified the species present, highlighted possible plant uses and described the environmental features of the site. The following results were obtained:

1. Sampling of plant remains from Qalat Said Ahmadan

Plant remains collected at an archaeological site generally reveal the food eaten by ancient people, and charcoal remains enable us to reconstruct the past vegetation and the environment surrounding the site. The plant remains are basically charred by fire, and the non-charred materials have disappeared due to bacterial degradation.

Soil samples obtained from Qalat Said Ahmadan during the 2014 excavation season were subjected to water floatation (Fig. 1) and the charred remains were extracted (Fig. 2). A total of 71 L of soil from seven samples were collected from the Neolithic layers (Table 1). Only a small amount of charred remains was recovered, but some intact lentil and *Aegilops*/*Triticum* seeds were found. One bag of hand-picked charcoals was sampled from the lowest sediment during the 2014 excavation season. Microscopic analysis of the charred remains will be needed to identify the species present, and further study will be undertaken at Yamaguchi University, Japan.

2. Field plant observations

The following are the field trip notes. The plants listed here are the species found at the archaeological site. In summary, the investigation revealed that 1) the vegetation in the Qaladizah area (and probably in neighboring areas) is basically composed of gradually increasing numbers of individuals of a relatively fixed pool of species after the Holocene period; 2) some valuable genetic resources, including wild diploid and tetraploid wheats, have become endangered by human activities; and 3)

Table 1 Soil sample list for water-floatation at Qalat Said Ahmadan

Sample No.	Operation	Basket	Structure	Layer	Soil volume (L)
No. 1	B	58	5	4	5
No. 2	B	99	–	6	25
No. 3	B	44	4	3	15
No. 4	B	59	6	4	5
No. 5	B	68	Beside 8	4	5
No. 6	B	98	–	6	9
No. 7	B	67	9	4	7
No. 8	B	101	–	6	hand pick

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overgrazing by domestic animals has had significant effects. The plant species identified and the sites at which they were observed are listed below:

2014–9–25 From Qaladizah to southeast Qandawl.

@9–25–1

N36.05.611 E45.30.44 roadside

Aegilops (*Ae. triaristata*, *Ae. triuncialis* and *Ae. umberrata/geniculata*), *Hordeum vulgare* subsp. spontaneum, *H. bulbosum*, *Avena* sp., *Heteranthelium piliferum* and *Taeniatherum caput-medusae* were frequently observed at park forest of deciduous oak (*Quercus aegilops*). In addition, a number of mines left from the Iran-Iraq War were seen by signboards at this site.

@9–25–2

N36.04.611 E45.31.888 roadside, a north slope of a wadi

Deciduous oak, wild pistachio (*Pistacia eurycarpa*), *Salix* sp., and *Arundo/Phragmites*. Small plantation of grape where pomegranate and almond were also cultivated.

@9–25–3

About 200 m above from 9–25–2

Pistacia eurycarpa, roadside, was grown for resin extraction.

2014–9–27 Qandil valley, northwest of Qaladizah and north and east of Lake Dukan.

@9–27–1

N36.31.389 E45.00.611 (650 m) Entrance of Qandil valley, small wadi

Aegilops triaristata were seen. On the west slope, approx. 200 m from 9–27–1, large colonies of Compositae *and-Avena* with *Hordeum vulgare* subsp. spontaneum, *H. bulbosum, Taeniatherum caput-medusae*, Apiaceae, and Caryophyllaceae were found.

@9–27–2

N36.10.444 E44.73.611 highway roadside, wheat and/or barley fields in front of deciduous-oak forest

Tetraploid wild wheats (*Triticum araraticum* and/or *T. dicoccoides*), *Aegilops comosa* and *Ae. umberrata/geniculata*. A hawthorn (*Crataegus azarolus*) tree was found in a two-rowed barley field on the west side of the highway. Very small lower ear spikelets with characteristic tip-end glume suggested that diploid wild wheat was present, but this must needs to be checked in future. East of the road, there were common wheat fields and deciduous-oak forest. The wheat field cuts into the forest, and the cultivated bread wheat and wild tetraploid wheat were grown side by side. The wild tetraploid wheat was growing widely over the hillside (Figs. 3, 4).

@9–27–3

N35.96.167 E44.99.833 eastern hill of Dukan, west slope

Deciduous-oak (*Quercus aegilops*) forest with stone partitions. Small numbers of tetraploid wild wheat were seen. They survive only along the stone walls, which clearly prevent invasion by herbivorous animals. *Aegilops triuncialis*, *Ae. umberrata, Avena* sp., and many species belonging to the genus *Brassica*, Apiaceae, and Leguminosae were seen. Dense stands exist where there was no animal predation (Fig. 5).

2014–9–28 Southeast of Lake Dukan.

@9–28–1

N35.99.972, E45.13.861 (1300 m) Hawara Barza village

About 200 m from the village, *Hordeum bulbosum*, *H. spontaneum*, and *Avena* sp. and Poaceae sp. appeared sporadically along the road. Spikes of *Aegilops triuncialis* on the slope below the road, as well as *H. bulbosum*, *H. spontaneum* and another *Hordeum* sp. were found at the

Fig. 1 Water floatation system to collect plant charred remain

Fig. 2 Charred plant remains recovered by water-floatation

Fig. 3 Wild wheat is endangered by human impacts

Fig. 4 A huge colony of wild tetraploid wheat (Triticum araraticum) (9–27–2)

Fig. 5 Overgrazing causes extinct of wild wheat; the wheat survives very limited place where animals do not enter (9–27–3)

Fig. 6 Okura cultivation and the view from Qalat Said Ahmadan (9–29–3)

entrance of the village. This village is the endpoint of the road and is located on a west-facing slope. Vineyards were spread across the village; many almond trees were planted along footpath; and orchard management was probably the main agricultural activity of this village. We found an individual wild tetraploid wheat growing in a nearby farmer's house, and *Ae. triuncialis* was found growing on the south-facing steep slope at the southern end of the village. The roadside slopes surrounding L. Dukan were often burned and black. The leaves of the oak trees were brown due to fire damage.

@9–28–2

N35.92, E45.11 (744 m) Qomirghan village

Hordeum vulgare subsp. spontaneum and *H. bulbosum* were observed along the wadi and the roadsides.

@9–28–3

N35.97.389, E45.04.805 (745 m) roadside near the junction leading to Slemani and Stuca villages. The soil was very dry, and contained plants that had adapted to these conditions, such as *Carthamus* sp. (Compositae) and *H. bulbosum*, *H. spontaneum*, and *Avena* sp. (Poaceae). Grazing by cows, sheep, and goats was severe and plants only survived along rock walls and between big rocks. Neither *Aegilops* nor *Triticum* species were observed.

2014–9–29 Vegetation found at Qalat Said Ahmadan.

@9–29–1

N36.22.472, E45.14.666 (706 m), top of the Tell

Prosopis (45%) and *Avena* (45%) were recorded in northwest parts of the area, *Centaurea* (70%), *ProsopFis farcta* (20%), and *Glycyrrhiza glabra* (Liquorice) (5%) were recorded in the northeastern Tell (Qalat) area. In the other areas, the grasses were cut down to keep the area clean and were therefore not appropriate for floral observation.

Prosopis farcta; Centaurea sp.; *Carthamus* sp.; *Avena* sp.; *Glycyrrhiza glabra*; and some *Trifolium, Medicago*, *and Caryophyllaceae* spp. were common. *Hordeum vulgare* subsp. spontaneum, *Astragalus hamosus*, and *Brassica* sp. were also recorded.

@9–29–2

A small wadi, approx. 100 m south from Qalat Said Ahmadan

Prosopis farcta, Aegilops triuncialis, Ae. umberrata, Avena sp., and other species were recorded. A spring was seen approx. 50 m downstream of the wadi, and riparian plants such as *Arundo/Phragmites, Salix* sp., *Poplus* sp., and *Rubus sanctus* were identified. On the bank of this spring, *Paliurus spina-christi*, which has a sharp spine, was found.

@9–29–3

Cultivation fields around Qalat Said Ahmadan

In summer, irrigation supports the growth of many different vegetables. Okura was the most cultivated vegetable in Said Ahmadan village. Tomato, eggplant, pimento, some squashes, mini-celery, kidney bean, leek, and garlic chive were all cultivated in the small spaces next to the okura (Fig. 6).

Fruit production was one of the important economic sources of the village. Pomegranate, fig and grape were the main species, whereas walnut, almond, peach, quince, etc. were also grown.

Wheat and barley were the winter cereal crops. Fragments of wheat spikes, damaged by harvesting, suggested that they were of bread wheat (common wheat, hexaploid species). The cultivars were both awned and awnless. However all the kernels had a white seed color (*i.e.*, no red kernel was seen). Two and six-row barley were also recorded. According to a farmer, wheat here is sown in mid-November and harvested in mid-June.

ARCHITECTURAL SURVEY OF EARLY DOMICAL VAULTS IN JORDAN[1)]

Ryuichi YOSHITAKE*

1. Introduction

The method of a shallow dome on a square plan supported by four arches and spherical-triangle corners (Fig. 1) in Roman architecture of Levant was already mentioned by Choisy in the end of the nineteenth century[2)]. In 1939, Hamilton, who made an architectural study of the Pagan Tomb at Samaria, reported its shallow dome on spherical-triangle corners, and briefly discussed similar examples of ancient Levant[3)]. Forty years later, Creswell reported there are many examples in Levant, including Nuweijis near Amman, West Baths at Jerash, Pagan Tomb at Samaria, Brad, and Golden Gate of Jersalem[4)]. Recently, the Baths at Petra is nominated as one of the earliest candidates of this kind of dome[5)]. These knowledge might lead to a consensus that the geometrical principle of the hemisphere domical vault with spherical-triangle corners were already known among Roman builders in Levant. Nevertheless, actual form and building technique of these candidates have not been clarified, probably because it was not easy to measure upper structure of them[6)]. In addition, this kind of technique has never counted among scholars of Roman building techniques[7)].

Under this circumstance, the author had an opportunity to make a general survey in ancient Levant. Based on its results and previous researches, a list of the candidates of domical vault is prepared (Table 1). In order to clarify their detail, the author focused on the earlier candidates in Jordan, including Baths at Petra, Nuweijis near Amman and West Baths at Jerash, all of them are dated between the first and second century AD. From 2011 to 2012, the author made fieldworks in collaboration with Department of Antiquity in Jordan[8)]. In the first season, Nuweijis near Amman

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1) This paper is revised from R. Yoshitake, "Early Applications of Domical Vaults in Jordan", Architectural Institute of Japan, *Architectural Institute of Japan*, Vol. 78, No. 693, pp. 2387–2397, Nov., 2013.

2) Choisy 1899, vol. I, pp. 518–519.

3) Hamilton 1939, pp. 64–74. The Pagan Tomb at Samaria has square walls ca. 3 × 3 m supporting an intact dome of stone blocks (Hamilton 1939, fig. 3). There are four arches on each side of the massive walls ca. 90 cm thick. The structure is quite tsimilar to those at Nuweijis and Jerash. The Tomb at Sebastya is dated in or soon after the reign of Septimius Severus, AD 193–211, from the character of the sarcophagi discovered from its inside (Hamilton 1939, p. 66).

4) Creswell 1979, pp. 450–470.

5) Rababeh 2005, pp. 166–174.

6) R. Nakashima *et al.*, "Studies of Ancient Mediterranean Cities (132): A Study of the dome in the ancient architecture of Mediterranean and west Asia", *Architectural Institute of Japan, Kyushu-Branch*, 2001, pp. 633–63 (in Japanese); Y. Okada, "Vaulting Masonry in Late Antiquity West Asia", *Summaries of technical papers of Annual Meeting Architectural Institute of Japan*, F-2, History and theory of architecture 2007, pp. 125–126 (in Japanese); Y. Okada, "A follow-up study on the domical vault at Gadara, Jordan", *The 13th Annual Meeting of Japan Society for Hellenistic-Islam Archaeological Studies*, Kanazawa, 21–22 October 2006, pp. 99–102 (in Japanese); Y. Okada, "A domical vault at Gadara, Jordan", *The 12th Annual Meeting of Japan Society for Hellenistic-Islam Archaeological Studies*, Kanazawa, 8–9 October 2005, pp. 60–61 (in Japanese).

7) White 1984; Adam 1994.

8) The author would like to express my sincerest thanks to Dr. Ziad al Saad, the general director of department of antiquities in Jordan, who kindly helped me to realize this project. The author would also like to express his deep gratitude to Dr. Kalil Hamadan, and to Mr. Fusein Dahbour, department of antiquities, who helped me conduct the actual proceeding. This project could not have begun without their understanding and interest in this research. In addition, the author would like to show his gratitude to two academic referees: Prof. Ken Matsumoto, Director of the Kokushikan University Expedition to Umm Quais, and Prof. Isamu Taniguchi, President of Kumamoto University. They kindly recommended my research and helped me realize the first season. Mr. Ehab Jariri, surveyor of the department of antiquity in Amman, kindly helped me to access the monuments in the archaeological sites. I would like to thank Dr. Ahmad Alshami, director of the department of antiquity in Jerash and Dr. Tahani Mohammed Al-Salhi, director of cultural resources management in Petra; they kindly helped me to access the subject on which I have worked. The author also would like

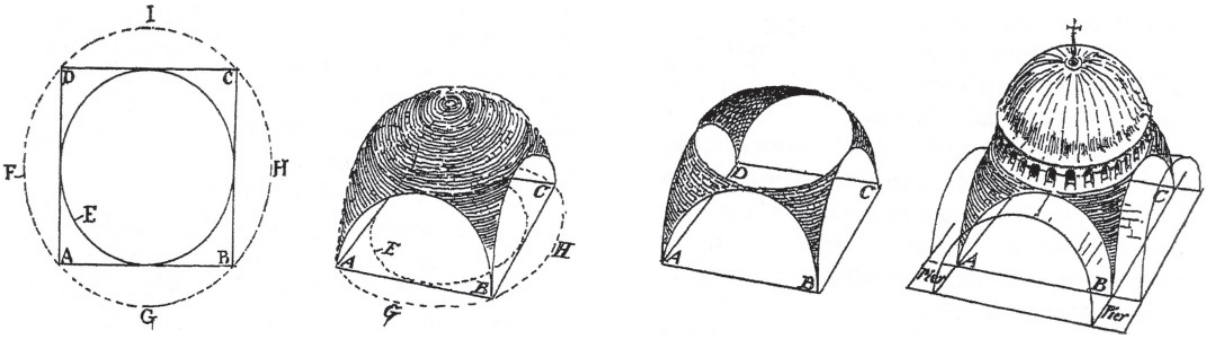

Fig. 1 Principle of domical vault with pendentive (after Jackson 1913, vol. I, p. 39, fig. 10)

Table 1 List of early domival vault with pendentive in Near Middle East

Monument	Element	Construction date	Restoration
Baths at Petra, Jordan	pendentive, domical vault	second half of the 1st century (pottery and ornamentation)	partly repaired (1968-69)
Nuwaijis near Amman, Jordan	arch, pendentive, domical vault	middle of the 2nd century (architectural ornamentation)	partly repaired (?)
West Baths at Jerash, Jordan	arch, pendentive, domical vault	second half of the 2nd century (architectural ornamentation)	original
North Tetrapylon at Jerash, Jordan	arch, pendentive, domical vault	second half of the 2nd century ?	reconstructed (1981-83)
Pagan Tomb at Samaria, Israel	arch, pendentive, domical vault	beginning of the 3rd century (style of sarcophagi)	original ?
Underground Tomb at Gadara (Umm Quais), Jordan	arch, pendentive, domical vault	beginning of the 3rd century ?	original
Brad, Syria	pendentive, domical vault	later than 4th century (architectural style?)	original ?
Golden Gate of Jersalem, Israel	arch, pendentive, domical vault	between 616 and 629? (historical context)	original
Double Gate of Jersalem, Israel	arch, pendentive, domical vault	same to Golden Gate?	original

was surveyed between the 4th and 13th of January, 2011, and a non-reflective total station (Leica Flexline TS06, angle accuracy 3", range flexpoint 30 m) was used. As a result, about 2,500 points were measured at this site, and architectural drawings were developed using AutoCAD 2008. In the second season, the same monument was surveyed between the 4th and 11th of September 2011, and a 3D laser-scanner Faro (FARO FOCUS 3D) was used for the mission. The third season, Nuweijis and other Roman buildings were surveyed from a chronological point of view, with special focus on the architectural ornamentations of the entablature, between the 1st and 9th of September, 2012.

to thank Prof. Konstantinos Tokmakidis, professor of the school of topography and survey engineering, Aristotle University of Thessaloniki and his son Panagiotis Tokmakidis, surveyor in Thessarlniki. Moreover, photographer Anastasios Ktistis of Thessaroniki kindly helped my fieldwork in Nuweijis and took architectural photos. Finally, the author would like to show his gratitude to Mr. Akira Mitsuyama and Mr. Sotaro Yamasaki, postgraduate students of Kumamoto University in 2011 and to Mr. Kazuki Otsuka, postgraduate student in 2013.

The present paper, thus, aims to report the result of the architectural survey and examines these early applications of domical vault with pendentive.

2. Baths at Petra

2-1. Architectural remains

Baths at Petra[9] is located in the city center, west of the Great Temple and south of the Temenos Gate. The building consists of three chambers; a circular one, a square one and a square one for a large staircase. All parts of the building are underground, and only a staircase chamber can be seen from the ground. They are constructed of rose local sandstone in ashlar masonry. Some stuccos remain on the surface of the inner walls.

The circular chamber (diam. 5.15 m) has been cleared, revealing a stone pavement (Fig. 2, left). Eight half columns (diam. 0.30 m) with Corinthian capitals and Attic-type bases are attached to the inner wall. Above the capitals there is a groove for an inset entablature[10]. Many pieces of plaster mouldings including an astragal, ovolo with painted egg and tongue, dentils, cyma reversa, corona with a drip cornice, beveled ovolo, and sima, were found on the ground and in the fill[11]. Every two bays have a semicircular niche, at the tops of which were traces of a conch[12]. The roof consists of an intact dome of stone blocks with a circular window at the top; however, there are no pendentives. Some parts of roof are probably restored.

Next to the circular chamber, there is a square chamber (4.64 × 4.61 m), which can be entered through the south wall of the circular chamber (Fig. 2, right). It has also been cleared to the floor level. The roof consists of an intact domical vault of cut stone voussoir with a circular window on the top (Fig. 5)[13]. There are four spherical-triangles with five courses on the corners[14]. However, there are no arches with voussoir on the four sides as Rababeh reported. In addition, when the chamber was excavated in 1968, a part of the upper structure and south wall (?) had been collapsed (Fig. 6)[15]. In fact, new blocks can be observed on the north and south parts of the domical vault and the north and west walls. Moreover, there are is no arch made of voussoir on the four wall as McKenzy's drowing (Fig. 2). Based on this fact, therefore, the following measurements (2–2.) must be treated as an estimation.

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9) R.E. Brünnow and A. von Domaszewkis, *Die Provincia Arabica*, vol. 1, Straßbrug 1904, pp. 179, 316; Bachmann 1921, pp. 45–48 figs. 39–42; K. Ronczewski, "Kapitelle des El Hasne in Petra", *Archäologischer Anzeiger*, 1932, p. 90; P.J. Parr, "Recent discoveries in the Sanctuary of the Qasr Bint Far'un at Petra: Account of the recent excavations", *Annual of the Department of Antiquities of Jordan*, vols. 12–13, 1967–8, 12–13, pp. 7–9; S. all-Tell, "The New Archaeological Studies in Jordan", *Annual of the Department of Antiquities of Jordan*, vol. 14, 1969, p. 29 (in Arabic); F. Zayadine, "Fouilles classiques récentes en Jordanie", *Annales archéologiques arabes syriennes* 21, p. 154; F. Zayadine, "Tempel, Gräber, Töpferöfen", in M. Lindner (ed.), *Petra. Neue Ausgrauben und Entdeckungen*, München, 1986, p. 217; F. Zayadine, "Decorative Stucco at Petra and other Hellenistic Sites", *Studies in the History and Archaeology of Jordan* 3, pp. 137–139; I. Browning, *Petra*, 1st ed., London, 1973, pp. 41, 147–150; A. Negev, "Die Nabatäer", *Antike Welt*, Suppl. 7, pp. 26, 29; Z. Ismail, "Les Chapiteaux de Pétra", *Le Monde de la Bible* 14, p. 28; M.M. Khadija, "16 Jahre Feldarchäologie in Petra", in M. Lindner (ed.), *Petra und das Königreich der Nabatäer* 3, Munich, 1980, pp. 208–209; M. Lindner, "Archäologische Erkundungen des Der-Plateaus oberhalb von Petra (Jordanien) 1982 und 1983", *Archäologischer Anzeiger*, 1984, p. 610; M. Lindner *et al.*, "New Explorations of the Deir-Plateau (Petra) 1982/83", *Annual of the Department of Antiquities of Jordan*, vol. 28, p. 166; R. Wennig, *Die Nabatäer-Denkmäler und Geschichte*, Göttingen, 1987, pp. 226–7, 235, 303; Rababeh 2005, pp. 166–174.

10) S. all-Tell, "The New Archaeological Studies in Jordan", *Annual of the Department of Antiquities of Jordan*, 14, 1969, pl. 12 a; McKenzie 1990, pl. 76-a.

11) McKenzie 1990, p. 138.

12) Bachmann 1921, p. 47.

13) Bachmann 1921, pl. 14; S. all-Tell, "The New Archaeological Studies in Jordan", *Annual of the Department of Antiquities of Jordan*, vol. 14, 1969, pl. 12 a; McKenzie 1990, pl. 76b; Rababeh 2005, p. 167, fig. 6.18.

14) Rababeh 2005, pp. 166–174.

15) S. all-Tell, "The New Archaeological Studies in Jordan", *Annual of the Department of Antiquities of Jordan*, vol. 14, 1969, pl. 12-b.

Table 2 Measurements of three monuments in Jordan

Petra	X (m)	Y (m)	Z (m)	Radius (m)	N. of Points	StdDev (m)
Domical vault	502.158	–4.848	900.364	3.836	107,099	0.031
Pendentives	502.180	–4.776	900.747	3.526	35,756	0.032
Domical vault and pendentives	502.040	–4.982	900.652	3.552	135,331	0.037

Nuweijis	X (m)	Y (m)	Z (m)	Radius (m)	N. of Points	StdDev (m)
Domical vault	516.655	11.907	1.772	4.037	2,554	0.008
Pendentives	516.561	12.001	2.109	3.763	14,936	0.014
Domical vault and pendentives	516.601	11.964	2.093	3.765	232,778	0.047

Jerash	X (m)	Y (m)	Z (m)	Radius (m)	N. of Points	StdDev (m)
Domical vault	700.894	–753.585	1.198	4.931	248,738	0.027
Pendentives	700.881	–753.658	0.122	5.793	46,677	0.017
Domical vault and pendentives	700.902	–753.594	0.910	5.188	325,790	0.040

Original point is following in the local topographical point of each sites.

2-2. Geometrical form

The domical vault and its four corners was measured by a 3D laser scanner (Fig. 3). Its measuring data is as follows: There are 8 point-clouds and ca. 226 million points were measured. Spheres and targets registration is in accuracy of 2.3 mm best to 3.8 mm worst cloud to cloud. ICP Registration is less than 2.2 mm accuracy cloud to cloud. The original point was placed on a local topographical point.

Based on the measurements, a theoretical sphere was calculated by commercial software, the surface of which fits the actual measured points of the domical vault with minimum error (Table 2). Before calculating the data, the measurements of restored parts were carefully excluded. As a result, the radius of the domical vault was 3.84 m (standard deviation 0.031 m) and the radius of the pendentives was 3.53 m (standard deviation 0.032 m). Since the radius of hemisphere standing on the square room is estimated as ca. 3.55 m, the domical vault was probably close to a hemisphere, but the pendentive would not have been so. In addition, the center of domical vault is ca. 29 cm lower than the center of hemisphere, thus, the top of the domical vault is ca. 0.4 cm lower than the hemisphere (Fig. 26). A section was drown based on the point-cloud image and sketches (Fig. 4).

2-3. Construction date

Since no inscriptions from the Baths have been discovered and no archaeological findings have been reported, only the stylistic analysis of the architectural ornamentation can be used for the dating. McKenzie categorized the floral from the Baths capitals as Group A, which includes those from the Kasr el Bint and from the Temple of the Winged Lions[16]. McKenzie concluded that the Baths were possibly constructed slightly later than the Kasr el Bint (the beginning of the first century AD) but not as late as the Temple of the Winged Lions; that is, at the end of the first century AD. The

16) McKenzie 1990, p. 51.

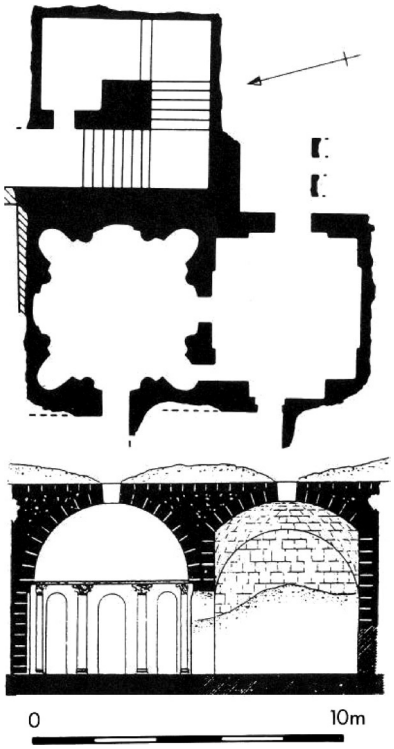

Fig. 2 Petra, plan of the Baths (after Mckenzy 2005, p. 75)

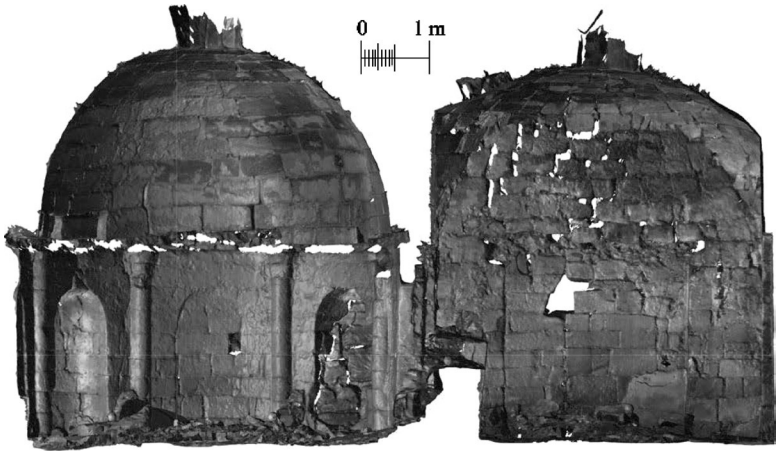

Fig. 3 Petra, point-cloud image of the Baths, looking from the east

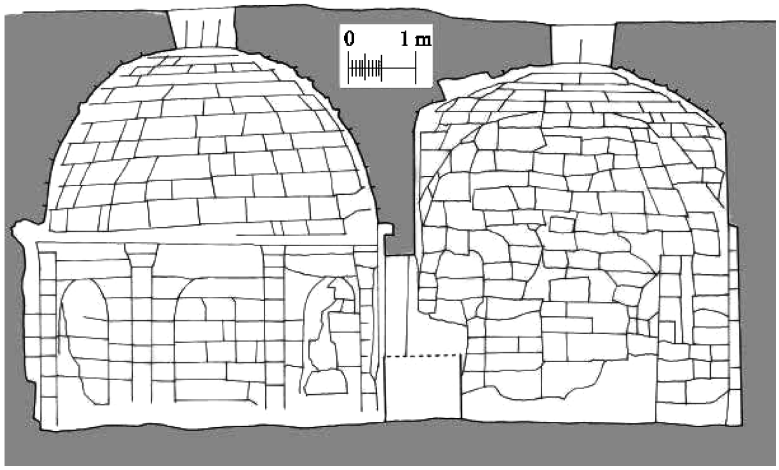

Fig. 4 Petra, section of the Baths, looking from the west to the east

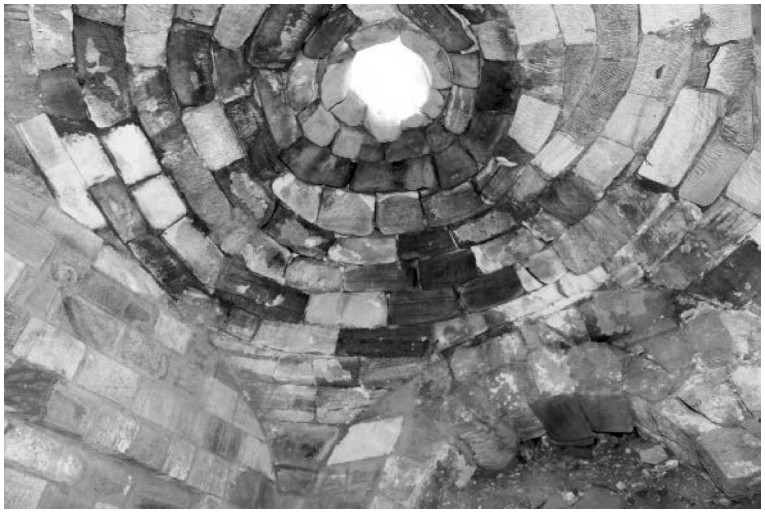

Fig. 5 Petra, domical vault with pendentive of the circular chamber of the Baths

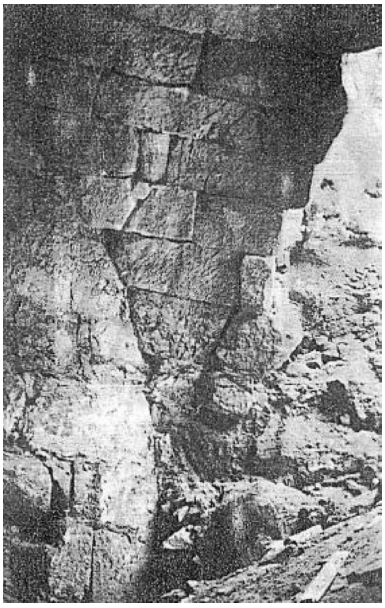

Fig. 6 Petra, pendentive during the excavations (after S. all-Tell 1969, pl. 12)

early date for the Baths at Petra is surprising, but it is acceptable here because the structure is not so established as those of Nuweijis near Amman and of the West Baths at Jerash.

3. Nuweijis near Amman

3-1. Architectural remains

Qasr an Nuweijis (Figs. 7–8) is located about 4 km north from the city center of Amman. The monument stands beside the big cross-road of beltlines and neighbors the restoration center of the

Fig. 7 Nuweijis near Amman, general view, looking from the south to the north

Fig. 8 Nuweijis near Amman, domical vault with pendentives, looking from the northwest to the southeast

Department of Antiquity. Qusayr an-Nuweijis means 'palace of the princes'[17]. Nuweijis was first discovered by T. Black and photographed by Mantell. It was also visited by Conder, who made the first publication of this monument[18]. Creswell reports with good photographs and discusses the spherical-triangle pendentive[19]; however, no architectural report has appeared yet.

The monument is a square of about 12.3 m, with a small chamber in each corner (Fig. 9). In the center of the plan, two semi-circle vaults cross and support a domical vault. There are four spherical-triangles with six courses on which the domical vault rests (Fig. 13). Massive outer walls, measuring ca. 1.2 m, are decorated by pilasters in corners and in middle of each walls, which project out a few centimeters. Ionic capitals crown the top. They support a continuous entablature, which is decorated with architectural ornamentations. The architrave has three fasciae and crown molding with the section of cyma recta on top. The frieze ornamentation is vegetables and figures on the façade (southeast), and palm leaves on the other sides. The geison is decorated by, from the bottom to the top, an egg and dart taenia on the bottom, small dentils, a small modillion, and sima with acanthus leaves. A high continuous attic and parapet are still remaining, which stand along the entablature and hide the central domical vault from people looking up from the ground.

Large limestone is used in all parts of the building, which mostly remain in good condition. The upper structure of four chambers and part of outer walls have been restored by modern technique. Probably these parts were damaged by an earthquake, but it is not clear when this restoration was made and who did it. The domical vault and pendentive are doubtless original, because there is no restoration on the upper surface of the domical vault. Some stuccos remain on the surface of the domical vault. Thus, there is no hindrance to our study. The wall of the Nuweijis has a width of ca. 60 cm, which is the same width as the tunnel volutes. Four chamber rooms have a small window each, which is supposed to be an entrance to place a gravestone.

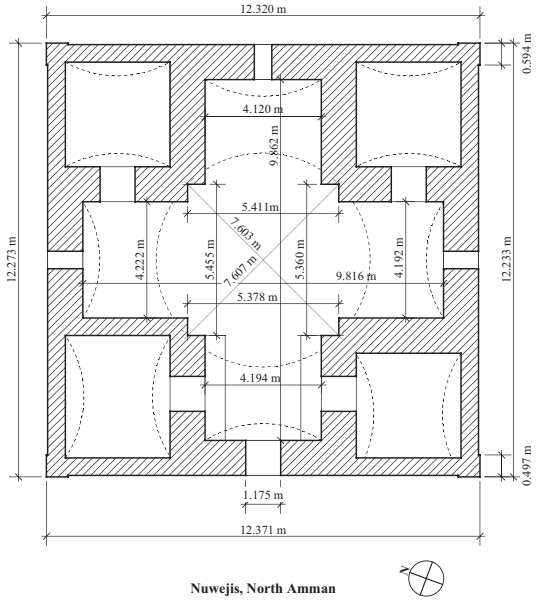

Fig. 9 Nuweijis near Amman, plan and measurements

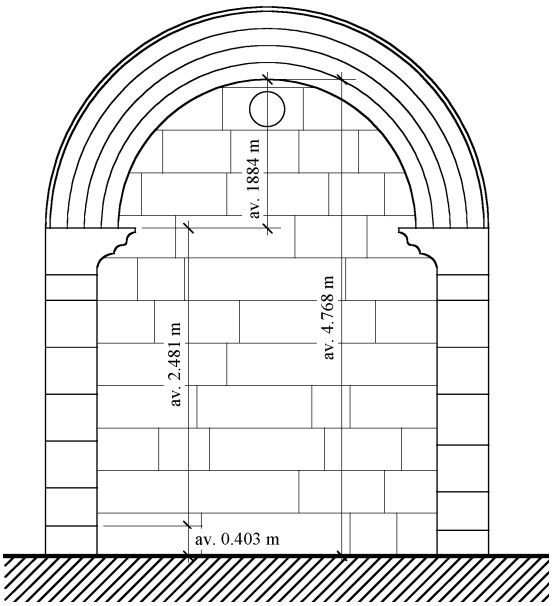

Fig. 10 Nuweijis near Amman, detail of inner arch

17) Conder 1889, p. 172.
18) Conder 1889, pp. 172–174.
19) Creswell 1979, vol. 1, part 2, pp. 460–461.

3-2. Geometrical form

The spherical-triangle pendentive at Nuweijis was measured by 3D Laser scanner. Its measuring data is as follows: There were 29 point-clouds and ca. 1 billion points. Spheres and targets registration is in accuracy of 0.9 mm best to 4.3 mm worst cloud to cloud. ICP Registration is less than 2 mm accuracy cloud to cloud. The original point was placed on a local topographical point. A section and an upper plan were drown based on the point-cloud image (Fig. 11).

Based on the measurements, a theoretical sphere was calculated by commercial software, the surface of which fits the actual measured points of the domical vault with minimum error (Table 2). The radius of the domical vault is 4.04 m (standard deviation 0.008 m) and the radius of the pendentive is 3.76 m (standard deviation 0.014 m). Thus, each the domical vault and the pendentives is created as a hemisphere with high accuracy. Since the radius of hemisphere standing on the square room is estimated as ca. 3.77 m, the pendentive is close to the hemisphere, but the domical vault is bigger than the hemisphere. Thus, the sphere of domical vault is slightly bigger than one of pendentives. In addition, the top of the domical vault is ca. 5 cm lower than the hemisphere (Fig. 27). A section was drown based on the point-cloud image (Fig. 12).

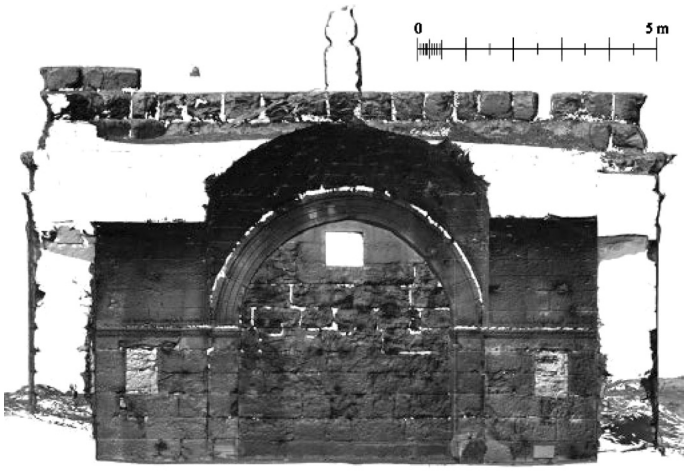

Fig. 11 Nuweijis near Amman, point-cloud image, looking from the southeast to the northwest

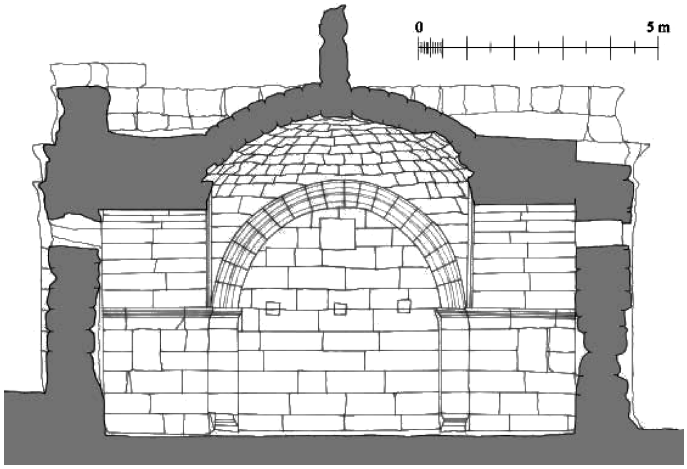

Fig. 12 Nuweijis near Amman, section, looking from the southerast to the northwest

Fig. 13 Nuweijis near Amman, pendentive

3-3. Construction date

The monument has been standing above ground probably from ancient time, so was never a target of excavation for archaeologists. In this case, a chronological analysis of the architectural ornamentation might be suitable. The frieze is decorated with a vegetable and figural motif on the front side, and with palm motifs on other three sides. The lower part of the geison is ornamented with an egg and dart taenia on the lowest part, dentils and a lesbian cyma with a heart-shaped leaf. The upper part is decorated with a small modillion, the bottom of which is covered by an acanthus leaf, taenia (?) with palm motif and reed and astragal on top of it, and the crown moulding of cyma recta with leaf motif (Fig. 14). These ornamental motifs and their combinations are found elsewhere in the architecture of the Roman East.

Conder, who reported Nuweijis in the end of the nineteenth century, assigned it to the second century AD without any clear evidence[20]. Rivoira accepted this estimate of the second century AD., but he probably did not know the interior of the Nuweijis at that time[21]. Creswell used the frieze ornamentation, the so-called 'continuous triglyph' (palm leaf which can be seen on the southwest, northwest and northeast sides of the monument) to confirm the construction date of the Nuweijis. According to simple comparison with the frieze ornamentation from the temple of Bacchus at Baalbek, which was begun in the middle of the second century AD, Creswell concluded that the Nuweijis could be dated to the last half of the second century AD[22]. Indeed, the frieze ornamentation of palm motif and the combination of decorations at the geison is almost the same as at Nuweijis[23]. The frieze with palm leaf can also be seen on the west façade of the West Propylaeum of the Temple of Artemis at Jerash, which is dated to AD 150 by the inscription (Fig. 15)[24].

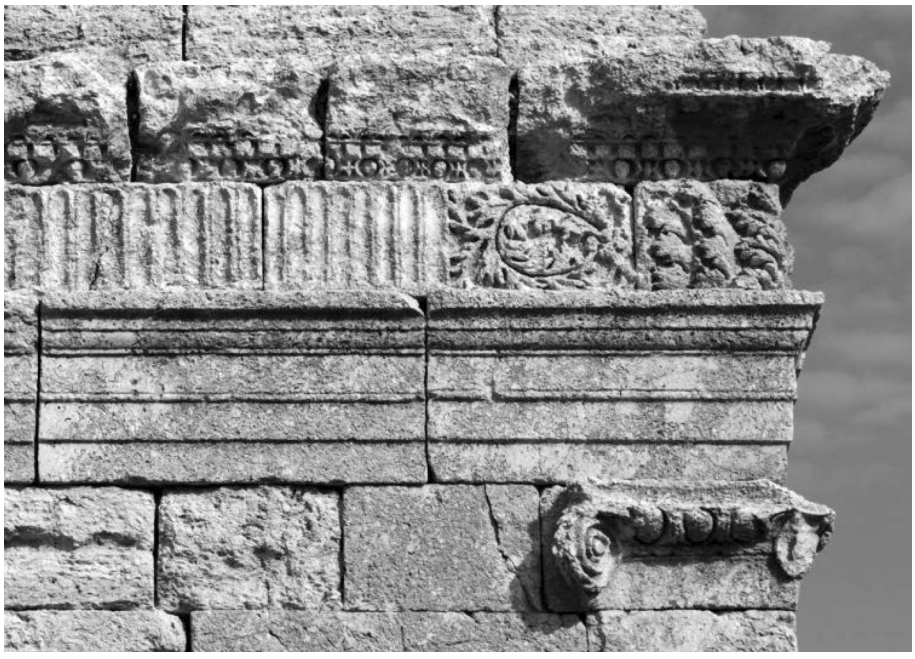

Fig. 14 Nuweijis near Amman, entablature of the south corner (photo by A. Ktistis)

20) Conder 1889, p. 174.

21) Rivoira, *Roman Architecture*, p. 173.

22) Creswell 1979, vol. I, part 2, p. 461. As for the date of the Temple of Bacchus, Creswell agreed with Krencker's opinion that the style of the Temple of Bacchus is not the same as that of the Great Temple, but it corresponds perfectly with the architecture of the great court, which is dated to Antonius Pius (AD 138–161) (Krencker 1921, p. 86). Fischer agreed with Krencker's opinion (C.S. Fisher, "The 'Forum'", in: Krealing 1938, pp. 155–157).

23) Ragette 1980, p. 104.

24) C.B. Welles, "The Inscription", in: Kraelling 1938, pp. 402–403, pl. CIX-b; Browning 1982, figs. 88–89 (see the left side of the inner façade of the Propylaeum of the Temple of Artemis).

The combination of the architectural ornamentation of the entablature, including the vegetable and figural motif of the frieze, also can confirm the construction date. The entablature from the Roman Temple at Amman has a similar ornamental motif to that of Nuweijis (Figs. 16–7)[25]. It must be noted that the palm motif of under part of the sima and the vegetable motif of the frieze from the Roman Temple are the same as the ornamentation of Nuweijis[26]. The Roman Temple at Amman is securely dated to the time when Geminius Marcianos was the governor of Provincia Arabia (AD 161–166)[27]. These similar examples, which are located close to the Nuweijis, confirm that the architectural

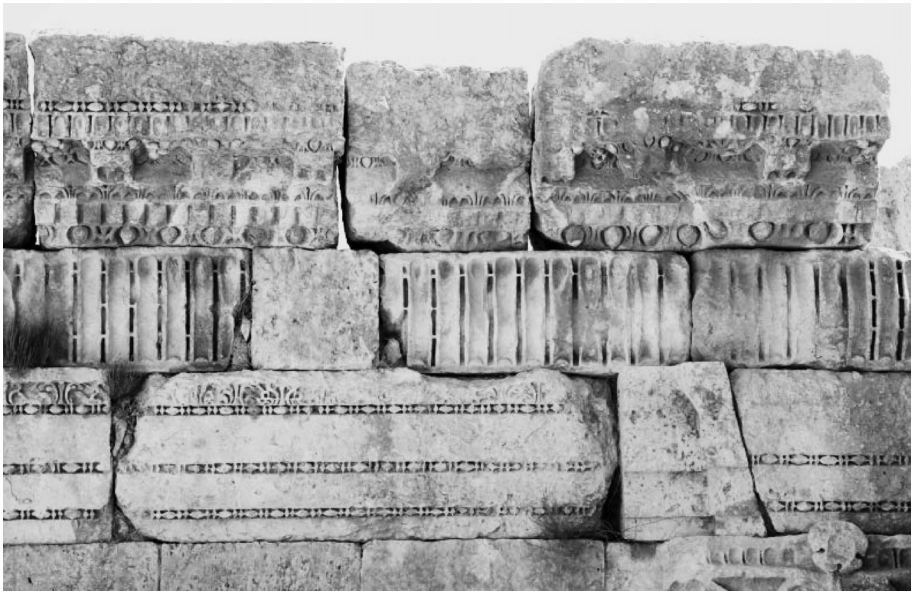

Fig. 15 Jerash, entablature of the west facade of the Propylaeum of Artemision (photo by A. Ktistis)

Fig. 16 Amman, entablature of the Roman temple

Fig. 17 Amman, cornice of the Roman temple

25) Kanellopoulos 1994, p. 61, fig. 111. Two other Roman tombs are known in Amman. The West Tomb in the downtown area was reported by Conder in the end of 19th century AD, but it is no longer remaining (Conder 1889, pp. 43–45). The West Tomb was located on the way to the downtown area, near the Nymphaeum. It is a square structure of masonry stone, and was once roofed with a dome, probably like a dome from the Mausoleum of Bizzos (Creswell 1979, vol. I, part 2, Fig. 504). When Conder visited this tomb, about three-quarters of the circle remained. Its arrangement does not look like a pendentive dome. Large voussoirs on the four corners are projecting inwards and their faces being cut to the arc (Conder 1889, p. 44; Creswell 1979, vol. I, part 2, Fig. 498). There is also another Roman tomb, which is located in the east outskirts of Amman. It is a massive square structure of masonry stone. The upper tunnel volute supports the roof. Five sarcophagi remain in inside.

26) Kanellopoulos 1994, pp. 52–53, figs. 92–94, 97–98.

27) Concerning the architectural ornamentation, the other Roman buildings, including the South Propylon, the Southeast Temenos Gate, and the Temenos, were probably built in this period (Kanellopoulos 1994).

ornamentation of Nuweijis was common in east Palestine around the second century AD. Summing up, the construction date of Nuweijis is around the middle of the second century AD, and not later than the third century AD.

4. West Baths at Jerash

4-1. Architectural remains

The West Baths are located in the north part of the city, which consists of the Cardo and the North Decumanus[28]. The West Baths stand at the east end of the North Decumanus, but do not abut on the colonnaded street. They are located on a terrace somewhat lower than the Cardo. The upper structures have collapsed on the ground, but the plane surface is not obscure (Fig. 18). The West Baths have two main halls with wings on the north and south sides. The entrances of the building are in the two wings (E), which are far from the Cardo. The large hall (F), which is probably a *frigidarium* (cool pool), is divided into three parts by huge arches supporting the upper structure. Three chambers beside the *frigidarium* (A) may have been used as *apodyteria* (changing room). Three doorways at the west wall of the *frigidarium* lead to the next hall (C), which is presumed to have once been covered by a great domical vault supported by pendentives. A rising of the pendentive is still remaining. The heating flutes in the walls clearly indicate that this hall was a *caldarium* (hot room). The chambers of the two wings are framed by four great piers, which are joined by arches supporting domical vaults set on spherical-triangles with six courses (Figs. 19–20). The domical vault in the north chamber, which was firstly reported by Kraeling in 1938, has been preserved mostly in perfect condition[29]. It is not clear what the function of these two winged chambers may have been.

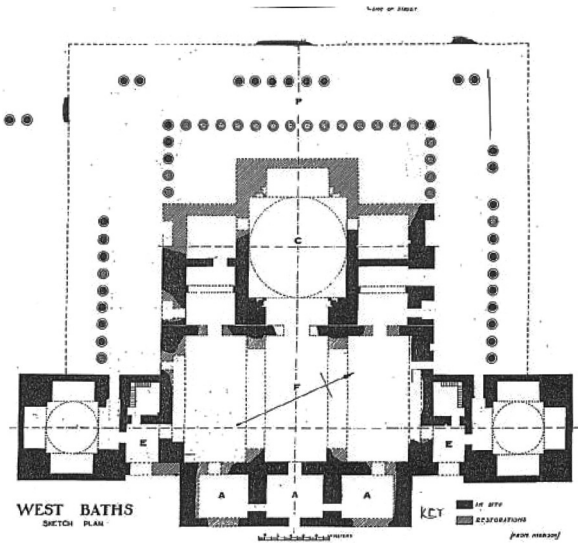

Fig. 18 Jerash, plan of West Baths (after Krealing 1938, plan XXVII)

Fig. 19 Jerash, spherical-triangle pendentive of West Baths

28) Browning 1982, p. 83, map 3; the West Baths, pp. 176–168, fig. 99.

29) Kraeling 1938, p. 23, pl. VI-b.

Fig. 20 Jerash, domical vault with pendentives of West Baths, looking from the south to the north

4-2. Geometrical form

The spherical-triangle pendentive of the West Baths at Jerash was measured by 3D Laser scanner (Fig. 21). The measuring data is as follows: There are 15 point-clouds and ca. 452 million points were measured. Spheres and targets registration is in accuracy of 1.2 mm best to 6.2 mm worst cloud to cloud. ICP Registration is less than 2.5 mm accuracy cloud to cloud. The original point was placed on a local topographical point.

Based on the measurement, a theoretical sphere was calculated by commercial software, the surface of which fits the actual measured points of the domical vault with minimum error (Table 2). The radius of the domical vault is 4.93 m (standard deviation 0.027 m) and of pendentive is 5.79 m (standard deviation 0.017 m). Thus, each of the domical vault and the pendentives is created as a hemisphere with high accuracy. Since the radius of hemisphere standing on the square room is estimated as ca. 5.19 m, the domical vault is smaller than the hemisphere, but the pendentive is bigger than the hemisphere. Thus, the sphere of domical vault is slightly smaller than one of pendentives. In addition, the center of the domical vault is ca. 29 cm higher than the center of the hemisphere, and the top of the domical vault is ca. 3 cm higher than the hemisphere (Fig. 28). A section was drown based on the point-cloud image (Fig. 22).

4-3. Construction date

Since the city of Jerash was abandoned by the seventh century AD and was not destroyed by modern activities, it is not surprising if the domical vault and pendentives remain as *in situ*; however, the construction date of West Baths has been discussed for long time because no direct evidence has been found. Creswell considered the construction of the West Baths to be not later than the first half of the third century AD judging from the building phases of the city. According to the result of new excavations of 1981–83, the north section of Jerash, including the North Tetrapylon[30], the

30) The North Tetrapylon at Jerash was fully reconstructed by the Department of Antiquity of Jordan during a research project between 1981 and 1983. The reconstructed North Tetrapylon is crowned with a central dome supported by pendentives, but no original

Fig. 21 Jerash, point-cloud image of West Baths, looking from the west to the east

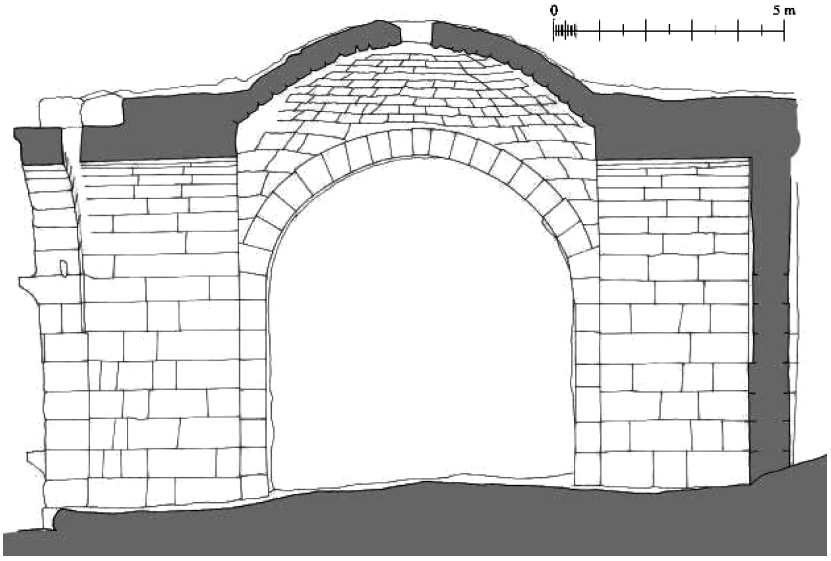

Fig. 22 Jerash, section of West Baths, looking from the west to the east

North Theater and the North Cardo were not planned in the original layout of the city. Ball says that the North Tetrapylon was built sometime between the middle of the second century AD and about AD 180[31]. This assumption is supported by two pieces of evidence: Firstly, the construction of the North Propylon is not later than the time of the expansion work of the Cardo, which is dated to AD 180, judging from the connection between the streets and the North Tetrapylon[32]. Secondly, the construction of the North Tetrapylon is associated with the construction of the North Theater in AD 165/166, which is supported by the epigraphic evidence of four line inscriptions of the architrave originally located above the central door of the north façade of the scene building, indicating that the building was dedicated, and probably completed at that time[33]. Judging from the excellent

fragments were reported. (W. Ball *et al.*, "The North Decumanus and North Tetrapylon at Jerash: An Archaeological and Architectural Report", in Zayadine 1986, pp. 385–386).

31) Ball *op. cit*., p. 389.

32) Ball *op. cit*., p. 386.

33) J.D. Stewart, "The Architecture of the Roman Theater", in Zayadine 1986, p. 229; Ball *op. cit*., p. 389, fn. 72.

character of its structure, it probably belongs to the earlier period of the northern part of the city.

In addition, the Corinthian colonnade surrounding the West Baths has a similar character to the one at the South Cardo. The Corinthian capital from the colonnade of the West Bath has a somewhat small kalathos with two ties of well-developed acanthus leaves (Fig. 23). The inner and outer volutes are raised upward, but they are rather small and simple. The acanthus leaves have small tongue-shaped serrations and there are no holes but only narrow gutters between them. The most characteristic point of the capital from the West Baths is its abacus, which is thin and has no decoration. These characteristics can be seen also on the Corinthian capital from the colonnade of the south Cardo (Fig. 24). In contrast, the Corinthian capital from the North Plaza, which is next to the North Theater, does not look like the one from the West Baths. The capital of the North Plaza has a slender kalathos and is crowning an abacus decorated by tongue leaves (Fig. 25). It is believed that the renovation of the North Decumanus including the North Plaza was later than widening of the South Cardo[34].

These facts indicate that the construction phase of the West Baths was probably the same as the widening of the south Cardo. It is safe to say, therefore, that the construction of the West Baths belongs to the period when the entire length of the Cardo in the south of the Tetrapylon was widened and its order was changed from Ionic to Corinthian. The rebuilding and widening operation began from the Propylaeum of the Temple of Artemis and continued until soon before the North Tetrapylon (the northern end was never finished). According to the Polish excavations, the date of this project was "not ...before the AD 165 and probably not after Marcus Aurelius (AD 161–180)"[35]. Therefore, the construction of West Baths was probably during the third quarter of the second century AD[36].

5. Summary

In the present paper, the author reports the architectural remains of domical valuts with pendentive remaining in Jordan. In the case of the Baths at Petra, the domical vault is not supported by arches made of voussoir on all four sides but rather by the ashlar walls. In this regard, the case of Petra is missing an element as a domical vault[37]. Nevertheless, the measurements indicate that each of

Fig. 23 Jerash, Corinthian capital of West Baths

Fig. 24 Jerash, Corinthian capital of South Cardo, near North Tetrapylon

Fig. 25 Jerash, Corinthian capital of North Plaza

34) Ball *op. cit*., p. 393 (phase 5).

35) Ball *op. cit*., p. 386, fn. 48.

36) Recently, Khouri said "inscriptions found here confirm that this was a public baths complex from the Byzantine period, built by Bishop Placcus in 454–5 and restored in 584". Khouri considered that the West Baths was reconstructed in the Byzantine period on the earlier Roman baths, because it has standard layout of Roman baths. Khouri's estimation is probably correct, but it does not say anything whether the domical vault and its pendentives are from Roman or Byzantine period. The North Tetrapylon, located 50 m north from the West Baths, which had domical vault with pendentives as well, and is dated to the same period to the West Baths. According to these circumstances, it is hardly to believe that the domical vault of West Baths is reconstruction in Byzantine period. Khouri 1986, pp. 116–117.

37) McKenzie 1990, p. 51. There are no practical arches reported by Rababeh (Rababeh 2005, p. 166).

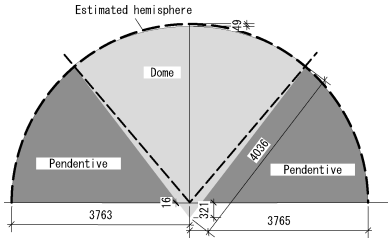

Fig. 26 Schematic model of domical vault of Baths at Petra

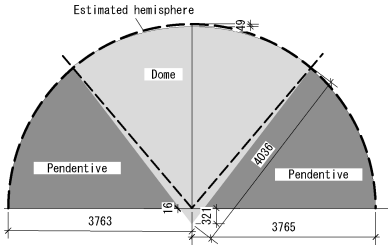

Fig. 27 Schematic model of domical vault of Nuweijis near Amman

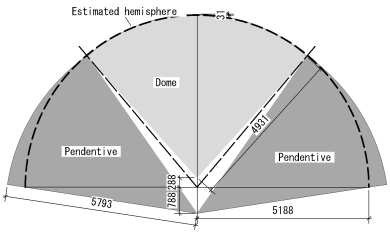

Fig. 28 Schematic model of domical vault of West Baths at Jerash

the domical vault and pendentive is created as a hemisphere and their standard deviations of them are less than a few cm. The gap between the top of the domical vault and of the estimated hemisphere is 4 cm.

Nuweijis near Amman is one of the best preserved examples of domical vault rests on pendentives. The new measurements indicate that the curvatures of the domical vault and of the pendentives are approximately same. The top of the domical vault is just ca. 5 cm lower than the top of the estimated hemisphere. As Creswell says, it is confirmed that we have 'an exact replica in stone of diagram (Fig. 1, No. 2)[38]. When the frame of the domical vault was removed, the cut stone blocks would have sagged down by their own weight until they were stabilized by friction which it would have probably made the top of the domical vault sink down. It is probably that the Nuweijis was built in the mid-second century AD.

The Baths at Jerash is also one of the best preserved examples of domical vault rests on pendentives. Both the domical vault and the pendentives are inscribed in hemispheres with high accuracy less than a few centimeters' error. However, the new measurements indicate that the curvatures of the domical vault and of the pendentives are not same. This possibly means that the domical vault of Jerash was not built all at once, but that each hemisphere was built separately. It is presumed that four aches and pendentives were built at the same time, and then, the upper part was built on the top. It is probably that the domical vault and pendentives of West Baths was built in the third quarter of the second century.

Cut stone technique has its origin in Hellenistic masonry of this region as we can see in many examples in Roman architecture of Levant[39]. Cut stone voussoir of domical vault has sphere surface on top and bottom, and other four faces are cut diagonally so as to fit adjoining stones. To create such a complicated shape was presumably not so difficult for Roman craftsman in this region. The weight of domical vault made of cut stones was considerably too heavy so it would make horizontal thrust, and it was difficult to support without heavy cross vault behind the four arches on which the domical vault rests. The curvature of central part rests on pendentive was probably too shallow to build a bigger one. That is why these monuments are relatively small in scale. It is probably impossible to build a domical vault on a square more than 10 m in diameter. In order to solve this problem, we must wait next solution of pendentive dome, which was made of brick and mortar. The first appearance of it might be the later dome of Agia Sophia at Constantinople built in AD 573[40].

38) Creswell 1979, p. 460.

39) Barrel vault and cross vault made of cut stone can be seen elsewhere from south Turkey to Levant; foundation of North Stoa of Agora at Izmir (with stone rib), vomitoria under the auditorium of Theatre at Miletus, vomitoria under the auditorium of Theatre at Side, cross-section of two corridors of Theater of Philippopolis in Syria, corridor under the colonnaded street at Bostra, vomitoria under the auditorium of Theatre at Bostra, corridor under the Temple of Jupiter at Baalbek.

40) The initial dome of Agia Sophia considerably belongs to the first type of dome, or domical vault. Since the eastern part of the main dome and the eastern semidome fell down due to the earthquake in 557, some parts of the present pendentive dome is of the reconstruction in later period. Mainstone 1988, pp. 89ff, esp. fig. 106.

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明代東トルキスタンの交易路とその変遷

早　川　尚　志*

Trade Routes in the Eastern Turkistan in the Era of Ming and their Transition

Hisashi HAYAKAWA*

Abstract

Despite numerous studies on the transportation hubs in Eastern Turkistan that connect West Asia and China in the ancient and early modern time, there are few studies on the transition of trade routes in the period between the fall down of the Mongolian Empire (14th century) and the arrival of Portugese missionaries (17th century). This study shows the main routes and the transition of trade routes in Eastern Turkistan in this period to fill the gap. A series of bibliographic survey of geographical documents and records of ambassadors and merchants who traveled this region reveal three main routes shown in the Khiṭāi-nāma, their transition, and the reason why the main route had changed.

1.　序　　章

1.1.　本稿の目的

東トルキスタンは古代より西アジアと中国を結ぶ交易路の回廊であった[1]。13世紀にモンゴル帝国が西アジアと中国をまたぐ領域を席捲すると，パクス・モンゴリカの下，この地は両地域を結ぶ交易路の中枢として大いに繁栄し［Grousset 1960: 383］，元の統治下，駅站が整備された［榎 1978a: 133］。元が衰退すると1331年までに東トルキスタンはチャガタイ系諸部族に征服され，中国で元に取って替った明も一転鎖国政策を取り始めた。当該地域は近代になって再び欧州の探検隊や使節団が入ってくるまでの間，使節や隊商の往復の少ない「暗黒期」［Yule 1913: 172–73］を迎えることになる[2]。

当該地域の交易路の道程と変遷についての研究は今日に至るまで精力的に続けられてきた[3]。とはいえ，その多くはモンゴル帝国以前の時代を対象とするもので，モンゴル帝国期衰退後，近代にいたるまでの期間を対象とす

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1　既に漢代には西域に向かうある程度固定した道程がいくつか存在していたことが覗える。「自玉門・陽関出西域有兩道。從鄯善，傍南山北，波河西行至莎車爲南道。南道西踰葱嶺則出大月氏・安息。自車師前王廷，隨北山，波河西行至疏勒爲北道。北道西踰葱嶺則出大宛・康居・奄蔡焉」（漢書西域伝上: 3872）。

2　明王朝の門戸を最初に開いた欧州の国はポルトガルである。1557年にマカオの永住権を獲得し，1600年に初めてマテオ・リッチなどイエズス会の一団が北京入りした［明史神宗本紀二: 282］。マルコ・ポーロのいうカタイオがリッチの到達したチーナと同じか確認すべくアグラから後述のゴーエシュが派遣され［BG: N 805–6］，彼の嘉峪関到着の報告と手記がリッチの許に届いて初めてカタイオが中国の領域と一致することが確認された。

3　東トルキスタンの交易路を考古学的に検討した代表的なものには［Hedin 1899; 1966; Stein 1907; 1921; 1923; 1928; 1933］など大戦期以前の西欧の探検隊が残した一連の報告書があり，当該地域の遺跡の様子，大戦期以前の地名を伝えている点で，その記述・地図共に有用である。当該地域を扱った東西の史料を収集したものには［Yule 1913; Bretscneider 1910］がある。清代以降の東トルキスタンの交通事情は［新疆図志］に詳しい。こうした史料や報告書に基づいて当該地域の交易路について検討したものには［松田 1956］がある。

る研究はさほど多くない。明朝と西アジアとの交易のシステム[4]や当代の個々の使節[5]について検討した研究は知られているが，交易路の道程とその変遷自体を検討したものは管見の限り，僅かに［Shaw 1876］があるのみで，本格的な研究はあまりなされてこなかった。しかし，モンゴル帝国崩壊後，近代に至るまでの当該地域の交易路の道程と変遷を究明することは，モンゴル帝国期以前の古代の東西交渉史と，近現代に大国間で分割された後再び中国の「新シルクロード構想」により再統合に向かいつつある当該地域の動態との間の空白を埋める上で極めて重要となり得よう。

そこで本稿では元衰退後，近代になって再び欧州人が入ってくるまでの期間，即ち14〜17世紀もしくは明代のトルキスタンの「暗黒期」に焦点を当て，当時の主要交易路の道程の特定，交易路の変遷と興廃，及びその理由について究明することを企図し，当該地域を往復した使節記・旅行記や地理書を検討する[6]。これにより，当該地域の交易路の道程がいかにして近現代の道程に収束していったか，その過程の一端を明らかにする。

1.2. 明代東トルキスタン

本論に先立ち，明代東トルキスタンの情勢について確認しておこう[7]。

14世紀に元とチャガタイ・ウルスが衰退すると，中国では明，西トルキスタンや西アジアではティムール朝がこれに取って代わり，東トルキスタンはモグール・ウルスの占めるところとなった。モグール・ウルスは初期においてアルマリクを主邑とするイリ河谷を中心とし，西はタシュケント・ヤスから東はバルスキョル，北はイルティシュ川から南はホタンに至るまでを占めていた。

ところが15世紀半ばからオイラト[8]やウズベクなど新たな遊牧勢力が勃興し，事態は変化する［濱田 1998: 100–3］。オイラトはモンゴル高原から西方へ転じ，東トルキスタンで活動を開始し［間野 1964: 14; Millward 2007: 72; Kara 2010: 167］，モグール・ウルスを圧迫し始める［間野 1977: 189–192; Jackson 1991; 濱田 1998: 103］。

ティムール朝も1447年にシャー・ルフが没すると，度重なる内乱で弛緩し，最終的にウズベクのシャイバーニー・ハンによって1500年にはサマルカンドを，1507年にはヘラートを奪われ，西トルキスタンから一掃された。

16世紀に入ると，15世紀中葉以降からの動乱は一段落する。東トルキスタンでは14世紀中葉16万人いた遊牧モグール人がオイラト等の新興遊牧勢力に吸収されて16世紀中葉までに３万人にまで減じ，その主体が天山山脈以南の定住民に取って代わられる［間野 1998: 191］。その結果，天山山脈をはさんで南にモグール・ウルス，北にオイラトなどの遊牧民が並び立ち，この構図は17世紀初頭まで続いた。西トルキスタンでも同様で，シャイバーニー朝がティムール朝の残党を一掃して覇を唱え，西アジアのサファヴィー朝やオスマン朝と鼎立することになる。

以上を見ると，この時代はティムール朝，遊牧民主体のモグール・ウルス，明が併存した14－15世紀と，シャイバーニー朝，定住民主体のモグール・ウルス，明が併存した16世紀の二つの時期に分けることができる。

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4 代表的なものには［羽田明 1965; 榎 1978a］がある。
5 こちらについては本稿で当該の使節や史料を紹介するごとに随時紹介していく。
6 同様の研究手法については［羽田亨 1957］が中国からカラコルムに至る交易路の道程を検討する際に用いられている。「駅路は元来使人往復の為に設けられたること記述の如く，之が設置の年即ち1235年以後…支那より和林方面に至りし官人の行路を研究，之に其前後の有様を徴することに於いてほぼその正鵠を失わざることを得んか」［羽田亨 1957: 26］。
7 当時の東トルキスタンの情勢とその変遷は［間野 1977; Jackson 1991; 濱田 1998］に詳しい。
8 彼等は中国史料には「瓦剌」，ムスリム側の記録には “Qalmāq/Kalmāk” として現れる［Guchinova 2006: 11］。

1.3.　本論の構成

以上，本論に入る前に明代東トルキスタンの情勢を概観した。本論では東トルキスタンの交易路について，当時の情勢を踏まえ，まず14－15世紀の，続いて章を分けて16世紀の史料が示す道程と記述を時代順に検討する[9]。

この際前者においては，1395－1409年に明からティムール朝に派遣された傅安についての記述，同時代のティムール朝史書ザファルナーマ［ZN I–II］の関連記述，1413－15年に明からティムール朝に派遣された陳誠の使節記［番国志；行程記］，1419－22年にティムール朝から明に派遣されたナッカーシュの使節記［GN］を検討する。

後者では1514－15年に明で成立した『西域土地人物略』［人物略］，1516年にイスタンブルで成立したヒタイナーマ［KhN］，1546－47年に成立したモグール・ウルスの史書ターリーヒ・ラシーディー［TR］，1551－53年頃明からヴェネツィアまで旅した商人ハッジ・ムハンマドの記述［HM］，1554－62年にイスタンブルに滞在したブスベックが旅のトルコ人ホージャからの伝聞を書き留めた記述［TD］，1603－07年にムガール帝国の帝都アグラから明の嘉峪関・粛州まで派遣されたベントー・ディ・ゴーエシュの旅行記［BG］を検討する。

以上の史料を検討し，明代東トルキスタンの交易路の道程と変遷を描き出し，その理由を検討する。これによって当該地域の交易路の道程がいかにして古代のものから近現代の道程に収束していったか，その過程の一端を明らかにする。

2.　14－15世紀における東トルキスタンの交易路についての記述[10]

2.1.　傅安：1395－1409年

明代東トルキスタンを往復した使節の内で初めて詳しく記録が残されたのは傅安[11]である。彼は洪武帝の命令で1395年にサマルカンドに派遣されるも，ティムールが対明遠征を準備していたためかサマルカンドにて13年間拘留され［明史西域伝四：8598–9，8609］，1409年になって漸く解放されて帰国を果たした［明史西域伝一：8527］。

この際，往路にて傅安が通った道程は，

【道程１】嘉峪関―流沙―哈迷里（ハミ）―瀚海―古高昌（カラホージャ）―亦剌八里（イリバリク）―撒馬兒罕（サマルカンド）―討落思（タブリーズ）―乙思不罕（イスファハーン）―失剌思（シーラーズ）―黒魯（ヘラート）

というものであったという[12]［榎 1978b: 144; Goodrich 1976: 229］【地図１】。トルファンからイリ河谷経由でサマルカンドに向かったことが覗える。

9　隊商の通る交易路が隊商宿や駅站付帯に都市間を結ぶのに対し，軍勢の遠征路は峠や隘路に制約される他は牧草地伝いに進み得るため，両者が必ずしも一致しないことについては注意を要する［Aubin 1971: 107］。それ故本稿では同時代の軍勢の遠征路については検討せず，次稿以降への課題としたい。14－15世紀のティムール朝による遠征の事例については［早川 2014］参照。

10　本章は第21回ヘレニズム～イスラーム考古学研究会（2014年７月５－６日，金沢大学）での発表及びそのプロシーディングズ［早川 2014］の内容に修正を加えたものである。発表時に出席者の方々から有益な指摘・助言をいただいた。ここに記して謝意を表する。

11　傅安自身は陳誠のように自ら記録を残すことはなかったが［Rajkai 2007: 62］，明史，明実録などに彼についての断片的な記述が見られる。主な研究には Bretschneider 1910; 榎 1978b; Rossabi 1976; Goodrich 1976］がある。

12　以下，地名・人名の表記については，史料に現れたものについてはその表記に従い，それ以外の場合では慣用名に従うことにする。（例）Andigān（史料），アンディジャーン（その他）

傅安はこの時の西域奉使を含め，都合 6 回西域に向かっており，内 3 回がサマルカンド，残り 3 回がビシュバリク[13]即ちモグール・ウルスを目指したものであったという［榎 1978b: 152］。

2. 2. Ẓafarnāma : 1398－1405年

傅安の西域奉使と前後して，［ZN］にも東トルキスタンについての記述が見える。1398－99年に行われたミールザー・イスカンダル（Mīrzā Iskandar）のモグーリスターン遠征に伴う記述として，［ZN］は当時の東トルキスタンの主要都市間の移動の所要日数と共に，以下の二つの道程を挙げている［ZN II: 219–20］[14]【道程 2 】【地図 2 】。

（ii）Khutan—35宿駅—Qarā Khwāja—31宿駅—Tītqāūl（嘉峪関）[15]

（iii）Samarqand—25宿駅—Kāšġar—15日—Khutan—40日—Tītqāūl（嘉峪関）

ここで興味深い点は，カシュガル～ホタン～嘉峪関の道程を除いていずれも道程が宿駅（manzil）の数で示されている点[16]である。この記事から，後の［KhN］や［TR］に見えるように，当時の東トルキスタンでも宿駅の制度が保持されており，その間隔が相当に密であったことが覗える。（ii）のルートについては，道程が日数で示されており，特にホタン～嘉峪関間の道は「耕地は皆無で果てしない砂漠が広がっている」［ZN II: 220］とされており，宿駅が維持されていなかった可能性が覗える。

また，1405年にティムールが明へ遠征する直前の記事も興味深い。曰く「惜しみない好意持てる者（ティムール）は Tāškant，Sayrām，Yānġī[17]，Ašpara[18]，そして Jata 諸国[19]全域を Khiṭāi に至るまで Amīrzāda Uluġ Bīg に割り当てるよう命じた。そして，Andigān，Afšīkant，Ṭarāz，Kāšġar を Khutan に至るまでとその周辺を Amīrzāda Ibrahīm Sultān に割り当てるよう命じた」［ZN II: 633］という。

以上より，以下の二点が明らかになる。

①この時代の東トルキスタンの交易路には，フェルガナ盆地からカシュガル，ホタンと続くルートがあり，ホタン以降，カラホージャ／高昌経由で嘉峪関を目指すルート，直接嘉峪関を目指すルートの二つがあり，少なくとも前者のルートでは宿駅が密に維持されていたこと。

②当時，中国に向かうルートは大きく二つあり，①で述べたルートのほかにタシュケント，サイラム，ヤンギ，アシュパラ，モグーリスターンと天山山脈北麓もしくは天山山中を経由するものがあった。このことはティムールの事前の領土分配に際しても意識されたこと。これらは各々，後述の［KhN］でいうモグール道[20]，

13 こうした漢文史料で用いられる「イリバリク」や「ビシュバリク」という名称は都市としての北庭故城を指すのではなく，モグーリスターン・ハン国の別称であることに注意しておく必要がある［丸山 2009: 152］。

14 これに注目した先行研究としては［Barthold 1958; 満井 1939］がある。

15 ペルシア語史料では嘉峪関には Tītqāūl, Qarāwul という二通りの名を与えられている。これらの名称は各々モンゴル語由来で「物見」「斥候」を意味していた［Doerfer 1963: 252, 399］。

16 同様の例は［NQ: 164］にも見える。イランにおける距離の度量衡が統一されていなかったことを述べる文脈で，フレグ・ウルス西方の「ルーム，グルジスターン，アラーン，ムーガーン，シルヴァーンにおいてファルサフは用いられておらず，距離は宿駅（manzil）と所要時間でもって数えられていた」という事例が言及されている。

17 Yānġī はモグール人による Ṭarāz の別称［TR: 205］。モグーリスターンの主要都市として，Balāsāqūn，Almālīġ，Yūmġāl と並んで紹介されている。

18 アシュパラはしばしばティムール朝のモグール遠征の拠点になったようで，ティムールがムハンマド・スルターンに命じて砦と穀倉の建設を命じた記述も見える［ZN II: 12］。

19 モグール・ウルスのこと。［間野 1964: 2］参照。

20 バルトリドもこれに気付いており，ティムールによる中国遠征はフェルガナからタリム盆地に入るルートではなく1389年のモグール・ウルス遠征の時と同様，シル川からセミレチエ，イリ河谷と進むルートで計画されていたことを指摘してい

ホタン道に相当すると思われる。

2. 3.　陳誠・李暹：1413－15年

1405年，ティムールが対明遠征途上，オトラルで客死した後，ティムール朝は後継者争いに見舞われた。その勝者シャー・ルフの許，ティムール朝と明の外交関係は劇的に改善していく［Fletcher 1968: 209–16; Millward 2007: 72］。先述の傅安が解放されて帰国を果たしたのも，シャー・ルフの許でのことであった［小野 2010: 276］。

そして1413年には明の宮廷にサマルカンドを筆頭に西域９ヶ国が「朝貢」し，これらの使臣を送り届けるべく，永楽帝はヘラート方面へ陳誠・李暹を首班とする使節団を派遣した［明史西域伝四: 8610］。この際に書かれたのが［番国志］［行程記］[21]の二巻である［明史芸文志二: 2419］。

その実際の行程は［行程記］に日誌形式で毎日の移動を緻密に記録されている。惜しむらくは記録が往路のみに留まる事であろうか。比定に問題のある場所も多いため，行程中，明史外国伝にも見える地名のみを抜粋すると，以下のようになる【地図３】。

【道程３】嘉峪関―哈密（ハミ）―火州城（カラホージャ）―吐爾番城（トルファン）―崖兒城（交河故城）―（托遜―ユルドゥズ草原[22]―イリ河沿いに西進）―阿力馬力口子（アルマリク）―亦息渴兒（イシククル）―養夷城（ヤンギ）―塞藍（サイラム）―達失干（タシュケント）―石剌思（シーラーズ）[23]―撒馬兒罕（サマルカンド）―渴石城（ケシュ）―迭里米（テルメズ）―八剌黑（バルフ）―俺都匯（アンドゥホイ）―哈烈（ヘラート）

［行程記］にはなお比定に問題の残る個所も多いものの，トクスンからアルゴイ川を遡ってユルドゥズ草原に入り，イリ河伝いにティムール朝領内に入るというルート［松田 1956: 270–3］が精緻に再現できる点で非常に価値がある。このルートは［KhN］の「モグール道」に一致すると思われるが，それについては後述する。また宿場や野営の記事も目立つ。明代東トルキスタンの交通体系について検討する際，改めて精読を要する史料といえよう。

2. 4.　Giyāth al-dīn Naqqāš：1419－22年

前述の陳誠・李暹の遣使の後，幾度かシャー・ルフと永楽帝の間を両国の使節団が往復した［小野 2010: 280–81］。1419年にシャー・ルフを筆頭に６人のティムール朝の君侯たちが合同使節団を派遣し，その内の一人アミールザーデ・バイスングルの使節として参加したのがナッカーシュ[24]であった［GN: 383v.– 384r.］。

る［Barthold 1958: 51］。

21　陳誠・李暹の記録，特に［番国志］は古来大いに注目を集め，研究も多岐にわたる。英文による訳注には［Rossabi 1976］があるが，扱っているのは［番国志］のごく一部のみである。実際の行程を含めてこの史料を正面から取り上げた研究には［Bretschneider 1910; 神田 1927; 満井 1939; Rossabi 1976; Bruno 1985; Karimova 2003］がある。［間野 1964］でもこの作品は活用されている。

22　ユルドゥズについての記述は［Mannerheim 1969: 282］に詳しい。

23　ファールス地方の首邑シーラーズと同名のサマルカンド近郊の集落。［HAM: 170a］では Šīrāz はサマルカンドの諸テュメンの一つに数えられている［川口 2011: 77］。なお，［HAM］については［川口 2011: 62; Subtelny 2002］に詳しい。

24　陳誠・李暹の記録同様，ナッカーシュの記録も古くから注目を集めてきた。主な研究には［Dunlop 1946; 宮崎 1947; Barthold 1958; Barthold 1962; Surreys 1967; 榎 1974; 1978a; Soucek 2001］があり，訳注には［Yule 1915; 小野 2010］がある。特に後者はオックスフォード大学蔵写本 Oxford. Bodleian Library. Elliot 422 の写真版と和訳を提示し，我が国の研究者のナッカーシュの旅行記へのアクセスを極めて容易にした点で称賛に値する。

ナッカーシュは1419年11月24日にシャーディー・ホージャ（Šādī Khwāja）の指揮下，ヘラートを出発し，1422年８月29日に帰還した［GN: 383v.］。彼は元来日誌（rūznāma）形式で記録を残していたようだが，引用されたのは摘要のみであり［GN: 384r.］，地理情報についてさして詳しい記述は残していない。彼の辿った道程上の地名を拾うと以下のようになる【地図４】。

【道程４】（往路）Harāt—Balkh—Kālif[25]—Samarqand—Tāškant—Sayrām—Ašpara—Muġūl 人の領内／良好な牧草地—Bīlġūtū—Kūngāz 川—Yuldūz 草原—峻険な山谷が続く—Ṭurfān—Qarā Khwāja（高昌）—Sūfī-Ata—Qāmul（哈密）—Qarāwul（嘉峪関）—Sukjū（粛州）

【道程５】（復路）Qarāwul（嘉峪関）—砂漠の道—Khutan—Kāšġar—Andigān（分岐点）—(i) Samarqand/—(ii) Ḥiṣār-i Šādmān[26]—Balkh—Harāt

地理情報をあまり詳述していないにも拘らず，［GN］は陳誠の記述と対照するとかなり示唆に富む史料である。彼の史料より以下の点が覗えよう。

①ナッカーシュの一行は往路において陳誠とほぼ同じ道程を辿っており，この道程（後述する［KhN］でいう「モグール道」と思われる）がかなりの程度固定されたルートとして用いられていた点。

②帰路ではホタン経由の道程を通っているが，これは「モグーリスターンあたりで騒乱ありという情報を受け…騒乱を恐れて砂漠の道を選択した」［GN: 411v.– 412r.］結果である点。

ホタン，カシュガルを通る②の道程は後述の［KhN］の「ホタン道」に一致する可能性が指摘されている［小野 2010: 293］。またこの嘉峪関～ホタン間の「砂漠の道」の道程は［ZNII: 220］に見えるホタンと嘉峪関を直接結ぶルートの記述と酷似することから，トルファンを経由するものではなく，タリム盆地南縁沿いに直接ホタンへと向かうものである。なお，［GN］の「騒乱」はモグール・ウルスのヴァイス・ハン（歪思）とオイラトのタイピン（太平）の交戦によるものであったことが［明実録］の記述より判明している［小野 2010: 293］。

3. 16世紀における東トルキスタンの交易路についての記述

3.1. 西域土地人物略：成立1514－5年

［人物略］[27]は西アジアの，恐らくはオスマン朝の使節のもたらした情報に基づき［堀 1978: 37］，1514－15年成立した西域関連史料である［堀 1982: 841］。堀は既に［Bretschneider 1910: 329–32］で紹介されていた，

粛州—哈密—トルファン—チャリーシュ[28]—クチャ—アクス—カシュガル

というルートに加え，「北／南に○○有り」として付記されている地名を結び付ければ別の併行ルートを復元可能であるとし，図１の通り３ルートを復元している［堀 1978: 42–45］。

25 テルメズから二日行程にあるアム河の渡し場［NQ: 106, HAM: 172b］。［BN］には Kilīf と見える［BN: 49］。

26 現タジキスタン領のヒサール［Le Strange 1905: 440］。アンディジャーンからバルフへの道程はヒサールを経由していることから，ヴァフシュ川沿いにヒサールまで進み，スルハンダリア川沿いにアム河へ下るルートに比定されよう。

27 ［人物略］は［Bretschneider 1910］にて紹介されて以来，その起源と叙述内容が議論の対象になり，［和田 1958; 羽田明 1965］によりオスマン朝から明への朝貢使節と関連付けられた。

28 明代の察力失。現カラシャール。［HM］に見える Chialis も同様。［丸山 2013: 73］参照。

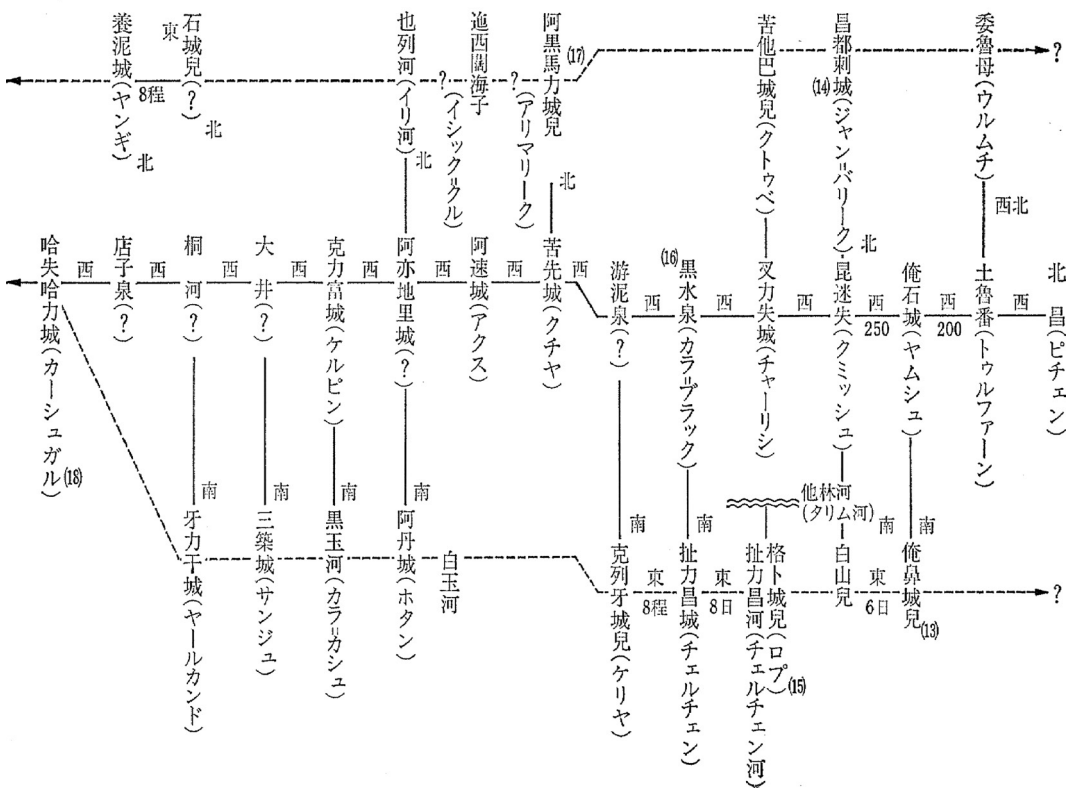

図１：『西域土地人物略』に見える道程　［堀 1978: 45，図２］より

以上［人物略］の叙述及び［堀 1978］を筆頭としたそれに対する研究より，東トルキスタン周辺では，

①委魯母～養泥城：天山北麓からイリ河谷[29]に続く北併行路

②北昌城～哈失哈力城：天山南麓を進む中央幹線

③俺花城兒～牙力干城：タリム盆地南縁を進む南併行路

の３ルートが知られていたことが判明する。特に，③のタリム盆地南縁ルートの記述は［GN］の帰路に使われたものの情報量の少ない「砂漠の道」について有益な示唆を与える。

3. 2.　Khiṭāināma：成立1516年

先述の［人物略］と前後して西方で成立している史料に，アリー・アクバル・キターイーの［KhN］[30]がある。［KhN］にて注目すべきは３つの交易路を名前と共に紹介している点である。

「（カタイへは）イスラームの地より陸路で３つの道（rāh）がある。第一は Kašmīr 道，第二は Muġūlistān 道，第三は Khutan 道である。Kašmīr 道，Khutan 道では住民の民度が高く，水と牧草が豊富である。最初の15日（行

29　也列川は［堀 1978］ではイリ河に比定されているのは，イシククル湖との地理関係が逆転していることからやや奇異である。［堀 1978］の比定が正しければ，［人物略］の段階で既に北並行路についての具体的な知識は失われつつあったのかもしれない。この仮定が正しければ，この書にユルドゥズ路の道程が反映されていないことも頷ける。

30　この史料自体の記述によると，成立は H 922年 ラビー・アル・アウワル月（1516年４～５月），イスタンブルでのことである［KhN: 174］。原本はペルシア語で書かれており，オスマン語の流布本も存在している。［Yule 1913］で取り上げられなかったためか，正面からこの史料を扱う専論は多くない。この史料の原文を紹介し，仏文の訳文・注解を附して紹介したのは［Schefer 1883］で，叙述内容を分析・紹介したものには［小田 1969; Yazici 1985］がある。また［小野 2010］もその解説の中で［KhN］の秘める重要性について言及している。

程）は水と牧草が少ないが，どの宿駅（manzil）でも人の背丈分掘れば豊かな水が湧き出る。一部の場所では手の長さ分掘ると水が湧き出る」［KhN: 39］。各々については「Muġūl 道，即ちČaġatāi 王国は良い街道である。Mīr Tīmūr はその道から行軍しようと決意し，命じて曰く，全ての宿駅に砦を造るべし。全ての砦に幾千の軍を配し，耕作せしめ，穀物を集めさせるべしと。そして軍がこの地を進軍するとも窮乏に至らしめるなかれと…（中略）… Jaiḥūn の畔から Khiṭāi の国境までは３ヶ月行程で，毎日一つの宿駅があり，［神の如き世界征服者陛下の兵士が２日行程毎に駐在し，］嘉峪関 Darband-i Sukjū に至る」［KhN: 39–40］と叙述している。残念ながら［KhN］は各々の道についてこれ以上の詳細を述べていないが，以上の記述より，

①東トルキスタンには３つの道が存在し，各々がカシュミール道，モグール道，ホタン道という名称で呼ばれていたこと

②いずれの道でも宿駅（manzil）[31]が存在していたこと

③モグール道はティムールの対明遠征路として想定され，宿駅が整備されていたこと

等が判明する。③については［ZN］の記述に基づく先述の［Barthold 1958: 51］の考察を裏付けるものであると言えよう。但し，他の二道に対し，カシュミール道がどこを指したのかは情報量があまりに少ないので，この段階では判断できない。

3. 3. Tārīkh-i Rašīdī：成立1546－7年

モグール・ウルスについて研究する上で［TR］を欠かすことはできない。著者のミールザー・ハイダル（Mīrzā Muhammad Ḥaidar Duġlāt Bīg）はカシュミールのチャガタイ系君侯で，H 953/1546－47年に［TR］を完成し，モグール・ウルス一帯についての詳細な歴史記述を残している［間野 1984: 95］。当該地域の地理記述についても［TR］は有用で，本稿の研究にも裨益するところが大きい[32]。

［TR］ではまず，チンギス・ハン時代のカシュガルについての記述に続けて，カシュガル～ホタンの道程とその周辺の地理記述を行っている［TR: 139b–140b］。まず，タシュケント（Šāš）～トルファン間は３ヶ月行程であると述べた上で，ホタンの東方にはかつて Lūb Kātak を始めとした古代都市があったものの，執筆当時には誰も住むもの無き荒漠たる砂漠となっていたという点に言及している。そしてカシュガル～ホタンの以下のような道程が述べられる[33]。カシュガル～ホタンは１ヶ月行程とされている［TR: 139b］【道程６】【地図５】。

Kāšġar —3F[34]— Qarā Tāzġūn 川—3F—Yāngī- Ḥiṣār—6F—Qarā-Čanāq—5F—Kilfīn Ribāṭ—Qūš Gunbadh—Qiztl—10F— Kūk Ribāṭ—7F—Ribāṭčī—Yārkand—7F—Tiz-āb— 3 日—Lākhūq—10日—Khutan

このルート上，Qarā-Čanāq と Ribāṭčī の間には宿駅以外人は住んでいないという［TR: 140］。また，923年のサリグ・ウイグル遠征についての記事も，この記述を補足している。曰く，「彼（スルタン・サイード・ハン）は聖

31 同様の宿駅についての記述は先述の［ZN］，後述の［TR］にも見える。詳しくは各々の箇所を参照のこと。

32 彼の地理的記述は古くより注目されており，既に19世紀末には［Shaw 1876］においてその英訳と研究が発表され，英露の「グレートゲーム」が本格化する中，中央アジアの地理研究の貴重な一次情報として紹介されていた。この史料の英訳には［Denison 1895; Thackston 1996］があり，その注釈中の地名比定も有用である。我が国でも［榎 1978a］において，明代東トルキスタンの交通史研究における重要資料として紹介が行われている。

33 各々の地名比定については［Shaw 1876］を参照のこと。

34 以下便宜上ファルサフに F という略号を用いる。

戦の計画についてアミールたちと諮り，ついに Sārīġ Uīġūr という名で知られる，Khiṭāi と Khutan の間に住まう異教徒たちに対して聖戦を行うことを決断した。Yārkand から Khutan までは12日行程で，道中の宿駅のほとんどが村落や集落であった」［TR: 199b］という。このルートは［GN］で帰路採られた「砂漠の道」や［KhN］に見える「ホタン道」を示しているものと思われる。詳細については4. 1. にて考察する。

［TR］では，天山山脈南麓をモグール・ウルスの南縁とし，筆者自身の知見に基づいて記している［TR: 205b］。曰くその南側の道程は【地図５】，

【道程７】Tāškand—10日—Andijān—20日— Kāšġar—15日—Aqsū—20日—Čālīš—15日—Ṭurfān—15日—Bārskūl

というもので，全３ヶ月行程に90の宿駅があったという［TR: 205b］。これは［人物略］の紹介するメインルートや後述の［HM; BG］で用いられた道程と一致する。このルートは当時モグール・ウルスのメインルートとなっていたようで，スルタン・マフムード・ハン（Sultān Maḥmūd Khān）がモグール・ウルスを継承した際，その版図は「Khitai の境域から Kāšġar に至るまで，即ち Ṭurfān，Čālīš，Kūčā，Aqsū，Uč」［TR: 65b］と描かれている。1516年（H 922）にスルターン・サイイド・ハンが兄のマンスール・ハンに従属した結果「両者の間には固い友情があり，それ故20年の間大いなる平和と安全があり，個人が独りで Khitai の Qāmūl から Andijān まで糧食の必要もなく旅することができ，毎晩誰かの家に客として招かれるほどであった」［TR: 47］とされている。この和約の結果，1460年代の明とトルファン＝チャガタイ家の哈密を巡る系争以来阻害されてきた東西交通が一挙に容易になったという［Millward 2007: 74］。なお，この和約でマンスール・ハンは「Čalīš，Turfān，Aqsū，Moġūlistān（イリ河谷）全土」［TR: 155］を取り，スルターン・サイイド・ハンはカシュガル，ヤルカンド，ホタン等のカシュガリア地方を安堵された［Millward 2007: 74］。

また，インド方面への交易路についての言及もなされている。

ヤルカンドからバダフシャーン，カシュミールは各々「夏の日没の方角」，「冬の日没の方角」にあり，その行程は以下の通りである[35]［TR: 161b］【道程８】【地図５】。

Yārkand—Pamīr/ 7 ～ 8 日—Badakhšān
Yārkand— Sānjū—20日—Aškārdū—Kašmīr

また，ミールザー・アブーバクルの子ボスタンギール・ミールザー（Bustangīr Mīrzā）はカシュガルから逃亡し，インド方面に抜けた後，ウズベクの庇護下に落ち着いているが，その経路は，カシュガル→チベット（ラダック）→カシュミール→ヒンドスタン→カーブル→バダフシャーン，というもので［TR: 152］，【道程８】を南側で廻り込むようなものであった。

3. 4.　Ḥajjī Muḥammad：1551－53年頃

ヨーロッパ初の東方旅行記集を編纂したのはヴェネツィアのラムージオ（Giovanni Battista Ramusio）であった。

35　このルートは1873－74年フォーサイス（Forsyth）卿によって探検され，地図にまとめられている［Forsyth 1875: 245］。当時のスカルドゥについては［Dani 2003］に詳しい。

彼はマルコ・ポーロを筆頭に著名な旅人の記録を蒐集し，イタリア語に翻訳し，“Navigazioni e Viaggi” という作品を著した［Bernardini 2007］。これに収録された作品の中に，イランはギーラーンの商人で，1551－53年［D’Avezac 1865: 60］にかけて中国の粛州で大黄を買い付け，ヴェネツィアまで旅したハッジ・ムハンマド（Ḥajjī Muḥammad：原文では Chaggi Memet）の記録[36]がある［HM: 14v.］。

［HM］の記述の中でもとりわけ興味を引くのは甘州からタブリーズまでの道程についての一連の記述である。これは往路彼が中国に向けてとったルートを逆順に記述したものである［HM: 16v.］。

他の史料に見られない点として，彼はまず一日の行程が距離にしてどのくらいかを述べている。曰く「毎日数ファルサフ（farsenc）[37]進む（１ペルシアファルサフは我々の３マイルに当たる）。１日の行程は８ファルサフであるが，その砂漠や山地では半分も進まないので，砂漠での行程は通常の行程の半分となる」［HM: 16r.］という。

また，甘州からタブリーズまでの道程は以下の如くである［HM: 16r.］【地図６】。

【道程９】Campion（甘州）―６日―Gauta（高台）―５日―Succuir（粛州）―15日―Camul（哈密）―13日（ムスリムと偶像崇拝者の居住地の境界）―Turfon（土魯番）―10日―Chialis（カラシャール）―10日―Chuchi（クチャ）―20日―Acsú（アクス）―20日（最も困難な砂漠）―Cascar―25日―Samarcand―５日―Bochara（ブハラ）―20日―Eri（ヘラート）[38]―15日―Vermi（ヴァラミーン）[39]―６日―Casbin（ガズヴィーン）―４日―Soltania（スルタニア）―６日―Tauris（タブリーズ）

以上より［HM］の道程は［人物略］で紹介された幹線路たる②天山南麓ルートであったことが分かる。ブハラ・ヘラート間のルートについてはフレグ・ウルス期［NQ: 178–79］と同様，今日のトルクメニスタンのファラップ国境でアム河を渡って南西に向かい，メルヴからムルガーブ川を遡ってヘラートに南下するという道程であろう[40]。

3.5. トルコ人ホージャの記録：成立1554－62年頃

続いて明への道についての情報を書き残しているのは，ブスベック（Ogier Ghiselin de Busbecq）[41]である。

彼の記録には，具体的な交易路の道程についての記述は見られないが，なおいくつかの記述は本稿においても

36 この記録についての先行研究には［D’Avezac 1865; Yule 1913; Veneri 2012］がある。

37 ［Houtum-Schindler 1888: 588］の研究によると，１ファルサフ＝6.3 km というので，仮にこの当時も同じ長さを示していたとして，平野での１日行程は 50.4 km となる。大量の荷駄獣を引き連れた隊商が一日でこの距離を移動するのが本当に可能かどうか，明代においてペルシア語の “farsakh” がどの程度の長さを示していたのかも含めて，一日の行程が正確にどのくらいの長さを示したものであったかということは未解決の問題ながら，究明は次項に譲りたい。

38 以下［HM］に見えるヘラート～スルターニーヤ間の道程はフレグ・ウルス期の東王道［NQ: 173–78］に一致している。

39 現ヴァラミーン（Varāmin）。Jājrud 川の畔にあり，テヘランから南東に 40 km の地点に立地している［Beaumont 1968: 169–70］。モンゴル軍がレイ（Rey）を壊滅させた後，その避難民が移住して興隆。15世紀には衰微し，テヘランに取って代わられる［Le Strange 1905: 216–17］。

40 少なくともメルヴ～ヘラート間についてはフレグ・ウルス期には王道があったことがその詳細な道程と共に14世紀の地理書［NQ: 178–79］にて記述されている。ブハラ～メルヴ間は今もウズベキスタン・トルクメニスタン間を結ぶ主要幹線が通っている。

41 彼はベーメン王フェルディナント（Ferdinand）によりオスマン帝国に大使として派遣され，イスタンブルに1554－62年の間留まり，滞在中クリム半島に残るゴート人の末裔と接触し，ゴート語の語彙を記録したことで特に知られている［Considine 2008: 139–41］。彼はまたイスタンブル滞在中にカタイから旅してきたというトルコ人ホージャ（Hoggia Turcae vocant）と出会う機会があり，その際耳にした話をその書簡集の中に書き残している。ブスベックの記録に引用されたトルコ人ホージャの記事について正面から扱った先行研究は管見の限りでは，［Yule 1913］のみである。［Schefer 1883; 羽田明 1965］でも言及は見られるが，いずれも簡潔なものである。

注目に値する。トルコ人ホージャは大規模なキャラバンに参加して旅したというが，それは「大人数の集団に同行してかの国の境界まで旅するのが習わしだったからである。少人数集団のための道はなく，少なくとも安全ではない。不実な部族が道に巣食い，旅人はいついかなる時も彼らの攻撃に怯えねばならない」［TD: 205］からであった。また，この地域を旅する際は「どこででも糧食糧秣の欠乏が困難をもたらす。故にどの旅人も自身の生存に必要な食糧を携帯せねばならず，これを多数の駱駝に乗せて運ぶ」［TD: 206］としている。先の［TR］の記述に見えた1514年の両ハンの和約直後の交通状況から事態は一変しており，この頃までにモグール・ウルスを始めとした諸国が求心力を失い，主要交易路の治安維持も行えなくなり始めていたことが覗える。

3. 6.　Bento de Góis：1603－07年

ゴーエシュ[42]は1603年１月６日にアグラを出発した［BG: N 805–6］。そして彼はヤルカンドを経由して東トルキスタンを横断し，カタイオとキーナが同一の地であることを確かめ，1607年４月11日に粛州の地で客死した。

この際のゴーエシュの旅行記［BG］[43]は一度破棄されるも，マテオ・リッチの手で再編され，『中国キリスト教布教史』に組み込まれて出版された。

ゴーエシュは現地の商人が「毎年互いに協力して盗賊その他の襲撃を防ぐべく，400－500人の者が連れ立って Cascàr（カシュガル）の町まで出かける」［BG: N807］のに便乗し，概ね以下のような行程を辿った［BG: N807–N832］【地図７】。

（ラホール～ヤルカンド：1603年１月６日－11月）【道程10】

Lahor―１月―Athec―２月―Passàur（ペシャワール）―25日―Ghidel―20日―Cabùl（カーブル）―Ciaracàr（チャーリーカール）[44]―10日―Parvàm（パルワーン）―20日―Aingharàm―15日―Calcia―10日―Gìalalabath―15日―Talhan（タリカン）―Chescàn―Tenghi-Badasciàm（バダフシャーンの悪路）―Badasciàm（バダフシャーン）―１日―Ciarciunar（チャルチナル）―10日―Serpanil―20日／山道―Sarcòl（サリコル）―２日―Ciecialith（チチェクリク）[45]―Tengethàr（ティンギタール）―15日―Jacorìch（ヤカアリク）―５日―Hiarcàn（ヤルカンド）

42　ベントー・ディ・ゴーエシュはポルトガル領アゾレス諸島サンミゲルのヴィラフランカ（Villa Franca）出身で，軍人としてインドに赴いた。その後イエズス会士となり，1595年にはムガール帝国の帝都アグラに赴いてそこで当時の皇帝アクバルの信を得た［Wessel 1924: 7–12］。当時ムガール帝国駐在のイエズス会士たちの間ではマルコ・ポーロたちの言うカタイオ（la Gran Cataio）やハンバル（Cambalù）と当時マテオ・リッチたちの駐在していたチーナ（Cina）やペッキーノ（Pechino）が同一の地を指すか，或いは別々の地を指したものであるかという議論が持ち上がっていた。そこで海路より近道の交易路がないか探究することも兼ね，ゴアの副王やムガール皇帝アクバルの援助の下，使節団が結成され，ゴーエシュがその団長となった。

43　［BG］はトリゴールによってラテン語に編訳され［Trigault 1616］，欧州にマルコ・ポーロ以来の中央アジア情報をもたらし，19世紀末に科学的な中央アジア調査が開始されるまでは，中央アジアの情報の典拠としては専らこれが用いられていたという［榎 1974: 162; Goodrich 1976: 472–4］。この旅行記について初めて言及したのは［Ritter 1832］である。後にこれを本格的に紹介したのが［Yule 1913］で，英文の訳注と紹介を附してこの史料の存在を広く学界に知らしめた。地名を含めて詳細に検討したものとしては，［Wessel 1924］があり，ゴーエシュの生涯を紹介すると共に，彼の記事にその後の科学的踏査の情報を加味し，詳しい考察を加えている。彼の生涯について簡潔にまとめたものとしては［Goodrich 1976］が挙げられ，わが国でも［榎 1974］がこの史料を正面から取り上げ，明末の粛州の状況について示唆に富む考察を行っている。

44　ヒンドゥークシュ山中の要衝。［Balland 1990］参照。

45　Chichiklik-dāwan として［Stein 1928iv: 5-map2］の地図に見える。Tāsh-Kurghān と Yangihisar, Yarkand の間の峡谷。［Stein 1923: 65］。

（ヤルカンド～嘉峪関：1604年11月14日－1605年12月22日）【道程11】

Hiarcàn（ヤルカンド）—Iolcì—Honcialix—Alcegher（アクチェキル）—Habagateth—Egriàr—Meselelec—Tallec—Horma—Toantec—Mingieda—Capetacòl—Cilàn—Sare-Guebeedal—Cambasci（クムバシル）—Aconterzec（サクサク）—Cìacor（チャカル）—Acsù（アクス）—Oitogràc—Gràso—Casciani—Dellai—Saregabdel—Ugan（ウガン）—Cucia（クチャ）—25日—Cialis（カラシャール）—Puccian（ピチャン ?）[46]—Turfàn（トルファン）—15日—Aramuth（ウルムチ ?）—Camùl（哈密）— 9 日—Chiacun（嘉峪関）

（カシュガル～ホタン）［BG: N825］［BG: N819］【道程12】

Cascar（カシュガル）— 5 日—Hiarcàn（ヤルカンド）—10日—Cotàm（ホタン）

また，彼はカラシャールから嘉峪関に至るまでの治安状況についても記述を残している。曰く「Cialis（カラシャール）から Cina（中国）に至るこの地全域では，Tartari 人による度重なる侵攻が続き，荒廃していた。それ故そこを旅する商人は常に大いなる不安と警戒の下にあった。その方法は，日中誰かが山に登り，遠くより Tartari 人の待ち伏せがないか，探っておくというものである。そして道が安全だとわかれば夜中に大いなる静寂の内に進むのである。一行は単独で行こうとして死んだ Saracen 人の遺体を道中たくさん目撃した」［BG: N833］という。なお，［BG］においてヤルカンド，ホタン，カラシャールのチャガタイ系の王族，そしてトルファン一帯の住民が Saracen 人と表現されていること［BG: N808，N829，N833］，万暦期（1573－1620年）に瓦剌が西域を席捲していること[47]から鑑みて，ここでいう Tartari 人とは即ちオイラトのことを示しているものと思われる。

以上より以下の点が覗える。

①ムガール帝国の帝都アグラからカシュガルまでは定期的に隊商の往来があり，そのルートはペシャワールから一旦，カーブルに向かい，バダフシャーン経由でヤルカンドに向かうものであり，現在のようにフンザ経由でフンジュラーブ峠を越えてヤルカンドを目指すものではない。

②ヤルカンドから嘉峪関までのメインルートは［人物略］や［HM］に見える如く，天山南麓を進むルートであり，カシュガルではなくヤルカンドがその一大ターミナルとなっていた。

③カシュガル，ヤルカンド，ホタンと進むルートは依然存在していたが，少なくともゴーエシュは何らかの理由から，ホタン経由で明を目指すことはなかった。

④［BG: N833］に見える通り，既にカラシャールから嘉峪関までの間が「Tartari 人」の猛威にさらされ，安全な通行が困難になっていたことが覗える。

4. 考　　察

4.1. 明代東トルキスタンの主要交易路

以上を通して，明代東トルキスタンの交易路についての記述を検討してきたが，その検討によって同定された交易路は以下の通りである【地図 8 】。

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46 現鄯善。ピチャンは本来トルファンの西方に位置するため，［BG］におけるこの順序は不適当である。
47 「萬曆以後，瓦剌強盛，侵擾諸部。土魯番漸爲殘破。於是相率逃散。沙州僅有空城」［考古録: 6. 8a］。

①トルファン・イリ河ルート：モグール道

サマルカンド―タシュケント―サイラム―ヤンギ―アシュパラ―イシククル湖北岸―アルマリク―イリ河谷―ユルドゥズ草原―トクスン―トルファン―高昌（カラホージャ）―哈密―嘉峪関

②タリム盆地南縁ルート：ホタン道

サマルカンド―アンディジャーン―カシュガル―ヤルカンド―ホタン―砂漠の道（サリグ・ウイグル人領）―嘉峪関

※ホタン―高昌（カラホージャ）のルートもあり

③天山南麓ルート：［人物略］のメインルート

タシュケント―フェルガナ―カシュガル―／ヤルカンド―アクス―クチャ―チャリーシュ（カラシャール）―トルファン―高昌（カラホージャ）―哈密―嘉峪関

④インド・カシュガルルート

（i）アグラ―ラホール―ペシャワール―カーブル―バダフシャーン―ヤルカンド

（ii）アグラ―カシュミール―スカルドゥ峠―サンジュ峠―ヤルカンド

ここで，各道についての記述を通時的に検討してみよう。

4. 1. 1.　トルファン・イリ河ルート：モグール道

本稿に用いた史料中にてこのルートを用いたのは，傅安（1395～1409年），陳誠・李暹（［行程記；番国志］: 1413～5年），ナッカーシュ（［GN］: 1419～22年）といった面々である。

［ZN］にてティムールがこのルート経由で中国への遠征を企図し，遠征直前にこのルート上の版図をミールザー・ウルグ・ベグに約束し［Barthold 1958: 51］，かつ［KhN］でもティムールが「モグール道」経由での中国遠征を企図したとの記述［KhN: 39–40］があることからも，既述の通り［KhN］のいう「モグール道」がこのルートに一致するとする［小野 2010］の比定は正鵠を射ている[48]。

このルートが利用された年代に目を向けると，いずれの史料の記述も，上記の如く15世紀前半に集中していることが分かる。

4. 1. 2.　タリム盆地南縁ルート：ホタン道

本稿に用いた史料中にてこのルートを用いたのは，ナッカーシュ（［GN］: 1419－22年），ゴーエシュ（［BG］: 1602－07年）といった面々である。ティムールは対明遠征に出陣する直前にこの沿線の版図をミールザー・イブラヒーム・スルターンに約束している［ZNII: 633］。

［TR］ではこの地域の道程・宿駅について詳細な記述されており［TR: 139b–140b］，［ZN］ではホタンから嘉峪

48　このルートの特にアルマリク―イリ河―ユルドゥズ―トクスンの箇所は清代には「朱爾土斯路」即ち「ユルドゥズ路」と称され，しばしば用いられていたことが『西域聞見録』の記述から分かる［松田 1956: 271–3］。

関へ向かうルートが，高昌（カラホージャ）を経由するものも，直接嘉峪関に向かうものも示されている［ZNII: 219–20］。特に後者の記述は［GN］のいう嘉峪関・ホタン間の「砂漠の道」の記述［GN: 412r.］と一致する。［KhN］の「ホタン道」でも宿駅の存在が指摘されている［KhN: 39］ことから，ホタンを経由して嘉峪関とカシュガル・フェルガナを結ぶこのルートは［KhN］に見える「ホタン道」に比定して差し支えあるまい。またこのルートに現れる地名は［人物略］に見える南側並行路と対応している。

［ZN］でホタン以東，高昌（カラホージャ）を経由するルートと直接嘉峪関に向かうルートが二つ紹介されたことは，明代になるとホタン以東チャルクリクやロプノールを経由するかつての西域南道が利用されなくなっていた事実［榎 1978a: 138］を反映したものであったのかもしれない。

このルートは明代全般を通して利用されていたようだが，ホタンへアクセスする際［ZN; TR; BG］や他のルートの利用が困難になった際［GN］が主のようで，あくまでメインルートとしてではなく，南側のサブルートとして用いられたようである。

4. 1. 3. 天山南麓ルート

本稿に用いた史料中にてこのルートを用いたのは，［TR］の著者ハイダル・ミールザー自身（［TR］: 成立1543年），ハッジ・ムハンマド（［HM］: 1551－53年頃），ゴーエシュ（［BG］: 1602－07年）といった面々で，16世紀に集中し，14－15世紀には利用例は少なかったようである。

陳誠はこのルートについて「其（別失八里）封域之内，惟魯陳（ルクチュン），火州（カラホージャ），土爾番（トルファン），哈石哈（カシュガル），阿力馬力（アルマリク）数處，略有城邑民居，田園巷陌，其他處所，雖有荒城故址，敗壁頹垣，悉皆荒穢。人多居山谷間，蓋為其國主微弱，恐為鄰境相侵故也」［番国志 102–03］とトルファン～カシュガル間の荒廃ぶりを強調し，［明実録］での朝貢事例もカシュガルが３回，クチャが２回，チャリーシュが２回と数も少ない上，各々の表記も「哈失哈兒／哈失哈」「苦先／苦察」「察力失／察力石」と揺れており［渡辺 1971: 1–39］，明から見た重要性も高くはなかったことが覗える。

先述のように［TR］によるとこの道には全３ヶ月行程に90の宿駅があった［TR: 205b］とされていた。1516年にカシュガルのスルターン・サイイド・ハンがマンスール・ハンに服属して以降，暫くモグール・ウルス全域で平和が保たれ，16世紀初頭のこの頃，既にこのルートが東トルキスタンのメインルートになっていたことが覗える［TR: 47］。

この交易路は続く［HM; BG］においても用いられ，16世紀の間メインルートとしての地位を保っていたと思われるが，道中における情勢の記述は一変している。ハッジ・ムハンマドは隊商に参加して中国に向かい［HM: 14v.］，復路にはウズベクのイェシルバシュの使節団に便乗してイスタンブルに向かっている［HM: 16r.］。このすぐ後の［TD］の記述では，道中の危険，糧食の補給の困難さ［TD: 205–06］が強調されている。

［BG］でも特にカラシャール～中国間の道程の荒廃と危険について詳述されており，これは「Tartari 人の度重なる侵攻」によるものとされている［BG: N 833］。ここでいう Tartari 人とは先述のようにオイラトを指すものである。

このルートは［人物略］（1514－15年成立）にてメインルートとして紹介されていることから鑑みるに，そのオリジナルの情報をもたらしたオスマン帝国の使節団が東トルキスタンを横断した15世紀末～16世紀初頭にかけての頃には既にメインルートとして用いられていたことが想定される。

4.1.4.　インド・カシュガルルート

本稿で紹介した限りでは，このルートが利用されたのは［TR; BG］の記述においてである。

ミールザー・アブーバクルの子ボスタンギール・ミールザー（Bustangīr）は（i）ルートを辿った後，（ii）ルートを経由してウズベク領に向かい，ゴーエシュは道程（ii）を辿ってムガール帝国からヤルカンドに向かっている。また，ゴーエシュが旅した当時，道程（ii）[49]を毎年隊商が往復していたことが述べられている［BG: N807］。

4.2.　カシュミール道

ここで問題になるのが［KhN］に見える「カシュミール道」である。イスラーム世界から中国に向かうルートとして第一に紹介され，宿駅の存在が示され［KhN: 39］ていながら，他の情報が与えられておらず，その名称と中国の嘉峪関という目的地からして，カシュミールと嘉峪関を結ぶルートであるということは想像がつくものの，今までその実際の道程の検討はなされてこなかった。

ここで考えるべきは1516年という［KhN］の成立年代である。著者のキターイーが実際に明に赴いている［小田 1969: 109］ことから，彼の情報は大凡15世紀末～16世紀初頭のものと考えられる。これと前後して成立した『西域土地人物略』でも三つのルートが示されており［堀 1978: 45］，その北並行路と南並行路は各々［KhN］のモグール道，ホタン道と概ね一致する。となると，残る天山南麓を走る道程③が［KhN］でいう「カシュミール道」に一致するのではなかろうかという仮説が生じる。［人物略］にはカシュミールについての記述が見えないため一見この仮説は荒唐無稽に見えるが，道程③を辿れば，アクスからヤルカンドにも進むことができ，道程④（ii）に接続し，そのままカシュミールに進むことができる。このルートについては，タシュケントからトルファンまで全３ヶ月行程に90の宿駅があったという［TR: 205b］記述から，その数の是非は措くとしても，宿駅の存在も明らかで，［KhN］での「カシュミール道」の記述に一致する。

以上より，［KhN］の「カシュミール道」とは，嘉峪関から天山南麓ルートを辿り，ヤルカンドからカシュミールに向かうものであると比定できる。

4.3.　各道の興廃

前節にて明代には東トルキスタンから中国へ向かう道が三つあり，ヤルカンドからは更にカシュミールに向かう道も存在することが判明し，各々の道の大凡の道程も明らかになった。続いてこれらの諸道の興廃について検討する。

前節でも既に触れたように，各々のルートの明代における大体の利用年代については以下の如くである。この際，先の節で触れた④インド・カシュガルルートについては，③カシュミール道に含めておく。

①モグール道：14世紀末～15世紀前半。

②ホタン道：明代全般。但しメインルートではない。

③カシュミール道：主に15世紀末～17世紀初頭

49　道程（ii）については，ヤルカンドからサリコル経由でカシュミールに出る現カラコルム・ハイウェイ［Lurje 2009］に一致するものと思われる。

以上を踏まえると，明代東トルキスタンの交通事情の傾向については，当初①モグール道が主要幹線として用いられていたものの，15世紀中葉以降に徐々に廃れ，③カシュミール道が主に使われるようになって明代に至り，②ホタン道は明代全般を通して利用されていたが，あくまでメインルートになることはなかった，と総括することができる。

4.4. 北方からの圧力

では，こうした傾向は何故生じたのだろうか。この傾向は実はモグール・ウルスの勢力圏の変遷と極めて高い相関性を示している。

先述の如く，モグール・ウルスはイリ河谷のアルマリクを中心に天山山脈両側を占めていたが，ペルシア語史料に「カルマク」と見えるオイラトなどの新興遊牧民に圧迫され，ホボク・セイル，ボロタラ，イリなど天山以北の重要な草原をことごとく失い［濱田 1998: 100］，定住民化して天山南麓に屏息した。

［TR］において「カルマク」の記述が初めて現れるのはヴァイス・ハンの治世の記事でのことで，ヴァイス・ハンは異教徒カルマクに対して聖戦を行ったが，「ハンは Qalmāq と61度戦ったが，勝ったのはたった一度だけであった」［TR: 23］という。

ナッカーシュが帰路をホタン道に採った主要原因たる1422年１－３月の「騒乱」も，［実録］の記事より，この時のモグールのヴァイス・ハン（歪思）とオイラトのタイピン（太平）の交戦に比定されている［小野 2010: 293］。

明側の記述もこの事実を裏付ける。明史瓦剌伝によると，オイラト（瓦剌）が初めて哈密に侵攻したのが1421年夏のことで，その後1440年，1445年と哈密を再度攻撃し，1449年には甘州を攻撃している。1495年には明の支援を受けてトルファンのアフマド・ハン（阿黒馬汗）と戦って哈密を奪取し，1518年にトルファンと和解し，1530年から再びトルファンと対立し，その後については遺憾ながら記録されていない［明史外国伝九: 8498–8503］。それ以降のオイラトの動静については［明実録］に記録が断片的に見え，トルファンとの衝突は1536年，1538年，1540年，1546年，1592年に散見され［明実録: 694–740］，万暦期以降その勢力を増大している[50]［考古録 6. 8a］。

5. む　す　び

以上，明代東トルキスタンの交通事情について本稿で新たに指摘された点は以下の通りである。

- 明代，東トルキスタンを経由して中国に向かうには，①モグール道，②ホタン道，③カシュミール道の三つがあり，各々多数の宿駅を擁していた。
- ①モグール道は嘉峪関から哈密，トルファン，ユルドゥズを経てイリ河谷に向かうルート。
- ②ホタン道はサリグ・ウイグル人の占める砂漠を経て，ホタン，ヤルカンド，カシュガル，フェルガナを進むルート。
- ③カシュミール道は嘉峪関から哈密，トルファンを経て天山南麓沿いにヤルカンドに向かい，その後カシュミールやバダフシャーン・インド方面に向かうルートであるが，アクスからカシュガルを経て，フェルガナ方面に向かう例も多かった。
- 明代当初はモグールの本拠地が置かれていたイリ河谷を通る①モグール道がメインルートとして用いられて

50　後にその支族ジューンガル部はガルダンの許で17世紀末にタリム盆地を制覇している［宮脇 1995: 204］。

いた。

・オイラトを筆頭とする新興遊牧勢力の侵攻（1421年～）で，モグールは天山以北の重要な草原をすべて失って［濱田 1998: 100］南遷し，モグール側が保持し，一定治安を維持していた③カシュミール道が代わってメインルートとなった。

・スルターン・サイード・ハンがマンスール・ハンに服属する（1516年）と暫くの間モグール・ウルスは大いに平和を享受し，特に③カシュミール道の交通は大いに容易になった［TR: 47］。

・しかしなおもオイラトの攻勢は続き，1550年以降この道では安全のため隊商を組んでの交通が主となり［HM; TD］，やがて17世紀初頭には隊商を組んでさえ危険が伴うようになった［BG: N 833］。

以上，明代東トルキスタンの交易路の三つの道程を特定し，各々の興廃について検討した。その道程は必ずしも他の時代の交易路の道程と一致するものではなく，天山南路がメインルートとなったのは16世紀になってからにすぎないことが判明した。以上の成果より，明代東トルキスタンでの各時期の他の使節団や隊商，軍勢の動きが整合的に説明できるのみならず，当該地域のパクス・モンゴリカ以前と近現代以降の間をつなぐ交易路の変遷の像が提示できたかと考える。

本稿では交易路がどのように維持・運営されていたかの制度面について究明することができなかった。このような課題については次稿以降で究明していきたい。

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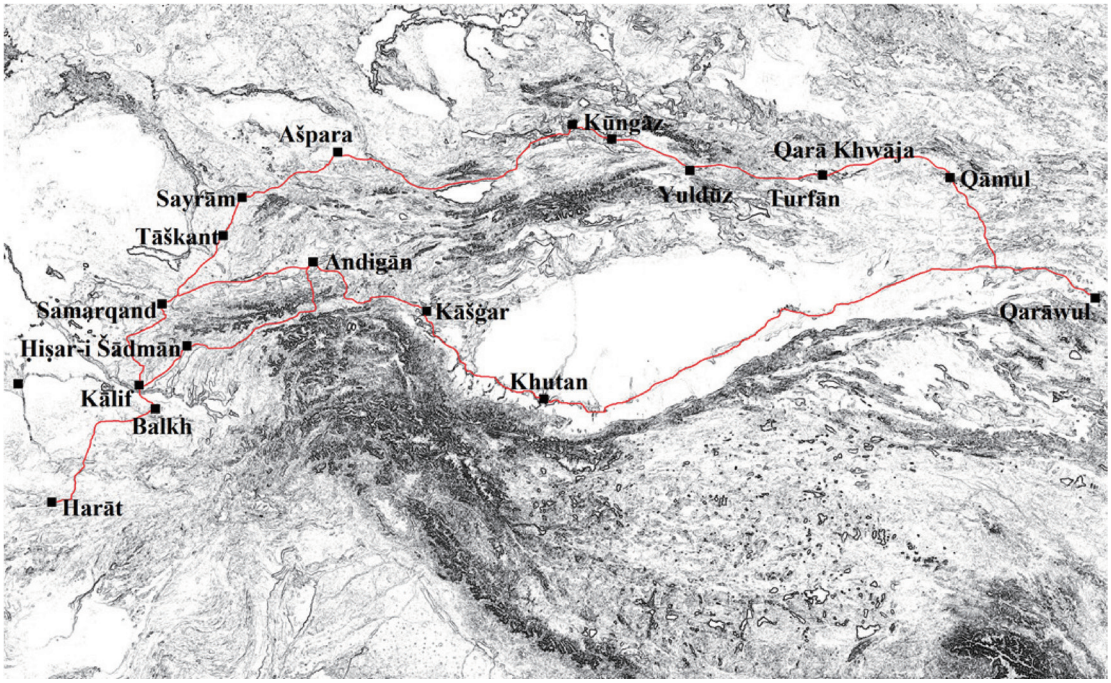
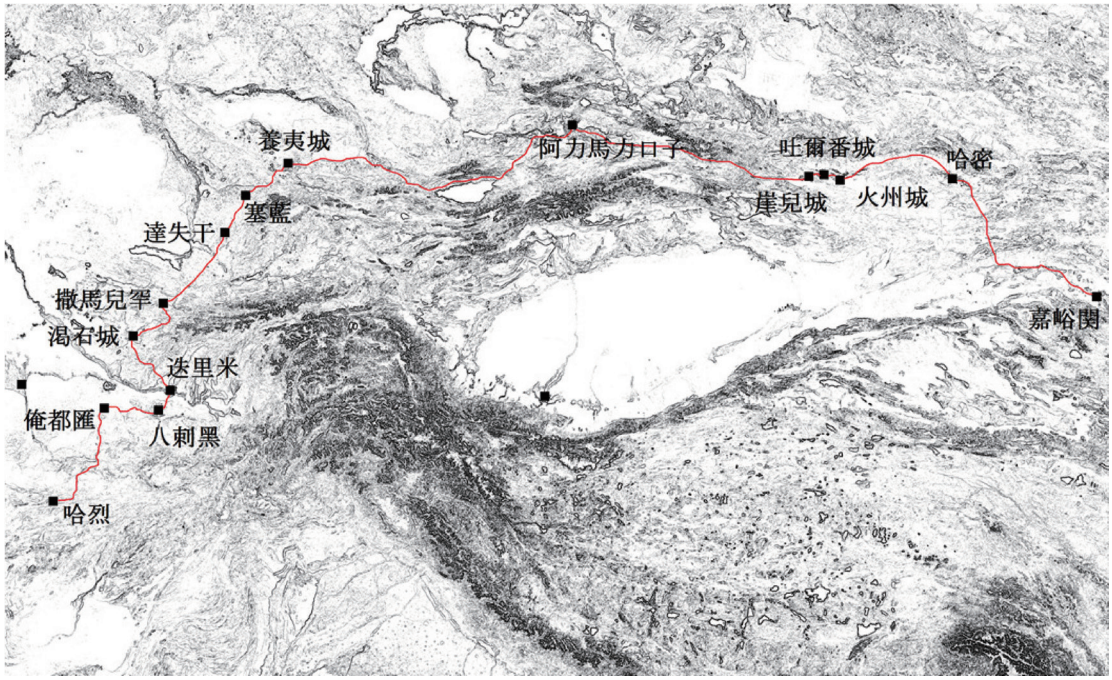
参考地図

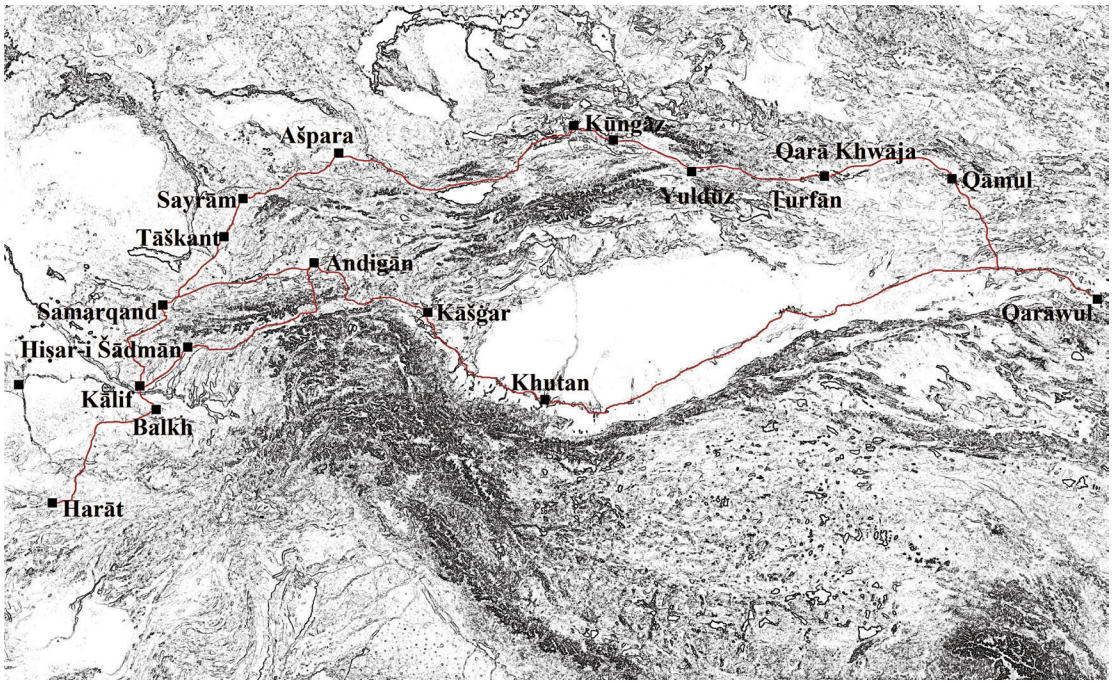
地図１：傅安の道程【道程１】早川作成



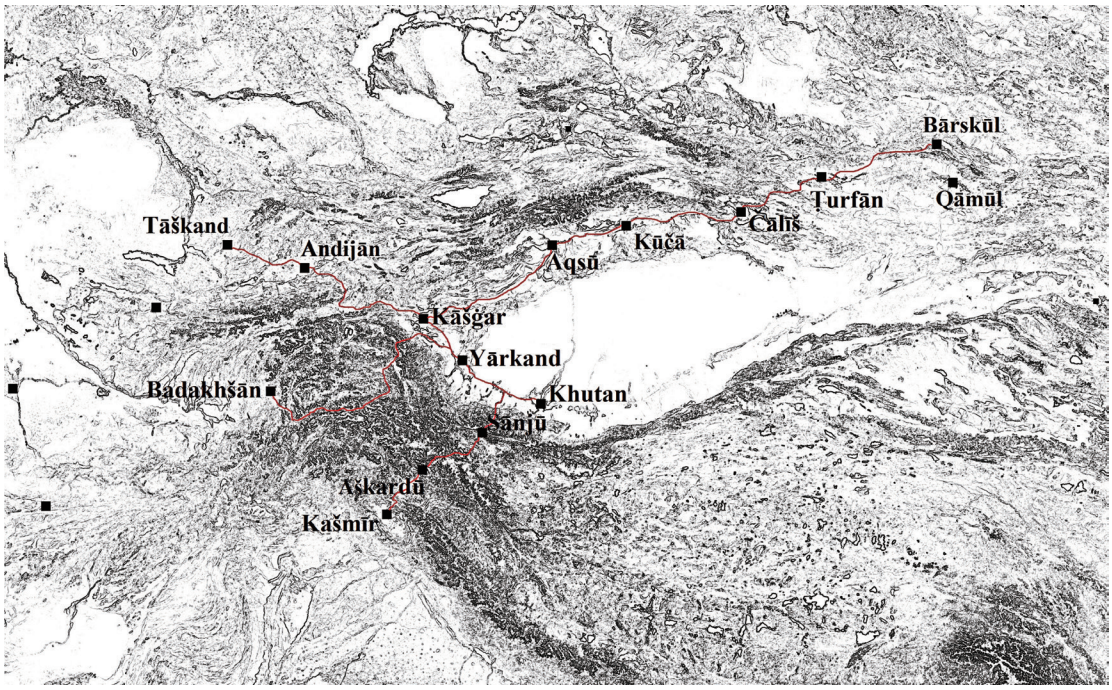
地図２：［ZN］の道程【道程２】早川作成



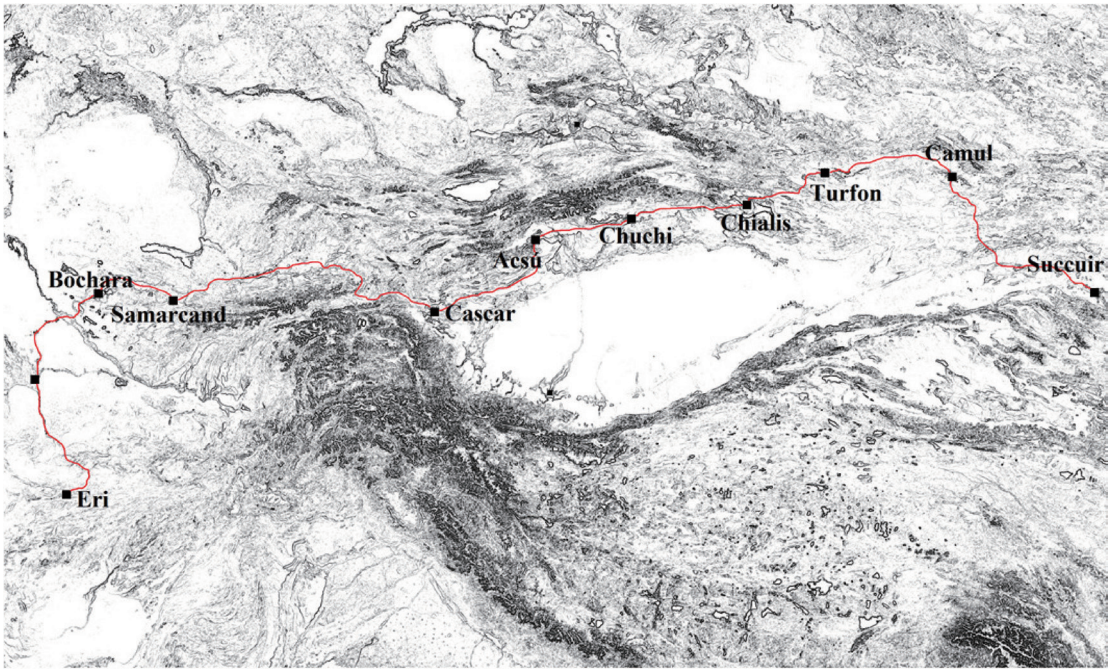
地図３：陳誠の道程【道程３】早川作成



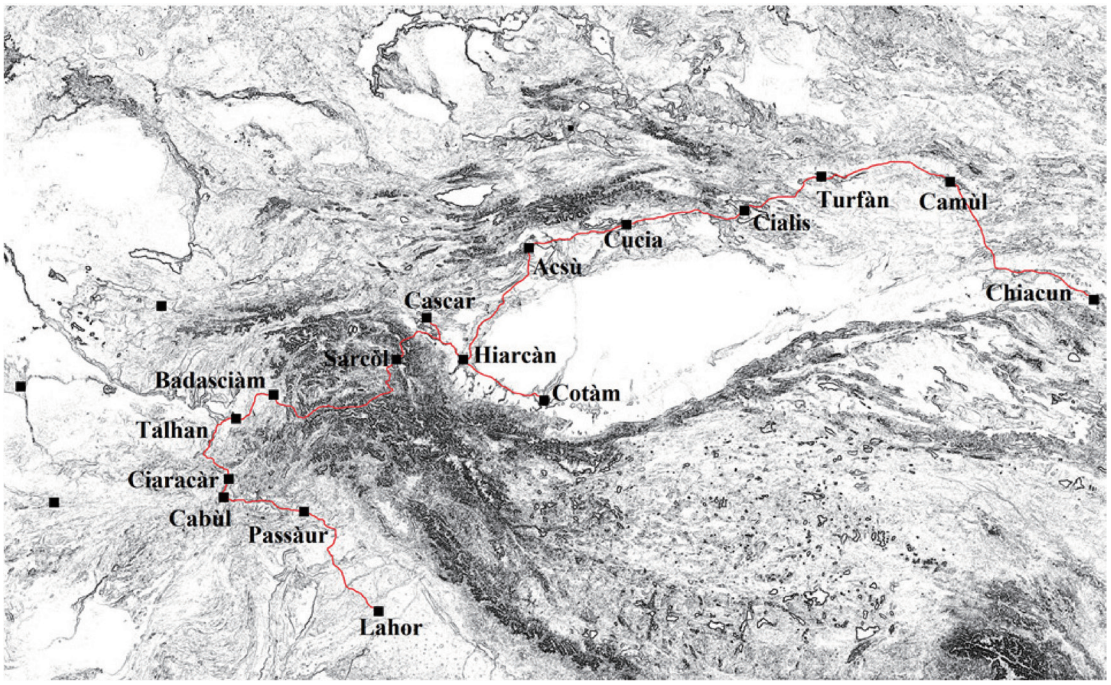
地図４：［GN］の道程【道程４】【道程５】早川作成



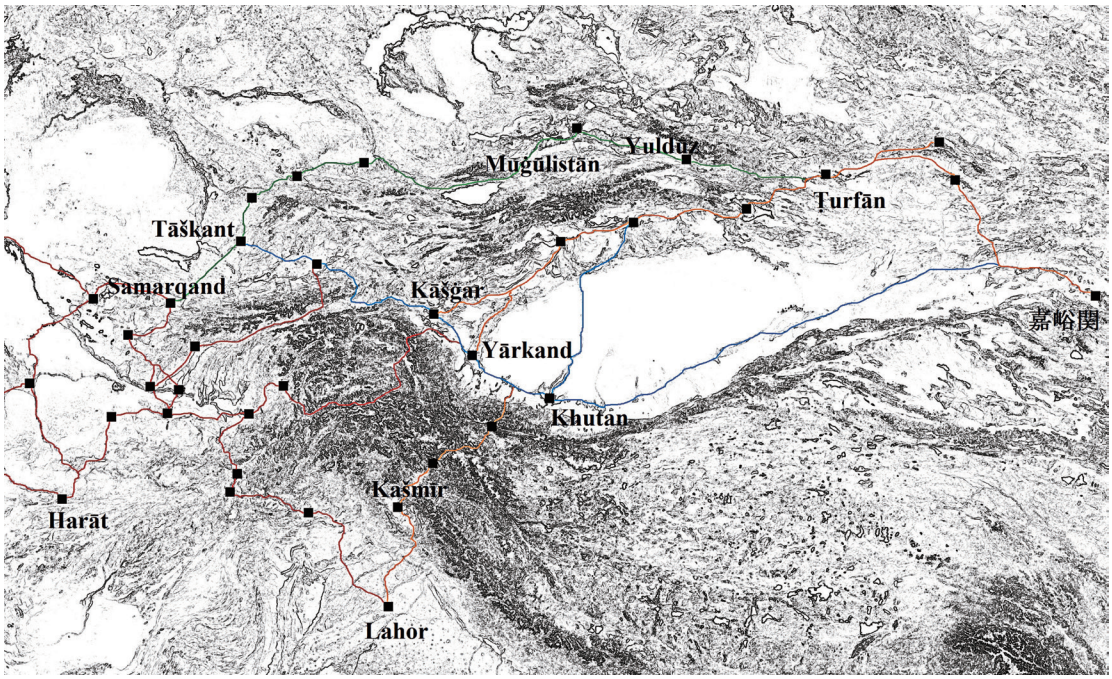
地図５：［TR］の道程【道程６】【道程７】【道程８】早川作成



地図６：［HM］の道程【道程９】早川作成



地図７：［BG］の道程【道程10】【道程11】【道程12】早川作成



地図８：全体地図　早川作成
カシュミール道：橙色，モグール道：緑色，ホタン道：青色

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[News]

Though belated, we must let the reader know very sad news. On the 16th of March 2013 Professor Hideo Fujii (86 years old), the founder of our institute, passed away peacefully. Funerals were held on the 18th and the 19th of March 2013. There was a large attendance (including the President of Kokushikan University, the Iraqi Ambassador in Tokyo, *etc.*) at the ceremonies. He hoped to visit Iraq once again before meeting his death, but he could not do it. We regrettably lost a true leader who kept being our great mental support even after retirement at 70 (in 1997).

Professor Fujii lost his wife Nobuko in 2010, and he spent much of time on surmounting the sorrow. Under such mental condition, he, getting a long-term high fever, had to be hospitalized in 2012. In the course of rehabilitation training, he found himself getting cancer, which was worsening from day to day without the realization of the condition. Nevertheless, sitting up in hospital bed, he kept working on translating a book from English into Japanese for university students in their late teens. The book is R.B. Dixon's "*The Building of Cultures*", published in 1928, which was one of his favorite books. We hope to publish his translation in the future.

[Postscript]

As editor of *Al-Rāfidān* I am pleased with receiving welcome contribution from University of Tsukuba, which is concerned with initial Japanese excavations in Iraq-Kurdistan. This University of Tsukuba's work done in the awkward situation of Iraq sheds a light upon Japan's Mesopotamian archaeology, further giving us hopes. I wish the Tsukuba's work continued, besides in hoping for the resumption of our Kokushikan's work at Kish.

Finally I would add that we are grateful to Professor Eisaku Hamada of the School of Asia 21 of Kokushikan University for his cooperation in editing this issue of *Al-Rāfidān*.

(K. O.)

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