

Flood Damage Assessment Report on the Cultural Heritage in Hadramawt, Yemen

Japan Consortium for International Cooperation in Cultural Heritage



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*Prof. Kazuhiro ARAI kindly supervised not only on Arabic name and name of places, but also on the description about Hadramawt.

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Foreword

News of the floods that hit the Hadramawt region in Yemen over the 24th and 25th of October 2008 was broadcasted into all over the world immediately after the tragedy. The flood not only resulted in many casualties, but also severely damaged social infrastructure in the region including houses, factories and roads. Statistics disclosed by the government of Yemen revealed that the flood claimed 73 lives, destroyed 3,264 houses, and deprived 2,000 to 2,500 people of their homes. Beside, information on the damage to and condition of Shibam, a World Heritage Site, was provided relatively quickly to experts around the world, from both the Yemen government, and the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).

Based on its information, the Japan Consortium for International Cooperation in Cultural Heritage (JCIC-heritage) exchanged information with experts and discussed ways to provide aid. Accordingly, in February 2009, a decision was made to send an on-site survey team to the affected areas as part of the operations of JCIC-heritage (Team Leader: Naoko Fukami). This report contains the result of the survey which was conducted by experts from Japan and Yemen.

Lastly, but not least, we would like to gratefully acknowledge the unfailing support of numerous institution and personnel, including UNESCO, Agency of Cultural Affairs, Ministry of Foreign Affairs, Japan, and Embassy of Japan in Yemen. In particular, we would like to express our appreciation to H.E. Muhammad Abu Bakr al-Maflahi, Minister of Culture, Yemen. We are also thankful to Mr. Ahmad Saad al-Rawdy, Head, Sana'a History and Architecture Division, Ministry of Culture, and Mr. Abdulrahman H.O. al-Saqqaf, Director, Wadi Hadramawt Branch Office, Antiquary, Museum, Archives Bureau, Ministry of Culture.

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* Note: In this report, settlements surveyed in Hadramawt are indicated as [U-] and historical monuments surveyed are indicated as [A-].

1. Introduction

1-1. Flood Damage to Cultural Heritage in the Hadramawt Governorate and Japanese Cooperation

The floods that hit the Hadramawt Governorate in Yemen over the 24th and 25th of October 2008 not only resulted in many casualties, but also severely damaged the cultural heritage of the region, including the World Heritage Site Shibam. Information on the damage to and condition of Shibam was provided relatively quickly to experts around the world, from both the Yemen government, and the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) which has been providing long-term development aid in Shibam.

Based on this information, an urgent meeting of the Subcommittee for West Asia of the Japan Consortium for International Cooperation in Cultural Heritage (JCIC-Heritage) was convened, and specialists exchanged information on the affected areas and discussed ways to provide aid. However, no information on the extent of damage to other cultural heritage besides the World Heritage Site Shibam was available, and there was not enough available for the Japanese government to consider its immediate response for the disaster. Accordingly, in February 2009, a decision was made to send an on-site survey team to the affected areas as part of the operations of JCIC-Heritage (Team Leader: Naoko Fukami). This team was tasked with gathering enough information to confirm the extent of damage to cultural heritage in the Hadramawt Governorate including the World Heritage Site Shibam and to enough information to allow Japan to consider the cooperation it should provide. In particular the team was asked to ascertain the extent of damage to historical buildings and other cultural heritage in Hadramawt Governorate, to determine areas where cooperation would be possible based on the steps already taken on-site immediately after the flood damage occurred and requests from the Yemen government, and to gather information on the current state of aid and cooperation provided by other countries and UNESCO. Additionally the survey team also gathered information on historical buildings and villages in the Hadramawt Governorate that had been picked up before the survey as lacking basic information, and the survey team attempted to make a list of major heritage assets, and record some items on the preservation state of cultural heritage.

The onsite survey was performed with help from staff from the Ministry of Culture, Division of history and buildings Sanaa, Yemen and General Organization of Antiquities-Museums & Manuscriptions Wadi Hadramawt Branch Cultural Affairs, and map and flood data was also received from these groups. Further, the GTZ provided flood information and information on the damage to Shibam. In this manner, the Japanese survey team worked with local heritage organizations and in conjunction with other international participants.

1-2. Summary of the Mission

a. Period

10 – 21 February, 2009 (stay in Yemen: 11 – 20 February)

b. Members

Naoko Fukami (Associate Professor, Organization for Islamic Area Studies, Waseda University)

Tomoaki Okamura (Visiting Researcher, Japan Consortium for International Cooperation in Cultural Heritage)

Jun Matsuo (Engineer, Oyo International Corporation)

Makoto Arimura (Research Fellow, Japan Center for International Cooperation in Conservation, National Research Institute for Cultural Properties, Tokyo)

Kentaro Tanaka (Deputy Director, Office for International Cooperation on Cultural Properties, Traditional Culture Division, Cultural Properties Department, Agency for Cultural Affairs, Japan)

Akiko Tashiro (Research Fellow, Japan Consortium for International Cooperation in Cultural Heritage)

c. Local Experts

Two members from Yemen's Ministry of Culture accompanied the Japanese members throughout the study.

Mr. Ahmad Saad Al Rawdy (Sana'a History and Architecture Division, Ministry of Culture)

Mr. Abdulrahman H.O. al-Saqqaf (Director, Wadi Hadramawt Branch Office, Antiquary, Museum, Archives Bureau, Ministry of Culture)

The driver was Mr. Mohammed N. al Bedhani from the Universal Travel Agency.

d. Surveyed Area

See Appendix 1-3.

2. Flood Damage and the Hadramawt Region

2-1. General Flood Conditions

The eastern part of Yemen suffered a flood caused by heavy rain which continued throughout 24th and 25th October, 2008. Extensive damage was reported in al Mahra Governorate and the Say'un District in Hadramawt Governorate [Government of Yemen et al. 2008].

According to the Office for the Coordination of Humanitarian Affairs, 68 lives were lost, 12 were missing, and 60 were injured in Hadramawt alone [OCHA 2008 Nov]. Statistics disclosed by the government of Yemen revealed that the flood claimed 73 lives, destroyed 3,264 houses, and deprived 2,000 to 2,500 people of their homes [OCHA 2008 Oct.].

2-2. Amount of Rainfall during the Flood

The recent flood was caused by torrential rain from a tropical storm (03B). Normally, the region receives only about 5mm – 6mm of rain during the said time of year, but as much as 91mm of rain had fallen in the region in the 30 hours between 24th and 25th October [Government of Yemen et al. 2008].

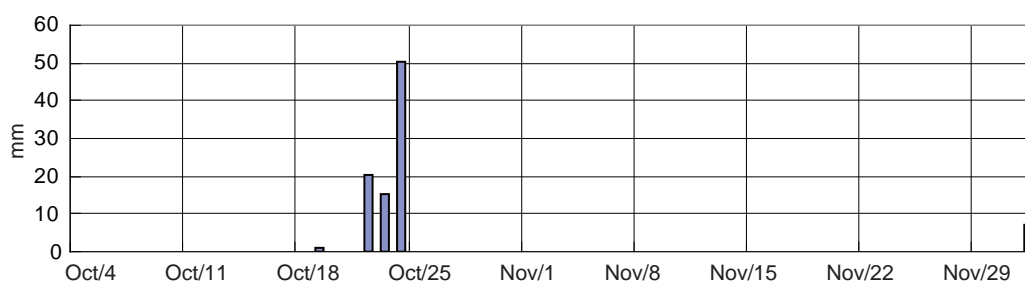


Fig. 1 Rainfall confirmed by satellite: Latitude = [15.8N, 16.1N], Longitude = [48.5E, 48.8E] (3B42RT NASA/GSFC).

Table 1 24-hour average rainfall between 19th Oct. and 25th Oct.
(location and source: same as Fig. 1).

Date	Rainfall (mm/day)
19 October	1.19
20 October	0.00
21 October	0.00
22 October	20.20
23 October	15.40
24 October	50.18

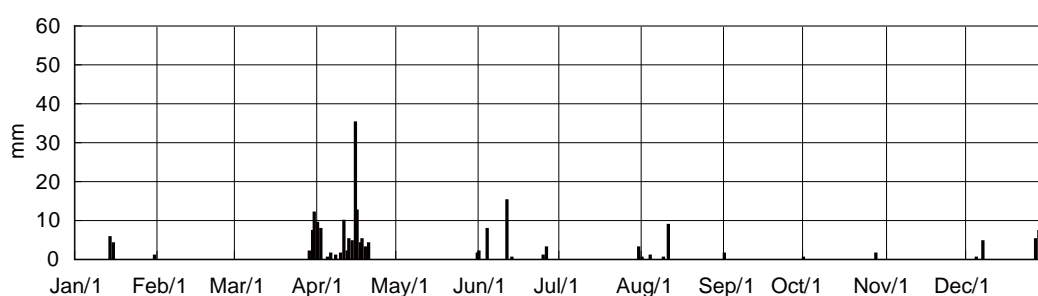


Fig. 2 Daily rainfall data (2004) (location and source: same as Fig. 1).

Fig. 1 and Table 1 show data on satellite-monitored rainfall provided by NASA. The figure is a daily record of rainfall between 4th October and 2nd December. It is clear from the graph that there was concentrated rainfall from 22nd to 24th October.

Table 1 shows the daily amount of rainfall during 22nd to 24th October. A total rainfall slightly over 90mm is recorded during those days. By the fact that this data corresponds to the above report by the government of Yemen [Government of Yemen et al. 2008], it can be assumed that the rainfall was as indicated in Table 1.

For reference, rainfall data for 2004 [Government of Yemen et al. 2008], a year which experienced no floods, is provided in Fig. 2 as rainfall data during a typical year.

The figure shows that in 2004, relatively heavy rains occurred in April, at a rate of 35mm per day. This only equals roughly half the amount of rainfall recorded in a single day during the recent flood. It is not an amount that would cause a flood, but certain measures had probably already been in place against any swelling of rivers. The figure also shows that there was hardly any rainfall in October and November 2004, which supports the observation made earlier that the region receives only about 5mm – 6mm of rain during the said time of year [Government of Yemen et al. 2008].

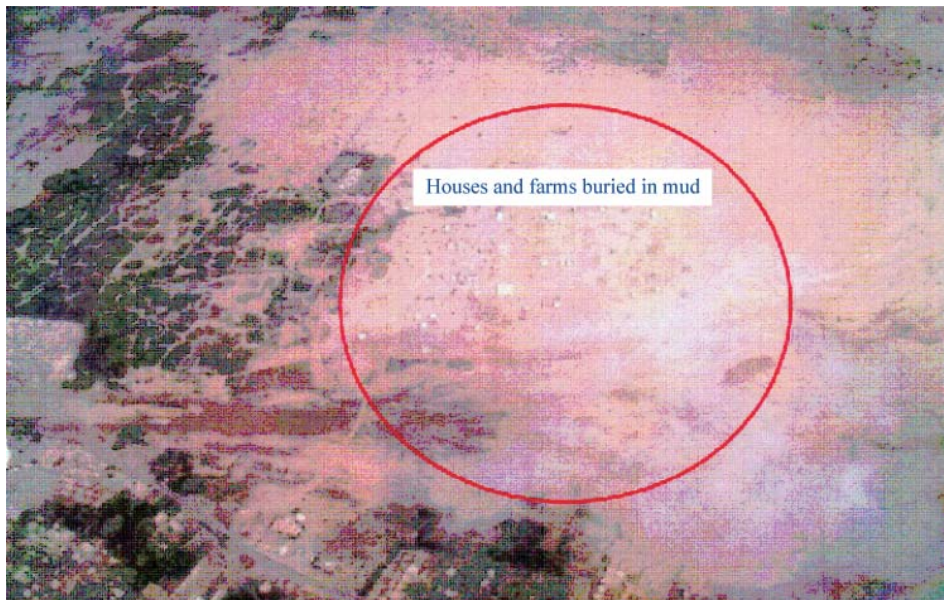


Photo 1 Houses and farms buried in mud (provided by JICA).



Photo 2 Palm trees moved down by the flood [Government of Yemen et al. 2008].



Photo 3 **Destroyed concrete structure** [UNESCO 2009].



Photo 4 **Mud deposits** (provided by JICA) **Debris removal Vehicle swept up by the mud flow.**

2-3. Flood Damage

The recent flood was more a mud flow than a water flood, judging by the facts that the disaster had a large impact on both downstream and upstream areas; there were large deposits of mud; and the flow was strong enough to mow down palm trees and destroy concrete walls (Photos 1 – 4). This type of flow generally wields destructive force as it flows linearly toward steep inclines, deposits mud at sudden changes in terrain, and turns into a flood flow in downstream areas. Therefore, it can be said that a mud flow disaster characteristically causes severe damage not only in downstream areas, but in upstream mudslide zones as well.

Direct damage from the recent flood was particularly severe in Wadi ‘Adm, Wadi Thibi, and further downstream, in Wadi Hadramawt. Wadi ‘Adm [U- ⑧] is situated along a transportation route connecting the port city of al-Shihr and the inland city of Tarim. Sah, a village located in the uppermost area of the wadi, occupies a narrow 500m-wide strip of lowland on both sides of the wadi. Palm trees are planted between the wadi and the houses of the village, which are built along the slopes of the wadi. However, the flood of water that overflowed from the wadi mowed down the trees and swept away the houses nearest the wadi as though to strip the surface of the land. Wadi Thibi [U- ⑦] is located to the south of Tarim and merges with Wadi Hadramawt from the west. The city of Thibi in the center of the lowland suffered considerable flood damage. In fact, in the city of Hyde-Sarah [U- ⑥], similarly located in the lowland, most of the buildings was swept away.

In Wadi Hadramawt, traditional settlements are located either along the slopes of the wadi, or on the terraces and alluvial plains that compose the bottom of the wadi. One of the reasons why a larger number of settlements is of

Table 2 Recent flood damage near Hadramawt.

Year	Month	Day	Wadi	Region	Maximum flow m ³ /s	Total flow million m ³
1974	6	2	Hadramawt	Shibam	650	14
1977	4	7	Hadramawt	Shibam	50	1
			Bin'Ali	Altareeq	200	5
	10	23	bin'Ali	Altareeq	200	4
			Hadramawt	Shibam	650	35
			Sar	Saar	45	3
1981	3	15	Hadramawt	Shibam	139	1
		18	Hadramawt	Shibam	61	2
			Sar	Alhaelha	145	2
1986	2	19	Hadramawt	Shibam	112	15
			Hadramawt	Mozah,Shinban	165	15
			Hadramawt	Shibam	45	14
			Hadramawt	Shibam	202	3
	4	9	Hadramawt	Mozah,Shinban	45	5
			Hadramawt	Shibam	83	3
1987	4	12	Hadramawt	Shibam	974	8.8
		13	Sar	Amarah	1,200	25
1989	4	7	Bin'Ali		175	1.4
1990	2	7	Sar	Amarah	92	6.4
	4	17	Sar	Amarah	34	
	7	15	Sar	Amarah	36	
1992	4	4	Sar	Amarah	82	
		5	Bin'Ali		454	
1995	3	4	Bin'Ali		205	
			Sar	Amarah	50	
	5	15	Bin'Ali		64	
			Hadramawt	Shibam	3,442	
			Sar	Amarah	3,082	
2002	7	29	Bin'Ali		200	
	9	4	Sar		450	

Table 3 Disaster history (flood data excerpted from Table 1 in [Kuriyama 2004]).

Year	Disaster
1249	Flood
1256	Major flood caused by heavy rains. Extensive damage to houses, farms, and livestock.
1260	Overflow of holding ponds caused by heavy rains. Houses were destroyed.
1286	Torrential rain, storm, and flood in Zufar. Many lives were lost.
1298-9	Major flood called hamim (heavy drizzle). Many lives were lost.
1325	Torrential rain in Zufar. Many lives were lost, and many houses destroyed.
1357	Lean harvest of agricultural products due to torrential rains and a cold wave
1385	Heavy rain, thunder and lightning in al-Shihr
1392	Torrential rain and major flood. Loss of 14 lives and considerable assets.
1407-8	Surge in grain prices due to torrential rains
1456	Torrential rains throughout the country
1461-2	Torrential rains
1482	Many deaths due to floods
1486	Torrential rains and two major floods throughout Hadramawt
1489	Major flood and pest damage
1503-4	Heavy rains in and around Hadramawt
1507-8	Strong winds and heavy rain in al-Shihr. Three ships were sunken.
1508-9	Torrential rains
1512	Torrential rains
1523	Strong winds and heavy rain in al-Shihr
1524	Strong winds and heavy rain
1562-3	Major flood in Hadramaut. Collapse of date palms.

the former and is located along the slopes probably has to do with the frequency of floods in the area, as mentioned earlier. On the other hand, many monuments of ancient cities, such as the Raybun Monument in Wadi Daw'an, are of the latter.

In the event of a major flood disaster, settlements in low-lying land are likely to receive greater damage than those along the slopes. Floods that occur at a long interval of about 400 to 500 years, in particular, would bring catastrophic damage to these settlements. Therefore, settlements were perhaps built along the slopes as a measure for avoiding such catastrophic flood damage. However, in recent years, old, densely-built cities are being abandoned and settlements are expanding to the low-lying areas in response to the increasing population in large cities such as Tarim and Say'un and the growing demand for modern housing, though they are poised to receive severe damage if suddenly struck by a large flood like the recent one.

Generally, a larger percentage of building damage is caused by rainfall, rather than the actual flooding. In traditional settlements where houses in the older areas were left abandoned without repair, many buildings made of mud bricks have collapsed due to heavy rainfall.

In the old city of Shibam, no direct flood damage was apparent, but water seepage was observed in the northern wall of the city. This damage to the wall, however, can be attributed to the poor drainage of rainwater from torrential rains and domestic wastewater, rather than to floods. Moreover, due to poor drainage, the ground has gradually subsided near the city walls, and cracks have emerged in the walls of houses along the city walls. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) notes that water seepage in the city walls is caused by the accumulation of rainwater and domestic wastewater in the city, and is accelerating their collapse.

Near Shibam, houses were swept away by the flood mainly at the northern boundary of Sahir Shibam located south of the old city of Shibam, and particularly in areas nearest the riverbed. However, by the time a post-flood survey was conducted in February 2009, rebuilding efforts were already underway using cement blocks and concrete, and new materials that withstand rain and do not require yearly maintenance were being used more extensively than traditional mud bricks.

In the recent flood, the walls enclosing the city and the traditional location of the city atop a small hill played a large role in preventing the old city of Shibam from being directly swept away by the mud flow. A testimony that was obtained in an interview survey conducted by JICA, that "the flood left traces of mud on the city walls at a height of around 20m from the wadi," and the relationship between the scope of the flood and houses shown in Fig. 3 illustrate the fact that the world heritage site of the walled residential area was located at a higher altitude than areas affected by the recent flood.

2-4. Flood History

Wadi Hadramawt and the coastal areas of the country have a history of frequent floods (Table 3). The History of al-Shihr describes the disaster of 1489 as follows:

That year, God brought rain, accompanied by a major flood in al-Iklil (24 May – 5 June). Waters began to flood in al-Khamila and completely submerged the city, together with flood waters flowing in from al-'Ayn, 'Amd, Daw'an, Sar, Thibi, and a number of other wadis. The great flood swallowed up large numbers of livestock, large volumes of grain from the threshing floor, as well as people and date palm trees. It overturned dams, damaged Qasam and Ribat Al al-Zubaydi, and partially destroyed houses in Bor. [Kuriyama 2005, pp. 61-63]

This passage indicates that the flood of 1489 was of a similar scale, and inflicted the same types of damage, as the recent flood.

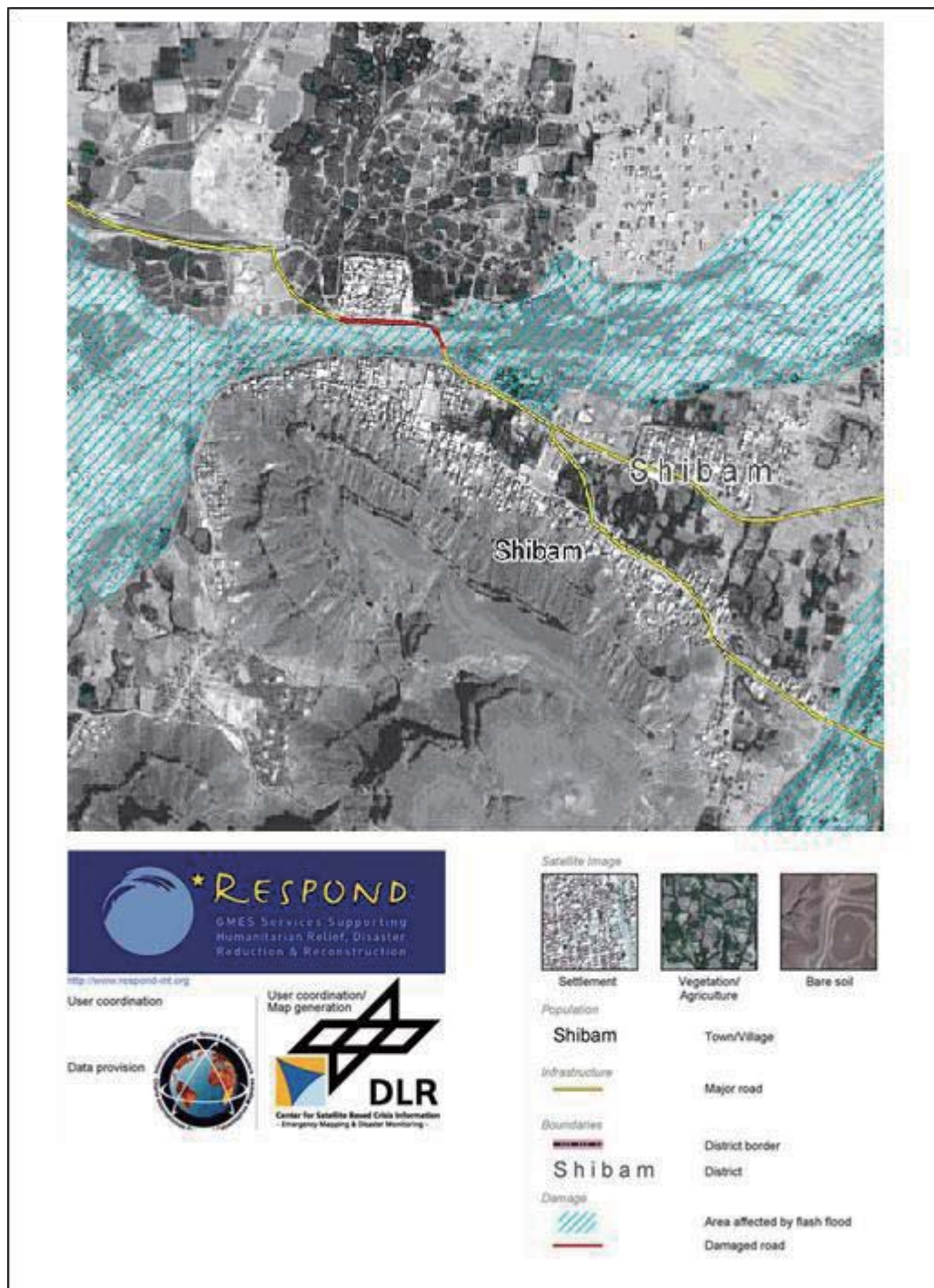


Fig. 3 **Flood areas near Shibam** (Source: International Charter [http://www.zki.dlr.de/applications/2008/yemen/160_en.html]).

Shibam is situated in the low-lying area of the wadi, approximately 400m from the southernmost slope of the terrace to the city walls. Today's dry river flows west to east through this terrace. To the north, there is a distance of about 3km from the city walls to the other slopes. This expanse of land provides a considerable acreage of flat land for farming. The land enclosed by the city walls rises significantly above the surrounding land, to a height 30m higher than the bed of the wadi. According to historical records, extremely destructive floods hit Shibam in 1298 and 1532 [Lewcock 1982, p. 74]. The old city of Shibam is said to have lost most its buildings in a flood that occurred in the 16th century but has been rebuilt thereafter, as will be discussed again later. It is believed that the accumulation of long

years of flood control measures contributed to the city's location and landscape.

The farmland surrounding the old city of Shibam relies on the traditional flood control system, even today. Because the region is subject to abundant rainfall in October and March, one of the main concerns of local residents is to prevent rain damage by controlling the flow of water and using it effectively for agricultural purposes. From generation to generation, religious leaders (*Imam*) of the Great Mosque in Shibam assumed the responsibility of flood control management. Today, an Imam by the name of Sheik Umar Ba-Ubaid assumes that responsibility.

The flood control system is installed in an area upstream and to the west of Shibam. It controls water by adjusting water levels using a dam. The dam has several gates for distributing water, and mud accumulations need to be removed every year after the rainy season. As of February 2009, the dam which was damaged in the 2008 flood has been repaired with the cooperation of GTZ.

It can be said that these flood countermeasures were borne from the wisdom gained from experiencing frequent flood disasters as shown in Tables 2 and 3.

2-5. Flood Countermeasures in Shibam

In a report submitted to UNESCO, Pamela Jerome proposes countermeasures for 100-year and 10-year floods [Jerome 2009]. In reality, it is assumed that the former refers to such major floods that have occurred once in around 300 to 500 years, in the 13th century, the 16th century, and most recently in October 2008, and the latter to more frequently occurring floods such as those shown in Table 2.

As mentioned earlier, it is commonly understood that the city walls, traditional location of the city, and traditional flood control measures have played an extremely important role in preventing the old city of Shibam from being directly swept away by mud flow in the recent flood. Therefore, the restoration of the city walls and the repair and additional construction of drainage facilities in the old city, as proposed by GTZ and Jerome, are certainly necessary. Furthermore, measures also need to be taken for the ground subsidence in the city that was confirmed in this survey, from the standpoint of world heritage conservation. Still another measure worth considering against frequent floods that occur around Shibam is to restore the mud-control dam of the traditional flood control system to its original appearance.

On the other hand, major 100-year floods that may occur once in 300 to 500 years cannot be sufficiently addressed simply by reinforcing the city walls and installing drainage facilities; they require wider-ranging measures. Particularly when considering how the upstream areas have suffered extensive mud slides in the recent disaster, it is apparent that mudslide countermeasures need to be implemented in the upstream areas, not to mention the need to establish a comprehensive watershed management system that covers the entire area from the upstream to downstream areas. As the government of Yemen proposes [Government of Yemen et al. 2008], a basic plan needs to be formulated, and based on this plan, each countermeasure work should be prioritized and implemented accordingly.

2-6. Conclusion

Based on a comparison of the scope of the recent flood and the 16th century flood, there are views that the entire city of Shibam could be wiped out if another flood of a scale similar to the 16th century flood were to occur in the future. The flood of the 16th century might have been larger than the recent flood, but it is certainly impossible to assess the amount of rainfall, the amount of water movement, and the amount of mud that has been displaced during a flood which occurred so long ago. Therefore as discussed above, a basic plan should first be formulated against floods of a scale equal to the recent flood, and countermeasure work implemented in accordance with that plan. By doing so, it would be sufficiently possible to lessen the damage even from floods that surpass the scale of the recent flood.

The recent flood destroyed more than 3,000 houses and deprived more than 2,000 people of their homes. When considering the extent of this damage, it can be said that the recent flood was a brutal flood comparable to the flood that occurred in the 16th century. Fortunately, the old city of Shibam sustained only minor damage, thanks in large part to the wisdom of creating high embankments, building houses in relatively high places, and erecting high walls as traditional means against floods.

Based on the above, we believe there is little investment effect in implementing a flood control measure that unnecessarily presupposes floods of a greater scale than the recent flood and focuses only on conserving the old city of Shibam. A much more effective solution would be to establish a countermeasure that covers the entire watershed, as proposed in the report compiled by the government of Yemen [Government of Yemen et al. 2008].

3. The Old Walled City of Shibam and Its Surroundings

3-1. Overview

Shibam, an old city enclosed by a wall 320m in the east-west direction and 240m in the north-south direction [U- ③], was designated a UNESCO World Heritage Site in 1982. Among the settlements of traditional mud-brick high-rise buildings in the area known as Wadi Hadramawt, the old walled city of Shibam was highly evaluated as worthy of designation, as pointed out in a report by Ronald Lewcock. He evaluated Shibam because of the height of buildings on the hill, the continuity to ancient Shabwa and the center of commerce in Hadramawt. And it must be designated not only the old walled city but also surrounding area as a buffer zone. While Lewcock focused on the preservation of settlements of mud-brick high-rise buildings, he also included the whole Wadi Hadramawt region in his studies, pointing out that the preservation of archaeological heritage must come first, and set Wadi Hadramawt down as equally important as Shibam. However, the “Old Walled City of Shibam” was inscribed by UNESCO on the World Heritage List, and Wadi Hadramawt is proposed only as an expansion area.

Since Shibam was designated as a UNESCO World Heritage site, from the period of communist-oriented South Yemen, Shibam was promoted governmental support and foreign ODA for the implementation of various projects that aimed to preserve the landscape of the high-rise community inside the fortified wall. This trend gathered momentum especially after the unification of South and North Yemen in 1990. In addition to the conservation initiatives of Hadramawt Governorate and local organizations such as the General Organization for the Preservation of Historic Cities of Yemen (GOPHCY), the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) also launched a project in 2000. The GTZ development aid included measures for cultural heritage conservation with a focus on Shibam, and featured enumeration surveys, restoration of houses, and reinforcement of vocational training and education for women.

The old city is entirely situated on a slightly elevated hill and surrounded by a wall that is about 7 m high¹. Before designation as a World Heritage site, in front of the city walls there were houses for lower-income class and empty apartments. These part of wall was not maintained adequately, and partially collapsed during floods in 1976 and 1982 [Lewcock 1986, p. 115]. Later, the city walls were repaired by GOPHCY in 1986, using traditional construction methods that involved using stones in the foundations, piling up mud bricks on top and then coating with mud. Previously, the city walls had towers spaced at intervals along them², but these were removed during the restorations, and now only remain on the North-East side. Ditches of the city wall where wastewater flows are coated with cement.

Some 500 tower houses are intricately huddled together within a 7-hectare walled area. Some are as high as eight stories, and rise 30m above street level. All the buildings are of mud-brick construction³, and the lower and upper parts are covered in white plaster for aesthetic and water-proofing reasons. On lower floors, the walls are up to 1m thick [Lewcock 1986, p. 98], and small windows line up on each floor. Door and window fixtures are made of wood, and are decorated with engravings or lattice work. The walls are built by stacking mud-bricks, and the internal dividing walls as well as the external walls have a structural function. Ceilings are flat ceilings, and made by laying wooden rafters, spreading date palm leaves over these supports and then covered the leaves in thick mud. Wooden columns are used in large rooms.

Each tower house with five to eight stories is generally occupied by a single large family of blood relatives. The lower two stories are normally used for storage and shelter for livestock, and the upper stories contain apartments

for men, apartments for women, and a family room, respectively. The tower houses occupy almost all own site without courtyard, and stand with their ground-story doors facing the street. Rooftop terraces above the topmost story of each house serves as the yard [Damluji 1992, pp. 96-112][A- ⑩]. While there are little differences in scale of these buildings, certain characteristics have been pointed out: the houses of merchants and brokers have warehouses and offices for business on the lower floors, and religious leaders such as *Mansab* have large rooms in their apartments with *mihrab* that indicates the *qibla* direction [Boxberger 2002, p. 81] .

There are six mosques and neighboring plazas, *sahat* within the walled city, which unite the individual houses as a community. These public spaces connect with each house via tunnel-like streets called *maddala* and blind alleys, and compose urban subdivisions, though they are not formally referred to as *mahalla*, a term meaning urban subdivisions. A great mosque stands in the center of the old city, and a *suq* (market) lies to its east. The *suq* is not a prominent commercial zone as in Western Asia, but instead the lower floors of dwellings facing the street are used as offices and shops. There are no prominent commercial facilities, *khan samsara* or *sarai* in Western Asia, but instead transactions were conducted in the square, and the caravan traders from distant lands stayed in the homes of their dealers [Boxberger 2002, pp. 81-85]. The southeastern corner is occupied by a palace that now houses the offices of GOPHCY and GTZ. A large city gate is found along the southern wall, slightly toward the east of the center of the wall. There are two smaller gates in the northeastern and western parts of the city wall⁴.

3-2. History

In the Middle East, there are many small hills called *tepe*, which are formed by the repetitive rise and fall of cities in the same location through their history. Modern Shibam also appears as though it stands on such a *tepe* with long history. It is thought that as villages with traditional mud-brick construction made repairs after infrequent period large-scale floods and more frequent normal-scale flooding, the ground level gradually rose, leading to the current situation.

The old city itself has not been archaeologically excavated as yet, but an inscription excavated from the nearby the city indicates that a city called Shibam had existed in the 3rd century [Grohmann 1993, Rouaud EI2]. Also, the Juja site and the Qabusa, respectively located 3km northwest and northeast of Shibam today, and the old city of Shibam had some form of relationship prior to the Islamic era in the 7th century, and the fertile crescent linking the three cities had flourished with frankincense trade [Lewcock 1986, p. 86; Siebeck 2003, p. 5]. After Islamization, there is a record that in around 1,000AD the city expanded from the current city walls in the North-Eastern direction⁵, and that in the 13th century it expanded to the Juja remains, 3km to the North-West [Siebeck 2003, p. 5]. However, considering the current state of building and flood history, it is believed that the city shrunk down to its current size in the large-scale floods of 1289/9 and/or 1532/3.

The buildings that exist today speak eloquently of the history of the old city. The Great Mosque of Shibam [A- ④] located in the center of the old city dates back to the reign of Harun al-Rashid in the Abbasid Dynasty during the latter half of the 8th century, using baked brick. It is only one example of baked brick in Shibam [Lewcock, 1986, p. 90] . Inside the mosque, a wooden *minbar* (preaching pulpit)⁶ was found that displays markings dating back to the 13th century. Most of the existing building frame was built in the 14th century with mud-bricks. Masjid al-Khwajah mosque of the Ibadi sect located northwest of the royal palace, is the second oldest building following the Great Mosque. The royal palace in the north dates back to 1220, and was home to the Kathiri Sultans during the 15th century [Lewcock 1986, p. 93][A- ⑩].

As mentioned above, there are records indicating that Shibam suffered a massive flood in the 13th and 16th centuries. Among the existing houses today, the Jafram Mansion [Lewcock 1986, p. 88-89] and the Masjid Ma'ruf Ba Jammal that stand adjacent to the royal palace are said to be the oldest, and date back to the 16th century [Lewcock 1986,

p. 93; Siebeck 2003, p. 6]. Also during this time, the minaret of the Great Mosque was rebuilt after the flood. These are clear indications that the city was redeveloped following the loss of many buildings in the flood. Further, it is thought that the Muza dam and other flood control projects outside the city wall mentioned above (in 3-4) took place after the floods of 1532.

After the 17th century, the Hadrami (people originally from the Hadramawt region) emigrated to prominence in the Indian Ocean, spread to East Africa, India and South East Asia as trader or Muslim leaders. As Shibam was the center of commerce in Hadramawt and home to large numbers of powerful merchants, the city acquired considerable amounts of capital from the trade. Many houses were apparently renovated to their modern appearance using this capital.

Construction of the city walls probably also began after the 16th century, concurrently with the implementation of flood control measures. The city had already been founded on a small hill over the course of many years, but an outer passageway and wall had probably been built surrounding the cluster of houses as a means of preventing flood damage. As mentioned above, only one tower was left on the North-East corner of the walls in the restoration performed in 1986, but previously there had been many towers along the walls.

From around 1830, the Qu'ayti began to rise to power. In 1858, it conquered the Kathiri Sultanate and built a royal palace in the southern part of the city [Boxberger 2002, pp. 78-79]. Judging by its eclectic design, the city gate was probably modified in 1909. It displays a mixture of baroque eave decorations of Western Europe, classical Western semicircular arches, and multifoil arches of Indian/Islamic architecture [Damluji 2007, p. 82].

After its conquest of Shibam in 1858, the Qu'ayti occupied Shihr on the coast in 1866, and Mukalla in 1881, and dominated trade in the Indian Ocean [Beeston EI2]. The first Sultan of the Qu'ayti, 'Awad bin Omar al-Umar bin Qu'aytia had been appointed to Jamadar, in the Hyderabad Kingdom in the Deccan Region of India, and returned to Hadramawt and seized power upon to Hadramawt. It is also thought to have introduced and promoted new design elements in the Hadramawt architecture through his experience. However, very little of these design elements imported from overseas are seen in the traditional houses standing in Shibam. After the 18th century, Hadrami who had emigrated to the coastal areas of Indian Ocean in large numbers, built luxurious houses, mosques and palaces in Hadramawt as hometown with funds and technologies from overseas.

In the 1880s, the population of the old city was around 2000, but under the control of the Qu'ayti, stability increased, and in 1931, population reached 8,000⁷ [Boxberger 2002, p. 78]. At the same time, trade was thriving, and in the 1930s it is said that from 400 to 1,000 head of camel were coming to Shibam in caravans each month [Rouaud EI2].

However, with the start of the Second World War, remittances from Hadrami overseas dried up, and Hadramawt experienced tough financial times. Besides, in 1967, when the region was placed under the control of the communist South Yemen government, powerful merchants who owned houses in Hadramawt fled the country. The traditional culture that had steadily developed after the 16th century flood up to the beginning of the 20th century was left abandoned during the rule by South Yemen. The mud-brick buildings of the region, which could only survive with regular maintenance by their residents, steadily deteriorated with time after losing their residents.

The "marginalized sustainability"⁸ late in the 20th century were caused because of some economic frontier of global socio-economic development. This "marginalized sustainability" was a common phenomenon to the traditional settlements in Wadi Hadramawt, as will be discussed later, and eventually led to the deterioration and hollowing-out of many old cities. The old city of Shibam was an exception, however. As mentioned earlier, its designation as UNESCO World Heritage site in 1982 triggered a flow of aid and cooperation for restoration of houses and preservation of the existing state of the city. According to GTZ office in Shibam, there are around 7,000 habitants within 437 houses, and 33 houses within the number are empty.

3-3. Location

The Shibam city enclosed by the city walls significantly rises above the surrounding land. As discussed earlier, the walls and traditional location of the city played an important role in preventing the old city of Shibam from being swept away in the recent flood and suffering serious damage.

A settlement called Sahil Shibam lies to the south of Shibam, along an incline across the wadi. The history of the settlement is not clear, but it is made up of a group of multi-story mud-brick houses that are three to four stories tall. According to documents published in 1932, much of the land was arable land [Wissmann 1932, pp. 116-118], and from the second half of the 19th century through to the start of the 20th century, wealthy city residents laid out gardens here or built houses with pools or even Indian-style bungalows [Boxberger 2002, p. 81], and by the 1930s the population was around 600 [Grohmann EI2].

In Say'un statistics from 1981, 342 houses were reported in Sahil Shibam [Damluji 1992], but by the end of the 20th century it was said to have a population of 15,000 [Rouaud EI2]. Comparing a map from the end of the 20th century [Damluji 1992, p. 73] and current satellite images, it can be seen that city has expanded 1.3km on the southern slope. Additionally, the shape and layout of houses is much neater than the old town, and a group of modern concrete buildings is expanding eastwards. Combining all these points, it can be seen that on the south slope of the valley where an outpost (*husn*) was previously located, suburban houses began to be built at the end of the 19th century, and from 1950 onwards, with the ruin and hollowing out of the old city, a new city began to sprawl outside the city walls, and even more so after the unification of South and North Yemen.

There are other traditional settlements around Shibam, including al-Qarah, al-Hazm, al -Hawta, Bushayrah and al-'Uqda. From olden times, these settlements had a relationship with Shibam, as the locations of the Sultan's remote palace, the shaykh's residence, caravan enclaves, and the center of agricultural production. The old city of Shibam essentially occupied the center of "a greater Shibam" that included other settlements, agricultural land, and wadi. Therefore, any investigation of the old city of Shibam should be made from the perspective of a wide-area network.

From a macro viewpoint, Shibam is one of the centers of the wide-area regions along with al-Qatn, Say'un, and Tarim. It is home to the palace of the Sultans that unified the Hadramawt since the 15th century. Including Shibam, only four cities in Hadramawt have city walls, the others being Say'un, Tarim and Ghurfah, and it is clear that Shibam is prominent within the region.

3-4. Future Measures for Shibam

The old city of Shibam is clearly better maintained than other settlements, and its historical landscape is well preserved, thanks to the initiatives of GOPHCY and GTZ for conserving the cultural heritage. In the Wadi Hadramawt region, many examples of the architectural culture of high-rise mud-brick buildings that people have developed during their struggle with nature can be seen, and these are comparable to Shibam. Shibam, hailed as the "Manhattan of the desert," is a presence that represents the architectural culture of Hadramawt.

As discussed in 2-3, the location of the Old Walled City of Shibam itself is a flood measure, and it can be said helped in reducing the damage to the old city from this flood. However, if a flood of similar size to the one that hit the old city in the 16th century were to happen again, it would be impossible to avoid the collapse of the old city. In order to prepare for this, simply strengthening the city walls and improving drainage facilities is not adequate. Flood prevention measures must be taken over a wider area.

As indicated by GTZ, the repair of the city walls and discharging of water are major concerns⁹. However,

compared to the potential problems facing the traditional villages of the Hadramawt, we believe that the problems faced by Shibam, with maintenance already being carried out by a number of organizations, are not the most pressing problems to be tackled when looking across the entire Hadramawt region.

People other than the people of Yemen are enthusiastically working to conserve Shibam as the single most important heritage of Wadi Hadramawt, but can this situation be considered appropriate? Hailed as the “Manhattan of the desert,” the appearance of the cluster of tower houses is certainly impressive. However, Shibam exists as part of the cultural foundation that encompasses the surrounding areas and the entire Hadramawt region. Given the current situation where most of the development of Shibam has been finished while other villages have been untouched, we believe that it would be advisable for development aid to be provided around a base of making use of the cultural heritage of the whole Hadramawt region, not just Shibam.

Based on this understanding, it is perhaps necessary to place priority on thoroughly surveying and documenting all towns and villages with traditional residence styles in the Hadramawt region, before proceeding with any other activities. While the condition of many of the traditional dwellings is battered, if action is taken soon, they can be restored.

Notes

- 1 Damluji reported its height from 6m to 9m [Damluji 1992, p. 80]
- 2 Seven towers are marked on a schematic map for the restoration of Shibam from the 1920s [Boxberger 2002, p. 84].
- 3 The mud-bricks are rectangular, with dimensions of roughly 45 – 50cm x 30 – 35cm x 5 – 7cm.
- 4 Information on the smaller gates is from Mr. Tom Lireman of the GTZ.
- 5 Based on information from Mr. Abdul Rahman H.O. al Saqqaf of the Say’un Museum. From the Hamudani records, there were 30 mosques in Shibam in the 10th Century [Lewcock 1986, p. 86; Rouaud EI2].
- 6 It has been repaired and prepared for display in a museum, which was newly built to the southeast of the Great Mosque with support from GTZ and is slated to open in March 2009.
- 7 Grohmann puts the population of the old city at the time as 6,000 and the population of Sahil Shibam as 600 [Grohmann EI2].
- 8 The Traditional Architectures Preservation District Program that was enacted in Japan in 1975 was a response to the loss of many traditional residential groups and ways of living during the high-growth periods from 1955 – 1973. Districts that received designation under this program included many that have kept their original appearance such as Tsumago and Narai mainly because they were a long way away from major roads or railways and were not developed.
- 9 Refer to 2-3.

4. Cultural Heritage in the Hadramawt Region

4-1. Status of Cultural Heritage

Hadramawt is the largest governorate in Yemen occupying the eastern part of the country. It is bounded by Oman to the east, via Mahra Governorate, and by Saudi Arabia to the north. The southern coastal region faces the Indian Ocean, but along the coast to the north the land rises to an altitude of 1,370m above sea level like a sheer cliff and forms the southern end of the desert region in the Arabian Peninsula. Wadi Hadramawt cuts through this northern arid highland from west to east, at a distance of about 150km from the coastal region of the country. The terraces and alluvial plains on both sides of the wadi as a dry riverbed are as narrow as 700m in some places and as wide as 12km in other places. A number of wadis merge with Wadi Hadramawt in the south-north direction. Many of them are of a considerable length, and include, from the west, Wadi Amd, Wadi Daw'an, and Wadi 'Adm.

Every year, regular rainfall in the wadi provides water that allows farming in the terraces and alluvial plains along the wadi. Specialty products grown in Hadramawt include wheat, dates, and honey. Residents live in settlements, or groups of houses, located near farmlands, but at a safe distance away from areas susceptible to flood damage. As mentioned earlier, they chose to build their settlements along the slopes of the valley or in slightly elevated areas in the flatland. To suit the hot-arid climate, the settlements have high density of multi-story brick houses with thick walls made of mud deposits from the wadi. The dense structure of these settlements effectively provides safety against floods and allows limited water resources to be utilized efficiently. This landscape, as represented by Shibam, is indeed the greatest feature of Hadramawt's traditional cultural heritage.

Unlike these low-lying areas, the highlands that spread outside the wadi plain were home only to a nomadic tribe called *badu*. Artifacts dating back to the Neolithic Age have been discovered, but historically, no permanent settlements have existed in these highland areas. Today, however, some areas along the arterial highway are being developed.

In the southern coastal region lying beyond the highlands, there are a number of historical port cities, including al-Shihr, which has engaged in trans-Indian Ocean trade since ancient times. These coastal port cities have established a strong relationship with the inland settlements, and have engaged in the exchange of people, goods, and information through the history. It is particularly interesting to note that the old city of al-Mukalla has the same type of high-rise houses as seen in the settlements of Wadi Hadramawt.

In this survey, we focused on Wadi Hadramawt, a region that is home to historical cities such as Shibam, Say'un, and Tarim where sultans built their palaces, and its tributaries, namely Wadi al-Masila, Wadi 'Adm, and Wadi Daw'an. We also targeted to the coastal cities of al-Mukalla and al-Shihr, where extensive flood damage was reported in a survey by Yemen's Ministry of Culture.

The history of the Hadramawt region can be traced back to the pre-Islamic period, as represented by the ruins of Raybun [A- ①] and al-Ghuraf [A- ②]. However, in traditional cities which are still alive today like Shibam, their existing buildings only date as far back as the 7th century, after the introduction of the Islamic religion. Although there are exceptional examples of old architecture, such as the mosques in Bor [A- ③] and Shibam [A- ④], most cultural heritage belong to periods after the 16th century, with the majority of houses built between the latter half of the 19th century to the first half of the 20th century. The cultural heritage of Hadramawt have greater value as a collective group than as individual buildings, and their value is further doubled in the form of a network of settlements distributed throughout wadis. Given this understanding, proper acknowledgement should perhaps be given to the basic structure of settlements and traditional building methods. Furthermore, the vast landscape composed

of numerous settlements of uniform mud-brick architectures existing throughout and under the severe natural conditions of a wadi, is itself worthy of recognition as an important cultural heritage born from the historical harmony of nature and people in Hadramawt.

4-2. Central Cities in Wadi Hadramawt—Say'un and Tarim

Wadi Hadramawt is characterized by a wide flatland and was historically the center of the Hadramawt region, owing to its outstanding agricultural production and political governance. Here, let us examine the salient features of cultural heritage in Tarim and Say'un, where sultan, as leaders built their palaces, like in Shibam. In addition to the palaces, these cities were also similar to Shibam, in that a fortified wall surrounded the old part of the city, though the walls in both cities have already collapsed and no longer exist¹.

Tarim [U- ①] is situated at the point where the west-to-east flowing Wadi Hadramawt merges with Wadi 'Adm and curves in an S-shape, and spreads across the southeastern foot of the high plateau situated in the northwest. It is the center of the Islamic religion, as exemplified by its numerous mosques, *ribats* (Islamic monasteries), and libraries. The city was said to have 365 mosques, the same number as the number of days in a year, and 100 of them were said to still exist in 1985 [Damluji 1992, p. 206]. Many residents of Tarim are of Southeast Asian descent, owing to the establishment of strong relationships with India and Southeast Asia around the end of the 19th century.

A sultan's palace called Husn al-Ranad [A- ⑨] stands in the southwestern part of the old city of Tarim. Due to continuous additions and modifications to its structure over many years, the platform of the palace now looks like a small hill. Recently, the ruins of an architectural structure that might have been built during the pre-Islamic period have been discovered in the platform part of the palace during the restoration of the upper structure, though they have yet to be excavated. The lower palace has collapsed due to the recent heavy rains in 2008, and lies abandoned in its collapsed state. To the northeast of the palace lies the Friday Mosque, a mosque that bespeaks a history going back to the 10th century. It was rebuilt in 1886 by a wealthy family who emigrated overseas, and now also functions as a *ribat*, containing living quarters for students, classrooms, and a ceremonial hall [Boxberger 2002, p. 75]. In 1914, the al-Mihdar Mosque was rebuilt to display a mixture of Indian and Southeast Asian styles, and was attached to a 52m-high minaret [Boxberger 2002, p. 77].

The name Tarim is said to appear in pre-Islamic inscriptions [Smith EI2 Tarim], but the founding of the present city dates back to the 10th century, when *Shafi'i sayyids* (descendants of the Islamic Prophet Muhammad) from Iraq established a *ribat* in the location of the present city. In 1488, the Kathiri Sultanate established its capital in Tarim and subsequently placed Say'un under its rule. During this period, a 500m-square wall enclosure was built around the old city surrounding the Friday Mosque and Royal Palace [A- ⑨], although it has no longer exist².

Around the middle of the 18th century, the intensification of inter-tribal wars created social chaos and caused many people to flee to the coastal regions of the Indian Ocean, such as India and Southeast Asia. Merchants from Hadramawt who succeeded abroad and returned from their emigration erected mosques and other such facilities in their homeland, in addition to extravagant houses for themselves. The most influential among them was the al-Kaf family, who are *sayyids* and made fortunes in Singapore³. Qasr Ham Tut, Qasr al-Qubba, Qasr al-Ishsha, and many other eclectic mansions were designed by Alawi al-Kaf, an architect who was himself a member of the al-Kaf family. The houses were built in the newer areas outside the old city. New city walls were built around this group of houses in the latter half of the 19th century and were reinforced in 1925 by *burj*. The new city, which included farmlands and date palms in addition to residences, spread around the foot of the mountain in the northwestern part of the region, and was as long as 1.5km at its eastern and southern boundaries [Boxberger 2002, p. 75].

Eclectic houses thus came to be built during the 1870s to the 1930s in Tarim. The high-rise houses built using mud bricks according to the traditional construction method of Hadramawt display an extremely unique mixture of Western influence and Indian and Islamic influences, as represented by the thick stucco decorations. When the owners of most of these houses fled Tarim during the period of control under the government of South Yemen, the government diverted these houses into schools or offices. They have been left abandoned in a state of degradation thereafter, but some initiatives for conserving the historical buildings have begun in recent years, following a research conducted by Salma Samar Damluji and a subsequent study by Pamela Jerome at Columbia University [Damluji 1992].

Say'un [U- ②] lies between Tarim and Shibam, at roughly equal distance from the two cities. It became a political center under the Kathiri Sultanate in the 15th century [Smith EI2 Say'un], and is still today the central city in the inland region of Hadramawt. Though Say'un is located the south of the Wadi Hadramawt valley, the old city of Say'un spreads in an L-shape from the northern to the eastern foot of a narrow mountain ridge which extends in the northern direction. At the bend point there stands a royal palace that was built in the beginning of the 20th century [A- ⑩]. There is a market and a walled grave site to the south of the palace. And there are many three- to four-story-high mud-brick houses in the city. The city was surrounded by a wall, whose west gate was roughly 1km to the west of the Royal Palace and its north gate roughly 300m to the northeast of the palace. There was also a number of fortresses around the city [A- ⑭].

The royal palace of the Kathiri Sultanate used to be located along the western slope of the valley, but the second sultan, Mansur bin Gharib, built his palace in its current location in 1873, and his son Ali bin Mansur undertook a major restoration in the 1920s [Boxberger 2002, p. 69] [A- ⑩]. The building functioned as the royal palace up until 1967. Under the communist regime of South Yemen, it was used as a radio station, but it was thereafter renovated into the museum it is today, in 1984.

Say'un also has many historical houses which were built during the period from the end of the 19th century to the beginning of the 20th century. One of those is the house of Say'un Museum Director Abdulrahman al-Saqqaf's grandfather [A- ⑰]. This building was built during roughly the same period as the above-mentioned houses in Tarim, but it chose to embrace the traditional architectural design of Hadramawt, unlike the houses in Tarim which adopted an eclectic mixture of Western and Indian/Islamic styles.

Tarim and Say'un, along with Shibam, play an important role in linking the architectural culture of Wadi Hadramawt to its history. However, Tarim and Say'un have come to function as centers of religion and politics in modern times. Unlike Shibam, they have expanded, lost their city walls, and are seeing the development of modern buildings even in the old city area. Under this situation, preserving their historical landscape requires some strategy aimed at conserving the traditional houses that still exist in the old cities. Considerations should perhaps also be given to formulating landscape guidelines that regulate the modification and new construction of buildings.

4-3. Traditional Settlements Today

In a number of wadi connected to Wadi Hadramawt, large numbers of settlements cover the slopes of steep rocky hills, sprawl along the wadi across a buffer of date palms, or sit atop a hill. They came to be located in those places through a history of trials and errors in relation to water utilization and flood control measures, as discussed earlier. Bricks were made from mud that could be easily obtained from the wadi and rocky hills, houses were arranged in high density in order to use limited water resources effectively, and high-rise buildings were built to maintain safety. In these ways, architectural materials, individual housing styles, and collective housing styles were closely connected to the environment of the wadi, and the Hadramawt region came to share a unique architectural culture represented by mud-brick high-rise buildings through the interrelationship of these elements. However, the characteristics and

historical status of these settlements and their houses have yet to be described. The characteristics of each settlement that have been surveyed in this investigation are listed at the end of this report, so here let us examine traditional water control measures, the significance of traditional rulers, and issues regarding the present state of the settlements.

The flood control system of Shibam has been discussed earlier, but in the Hadramawt region as a whole, canals from the wadi, holding ponds, and date palm forests play a large role in controlling floods. In Buda [U- ⑫] and Qaydun [U- ⑪], located upstream of Wadi Daw'an, an extremely large date palm forest lies between the wadi and the settlements, and an irrigation canal, which is used as a road during non-rainy seasons, lies between the date palm forest and houses. Date palms are said to mature in about ten years. The water from the irrigation canal is collected in holding ponds.

This type of flood control system is frequently managed by a religious or political leader. Religious leaders include the *Imam* of mosques and the religiously revered *Mansab*. Political rulers include the earlier-mentioned sultans of the Kathiri and Qu'ayti Sultanates and tribal leaders called *shaykh*, who hold power over smaller groups of settlements or a single settlement.

Most *Mansab* belong to the lineage of *sayyids*, or descendants of the Prophet Muhammad. The most famous families that have *Mansabs* are the Abu Bakr bin Salim family in 'Inat [U- ⑥ , A- ⑦], the al-'Aydarus family in al-Shihr [U- ⑭], the al-Kaf family in Tarim [U- ①], the al-'Amudi family in Qaydun⁴ [U- ⑪], and the al-'Attas family in Hurayda. Members of these families were revered by the people, and received religious education from generation to generation. As they passed down the tradition through their blood relations, they came to possess large parcels of land and to manage large manors. Some families have also succeeded in business, like the al-Kaf family in Tarim, or acquired political power, like the al-'Amudi family in Qaydun.

The *shaykhs* and the *Mansab* not only acquired wealth and lived in extravagant houses, but they were also revered as public figures who donated mosques and other public facilities, intervened in disputes, and controlled water use. However, most of them left their homeland after 1967, when Yemen became a communist state. Their departure brought a change to the ownership of land and houses, and certain aspects of traditional social relationships based on the division of roles among residents collapsed. Like the group of abandoned houses in Tarim, which fell into ruin from lack of maintenance after losing their residents, traditional symbiotic relationships also collapsed, global values of the modern era came to be valued, and the traditional architectural culture that provided the foundation of common houses was shattered. When traditional social systems collapse, public welfare and infrastructure development should be administered by modern politics. However, aid from the state and provinces were concentrated in the education and medical care sectors, and protection has yet to be given to the cultural heritage of residents' lifestyles.

In Qasam, a town located south of Tarim, we met a *shaykh* named *Shaykh* Geis bin al-Abd bin Ali bin Ahmad bin Yamani al-Tamimi [A- ⑯]. The *shaykh* said he has authority over the wadi between Qasam and Sana'a, from the northern desert to the coastal area. He once fled to Abu Dhabi when the South Yemen government was established in 1967, but returned to Qasam in 1993, restored the historical house that has been passed down through the generations in his family, and now lives in a traditional citadel-like house that was built 200 years ago. He introduced his historical house to us with pride. It could be said that this type of culture that is directly connected to one's identity provides the very foundation of cultural heritage conservation. Perhaps owing to the presence of such *shaykhs*, the town of Qasam is relatively well maintained. In the town of Khila in Wadi Daw'an, the Buqshan family is well known. The present head of the family, who has succeeded economically, has renovated his house into a modern hotel, implements public projects such as the construction of schools, and otherwise contributes to revitalizing the town [U- ⑩].

During the twenty-some years of shifts to communism, the emigration of the wealthy class has greatly

impacted traditional cities. The old city in each settlement has its own history and characteristics, but most are now in moribund condition. Needless to say, we cannot turn back the hands of time. Therefore, seeking a path to preserve cultural heritages still in existence for the benefit of the future, and restoring the cultural pride of local residents, is probably the shortest route to the sustainable future of Hadramawt, its settlements, and its residents.

4-4. Coastal Cities of al-Mukalla and al-Shihr

Coastal historical cities, with ports that served as a gateway to Wadi Hadramawt, played an important role as a relay valve for the introduction of diverse cultures and institutions from across the sea. These cities were where wealthy merchants from inland Wadi Hadramawt built their extravagant houses and people from India and East Africa created their communities.

Due to the difference in climate, the inland and coastal areas have different architectural cultures. In the inland area, mud bricks are used according to the traditional construction method. In the coastal city of al-Mukalla, coral stones are stacked using mortar. In al-Shihr, houses are built using both stones and mud bricks, are generally low, with only two or three stories, and have an inner courtyard.

The cultural heritage of the coastal area provides important indicators for identifying introduced elements and their dates in regard to the cultural heritage of Wadi Hadramawt. Below, let us examine the location and shape of al-Mukalla and al-Shihr and their historical connection to the other regions.

Al-Mukalla [U- ⑬] is located on the southern coast, from where Wadi Daw'an flows and merges with Wadi Hadramawt in the north. Today, the route headed toward the coast via Wadi al-Ayn, a tributary of Wadi Daw'an, is an arterial road, but in ancient times, the route through Wadi Daw'an was the main route to the city.

Al-Mukalla is composed of two smaller cities. One sprawls across a cape that juts out from the coastline, and the other covers the slopes facing the cape. The origin of the city is unknown, but the area that includes the cape and the connected eastern shoreline composes an old city called Hayy al-Bilad [Damluji 2007, p. 152]. The western part of the narrow area at the base of the cape used to be occupied by a palace⁵ that dates back to the early 18th century, and the central part used to be occupied by the tomb of *Shaykh* Ya'qub, which has a traditional going back 800 years. In the southwestern area to the south of the palace, a customs facility and city gate still exist. The area used to be a port in ancient times. The urban area that spreads to the south of these facilities and toward the east is characterized by a dense group of four- to five-story houses, so that the area within a 250m diameter at the tip of the cape, in particular, appears to have a wall separating the city from the sea⁶. Since more than 300 years ago, this area was home to wealthy merchants and ship owners from inland areas, as well as Indians and Somalis who were employed by the Qu'aiti family and people who migrated from the Gujarat region during the previous administration [Damluji 2007, p. 153]. The city spread westward after the Qu'ayti Sultanate moved the capital of Hadramawt to al-Mukalla in 1881, and groups of houses cropped up the area of 200m width between the coastline and the northern slopes, and it seems gradually covered the slopes. The area up to the eastern side of the Umar Mosque, which was built in the 1930s, constitutes the new city, and the wall dividing the western side of the city extended up to a fortress located along the slope of the mountains behind the city. A concentration of high-rise houses was built as in the old city, and was organically arranged along curving roads.

From the 1930s, the city further expanded westward, and the area up to the new Indian-style royal palace of Sultan Umar bin Awadh al-Qu'ayti [A- ⑭] was systematically developed as a new city. Groups of high-rise houses also characterize this new area, but compared to the above-mentioned two old cities, it displays a grid-like, orderly arrangement. The new royal palace was built in the 20th century, but it features a mixture of Indian/Islamic and Western architectural styles. Today, it has been converted to a museum.

Al-Shihr [U- ⑭] is a historical port city located 60km northeast of al-Mukalla along the coastline. From ancient times, a caravan route passing through Wadi 'Adm to Tarim connected al-Shihr and Wadi Hadramawt in the north. This route was developed into a motorway by the al-Kaf family in Tarim in the 1930s, but was abandoned due to strong opposition from tribes governing the caravan trade.

The old city of al-Shihr used to be surrounded by a wall constructed in 1867 [Boxberger 2002, p. 103], with a sandy shoreline on the southern side facing the sea. It corresponds to an area stretching approximately 1.3km between the west gate (Kaur Gate) and small east gate and approximately 1km between the north gate ('Aydarus Gate) and the southern coastline. The roads in the old city are wide. Today, very few traditional houses exist in the old city, due to the construction of many buildings made of new construction materials because of flourishing modern port.

A plaza is located roughly in the center of the old city. The Qarat al-Nasir Palace lies to the north of the plaza, and the Husn bin Ayyash Palace [A- ⑪] to its south. The northern palace was built in the mid-18th century by the Bulaiqi family from Yafa, but the eastern half was built in 1858 by the Qu'ayti Sultanate, which ruled Shibam and moved its capital to al-Shihr. The southern palace was built on the opposite side of the plaza in 1868 as a military facility. Bin Ayyash, whose name was given to the southern palace, was a *shaykh* (tribal leader) from Yafa, who served the Qu'ayti sultans. As mentioned earlier, Qu'aiti sultans served the Nizam of Hyderabad, and the architect Mabhaut al Juairi also resided in Hyderabad for some time, so the palaces display some influences of the Indian/Islamic architectural style. Prior to completion of the southern palace, however, the Qu'aytis moved their palace to al-Mukalla in 1879. A customs facility still exists on the coast, to the south of the palaces.

The majority of architectures still in existence were built after the 19th century, but al-Shihr has a long history that goes back to early Islam. The Friday Mosque, located southeast of the plaza, is said to date back to the early Islamic period. From a monument⁷ called Biyani House⁸, located southeast of the Friday Mosque, potteries dating back to the Abbasid Dynasty have been excavated. Over the years, al-Shihr developed into an international trading port, following an unsuccessful invasion by the Portuguese in 1523, the establishment of a trading house by the Dutch East India Company in 1610, and an influx of Indian merchants in more modern times.

The port cities of al-Mukalla and al-Shihr have served as a springboard to the people of Wadi Hadramawt when they migrated abroad. The Indian/Islamic and Western architectural designs seen in Tarim, Say'un, and Shibam entered from these port cities and gradually spread inland.

The construction method of domes in Shaykh 'Umar Ba Wazir [A- ⑥], 'Inat [A- ⑦], and Qabr Nabi Allah Hud [A- ⑧] were probably also one of the methods introduced from abroad. Most mosques in the Hadramawt region rarely have a dome ceiling, because they are composed of an inner courtyard and multi-column chambers, and a flat ceiling is installed on top of wooden beams placed on the columns. From early on, however, these multi-column mosques adopted arches and tunnel vaults that are made by stacking mud bricks at an angle. In tomb architectures, corbelled mud bricks with inserting wooden support create a spindle-shaped dome. Considering the year of construction of these structures, it appears likely that dome construction methods were introduced to Hadramawt sometime after the 16th century. A detailed investigation should perhaps be made in relation to the tomb of Shaykh Ya'qub in al-Mukalla.

The arches are mostly horseshoe-shaped or pointed arches. The *mihrab*⁹ characteristically display twisted columns. With respect to the styles of arches and the *mihrab*, comparisons should be made among those in Yemen, Oman, East Africa, and West Asia, to gain a perspective on the relationship of influences through the port cities.

As matters stand, however, the traditional aspects of the port cities are rapidly disappearing due to the concentration of capital and development compared to inland settlements.

4-5. Conservation Status of Historical Cultural Heritages

A list of historical buildings in regions we investigated in the recent survey is provided at the end of this report. Here let us discuss their characteristics by their functions, and examine their differences from three different perspectives that are deeply related to the conservation of historical cultural heritages: large cities and settlements, coastal areas and inland areas, and the world heritage site of Shibam and other cities.

The most prominent historical religious buildings are mosques and tombs. There is a Friday Mosque in every city, and large cities even have several mosques [A- ③ , A- ⑥]. Tombs are sometimes located near a mosque, and enclosed burial grounds surrounding a tomb are also important elements to a city [A- ⑥ , A- ⑧]. The year of construction of most of these religious buildings are known through inscriptions and the names of the founders. Moreover, the majority of buildings that date back to the early 16th century are religious buildings. There are many well-maintained religious buildings in Hadramawt, where devout Muslims (Islamic believers) compose a large part of the population.

The mosque in Bor [A- ③], which dates back to the 10th century, was restored by the agency for cultural heritage following the inscription of Shibam on the World Heritage List, and is now being used frequently by local residents. Most of the upper portion of the mosque has been restored, and the inner courtyard has been covered, for use as a place of worship. The mosque in Shibam [A- ④] is said to still have burnt bricks dating back to the 9th century, during the Abbasid Dynasty, though they are hidden behind the white plaster that is applied every year to the mud-brick part created in the 14th century. There are also many buildings, such as the Friday Mosques in Buda and Qaydun, which were originally built long ago but were rebuilt with new materials in the latter half of the 20th century.

There are also tombs of many prophets and saints in Hadramawt. To emphasize their sacredness, these tombs are thickly coated with white plaster. In fact, many of them are given a new coating every year. The Qabr Nabi Allah Hud [A- ⑧] was built in 1673 in dedication to Prophet Hud who existed before Muhammad. Every year during the city's large festival, the city teems with people making a pilgrimage to the tomb. The tomb of a *Mansab* in 'Inat, which dates back to the 16th century, features seven white, towering domes within the vast site [A- ⑦]. The town of al-Mashhad, located downstream of Wadi Daw'an, has half fallen into ruin after a massive emigration of its residents, but the burial architectures remain well-maintained, because there are still people who come to visit the burial grounds [U- ⑨].

Some tombs have only been repaired using temporary measures, and have yet to be completely restored. Shaykh 'Umar Ba Wazir¹⁰ [A- ⑥], located atop a cliff across the wadi from the town of Ghayl 'Umar, is a combination tomb and mosque architecture. It still remains untouched by modern restoration efforts. The precise date of its construction is not known, but it is said that a Sufi cult used to hold a coffee-drinking ritual in the building, and Chinese white porcelain and blue glaze objects have been discovered from around the building.

Another type of prominent architecture is castles and palaces constructed by rulers called *dar* or *orqal'a* [A- ⑨ , A- ⑫]. Most palaces still in existence were built after the 16th century, mainly during the 19th and 20th centuries. Generally, they were built roughly in the center of the old city, and served both as an administrative organ and as the ruler's residence. Most are massive high-rise structures that have been expanded and modified whenever the ruler changed. Some palaces have been restored and opened to the public as a museum, such as those in Say'un [A- ⑩], Shibam [A- ⑪], al-Mukalla¹¹ [A- ⑫], and Tarim [A- ⑨], but palaces in al-Shihr [A- ⑪] and al-Qatn [U- ⑤] have lost their functions as a palace, and remain abandoned in a severe state of damage. Military architectures that were built as a regional fortress are called *kut* or *husn* [A- ⑬ , A- ⑮]. Most were built between the 19th and 20th

centuries by the Kathiris and Qu'aytis. Husn al-Guwayzi ¹² [A- ⑬], which was built in 1884 on the outskirts of al-Mukalla, and Husn al-Fales¹³ [A- ⑭], which was built in the mid-19th century on the outskirts of Say'un, are being restored with funding from Yemen's agency for cultural heritage and the Governorate of Hadramawt, with the objective of opening them as tourist attractions. Kut al-Nahr [A- ⑮], located near a wadi between Say'un and Tarim, has been restored in 2005 as a caravan museum, but prior to its opening, the recent flood razed the southeastern corner of the building, and the building now lies in decrepit condition.

In many traditional settlements, tower-like castles (Ajuraniya) can be found on elevated hills. They were traditionally owned by tribal leaders (*shaykhs*). Examples are found in al Ghurfa [U- ⑮], Sif [U- ⑪], Ajuraniya, Hawra, and Qarn Majid [U- ⑩], but none of them have been restored and are simply left to collapse.

At the foundation of buildings that serve a public role, like those mentioned above, is the construction method of mud-brick high-rise houses. However, the maintenance management of individual houses composing the old city is placed in the hands of their each owners, regardless of their financial strength, with the exception of Shibam, so the majority of them have fallen into a severe state of deterioration due to abandonment or poverty. Furthermore, because the ownership of houses has been divided up through the generations, it is difficult to utilize the abandoned buildings in an effective manner. Yemen's Ministry of Culture keeps a record of public buildings, but with the exception of Shibam, individual houses simply collapse and disappear without ever being recorded.

Lastly, let us discuss traditional commercial facilities. In Shibam, the area on the eastern side of the Friday Mosque is a market (*suq*), and the ground level of traditional high-rise houses is used as a store. In Say'un and Tarim, a group of low-story stores in the center of the old city forms a suq. This type of suq is commonly seen in large cities. Additionally, like the Wednesday market in Budah, a market is held regularly in a space outside the city [U- ⑫]. In 'Inat, a roadside suq was developed in the low-lying area of the city by a *Mansab* named Abu Bakr al Salim. The road was paved and the stores were newly built [U- ⑥]. In al-Khurayba, located in Wadi Daw'an, the low-story suq leading to the center of the city was no longer functioning and had closed down. Instead, a new concrete market has been built outside the city. Though no longer in use, a station house (*mahatta*), which served as a lodging for caravans, still exist in the old suq in al-Khurayba [U- ⑫]. While religious buildings and palaces are in relatively good condition, as described above, old commercial facilities have been abandoned and new ones rebuilt in response to modern needs, and fortresses and houses in traditional settlements have been left abandoned to eventually disappear. Next, let us examine their differences from three different perspectives.

Large cities and small settlements: Cities are regional centers where large amounts of capital concentrates, development progresses, and people gather from outlying regions. They therefore display a tendency to expand. The traditional urban structure of old cities and the modern urban structure of new cities differ from each other and it is this difference that has triggered a heightened awareness of the need to conserve traditional cultural heritages. On the other hand, small settlements tend to abandon old cities and seek new land outside them, so a doughnut phenomenon is commonly occurring in many such settlements.

Coastal and inland areas: Cities and settlements along the coast display a faster pace of development and a conspicuous expansion of new cities, compared to cities and settlements in inland areas. In fact, plans for the construction of new, modern ports and resort facilities are undermining the traditional landscape of old coastal cities, such as in al-Shihr [U- ⑭] [Damluji 2007, p. 181]. Cement concrete, and other modern industrial products are replacing traditional building materials such as stones, mud bricks, and *nura*. However, coastal cities were once home to a diversity of people, from India and Somalia, in the mid-20th century, and developed as international port cities where different peoples coexisted in separate city blocks [Boxberger 2002, pp. 97-106]. Even today, one may encounter people of different nationalities and experience the diversity that exists in port cities. The old names of city blocks have

been preserved [Smith EI2 al-Shihr], and the zoning of markets still exist. Nevertheless, although the local residents are strongly conservative in nature as Muslims, the ancient urban structure of old cities is gradually disappearing and giving way to the emergence of global cities based on modern urban planning.

World heritage site of Shibam and other cities: The differences between the world heritage site of Shibam and other cities have surfaced after Shibam was designated a world heritage site and began to receive a concentration of diverse aid and development initiatives. In Shibam, residential vacancy rate is low in the old city. Each house is well maintained and preserves the traditional construction method. On the other hand, in other cities and settlements, residential vacancy rate is high particularly in the old parts of the cities, and many houses are on the verge of collapse. In the newer parts of the cities, the number of houses utilizing new materials is increasing.

In order to formulate a comprehensive development plan centered on the cultural heritage of Hadramawt, it is necessary to consider the above-mentioned functional differences of buildings when deciding on the utilization method and maintenance policy for each type of building. Furthermore, regional differences that are seen today between large cities and settlements, coastal areas and inland areas, and the world heritage site of Shibam and other cities, must also be considered and appropriate measures taken in response to those differences.

Notes

- 1 In Wadi Hadramawt, city walls still exist around settlements in Shibam [U- ③], Tarim [U- ①], Say'un [U- ②], and al-Ghurfa [U- ⑤] though only Shibam's is complete but others are partly existed. The walls around al-Ghurfa are an example of city walls constructed by a *shaykh* in the early 20th century. In addition to sultan's palaces of the three cities of Tarim, Say'un and Shibam, palaces of the Qu'ayti Sultanate exist in al-Qatn [U- ⑤] and Hawta.
- 2 The size of the original city walls is based on an interview with Mr. Muhammad Abdullah al-Junayd, Director of the Nur Center in Tarim.
- 3 'Abd al-Rahman bin Shaykh al-Kaf is known for his construction of a highway connecting Tarim and the port city of al-Shihr in 1937, in an effort to modernize Hadramawt.
- 4 This family is not *sayyids*.
- 5 This was a four-story structure called Kasadi Naqib Palace. Two stories still existed in 2004, but today, it has been replaced by a concrete structure. Al-Mukalla was ruled by the Kasadis from Yafi' from 1703 to the mid-19th century, until the Qu'aytis came to power.
- 6 Today, revetment works have been implemented and a peripheral motorway has been developed.
- 7 The monument was excavated by Claire Hardy-Guilbert, from 1996 to 2002. The unearthed artifacts are stored at the al-Aydarus Gate museum.
- 8 Biyaniis said to come from Baniyani or Baniyan, which is a word that refers to Indian merchants.
- 9 A niche in the wall that indicates the direction in which to pray in a mosque. In Hadramawt, the direction of Mecca is almost due west.
- 10 According to Mr. Abdulrahman al-Sakkaf, Shaykh 'Umar was the chief officer of al-Mukalla during the Abbasid Dynasty, and his grave is in al-Mukalla. It is said that his descendants embraced the Sufi mysticism.
- 11 In al-Mukalla, the eastern half of the palace is open to the public as a museum, but the western half is empty and abandoned. The museum also displays considerable wear and damage from lack of maintenance.
- 12 The castle was repaired and its lower garden was restored ten years ago, but the corner of the building collapsed during the large flood of 2008, and the building remains abandoned without repair.
- 13 At the time of the February 2009 survey, most of the repair work had been completed, but the entrance stairway had not been restored, due to a shortage of funds. Unable to be opened to the public, it remains abandoned.

5. Conclusion

5-1. Flood Countermeasures

Flood countermeasures can be divided into emergency measures and permanent measures. The development of ground drainage channels and the reinforcement of city walls in the old city of Shibam fall under the former type. These emergency measures alone, however, cannot guarantee the survival of the old city of Shibam, in the case of a flood exceeding the recent flood in scale should occur.

Before permanent measures can be established, it is necessary to implement watershed management for the Wadi Hadramawt region as a whole. At the same time as implementing flood control measures, it is also important to consider measures for the effective utilization of water for agricultural and domestic purposes.

This survey has revealed salient flood damage in new cities that were located near the riverbed in the alluvial plains of the wadi and at the foot of hills. It can be assumed that new residential areas extended to the plains in pursuit of modern convenience and wound up suffering flood damage. When implementing watershed management, a hazard map should be created based on an assessment of the suitability of the area as a residential zone, as a precaution against damage for human lives. Moreover, in order to implement large-scale watershed management, it is necessary to not only restore cultural heritages, but to also take into account the development of the entire society, as will be discussed later.

However, large-scale watershed management requires a substantial budget and a detailed plan. Immediate actions that are slightly closer at hand might include the following.

Firstly, based on an assessment of cultural heritages, it could be said that the most ecological method of permanent flood control is to reassess, maintain, and hand down to posterity the location of traditional settlements, the role of date palm forests as a flood prevention measure, and traditional flood control technologies employed in each settlement. Rainwater may be a source of disastrous floods, but it also brings fruitful blessings of nature to farmlands. Cultural heritages in Wadi Hadramawt have emerged through a long-accumulated history of rainwater control and effective utilization.

Another relatively simple yet effective flood control measure might be the development of an emergency information network. Although it may not be able to save traditional settlements and buildings, it would save human lives. Floods flow from upstream to downstream at the speed of the flow of water. If flood information from upstream could be promptly relayed downstream, residents near the river bed, for example, could evacuate to the hills of the wadi or to a higher elevation above the alluvial plains.

5-2. Crisis of Traditional Settlement Styles

Direct flood damage to buildings was concentrated in narrow areas adjacent to the river bed in the wadi, but heavy rainfall had an impact on mud-brick buildings in a wider area. In Shibam, the majority of buildings are in relatively good condition because of well-maintained, so excluding houses in the southwestern area which had shown signs of collapse from before the flood, most buildings suffered only relatively minor damage. Nevertheless, as discussed in “4. Cultural Heritages in the Hadramawt Region,” rainfall had caused the abandoned mud-brick buildings to decay in most of the old cities of settlements which had “hollowed out” due to the emigration of their residents. In fact, the deteriorated buildings look like melting candles. This damage is not simply the result of the recent heavy rain but the accumulation of yearly rainfall; and behind this issue we must notice a serious social problem confronting Wadi Hadramawt.

It is believed that the hollowing out of old cities was accelerated by the overseas emigration of the wealthy class of people who had homes in the old city, following the transition to a socialist regime accompanying the independence of South Yemen in 1967. After the unification of North and South Yemen thereafter, some of those who emigrated have returned to their homeland and not only restored their own homes but also contributed to rebuilding their city as *shaykhs*, like Shaykh Qeiss in Qasam and the Buqshan family in Khila. However, there are only few such examples; in most settlements, the old city lies abandoned in a state of deterioration, and residential areas are conspicuously shifting to the periphery of the old cities. Since regular maintenance is essential to mud-brick buildings, those that have been abandoned by their residents are treading a steady path toward collapse.

Another possible factor involved in the shift of residential areas is residents' pursuit of modern lifestyles. In addition to gaining access to modern infrastructures such as water and electricity systems, low-lying lands around the old cities offer better convenience for using automobiles. Residents have abandoned the old cities and their intricate ownership and inflexibility of urban zoning, and have relocated to areas outside the old cities. Such modern demands are also evident in the trend toward houses built of new materials such as concrete blocks and reinforced concrete that do not require regular maintenance. However, houses built of new materials provide less insulation efficiency than mud-brick houses, and require air conditioners. Moreover, their location in the low-lying areas near the wadi makes them vulnerable to direct damage in the event of a major flood disaster.

5-3. Reassessment of Mud-brick Buildings

The residents of Wadi Hadramawt are committed extremely to traditional lifestyles, as seen in their traditional dresses and diligent behavior as Muslims. People of Hadramawt descent are called Hadrami. Although they have spread from Hadramawt to Indonesia and other parts of Southeast Asia, as well as to other regions, they nevertheless share a common pride in their homeland of Hadramawt. However, due to the continuation of civil conflicts even after unification of South and North Yemen, and the lack of any particular industry to speak of, the lives of most Hadramawt residents are far from affluent, and a considerable number of children are unable to enroll in school.

Oil-producing countries in the Arabian Peninsula, such as Saudi Arabia and Oman, have been transformed by their inordinate economic growth in recent years. However, Yemen cannot expect to achieve the same level of economic growth, because its resources are limited. The residents of Hadramawt, and particularly the poor who have experienced a change in social structure during Yemen's communist era, can only await a future vision that promises sustainability to the greatest degree.

In the recent flood, the fact that traditional settlements such as the old city of Shibam have received little direct damage indicates that these historical cities have properly judged their location as suitable to building a settlement through their long history. Moreover, the materials for traditional mud-brick buildings are amply supplied by the mud and sand carried to the wadi by annual rainfall and the slopes of the hills. Mud bricks harden under the scorching sun, and when they are no longer maintained and are left exposed to wind and rain, they return to the earth. The entire process from their production and usage to their disposal is extremely ecological. Since mud bricks also provide excellent thermal insulation, mud-brick houses are cool during the summer and warm during the winter. Additionally, beams inside mud-brick houses are made of date palms, which grow relatively quickly and are also used for flood prevention in the wadi. Wooden entrance elements are made of teak wood and versatile materials brought from afar. Excluding the fact that the white plaster called *nura*, which is applied to the mud-brick buildings as decoration and as water repellent, must be kiln-burned as part of its production process, the traditional buildings adopt an extremely advanced construction cycle that is ecological and recycle-oriented, particularly in today's society where global environmental issues are a serious worldwide concern.

When considering the present state of Hadramawt, it is perhaps best to re-acknowledge the architectural culture of sustainable and economical traditional mud-brick buildings and to maintain the traditional landscape, while also developing variations of the traditional to the future vision of cities.

5-4. Coordination with Social Development

To protect the traditional landscape, old cities that have hollowed out must be revitalized, and the residents themselves must recognize their urban culture as their identity and recapture the cycle of regular maintenance of mud-brick high-rise buildings. Needless to say, in today's society, such modern aspects as education, hygiene, medical care, and women's empowerment cannot be ignored. To balance the traditional and the modern, it is necessary to establish measures for preserving the unique cultural heritage in coordination with social and economic development initiatives in the Hadramawt region as a whole.

In the world heritage site of Shibam, deeper coordination with social development has begun to emerge, thanks to aid from the government of Yemen and other countries. Shibam would provide a meaningful example when expanding this type of social development to the entire Hadramawt region in the future. On the other hand, however, there is no denying that Shibam has become a special example within the Hadramawt region, due to its close ties with tourism.

On the side of cultural heritage conservation, we propose the preparation of a detailed report on the traditional settlements in the entire Hadramawt region as the first step toward cooperation with development initiatives. Despite the fact that there are a great number of settlements comparable to the world heritage site of Shibam throughout the Hadramawt region, no comprehensive building survey has been conducted to date. By producing some type of basic reference, such as an architectural register of settlements in Hadramawt covering not only the present state, extent of damage, history, and style of each building, but also more personalized information including ownership, number of residents and residents' views, a foundation could be created for the incorporation of cultural heritages in social and economic development initiatives.

Putting into perspective the urban culture of the Hadramawt region as a whole could also lead to the establishment of permanent flood control measures.

5-5. Proposal

Based on the recent survey, we have described the present state of traditional cultural heritage in Wadi Hadramawt and have discussed future policies based on it in the final chapter. From the perspective of a living heritage that is directly related to the wide-area culture and provides the foundation of people's lifestyles, a main goal lies in maintaining Hadramawt's cultural heritage in coordination with wide-area social development initiatives in response to the modern needs of local residents, not simply with a view to promoting tourism, but to reaffirm the awareness that the unique culture is the very basis of people's lives in the region. However, doing so is such an ambitious goal, that it cannot possibly be addressed in a short space of time, even considering the history of traditional building preservation areas in Japan. It is not simply a matter of requiring economic assistance or establishing a policy leader, be it the central or local government, but it calls for the voluntary cooperation and approval of each and every resident.

In order to achieve this ambitious goal, we Japanese have a realistic potential to do the following, though we cannot deny that the proposals presented below would be restricted to the buildings that have been investigated in the recent survey.

Firstly, Japan can help restore buildings that have suffered actual damage. Many privately-owned houses

are in critical state, but from the viewpoint of making a society-wide contribution, the restoration of buildings serving public functions should perhaps be given priority. Additionally, restoration initiatives that have been excessively concentrated in Shibam to date should be distributed to other cities and settlements as well.

Most Islamic religious buildings are relatively well taken care of [A- ③ , A- ⑤ , A- ⑦ , A- ⑧]. This is not only because they have been restored by the bureau of cultural property as buildings of historical significance, but also because they receive daily maintenance by virtue of the fact that personnel and economic foundations have been developed for their support. Among the properties investigated during the recent survey, Shaykh ‘Umar Ba Wazir [A- ⑥] is a suitable target for restoration, because although it is a historical monument, it has never been restored but maintains its original condition.

Most palaces, castles, and other publicly-owned buildings [A- ⑨ , A- ⑮ , A- ⑱] have been restored and opened to the public as museums. Kut al-Nahar [A- ⑮ (15)] and Husn al- Guwayzi [A- ⑬], which have suffered major damage in the recent flood, and Al-Fares Fort [A- ⑭], which is hard put to be opened to the public, are small-scale buildings that can be restored relatively easily. Large-scale buildings that require restoration include Husn al-Ranad [A- ⑨] and Qasr al-Mu’in [A- ⑫], which have suffered damage in the recent flood, and Husn bin Ayyash [A- ⑪], which remains unrestored.

Among these buildings, however, there are those where maintenance is clearly lacking, even though they have once been restored. This situation has made us aware of the difficulty of managing these buildings after placing them under public ownership and opening them to the public, unlike religious buildings that are an integral part of society. In order to solve this issue, restoration cooperation efforts should not only focus on the repair of buildings, but also on formulating a sustainable management plan for their use as museums or other public facilities.

The palace museum in Say’un [A- ⑩] has an extensive display of archaeological artifacts, and is functioning relatively well as a central cultural property to both the government of Yemen and the Governorate of Hadramawt. However, when considering the restoration and public opening of larger numbers of historical buildings in the future, there lies a challenge in providing functions that are sought by the people, with a conscious awareness of sharing the buildings with the local community. One method is presented in the example where a privately-owned residence is being maintained by giving it a modern, public function [A- ⑰]. However, such projects are left entirely up to individual owners as matters stand, so it would be necessary to establish a public cooperative framework.

Restoring privately-owned houses to continue using them as residences and to pass them down to the next generation as a family legacy is certainly the most effective means of maintaining the traditional settlement style of the Hadramawt region and creating Hadramawt’s specific future. However, there are few such examples [A- ⑯] in cities other than Shibam. At present, the issue primarily hinges on the conscience and financial ability of individual owners. Therefore, it is necessary to provide some form of public aid, as well as to establish legal restrictions on the modification of traditional buildings.

Secondly, Japan can cooperate in promoting awareness of archaeological heritages. We have included only two examples [A- ① , A- ②] in our list of architectures, but in addition to Islamic monuments, there exist many archaeological sites in Hadramawt that date back to the pre-Islamic period. So far, many foreign survey teams as well as Yemeni teams have undertaken the excavation of sites throughout Yemen. However, it should be noted that from the perspective of sharing the results of such archaeological surveys with society, the results of past excavation surveys have been sufficiently disclosed neither to the Yemeni side nor to foreigners in the form of written reports and museum catalogs or museum exhibitions. The disclosure of survey results is not only necessary for advancing research, but their broad disclosure to local residents could also provide an opportunity for them to reaffirm the value of their regional culture. Providing that opportunity to local residents is indispensable to changing their awareness of

cultural heritage conservation as the primary keepers of their cultural heritage.

Some possible measures for information disclosure include (1) creating a register of monuments in Hadramawt; (2) preparing a general brochure or museum guidebook containing the results of archaeological findings in Hadramawt; and (3) developing the sites of monuments that are in relatively good condition as historic landmarks. Measure (1) calls for the reassessment of the results of past surveys and the creation of the list of monuments while confirming their present condition. In measure (2), the brochure or guidebook should be created in Arabic and English, by consulting past excavation reports that have and have not been disclosed, as well as by requesting various survey teams that are currently conducting an excavation survey to provide a brief introduction of their findings. Measure (3) might be applied to the reinvestigation and development of the Raybun Monument, which has been left abandoned. In terms of funding, measures (1) and (2) could probably be implemented without requiring a large budget, but measure (3) may not be immediately possible. At the present stage, to prevent the collapse of the monuments and to leave open the possibility of developing them into a park in the future, excavated sites should at least be back-filled after excavation.

Thirdly, Japan could help create a list of traditional settlements, as discussed earlier. It is apparent even from looking at the settlements listed in the recent survey that, besides central cities which are surrounded by walls and whose histories are relatively known [U- ① , U- ③ , U- ⑬ , U- ⑭], there exist many settlements that are unique in their own way, in terms of their location or relationship with *shaykhsh* and the *Mansab*. Additionally, settlements such as Hurayda and 'Amd in Wadi 'Amd are also important, though we could not investigate them during this survey.

When conducting a survey of such settlements, it is obviously necessary to carry out an architectural survey, but it is also necessary to conduct interviews to assess the composition of residents and current issues they face.

Another important aspect to note is the conservation of cultural heritages other than buildings. For instance, Hadramawt is one of the greatest centers of literature and learning in the Arabian Peninsula, and large volumes of traditional documents can be found in old houses. However, these documents have constantly been exposed to the risk of loss due to frequent floods and termite damage. Moreover, during the South Yemen regime, historical houses that stored traditional documents were abandoned, leaving the documents were exposed to the risk of disappearance along with the buildings. Some manuscripts and public documents are now stored in public libraries and archives, but whether true records of people's tradition will be preserved depends on grass-roots conservation activities and residents' awareness of the value of their own history. In addition to restoring palaces, fortresses, and other traditional buildings, supporting the establishment of private archives, museums, and history and culture research centers by utilizing traditional buildings and historical houses and creating an inventory of buildings and documents would be a potential countermeasure to disasters that are anticipated in the future.

Japan has experienced the loss of many traditional cultural heritages that were an integral part of people's lives, during the period of rapid economic growth in the 1960s and the bubble economy period in the 1990s. Not only were valuable properties lost in the physical sense, but the all-too-rapid transformation brought dissonance to people's lifestyles and principles. This has taught Japan a lesson, and has made the Japanese people realize the significance of the surviving properties as their roots, and has promoted their awareness of the need to accumulate diverse measures for their conservation and restoration. This negative experience and positive accumulation could no doubt offer some form of wisdom to the future of Wadi Hadramawt.

APPENDIX

1. Research Schedule, 10 February – 21 February 2009
2. Wadi settlements in the Hadramawt Region
3. Historical monuments in the Hadramawt Region

APPENDIX 1 Research Schedule, 10 February – 21 February 2009

1. Period

10 – 21 February, 2009 (stay in Yemen: 11 – 20 February)

2. Purpose

Survey of the post-flood condition of the World Heritage Site of Shibam and the cultural and historical heritage of Hadramawt Governorate

3. Members

Naoko Fukami (Researcher, Institute of Industrial Science, University of Tokyo)

Tomoaki Okamura (Ph.D. candidate, University of Shiga Prefecture Graduate School)

Atsushi Matsuo (Engineer, Oyo International Corporation)

Makoto Arimura (Research Fellow, Japan Center for International Cooperation in Conservation, National Research Institute for Cultural Properties Tokyo)

Kentaro Tanaka (Deputy Director, Office for International Cooperation on Cultural Properties, Traditional Culture Division, Cultural Properties Department, Agency for Cultural Affairs, Japan)

Akiko Tashiro (Research Fellow, Japan Consortium for International Cooperation in Cultural Heritage)

4. Local Experts

Two members from Yemen's Ministry of Culture accompanied the Japanese members throughout the study.

Mr. Ahmad Saad Al Rawdy (Director (?), Sana'a History and Architecture Division, Ministry of Culture)

Mr. Abdulrahman H.O. Al-Saqqaf (Director, Wadi Hadramawt Branch Office, Antiquary, Museum, Archives Bureau, Ministry of Culture)

The driver was Mr. Mohammed N. Al Bedhani from the Universal Travel Agency.

5. Schedule

10 February (Tue)

- Departed Kansai International Airport for Sana'a via Dubai.

11 February (Wed)

- Arrived in Sana'a 9:00 a.m., local time. Met by Mr. Kawashima, from the Japanese Embassy in Yemen.
- Visit to the Japanese Embassy in Yemen: Meeting with Ambassador Masakazu Toshikage and Mr. Kawashima.
- Visit to the Ministry of Culture: Meeting with His Excellency Muhammad Abu Bakr al-Maflahi, Minister of Culture.
- Visit to JICA Office: Meeting with Mr. Kenichi Sasaki, Director, and Mr. Hama, Researcher.

12 February (Thu)

- Boarded a plane in Sana'a bound for Say'un, but low visibility due to a sand storm prevented the plane from landing at Say'un Airport. The plane continued to fly southward and landed in al-Mukalla (9:20 a.m.).
- Departed al-Mukalla for Say'un on a bus chartered by the airline company (12:00 p.m.), with the exception of Mr. Matsuo, who remained in al-Mukalla Airport, because he needed to return to Sana'a that same day, and the plane bound for Sana'a was scheduled to take off at 2:00 p.m. (Mr. Matsuo ended up returning to Sana'a the following day (2/12), however, because Sana'a Airport had closed down due to a sand storm and other circumstances.)
- Arrived in Say'un. Checked in to Al-Hawta Hotel (7:30 p.m.).

13 February (Fri)

- Visited the local settlements, monuments, and historical buildings in Wadi 'Adm (in the following order).
Kut al-Nakhr [A- ⑮]
Monument in Ghuraf Village influenced by the Sassanian Empire [A- ②]
Shaykh Umar Ba Wazir [A- ⑥]
Saf Village [U- ⑧]
- Turned back and headed for Tarim. Made a stop on the way at Thibi Village. [U- ⑦]
- Visited a number of residences in Tarim dating back to the beginning of the 20th century. [U- ①]
- Visited a mosque in Bor Village. [U- ④]

14 February (Sat)

- Visited settlements and historical buildings located east of Tarim (in the following order).
Plaster workshop in al-Juhayl Village [A- ⑱]
Qasam Village and the Shaykh residence in the village [A- ⑯]
Qabr Nabi Allah Hud: tomb of the prophet Hud [A- ⑧]
'Inat Village [A- ⑦]
- Returned to Tarim and viewed the outer walls and palace of the Sultan. [A- ⑨]
- Al-Suwayri Village [U- ④]

15 February (Sun)

- Say'un West Gate
- Say'un Museum [A- ⑩]
- Say'un Eastern Citadel: Restored with aid from Hadramawt Governorate, but remains incomplete, due to fund shortage. [A- ⑭]
- Traveled from Say'un to Wadi Daw'an.
Al-Mashhad Village [U- ⑨]
Raybun Monument [A- ①]
Al-Hajarayn Village [U- ⑨]
- Passed through Sif Village and arrived at Al Jazeel Hotel.

16 February (Mon)

- Survey of settlements and historical buildings in Wadi Daw'an (in the following order).
Khila Village [U- ⑩]

Hufa Village [U- ⑩]
Ribat Village [U- ⑫]
Al-Khurayba Village [U- ⑫]
Sif Village [U- ⑪]
Qaydun Village [U- ⑪]
Buda Village [U- ⑫]

17 February (Tue)

- Traveled southward from Wadi Daw'an and headed for the port city of al-Mukalla (visits made in the following order).
Al-Ghuwayzi Observation Tower [A- ⑬]
Al-Mukalla Museum [A- ⑫]
- Headed for al-Shihr from al-Mukalla.
Al-Shihr West Gate
Barracks, royal palace, ruins of the customs office, etc. in the old part of Al-Shihr [U- ⑭][A- ⑪]
Al-Shihr North Gate and Museum
- Traveled from Al-Mukalla to Say'un (3:00 p.m.) and arrived at al-Hawta Hotel at 7:30 p.m.

18 February (Wed)

- Say'un North Gate
- Say'un Museum [A- ⑩]
- Visited Ibn Obaidellah Center for Heritage and Society Service, built by Abdulrahman's brother [A- ⑰].
- Meeting with Mr. Ahmed Junaid Al-Junaid, Deputy of Hadramawt Governorate for the affairs of the wadi and desert districts, in Say'un.
- Ghurfa Village [U- ⑤]
- Old town of Shibam [U- ③]
- Qatn Village [U- ⑤]

19 February (Thu)

- Visited the GTZ Office in Shibam. Met with members of GTZ and GOPHCY. Joined by Mr. Tanaka, the Agency for Cultural Affairs and Ms. Tashiro from Japan Consortium for International Cooperation in Cultural Heritage, at the GTZ Office.
- Observed the perimeter wall of the city of Shibam and the irrigation system and dikes in the outskirts of Shibam; visited Minbar Museum in Shibam.
- Departed Say'un and returned to Sana'a (arrived at 5:00 p.m.).
- Dinner party at the Japanese Embassy with members from GTZ and the German Ministry of Economic Cooperation, the Yemen Minister of Culture, the Japanese Ambassador to Yemen, and others.

20 February (Fri)

- Departed Sana'a for Japan via Dubai.

APPENDIX 2 Wadi Settlements in the Hadramawt Region

Wadi Hadramawt

- U- ① Tarim
- U- ② Say'un
- U- ③ Shibam
- U- ④ Bor
- Al-Suwayri
- U- ⑤ Gurfa
- Qatn

Wadi al-Masila

- U- ⑥ Qasam
- 'Inat
- Al-Juhayl
- Hyde-Sarah
- Qabr Nabi Allah Hud

Wadi Thibi

- U- ⑦ Thibi

Wadi 'Adm

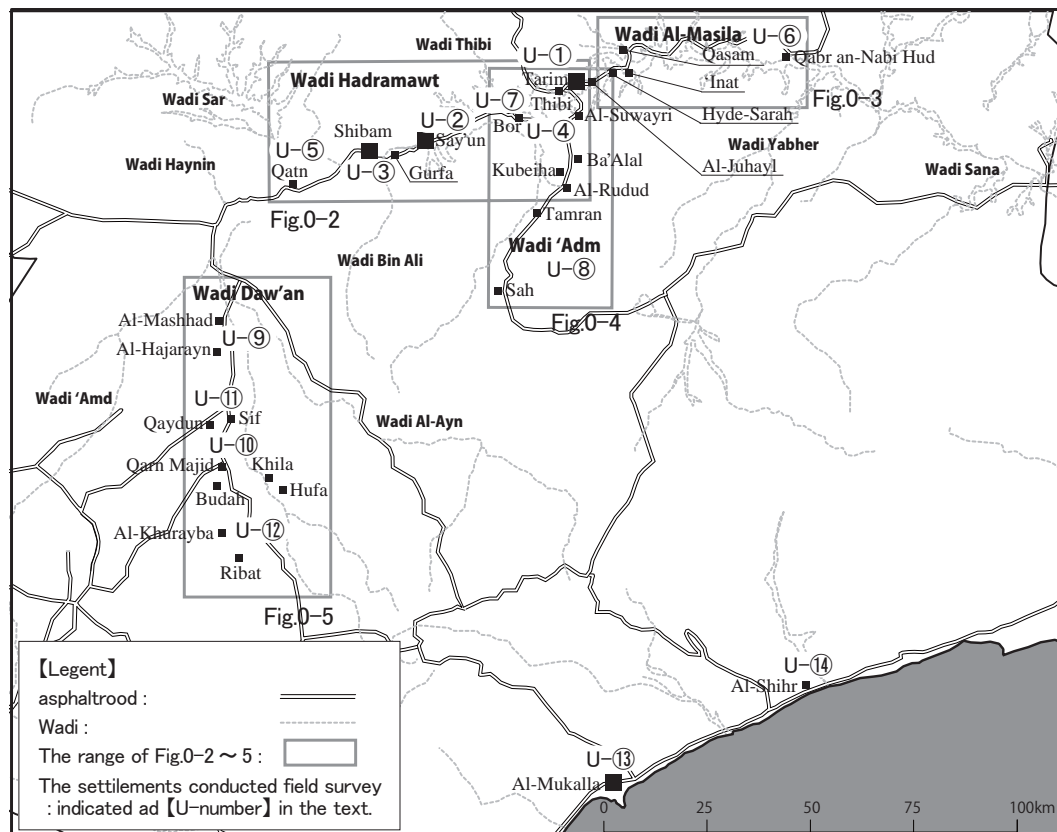
- U- ⑧ Ba'alal
- Kubeiha
- Al-Rudud
- Tamran
- Sah

Wadi Daw'an

- U- ⑨ Al-Mashhad
- Al-Hajarayn
- U- ⑩ Khila
- Hufa
- Qarn Majid
- U- ⑪ Sif
- Qaydun
- U- ⑫ Buda
- Ribat
- Al-Khurayba

Coastal area of Hadramawt

- U- ⑬ Al-Mukalla
- U- ⑭ Al-Shihr



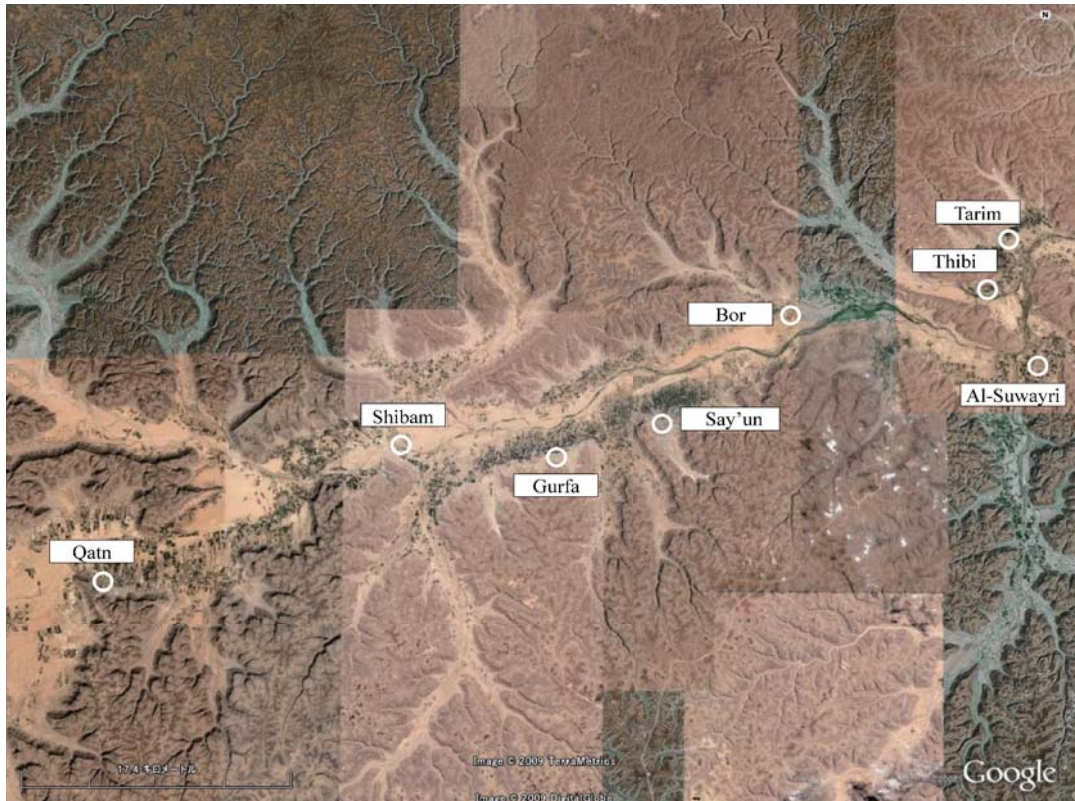


Fig. 0-2 The Distribution of surveyed settlements in Wadi Hadramaut (Google Map : image ©2009 Digital Globe).

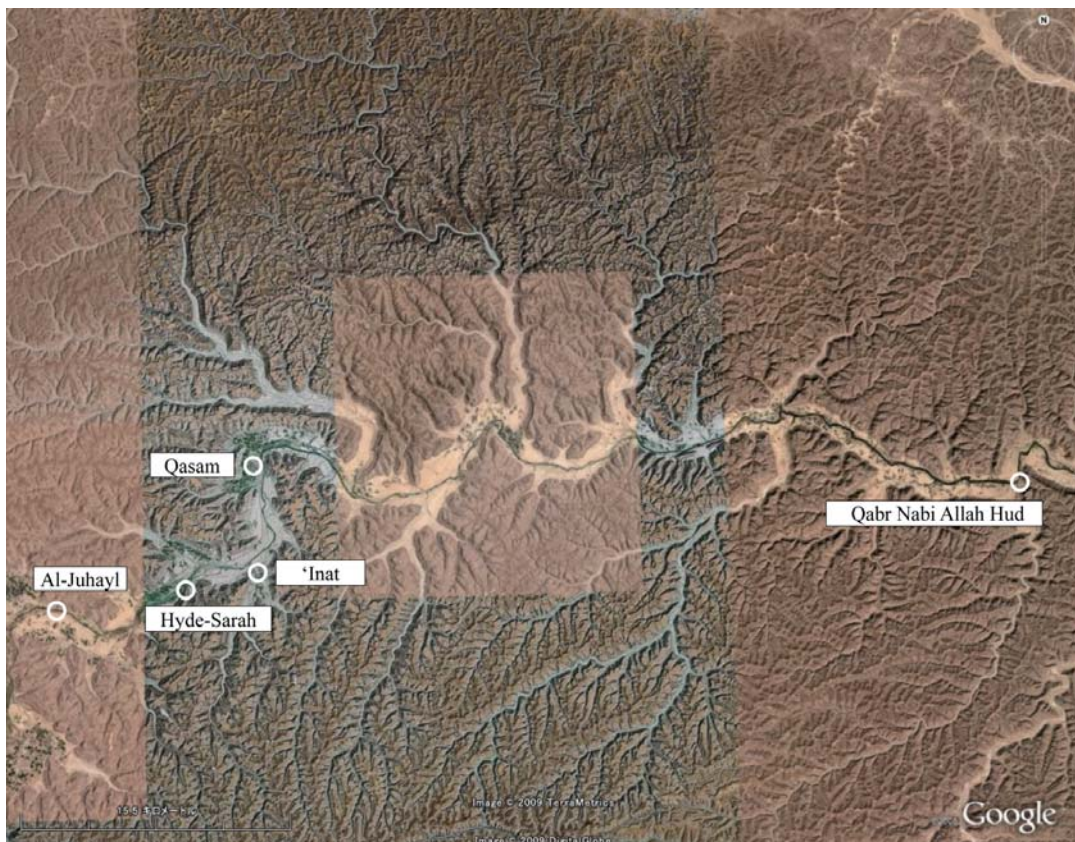


Fig. 0-3 Distribution of settlements in the conducted field survey in Wadi al-Masila (Google Map : image ©2009 Digital Globe).

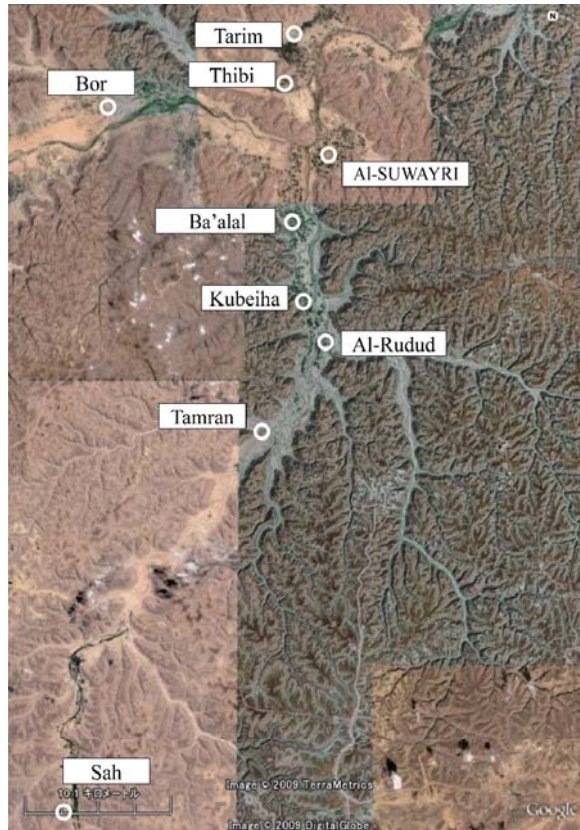


Fig. 0-4 Distribution of settlements in the conducted field survey in Wadi 'Adm / Thibi (Google Map : image ©2009 Digital Globe)

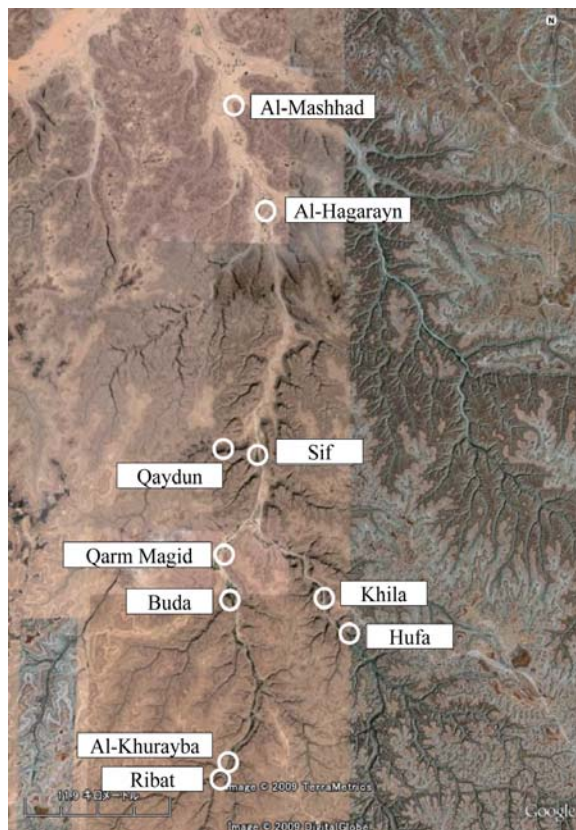


Fig. 0-5 Distribution of settlements in the conducted field survey in Wadi Da'wan (Google Map : image ©2009 Digital Globe).

U- ① Tarim / Wadi Hadramawt

Latitude: 16°3'36.00"N / Longitude: 48°59'60.00"E

Location and settlement overview

Tarim is located at the point where Wadi Hadramawt, flowing south-to-north from Ghuraf, curves to the east (Fig. 0-4). And the settlement occupies the southeastern foot of the slope. The wadi near Tarim is about 3km wide, and continues to Wadi Masila in the east.

Features of the settlement's form

The urban area of Tarim spreads out in a fan-like form along the slopes from east to south. Of note is the old city, which is located at the eastern foot of the slope and features an organic street network and three to four-story traditional mud-brick high-rise buildings (Fig. 1-2). The city core of Tarim consists of Palace, named Husn al-Ranad (currently under construction)[A- ⑨], located roughly in the centre of the city, which covers an area of 120m from east to west, and 80m from north to south (Fig. 1-3). In the foreground is the Royal Palace Square called *Midan* (Fig. 1-4), which covers an area of 40m from east to west, and 60m from north to south. The Palace resembles a small hill, and the ruins which is older than the upper part of the palace, have been discovered from its foundation, so it is one of the important historical sites in Tarim. The Friday Mosque was built in the neighbourhood to the north of *Midan*, and the *suq* (market) is located in the eastern part of the mosque. These public places are regarded as both symbolic places and public spaces for people in Tarim (Fig.1-4).

The foundation of Tarim goes back to pre-Islamic times, and in 1488 the al-Kathiri family established its capital there. The small elevated palace and the Friday Mosque built in the northeast of the palace dates back to the ancient times. It is believed that Tarim was a small town where the houses were built around the fort and the mosque.

At next stage, the first city wall was built in the 17th century, as the urban area had developed, although it no longer exists. It is apparent from the location of old mosques that the area surrounded by the city walls was an irregular shaped rectangle centering on the present Friday Mosque, which is 300m from east to west, and 250m from north to south¹. The south wall of the palace stands near the south boundary of the city walls; similarly the al-Mihdar Mosque (Fig. 1-5) and two other mosques stand on the southern edge of the city walls to the southeast, whilst two others stand on its northeastern edge near the north wall.

During the 19th century the second city walls were built in a semicircle around the southeast part of the slope, and even today some parts of the city walls still exist. The semicircle has a radius of 1km. The area within the new city walls includes not only residential areas, but also large stretches of green space. Moreover, the Muslim cemetery set up on the west slope abutted the inner city wall.

In the expanded area to the east of the old city, once enclosed by the city walls, the streets are said to be only slightly systematic, the houses are sparsely distributed, and there is an oasis with palm trees stretching from north to south. To the roadside of this area are 21 magnificent western style residences, established by the al-Kaf family who were based at Tarim from the late 19th century to the early 20th century (Fig. 1-6). The residences are straightforward multilayered structures, but they are different from the traditional houses and most of them have a large garden. Furthermore, in the late 20th century the city sprawled through a wide area with new residential areas were constructed by the east and west city walls.

Damage description

Although there appears to be no direct damage from flooding, damage from intensive rainfall was observed in many places. It should be noted that the northeast parts of the Royal Palace did collapse after a flood, however.

1 The size of city walls is based on an interview with Mr. Muhanmad Abdullah al-Junayd, Director of the al-Nur Center in Tarim.

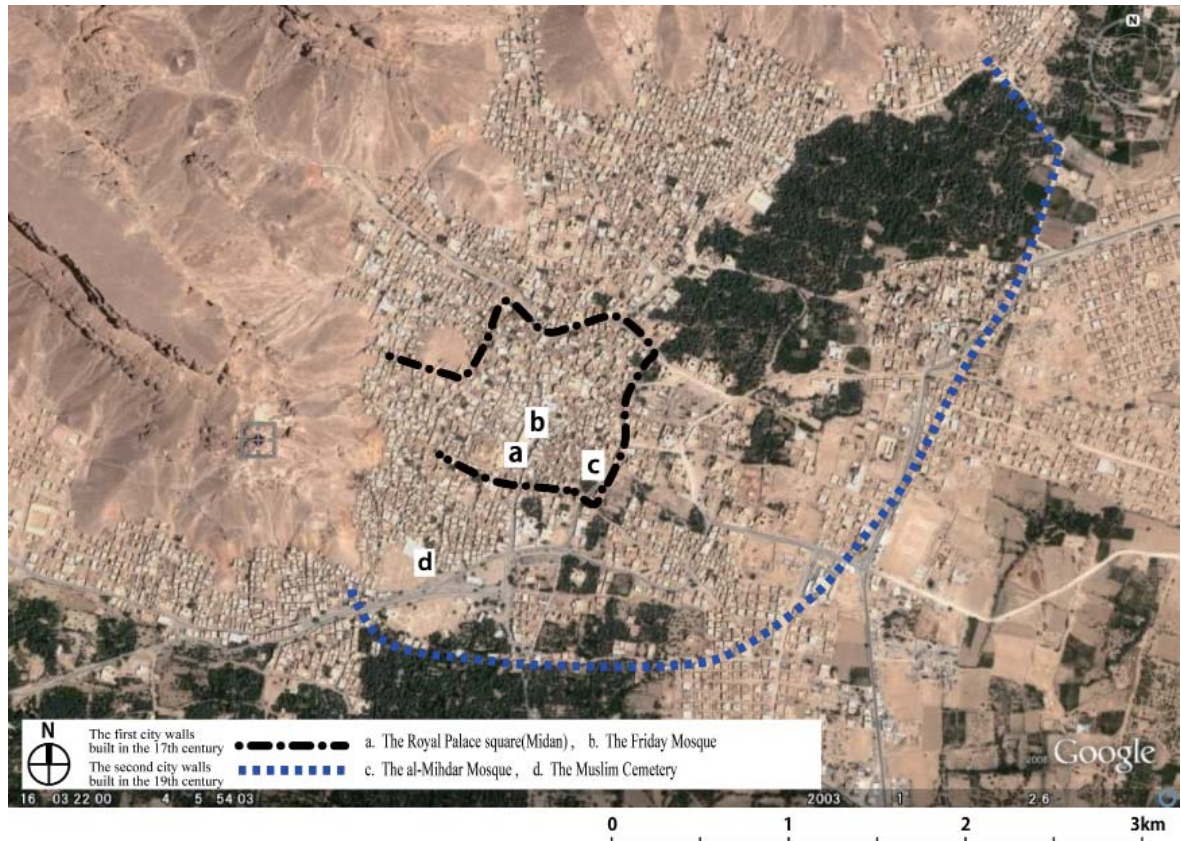


Fig. 1-1 The old city of Tarim (Google Map : image ©2009 Digital Globe).



Fig. 1-2 High-rise houses in Tarim.



Fig. 1-3 The Royal Palace Square (midan) in Tarim (Google Map : image ©2009 Digital Globe).



Fig. 1-4 Looking out from the rooftop of the Royal Palace.



Fig. 1-5 The al-Mihdar Mosque.



Fig. 1-6 Residential Architecture designed by Alawi al Kaf.

U- ② Say'un / Wadi Hadramawt

Latitude: 16°3'36.00"N / Longitude: 48°59'60.00"E

Location and settlement overview

Say'un, which is located roughly in the centre of Wadi Hadramawt, prospered as trading and political centre from ancient times (Fig. 0-2). It is the modern capital of the Hadramawt Governorate, approximately 160km from the port city of al-Mukalla on the coast.

Features of the settlement's form

The Wadi Hadramawt runs from east to west, and is about 4km wide from north to south near Say'un. Two narrow wadis flowing from south to north connect at the southern edge, forming a tongue-shaped hill. The present residential area spreads from the north to the east across the foot of a tongue-shaped plateau (Fig. 2-1). The eastern side of wadi is about 1.5km wide. Along the slope on the western side of the north-south road that passes nearly through the centre is the old city, with a densely built-up residential area. The urban area has been extended across this narrow wadi from east to south, and to the eastern slope of the western wadi enclosing the hill, thus the new city has been systematically segmented.

The main gates, which were constructed in the late 19th century, stand at the northwest and the north of the city. The west gate is located roughly 1km to the west of the Royal Palace (Fig. 2-1: b), and the north gate is roughly 300m to the northeast of the palace (Fig. 2-1: c). There is also al-Fales fortress [A- ⑭] nearly 1.5km to the east of the palace (Fig. 2-1: d). The city walls were built in the north of the city, connecting the west and the east cliffs, and the site of the walls can still be seen on the eastern side of the fort (Fig. 2-2). It can be imagined therefore that the walls were built to block the northern approach, incorporating the characteristics of the east wadi running from south to north (Fig. 2-2).

One of the major places in Say'un is Tahrir Square (Fig. 2-3), located in the north of the old city (Fig. 2-1: a). On the east side of the square is the Sultan al-Kathiri Palace (currently the National Museum in Say'un) [A- ⑩], with the Friday Mosque in the north. To the south is a shopping street, including the *suq* (market) trading mainly in handicrafts (Fig. 2-4). The ruins of the old palace are located on the slope of the west side of the square. Through the passage between the market and the palace is the Muslim cemetery, situated to the southeast of the palace, suggesting that this area has been traditionally a centre of government, religion and commerce.

As if this area like the node of urban structure, the urban area spread towards the west and the south. Inside the old city is a complicated network of streets and three-story traditional houses built mainly of mud-brick. The old city is dotted with mosques, which implies neighbourhood units have been formed around the mosque.

There is no single style of the traditional houses. On the one hand, some houses have a roughly 2.5m low-rise wall surrounding the building and the small backyard; on the other hand, some have thick walls to strengthen mud walls (Fig. 2-5). In the case of huge houses, its plan is complicated, and there are cases where neighbouring houses have created a small neighbourhood unit by means of connecting *mazalla* (connecting passages on the upper floor) (Fig. 2-6).

Damage description

The cityscape formed by traditional houses is relatively intact, and it would appear that the recent flood caused little damage. In the old city, some houses have no regular maintenance, and consequently they are becoming noticeably vacant, or even dilapidated. In the developing area near the Royal Palace, reinforced concrete buildings have increased, and in many cases they are replaced by buildings that combine new techniques with traditional style.

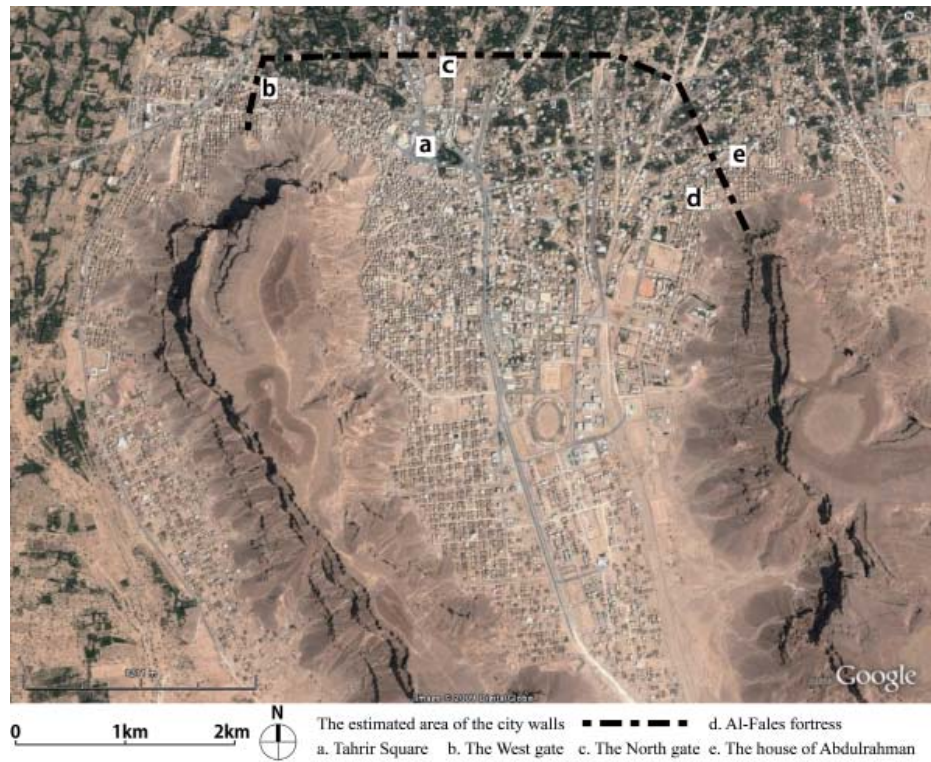


Fig. 2-1 Say'un (Google Map : image ©2009 Digital Globe).



Fig. 2-2 The city walls in the northeast of the city, looking out from al-Fales fortress.



Fig. 2-3 The area surrounding Tahrir Square (Google Map : image ©2009 Digital Globe).



Fig. 2-4 The panoramic view of the north of the old city.



Fig. 2-5 Traditional settlements in the old city.

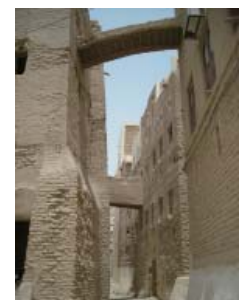


Fig. 2-6 Mazalla on the street.

U- ③ Shibam / Wadi Hadramawt

Latitude: 15°55'32.25"N/ Longitude: 48°37'36.78"E

Location and settlement overview

Shibam is located roughly in the centre of Say'un and Qatn in Wadi Hadramawt (Fig. 0-2). About 7ha of the old city within the rectangular wall was registered as a World Heritage site in 1982. The population of the old city was approximately 3,000 people 40 years ago², however this has increased due to the replacement work and development assistance of the Hadramawt Government and GTZ; as of February 2009, there are 437 houses and about 7,000 people living within the city walls, while 33 houses are empty (Fig. 3-1).

On the slope across the riverbed located in the south of the old city, there is a residential area called Sahil Shibam³, which was urbanized in the late 20th century, and presently has a population of about 15,000 people (Fig. 3-4). The farming land spreads to the west, north and south parts of the old city; there is a lifeguard tower called *shuqayya* here, and irrigation canals are scattered about. In the west of Shibam, there is a traditional irrigation system distributing water from the riverbed, which supplies the vast area of farming land.

Features of the settlement's form

The gate is located in the southeast part of the old city. Public architecture, such as the palace [A- ①⑨] and old hospital, cover the eastern corner of the city wall (Fig. 3-3). In the other parts of the old city, except for four squares (*sāhāt*) and six mosques which function as public spaces, multi-story houses almost equivalent size to those public buildings are located along streets⁴.

Each house occupies site approximately 100 to 150m², and it is notable that the traditional settlements in Hadramawt (Fig. 3-2) have been formed from unusually high seven-to-eight story high-rise houses [A- ①⑨]. It has been reported that some of the houses date back to the 16th century, but most of them were built about 100 years ago. The mud-brick buildings need regular maintenance, although in many cases they are replaced with new buildings. The high density of closely-packed residential structures in Shibam is the combined result of successive traditional housing styles over the years within the limited area that is surrounded by the city wall, spanning 320m from east to west, 230m from north to south. High-rise houses are owned by individual families, and same method is applied to a property when it is rebuilt.

On the other hand, in Sahil Shibam the gardens of wealthy people living in the old city, and low-rise buildings of working class people, were built in the 1920s (Fig. 3-6). During the gradual urbanization process, larger houses (compared to those in the old city), with three or four stories, were built. The town block is wider than that of the old city, and rectilinear in shape. Sahil Shibam is still expanding towards the east, where public facilities such as schools, hospitals, and new houses have been built.

Damage description

The northern houses near the riverbed in Sahil Shibam were swept away by a flood, and they had already been rebuilt as of February 2009. The raised old city of Shibam does not appear to have received any direct flood damage. However, damage from rainfall was observed, and the northern wall of the city is still damp (Fig. 3-5).

2 According to Damluji, in 1976 the old city of Shibam had 500 houses with a population of 3,491 people (Damluji 1992, p. 76).

3 According to Damluji, in 1982 Sahil Shibam had 342 houses with a population of 2,079 people (Damluji 1992, p. 74).

4 Regarding commercial facilities, there was a shop on the ground floor of one of the houses in the eastern area of the Friday Mosque. Periodical markets were opened in the Friday Mosque Square.

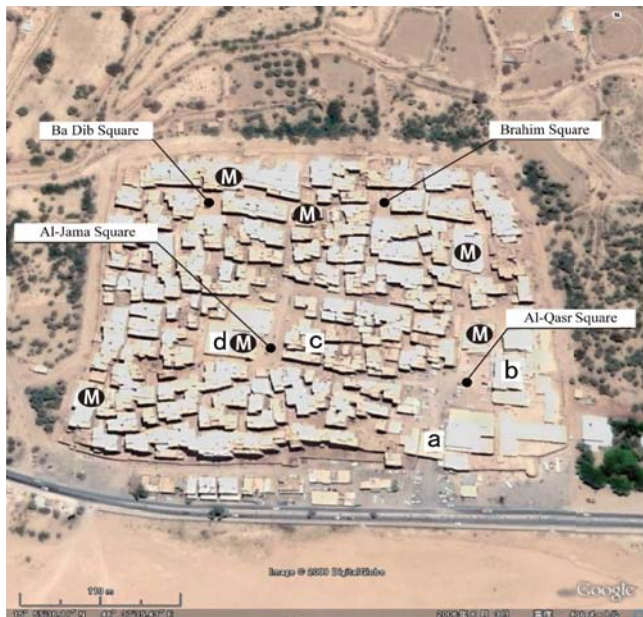


Fig. 3-1 The old city of Shibam
(Google Map : image ©2009 Digital Globe)



Fig. 3-2 The old city and the high-rise buildings.



Fig. 3-3 The square in the southeast side of the old city.



Fig. 3-4 The area surrounding the old city.



Fig. 3-5 The northern city walls.



Fig. 3-6 The northern façade of Sahil Shibam.

U- ④ Bor, Al-Suwayri / Wadi Hadramawt

Bor Latitude: 16°0'28.22"N / Longitude: 48°52'15.61"E

Al-Suwayri Latitude: 15°58'42.24"N / Longitude: 49°1'17.54"E

Location and settlement overview

These settlements lay between Say'un and Tarim, where east-west Wadi Hadramawt merges with Wadi 'Adm from the south (Fig. 0-2). They are located about 9km southwest of Tarim. Bor is located in a flatland that is 2km away from east-west arterial highway running in the riverbed of the wadi in the direction of north. al-Suwayri is located at the bending point of Wadi Hadramawt where formed by the confluence of Wadi 'Adm.

Features of the settlement's form

The settlement in Bor is located where the north-south main street to the arterial highway curves sharply to the west. The residential area spreads out on both sides of the north-south road, consisting of about 130 houses (Fig. 4-1).

The Friday Mosque is located in the eastern part [A- ③], and dates back to the 10th century⁵. The east side of the Friday Mosque are the ruins of many houses, which imply the town gradually spread westward with the construction of asphalt roads (Fig. 4-3). In the south of the arterial highway, well-formed houses are systematically built, and at present it can be said that the town has been gradually developed from the north towards the south. The houses located in the surrounding area are made of mud-brick⁶ and are of a two or three-storied structure. The layout of the houses is well organised, orderly situated upon grid-like streets, and different from the old city of Say'un and Tarim, where somewhat awkward-shaped high-rise houses are highly concentrated (Fig. 4-4).

Al-Suwayri is a town covering an area of about 650m from east to west and about 750m from north to south (Fig. 4-2). The settlement consists of the residential area where the central Friday Mosque and traditional houses are intricately concentrated, and another section, which is systematically arranged in blocks in that external area. The former is a part of the old city, covering a circular area with a radius of about 120m. In the south region of the old city, the gateway of the old city still stands (Fig. 4-5). The two-story houses with terraces are of a traditional mud-brick construction. The premises sizes vary widely. For example, the houses of a merchant, who made his fortune trading with Indonesia in the early 20th century, has huge premises, and has been embellished by equipping the main gate (Fig. 4-6).

The other part of the city covers a grid-like area with a roughly 350m radius from the Friday Mosque, and a recently asphalted road connects it to the old city. The houses are low-rise compared to the traditional houses in the old city, but many of them have a wide rectangle yard. There were also observed instances of people cultivating vegetable gardens in these yards.

Damage description

No direct flood damage was apparent, but the buildings of the old city have become decrepit with extended vacancy. On the other hand, the new city has developed towards the external areas of the town.

5 At the southern end of Wadi Hadramawt, located south of Bor, there is a grave of Saint Sayyids Ubaidullah ibn Ahmad ibn Isa, who founded the mosque in Bor. The grave is a pilgrimage site, and the modern mosque has been built at the foot of the wadi.

6 The standard size of mud bricks used in traditional housing is 470mm in length, 300mm in width, and 55mm in thickness.



Fig. 4-1 **Bor** (Google Map : image ©2009 Digital Globe).



Fig. 4-2 **Al-Suwayri** (Google Map : image ©2009 Digital Globe).



Fig. 4-3 **Bor**, piled-up mud bricks in the remains of houses.



Fig. 4-4 **Bor**, eastern side of the residential area.



Fig. 4-5 **Al-Suwayri**, south gate of the old city.



Fig. 4-6 **Al-Suwayri**, merchant's house.

U- ⑤ Gurfa, Qatn / Wadi Hadramawt

Gurfa Latitude: 15°54'0.01"N / Longitude: 48°39'51.45"E

Qatn Latitude: 15°50'36.30"N / Longitude: 48°27'9.56"E

Location and settlement overview

The settlements are located in Wadi Hadramawt along with Say'un and Shibam (Fig. 0-2). Gurfa is located roughly in the centre of the arterial highway that connects Say'un to the east and Shibam to the west. Qatn is situated roughly at the western edge of Wadi Hadramawt, about 20km from Shibam to the west, and is almost a gateway to Wadi Daw'an which diverges from Wadi Hadramawt to the south.

Features of the settlement's form

Gurfa spreads in a crescent across the slopes jutting from the south (Fig. 5-1). Old houses lie along the gently sloping land, approximately 750m from east to west, and about 250m from north to south (Fig. 5-2). In the surrounding flatland, a well-organised residential area has emerged, and continues to extend westward; indeed the settlement sprawls extensively.

At the foot of the settlement, two kut (lifeguard towers) presently stand on a stretch of palm tree land. The houses forming the cityscape are three-story mud-brick structures, and the stairs are built on steep walkways (Fig. 5-3). Near the summit of the slope, the site of a qal'a (fort) can still be seen (Fig. 5-4). At the beginning of the 20th century, the surrounding city walls were built by the emerging Shibam-based Qu'ayti family in preparation for conflict with the Say'un-based al-Kathiri family. At the foot of the slope, the Friday Mosque is located as a focus of the residential area.

Qatn is situated alongside the dogleg western edge of the hill slope, and its residential area has grown alongside the arterial highway, about 9km from east to west (Fig. 5-5). In the westerly area of the central settlement, there is the Friday Mosque, and the square facing Bā Hariz palace which used to be owned by the Qu'ayti family (Fig. 5-6). In the area to the south of the square is the old city, including three-story traditional houses irregularly located on the slope (Fig. 5-7).

In this survey, it was found that the houses on the hill in the old city were prominently devastated in an advanced state of disrepair. Alongside the east-west arterial highway, which is the present city axis, there are new houses, concrete block structured public facilities, and shops. It is possible to speculate that the city has spread eastwards as the road to the east-west arterial highway has been improved

The Royal Palace of the Qu'ayti family is a white plaster-coated building with six-story terraces (Fig. 5-6). The façade of the royal palace has a wooden opening, transom windows under 3 to 4 horseshoe arches, and is decorated with plant and flower motifs. This kind of Indian/Islamic architectural design can also be seen in the ogee arch in the upper part of the window frames, *chahatri* (kiosk) on the terrace, and the oriel windows.

Damage description

In the case of these two settlements, no direct damage was observed. This is partly because they are standing on the slope, and partly due to the palm trees that have been planted in the foreground, the result of past experiences with floods in ancient times. However, some scattered houses on the hill in the old city are vacant and have been seriously damaged by rainfall. In many cases, they have become derelict, with cracked plaster on the exterior walls and rooftops that has led to collapsed roofs and flood damage. This can be attributed the fact that people have moved to the newly developed town, for greater convenience (Fig. 5-7).



Fig. 5-1 Gurfa (Google Map : image ©2009 Digital Globe).



Fig. 5-2 Gurfa, overlooking the settlement from the hilltop.



Fig. 5-3 Gurfa, traditional houses and streets in the old town.



Fig. 5-4 Gurfa, the site of the fort on the hilltop.

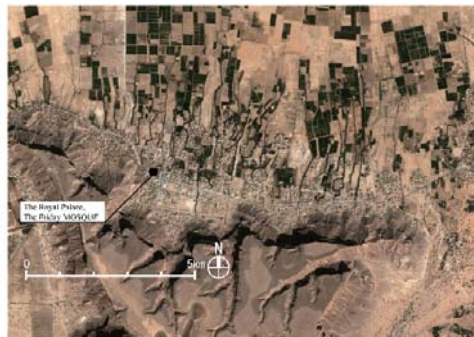


Fig. 5-5 Qatn (Google Map : image 2009 Digital Globe).



Fig. 5-6 Qatn, the Square in front of the Royal Palace and the Friday Mosque Square.



Fig. 5-7 Qatn, overlooking the old city from the hilltop.

U- ⑥ Al-Juhayl, 'Inat, Hyde-Sarah, Qasam, Qabr Nabi Allah Hud / Wadi al-Masila

Al-Juhayl Latitude: 16°3'43.04"N / Longitude: 49°1'27.37"E

Qasam Latitude: 16°7'51.17"N / Longitude: 49°9'3.77"E

'Inat Latitude: 16°4'21.37"N / Longitude: 49°8'56.72"E

Qabr Nabi Allah Hud Latitude: 16°6'10.06"N / Longitude: 49°34'6.09"E

Hyde-Sarah Latitude: 16°3'57.58"N / Longitude: 49°6'35.45"E

Location and settlement overview

Wadi al-Masila flows about 120km to the east of Tarim, and curves sharply in an L-shape in some places; it also becomes extremely narrow in some locations (Fig. 0-3). The riverbed continues to the Wadi Sana in the east, and many Kut and Husn from old times can be found on the slope. Settlements are located; Al-Juhayl in cleared land cut out of the cliff; 'Inat and Qasam in between the slope and the flatland where the wadi curves in an L-shape; Hyde-Sarah alongside the arterial highway; and Qabran-Nabi Allah Hud in the upper point of the wadi.

Features of the settlement's form

Al-Juhayl is a small settlement formed by cutting away the cliff of the hill slope. It is surrounded on three sides by steep cliffs, and at the foot three-story houses are systematically built up (Fig. 6-1, 6-2). The same cliff-cutting technique is used by five plaster factories [A- ⑮] in the area.

Hyde-Sarah is located alongside the arterial highway on the route to 'Inat in the east, and included two- and three-story houses.

The residential area in 'Inat spreads over an area about 1km in circumference, and is broadly divided into three parts. The oldest part is uphill in the south, about 700m from the bottom of the wadi. At the foot of the settlement, there is Masjid al-Faqih [A- ⑤], established in about the 14th century, and in the foreground is linear form of the *suq* market (Fig. 6-3). The traditional houses are basically three-story and located on the slope (Fig. 6-4). The town has expanded northeastward across the river, and at the corner there is a vast enclosure that includes seven holy tombs and burial grounds [A- ⑦].

Qasam is a settlement formed on flatlands spreading out from the fringe at the bending wadi. In the central square of the town, there is a market and a water place (Fig. 6-5). Most of the houses are of two or three-stories (Fig. 6-6). On the outside of the town are the *shaykh's* house [A- ⑩] and the Friday Mosque.

Qabr Nabi Allah Hud is located at the upper point of valley, and developed alongside the slope of a small hill in the south (Fig. 6-7). Alongside the slope in the town, there are some shrines [A- ⑧] where huge rocks are placed as symbols of religious belief (Fig. 6-8). During the birthday celebration of *nabi*, prophet, this thinly-populated town is filled with visitors. People make a pilgrimage from the riverbed to the hilltop, walking around some springs and rocks. During the research survey, accommodation for pilgrims was under construction all around the town.

Damage description

In general, flood damage can be more observed in the newly developed residential area in the centre of the settlement. Flood damage to the traditional houses does stand out however in the developed parts cut into the cliff of the wadi, and the newly expanded parts around the arterial highway from the old city located on the slope of the valley; the lower walls on the ground floor have partially fallen off, and some houses have been partially destroyed.

Because Wadi al-Masila has a narrow valley, an expanding or newly established settlement has no other choice than to build on the flatland at the bottom of the valley, which is susceptible to direct flooding. As a result, settlements tend to spread along the soft-grounded frontier area and alongside the arterial highway, which is similarly susceptible to direct flood damage.

Consequently efforts to counter this threat need to be considered. For example, in Hyde-Sarah it appears palm trees are needed alongside the river in order to prevent flooding. Moreover, in towns that have expanded to the bottom of the wadi, such as Qasam, installation of irrigation systems adapted in Shibam have to be considered.



Fig. 6-1 Al-Juhayl (Google Map : image 2009 Digital Globe).



Fig. 6-2 Al-Juhayl, looking at the settlement from the roadside.



Fig. 6-3 'Inat, a suq in the old city.



Fig. 6-4 'Inat, the old city, the hill top area surrounding the Mosque.



Fig. 6-5 Qasam, the square in the centre of the city.



Fig. 6-6 Qasam, the cityscape.



Fig. 6-7 Qabr An Nabi Hud (Google Map : image 2009 Digital Globe).



Fig. 6-8 Qabr Nabi Allah Hud, overlooking the settlement from the hill.

U- ⑦ Thibi / Wadi Thibi

Latitude: 16°1'20.86"N / Longitude: 48°59'28.86"E

Location and settlement overview

Wadi Thibi is a tributary wadi and joins together Wadi Hadramawt at the south of Tarim, flow from about 20km in a northwestern direction (Fig. 0-2).

The settlement in Thibi is situated on lowland, close to the wadi, and the river runs just south of the settlement (Fig. 7-1). In the surrounding area palm trees have been planted, but most of them were uprooted by the flood and the settlement suffered great damage on the inner side of residential area (Fig. 7-3).

Features of the settlement's form

Thibi is a settlement lying on the both sides of the east-west arterial highway (Fig. 7-2). The settlement covers an area of 1km from east to west, 350m from north to south, and the residential area consists of a grid of streets and well-organized houses. According to Mr. Abudulrahman, the settlement in Thibi was constructed in the early 19th century. Under the political control of the Qu'ayti family, it would appear that Thibi was one of the newly-constructed settlements in the Hadramawt region when a lot of new capital flowed into inland cities such as Say'un and Tarim from ocean trade based on the port city al-Mukalla.

Alongside the main roads running in the east and west sides of the settlement, two and three-story mud-brick houses and concrete-block public buildings are located in an orderly fashion (Fig. 7-4). At present the roads continue to the west and north sides of the settlement, and furthermore to the riverside of on the opposite shore, and some well-organized small housing areas are scattered about. In recent years the town seems to have sprawled toward the fringe of the river, due to dilapidation in the town centre and empty houses. This kind of settlement arrangement differs from the traditional settlements located in Hadramawt, which tend to be formed on the slope of cliff.

Damage description

The survey revealed extensive damage in this area. Most of the southern half of the settlement was swept away by the flood. Most of the houses that remain are heavily damaged (Fig. 7-5, 7-6). It can be said that the settlement suffered great damage because of its location alongside the river, which is obviously susceptible to flood damage.

After the recent flood, reconstruction of the traditional housing systems must be reconsidered. In particular, it will be essential to plant palm trees alongside the river where it abuts the settlement to prevent flooding, or to publish hazard maps to educate the local people on the dangers of future flooding.



Fig. 7-1 **Wadi Thibi and the location of the settlement**
(Google Map : image 2009 Digital Globe).



Fig. 7-2 **Thibi** (Google Map : image 2009 Digital Globe).



Fig. 7-3 **The area surrounding the settlement, the date palm forest swept away by flood.**



Fig. 7-4 **Residential area spread alongside the road.**



Fig. 7-5 **Partially-destroyed houses with exposed interiors.**



Fig. 7-6 **Fully-destroyed houses alongside the arterial highway.**

U- ⑧ Ba'alal, Kubeiha, Al-Rudud, Tamran, Sah / Wadi 'Adm

Ba'alal Latitude: 15°56'15.09"N / Longitude: 48°59'43.59"E

Kubeiha Latitude: 15°53'23.14"N / Longitude: 49°0'7.91"E

Al-Rudud Latitude: 15°51'55.40"N / Longitude: 49°0'56.92"E

Tamran Latitude: 15°48'31.09"N / Longitude: 48°58'28.88"E

Sah Latitude: 15°56'15.09"N / Longitude: 48°59'43.59"E

Location and settlement overview

Wadi 'Adm, which is about 60km long, stretches and turns to southwest direction from the point where Wadi Hadramawt curves near Ghuraf to the north (Fig. 0-4). Ba'alal and Kubeiha are located at the approach of Wadi, al-Rudud and Tamran are located at the junction of the east-west flowing wadi, and Sah is located in the uppermost part of the valley. The width of the wadi gradually becomes narrower as it becomes deeper.

The current arterial highway that cuts through Wadi 'Adm was initially developed as a motorway to connect Tarim and a port city, al-Shihr in the coastal area. It was built in 1937 by the al-Kaf family in Tarim, and used to be called the 'al-Kaf road'. However, it was abandoned in the face of strong opposition from the Bedouin governing the caravan trade. A river is flowing northwards at the bottom of the wadi from a deeper part of the wadi in the south. The level of the river was noticeably high during this research survey in February. Palm trees had been swept away by the flood, and it was observed that some of the bank protection work that had been done before the flood was damaged (Fig. 8-1).

Features of the settlement's form

Ba'alal, a village famous for producing wheat, has huge three-story houses. As it is located on the western slope to the wadi, and far from the river which flows on the easterly side of the wadi, there was relatively little flood damage to be seen.

In Kubeiha, traditional two and three-story houses line the arterial highway on the sloping land. Al-Rudud is a settlement located on the eastern opposite side of the arterial highway, over the river close to the west side of the wadi.

Tamran is located on the western side of the arterial highway. Huge three-story houses are lined up between the roadside and the slope.

Sah is situated at the deepest point of Wadi 'Adm. Houses with three-story structures have extended in a line on a north-south axis between the roadside near the river, and the slope (Fig. 8-2). It is the hometown of merchants based in Kuwait, Iraq, and Saudi Arabia, who have constructed a number of new houses in the town in recent years. In the recent flood, the houses alongside the river were swept away and completely destroyed, and the remaining houses and public buildings have been affected by the damage (Fig. 8-3, 8-4, 8-5). It is possible to assume that the extensive damage was the result of the town's location in the deepest part of the wadi, where the valley becomes extremely narrow.

Damage description

It can be assumed that the flood damage observed in Sah can be attributed to the vulnerable location of the settlement, which has been formed alongside the river. Before the flooding occurred, preventative work was carried out in the watershed area by packing stones into wire mesh, and by concreting parts of the bank for protection; nevertheless, a large part of the area was devastated by this flood. In order to reduce flood damage in the future, it is necessary to plant palm trees, and to designate the surrounding area of the river as a dangerous region.



Fig. 8-1 The riverbed of Wadi 'Adm.



Fig. 8-2 Sah, a settlement constructed alongside the road.



Fig. 8-3 Sah, damage to streets and traditional houses.



Fig. 8-4 Sah, completely destroyed houses.



Fig. 8-5 Sah, damaged public building (Mosque) in the town.

U- ⑨ Al-Mashhad, Al-Hajarayn / Wadi Daw'an

Al-Mashhad Latitude: 15°34'23.95"N / Longitude: 48°18'47.97"E

Al-Hajarayn Latitude: 15°29'19.82"N / Longitude: 48°20'14.63"E

Location and settlement overview

The huge Wadi Daw'an is about 95km long, and merges at the western edge of the Wadi Hadramawt where many traditional settlements are situated (Fig. 0-5). The existing arterial highway leads to the provincial capital, al-Mukalla, alongside the Wadi al-'Ayn which diverges from al-Mashhad. Both al-Mashhad and al-Hajarayn are settlements formed in the northern part of the Wadi Daw'an. al-Mashhad is located in the southern area where the Wadi al-'Ayn diverges in the east, and just to the west is Raybun [A- ①], a site that dates pre Islam. Al-Hajarayn is located about 8km south of al-Mashhad, and is sited on the slopes of high hill.

Features of the settlement's form

In al-Mashhad there are religious facilities, such as the Islamic mausoleum⁷ in the eastern district across the north-south arterial highway, and the old city spreads over the western area (Fig. 9-1). The old city is no uninhabited, and in many places has half fallen into ruin. The Friday Mosque is almost in the centre of the city, and in the surrounding area are single-story buildings with shops, which form the square of the *suq* (Fig. 9-2). On the side near the arterial highway is the site of the former reservoir. Traditional mud-brick two and three-story houses are sprinkled about. Generally the ground floor is used as a shop, a storage, or a stable whilst the upper rooms are furnished for the family (Fig. 9-3, 9-4). The house plan is based on surrounding form, where stairs wind around a central pillar. The ceiling is only as high as a man, and very low compared to that of the other houses in the settlement.

Al-Hajarayn was formed along a steep slope of an exceptionally high, ellipsoid shaped hill (Fig. 9-5). On the whole the settlement is composed of high-rise houses suitable for the cliff shaped landforms which are typical of these settlements (Fig. 9-6). Palm trees spread out over the surrounding area. It can be surmised that the location and form of the settlement appears to have protected it from flooding, which is consistent with the other most common settlement structures in Wadi Daw'an.

On the easterly cliff, on the flatland in the middle, are the Friday Mosque and a square for the people to assemble. The main street stretches between the square and the circular road, and some other intricately winding streets run into the town from here also. *Mazalla* (connecting upper floor passages) have been built between houses facing each other across the street, and it is noticeable that the houses are highly concentrated (Fig. 9-7).

The houses are mud-brick three or four-story structures, with masonry at the base. The approach to each house is equipped with a porch jutting out into the street, which seems to offer protection from strong sunshine. In general, lower floors are used as barns for sheep and goats, and the upper floors are living spaces for the family; however there are instances of the ground floor being used as a shop near the square (Fig. 9-8). There are three more mosques, which are community center of the each district (Fig. 9-9).

Damage description

Direct damage from the recent flood cannot be observed, but dilapidated or empty houses are prominent in the settlement. Al-Mashhad is in a state of depopulation and deterioration. Some of the traditional houses scattered about are in serious disrepair due to exposed interior spaces and crumbling floors. Judging from the ruins of the houses, it would appear that the old city also spread westward, but it is difficult to restore the full details of the former settlement. In the case of al-Hajarayn, the area near the hilltop is uninhabited and the houses are left derelict and run down.

⁷ It is a tomb of Hasan b. Hasan and 'Ali b. Hasan. One theory dates its construction to before 1591, whilst another theory suggests that the whole building was reconstructed 150 years ago [Lewcock 1986, p. 125].

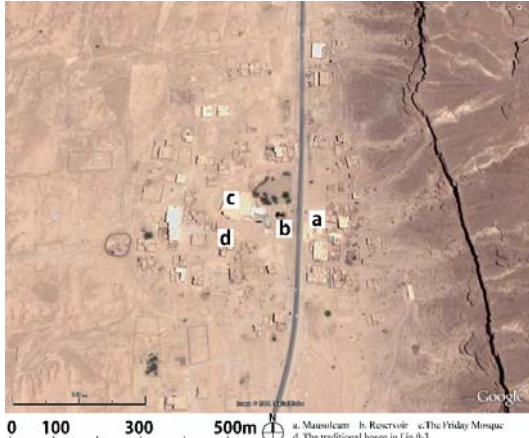


Fig. 9-1 Al-Mashhad (Google Map : image 2009 Digital Globe).



Fig. 9-2 Al-Mashhad, in front of the Friday Mosque, the remains of the *suq*.



Fig. 9-3 Al-Mashhad, the remains of the traditional houses.



Fig. 9-4 Al-Mashhad, interior space of the traditional houses.

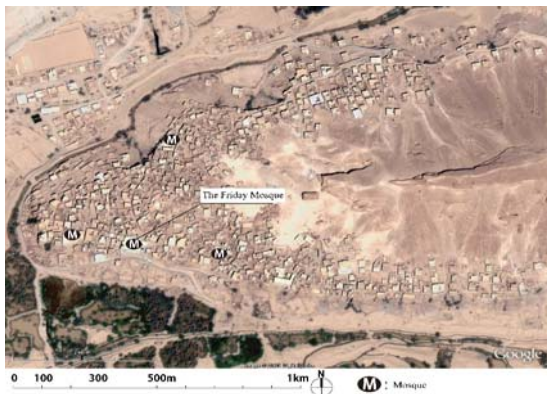


Fig. 9-5 Al-Hajarayn (Google Map : image 2009 Digital Globe).



Fig. 9-6 Al-Hajarayn, panoramic view of the settlement viewed from the west side.



Fig. 9-7 Al-Hajarayn, the traditional houses viewed from the hill.



Fig. 9-8 Al-Hajarayn, the dwelling with a shop, facing the square.



Fig. 9-9 Al-Hajarayn, the mosque in the city.

U- ⑩ Khila, Hufa, Qarn Majid / Wadi Daw'an

Khila Latitude: 15°12'59.10"N / Longitude: 48°23'12.70"E

Qarn Majid Latitude: 15°14'46.29"N / Longitude: 48°18'30.74"E

Hufa Latitude: 15°11'15.67"N / Longitude: 48°24'23.22"E

Location and settlement overview

The settlements are located around the area where the 24km-long Wadi Laysar, flowing from the southeast, merges with a tributary wadi in a remote area of the southern part of Wadi Daw'an (Fig. 0-5). Qarn Majid is located near a diverging point of Wadi Da'wan, whilst Khila is halfway along Wadi Laysar, and Hufa is almost at the deepest point. During the research survey, the road heading beyond Hufa was under construction.

According to the Say'un Museum Director, Mr. Abdulrahman, in Wadi Laysar many settlements have public facilities that were built and infrastructure that was improved through the economic assistance of the Buqshan family, a shaykh who moved to Saudi Arabia and achieved success in the early 20th century. Of particular note, the house of the Buqshan family in his hometown of Khila, a traditional house renovated into a hotel, is colorfully painted (Fig. 10-1).

Features of the settlement's form

All the settlements are formed on steep slopes near the edge of the valley, and mud-brick, high-rise, four-story structures are densely concentrated.

Khila is a small settlement formed near the edge of the valley where the wadi curves in an 'S' shape (Fig. 10-2). The most conspicuous building in the settlement is the Buqshan palace (currently a hotel), which is an eight-story structure with colorful plastered walls. The palace is owned and managed by the Buqshan family. Central to the town are an elementary school and the Friday Mosque, which towers on the hill.

The settlement in Hufa spreads over an undulating slope (Fig. 10-3). Due to the many patches of jutting cliffs, the houses are not standardized and many of them have an irregularly shaped plan adopting its site. A road in front of the settlement located at the foot of the valley twists an intricate path up to the Friday Mosque on the hilltop above. Many *mazalla* (connecting upper floor passages) can be observed on the streets. Essentially each factors have been adapted to the limiting conditions of the location and a highly dense settlement (Fig. 10-4). The trunk of palm trees have been used for the frame of the *mazalla*. Houses have stone foundations, and mud-bricks are built on. Old carved wooden doors have been used. The Friday Mosque has square minarets, which implies that it was rebuilt using modern construction methods. Furthermore, the streets are well-paved by flagstone, and gutter drainage system are attached along the street

In Qarn Majid, the keep-like *husn* (fortress) stands on top of a cliff, with the residential area spreading across the surrounding slope (Fig. 10-5). Many of the houses have been newly rebuilt using old construction methods (Fig. 10-6). Near the arterial highway side can be seen the site of a former reservoir. Across the reservoir is a settlement called Bilad al-Ma'. There used to be a well filled with spring water in this town, which could have supplied the surrounding towns.

Damage description

Direct damage from the recent flood is not apparent, but collapsed houses lie scattered prominently all around the city. There is a dramatic difference between those houses, and the public houses constructed and maintained with massive amount of money. These settlements have been formed under severe local conditions, because they were formed on narrow strips of cleared land between the wadis, the ground is loose, and there is no choice but to build on awkward-shaped cliffs.



Fig. 10-1 Khila, Buqshan palace.



Fig. 10-2 Khila, overlooking the settlement from the north side.



Fig. 10-3 Hufa, looking up to the settlement from the foot of the wadi.



Fig. 10-4 Hufa, a street in the city.



Fig. 10-5 Qarn Majid, the fort and settlement.



Fig. 10-6 Qarn Majid, traditional houses.

U- ⑪ Sif, Qaydun / Wadi Daw'an

Sif Latitude: 15°18'48.83"N / Longitude: 48°19'48.64"E

Qaydun Latitude: 15°19'21.13"N / Longitude: 48°18'52.68"E

Location and settlement overview

The settlements are located in the middle of the Wadi Da'wan, where its tributary diverges towards the south and southwest (Fig. 0-5). Sif is situated at a diverging point of the tributary. Qaydun is located to the northwest of Sif, which is about 1.5km from the point where the tributary diverts towards the southwest. Both Sif and Qaydun are located on slopes at the foot of the hill. Palm trees stretch from the bottom of the river to the settlements.

Features of the settlement's form

Sif is formed on the western slope to the wadi (Fig. 11-1). In the upper western part of the settlement is a three-story mud-brick fort that used to be owned by a *shaykh*. Traditional three-story, white-plastered houses are the norm (Fig. 11-3).

In the old part which surrounded by circular road running on a hill, the houses have irregularly-shaped plan and are arranged in bad order in order to fit on the undulating slope (Fig. 11-2). In addition, many houses have a semi-basement and *mazalla* (connecting upper floor passages). The entrance of each house features a porch.

In contrast, a scattering of more regular residential buildings with enclosing walls are scattered alongside the street, spreading southeast-wards from the circular road. Their doors and window frames are finished with colorful plaster work (Fig. 11-4). The owners are successful merchants who trade in Saudi Arabia, including the al-'Amudi family, generally return to the town only once a month.

The old district is uninhabited, and ruined houses are in evidence. When the new road which runs north to south was constructed, many people moved from the old district to the external flatlands, and in consequence the settlement expanded towards the southeast. Furthermore, the residential area has spread near the cemeteries, located in the west, the south and the east of the settlement's periphery.

The settlement in Qaydun spreads about 2km from east to west with the southern hill as the backdrop (Fig. 11-5). On both sides of road running in the north of the settlement, stones have been piled up as high as 3m or so, creating a dike and channel to protect the settlement from flooding (Fig. 11-6). The dike continues up to a reservoir located on the western edge of the settlement (Fig. 11-7).

The traditional houses have four or five-story structures. The western area of the settlement is old, and has an organic street structure and very densely spaced traditional houses. The Friday Mosque is located in the centre, and behind it the tomb of *shaykh* Sa'id b. 'Isa al-'Amudi, and the cemetery spread out (Fig. 11-8). Religious architecture, including the Friday Mosque, were rebuilt with simple materials such as concrete blocks in the late 20th century. Concerning to the traditional houses, the wooden openings and beams made from palm tree are old (Fig.11-9). In the eastern area of the settlement, and that part of the settlement which lies on the other side of the riverbed, regular houses are scattered about. In addition to the limiting conditions of the location, the old settlement became overcrowded because the cemetery spreads through a broad area of the settlement; consequently the present settlement expanded to the east, and further extended toward the opposite shore in the north.

Damage description

In these two settlements (Fig. 11-9), traditional houses in old district become vacant and are ruinous condition without maintaining, in contrast with new houses constructed by rich merchant. The residential areas are constructed with new technology, and spread over as far as the cemetery, which is supposed to be located outside the settlement, and to the opposite bank of the riverbed. It should be noted that both settlements tend to sprawl.

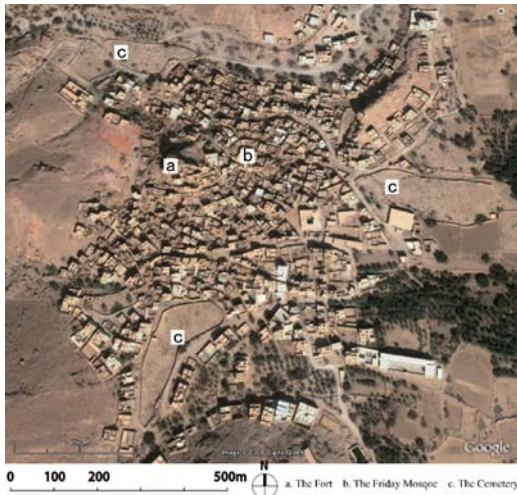


Fig. 11-1 Sif (Google Map : image 2009 Digital Globe).



Fig. 11-2 Sif, cityscape of the old town district.



Fig. 11-3
Sif, houses
on the cliff top.



Fig. 11-4
Sif, houses alongside
the circular road.



Fig. 11-5 Qaydun (Google Map : image 2009 Digital Globe).



Fig. 11-6
Qaydun, the dike
along the east-west
road.



Fig. 11-7 Qaydun, the reservoir on the western
edge of the settlement.



Fig. 11-8 Qaydun, the mosque with the
cemetery behind.



Fig. 11-9 Qaydun,
dilapidated house.

U- ⑫ Buda, Ribat, Al-Khurayba / Wadi Daw'an

Buda Latitude: 15°12'44.04"N / Longitude: 48°18'44.90"E

Ribat Latitude: 15°5'16.46"N / Longitude: 48°18'34.46"E

Al-Khurayba Latitude: 15°6'8.94"N / Longitude: 48°18'48.59"E

Location and settlement overview

Buda, Ribat, and al-Khurayba are located at the upper stream of Wadi Daw'an (Fig. 0-5). In this area many small wadis join together Wadi Daw'an, there are flat green forest of palm trees at the conjunction. Big settlements are located the slope behind these forests. Ribat, most upper settlement and Buda are located upland slope continuing to the forest in north direction, and al-Khurayba is located upland slope continuing to the forest in east. In this area the al-'Amudi family, one of the *shaykhs*, is influential. They have funded the construction and improvement of their house and several public buildings.

Features of the settlement's form

Buda spreads in a crescent shape over the northern upland slope, and is famous for its Wednesday market. On the central cliff is the residential space of the al-'Amudi family, and in the surrounding area numerous kinds of houses have been constructed around the Friday Mosque, and continue to spread out in an east-west direction (Fig. 12-1). The traditional houses have three or four-story structures, but many of those standing on the cliff have collapsed as a result of rainfall. Recently constructed houses have a U-shaped plan with front yard. The large scale houses of this type share a characteristic feature—a series of terraces built up on the rooftop (Fig. 12-2). For decoration, ogee arch has been applied to the upper part of the window frames colorful plaster quoins were painted at the corners of the building and horn of ibex was projected from the corner. Near the reservoir, located in the park to the western edge of the settlement, is an area of collective houses built by the al-'Amudi family (Fig. 12-3).

Ribat has the same location conditions as Buda (Fig. 12-4). Green palm trees spread out at the foot of the settlement. In the town there are many public facilities, including mosques and *madrassa*. Most of them are concrete block structures. Al-Qaeda group support to adjust education institutions of Ribat, and there is one *madrassa* in the north of settlement (Fig. 12-6). The traditional houses are basically five-story structures, which have been kept in good condition apart from the old wooden parts adopted to openings. The distribution of houses is limited by the four cemeteries that occupy a vast area of the slope. The houses are highly concentrated along the rugged and winding streets (Fig. 12-5). Lining the street at the foot of the town are a number of bustling variety shops, including a music shop and a pharmacy.

Al-Khurayba functions as the centre for educational institutions in Wadi Daw'an. The settlement spreads with a rounded configuration lies on the western bank of wadi, and the town currently extends in a north-south direction either side of an asphalt pavement (Fig. 12-7). The concrete block Friday Mosque stands near the centre of the settlement. On both sides of the road (Fig. 12-7, dotted line) are low-rise commercial shops and service facilities, including an economy hotel (Fig. 12-8). There is the square at the south of the centre. Around the square palm trees are planted, so the environment of the landscape has been improved by palm trees. The *suq* stretches in linear fashion to the northwest of the square, and dilapidated one-story shops stand facing the streets (Fig. 12-9). It is evident from the walls that palm tree beams once connected shops facing each other, so there is a high possibility that the *suq* used to be covered. According to Mr. Abudulrahman, al-Khurayba used to function as a trading post on the route which ran through the surrounding wadis.

Damage description

These three settlements have suffered a little flood damage. In al-Khurayba, palm trees which locate in front of the settlement are gone down by the recent flood, it shows to protect the settlement from the flood. In addition to the public architecture, some traditional houses have been undergoing conversion into concrete block structures.



Fig. 12-1 Buda, a panoramic view of the settlement looking from the north.



Fig. 12-2 Buda, the house of the al-'Amudi family at the top of hill.



Fig. 12-3 Buda, the house of the al-'Amudi family near the reservoir.



Fig. 12-4 Ribat (Google Map : image 2009 Digital Globe).



Fig. 12-5 Ribat, high-rise buildings on a slope.



Fig. 12-6 Ribat, a madrasa in northern part of the city.

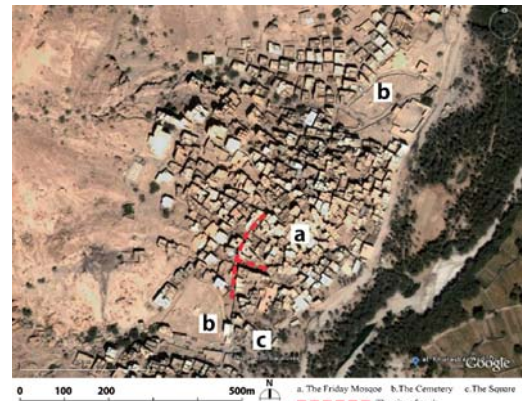


Fig. 12-7 Al-Khurayba (Google Map : image 2009 Digital Globe).



Fig. 12-8 Al-Khurayba, the shopping area facing the square.



Fig. 12-9 Al-Khurayba, the site of the suq.

U- ⑬ Al-Mukalla / The coastal area of Hadramawt

Latitude: 14°31'41.60"N / Longitude: 49°8'15.17"E

Location and settlement overview

Al-Mukalla is a port city located about 160km south of Say'un (Fig. 0-1). The current old city and the port were constructed under the Kasadis regime in the early 18th century, and gradually developed into a trading port. From 1881, al-Mukalla rapidly urbanized under the rule of the Qu'ayti Sultanate, which was conspicuous for Indian Ocean trade at that time. The current layout of the city was formed during that period.

Features of the settlement's form

The city of al-Mukalla is composed of two parts; one spreads across a cape that juts out from the coastline, and the other covers the slopes facing the cape. The cape measures 200m from east to west, and 300m from north to south. A flatland about 300m wide runs along the southern shore, and there is a towering rocky hill at the back. About 1.3km from the cape to the west, a river flowing from north to south empties into the sea (Fig. 13-3).

The origin of the town is unknown, but the area that includes the cape and the connected eastern shoreline is composed of an old city called Hayy al-Bilad (Fig. 13-1). The narrow strip at the base of the cape was occupied by a palace dating back to the 18th century⁸, now renovated to new *madrassa* on the west and the cemetery of *shaykh* Ya'qub on the center, which, according to tradition, goes back 800 years. In the western area to the south of the former palace, a customs facility and a city gate still exist. The area used to be a port in old times (Fig. 13-2). The Friday Mosque is located on the eastern shore of the cape. It may be assumed that in the early 18th century the old established small port town on the cape spread eastwards towards the cemetery in a crescent shape.

In the 19th century, the town developed westward soon after al-Mukalla became the capital of the Qu'ayti family. The area covers an area of a little more than 500m from east to west, and 300m from north to south, called Hayy al-Sayyadin (Fig. 13-1). In addition, a new palace of the Qu'ayti family (the current museum) [A- ⑫] was built on the beach near the river in the first half of the 20th century, and the town extended further westward. Recently the town has spread over the western area of the river (Fig. 13-3). The new city covers an area including Husn al-Ghuwayzi [A- ⑬], a fort constructed to defend the town in the 19th century.

The old city is densely occupied by high-rise buildings, and the houses alongside the periphery of the cape that have a partial fortress-like shape are assumed to be part of the city walls surrounding the town area (Fig. 13-4). The city's north-south axis is the *suq*, connecting the old city, and Hayy al-Sayyadin to the north (Fig. 13-5). The shopping arcade facing the western part of the *suq* street has a two-story structure, and its façade features a series of trefoil arches, a style common during the Qu'ayti era. In the shopping arcade are eating places, chai stands, and a variety shop selling daily products. Mosques are spread out along the peripheral road of the districts. In addition to *madrassa*, there is a *husayniyya* (a meeting place for Shi'a religious services) in the old city. Shops stand alongside the peripheral road that runs through the southern part to the tomb of *shaykh* Ya'qub, which function as a place to relax for the people in the old city. The district on the eastern shore is lined with a variety shop, a beauty salon, a post office, and an office. Inside the districts there are stalls selling sweets and vegetables, while the ground floors of some houses are used as a surgery and a pharmacy. Ibex are kept for food in the area surrounding the mosque and in the limited open space in the alleys.

Damage description

Damage caused by torrential rain was observed in the museum.

8 This four-story concrete building is called the Kasadi Naqib palace, and replaced an older two-story building in 2004.

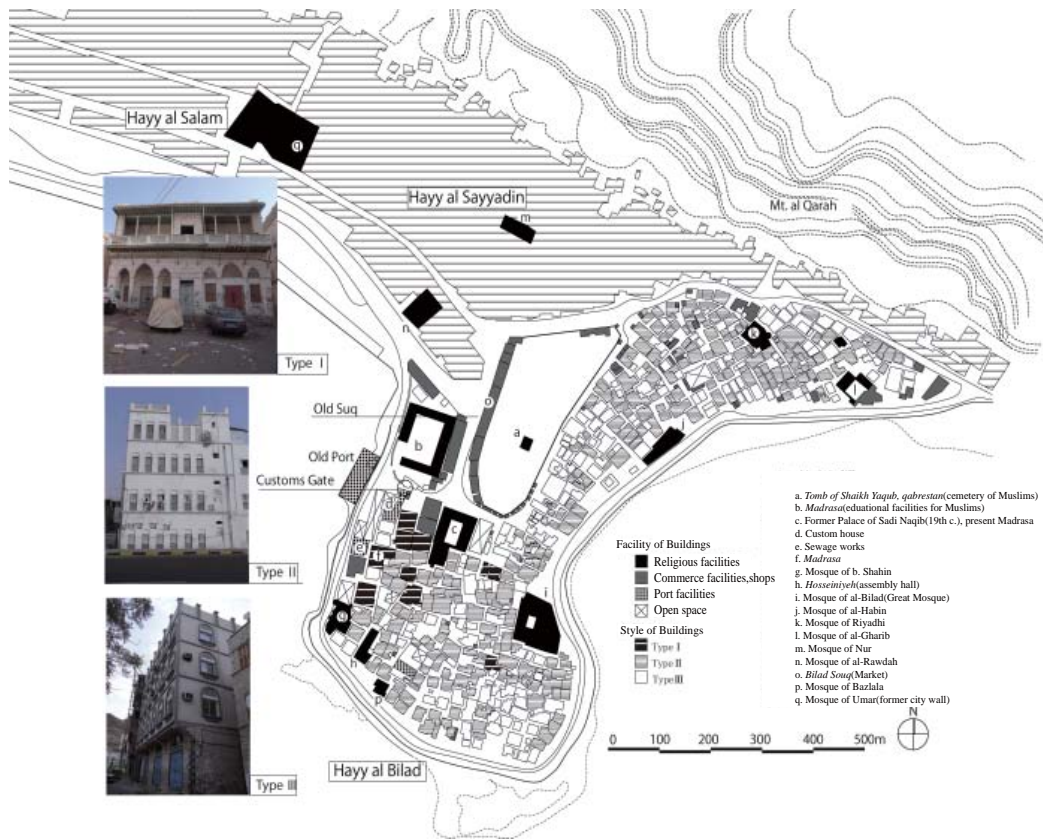


Fig. 13-1 The structure of the old city of al-Mukalla.



Fig. 13-2 The western part of the old city, the site of the customs house.



Fig. 13-3 The old city, and an extended area of the west.



Fig. 13-4 The traditional houses in the area surrounding the town blocks.



Fig. 13-5 A southern view of the old suq.

U- ⑭ Al-Shihr / The coastal area of Hadramawt

Latitude: 14°45'19.53"N / Longitude: 49°36'21.61"E

Location and settlement overview

Al-Shihr is a port city located about 60km northeast of al-Mukalla (Fig. 0-1). In contrast to al-Mukalla [U- ⑬], it has a series of smooth shorelines, and the 4km flatland continues up to highlands of Hadramawt at the back (Fig. 14-1).

The city has prospered as a port from ancient times. During the Abbasid period, it played an important role as a springboard to the people of Hadramawt when they migrated to India and Eastern Africa [Smith EI2 Al-Shihr]. Chinese and Early Islamic potteries were excavated the archaeological site called Biyani house⁹ which locates southeast of Friday Mosque, established in 632 (Fig. 14-3). Shihr which was mentioned some literature after the 9th century, was flourished as an international port trading fish oil and ambergris as the sea products and frankincense as the inland products.

In 1462, al-Shihr was occupied by Sultan Badr Bu Tuwayriq who is from the Kathiri family. In 1522 they fought against the Portuguese and gained a victory. In 1610 the Dutch East India Company was established, which flourished under trading with India. In the middle of the 18th century, the sultan of the Burayki family built a palace [A- ⑪], and around the same time, the city walls were presumably constructed [Boxberger 2002, p. 104]. In 1866 the Qu'ayti family started construction of another palace, but in 1879 they moved the capital to al-Mukalla, which became the trading centre. Currently al-Shihr functions as a fishing port.

The town is a vast sprawl over the surrounding area, and many of the houses within the old city have been replaced by new buildings. However, people, including Mr. Khaled Dafary, director of the museum (previously the al-'Aydarus gate), are concerned about the restoration of historical buildings.

Features of the settlement's form

The old city corresponds to an area stretching approximately 1.3km from east to west and approximately 1km from north to south with centralized the Palace Square, and was surrounded by city walls leading to the coastline (Fig. 14-2, 14-4). The current port and breakwater are recent constructions, but in old days arriving ships used to stand in the offing, and people and freight were loaded by barge. The custom house that is used by the fishermen's union still exists.

In contrast to the old city of al-Mukalla on the coast, the houses are of a mud-brick structure with stone masonry foundations, and are lower two or three-story structures with the occasional terrace and courtyard. However, compared to the inland areas, economic development is remarkable in the coastal area, and many of the houses within the old city also have been rebuilt by using new styles (Fig. 14-5).

Even though the buildings have been replaced with modern architectural styles, the strong tradition of communities, streets and districts *Hāfat* is still evident. The town can be divided into major three districts. The district located near the beach is the oldest, inhabited by fishermen and sailors (Fig. 14-6). Each district can be divided further into small sections *Rābu*¹⁰. There also exist some markets named after trading goods or the hometown of the merchant, including Suq al-Lahm (the shark market), Suq al-Hunud (the Indian market), and Suq al-Shibam (the Shibamian market) [Smith EI2 al-Shihr].

Damage description

In some historical buildings, including the city gate and the palace, the plaster coating has become delaminated and cracked.

⁹ According to Mr. Khaled Dafary, director of the museum in al-Shihr, Biyani is a corrupt form of Baniyan (Indian merchant).

¹⁰ [Camelin 1997, p. 15]

APPENDIX 3 Historical Monuments in the Hadramawt Region

- A- ① Sun Temple in Raybun
- A- ② Archaeological site in Ghuraf
- A- ③ Friday Mosque in Bor
- A- ④ Friday Mosque in Shibam
- A- ⑤ Masjid al-Faqih in 'Inat
- A- ⑥ Shaykh Umar Ba Wazir
- A- ⑦ Tombs in 'Inat
- A- ⑧ Qabr Nabi Allah Hud
- A- ⑨ Hush al-Ranād
- A- ⑩ Say'un Museum
- A- ⑪ Husn bin Ayyash
- A- ⑫ Qasr al Mu'een
- A- ⑬ Husn al-Guwayzi
- A- ⑭ Husn al-Fales
- A- ⑮ Kut al-Nakhr
- A- ⑯ *Shaykh's* house in Qasam
- A- ⑰ The house of Abdulrahman al-Kaf in Say'un
- A- ⑱ *Nura* factory in Al-Juhayl
- A- ⑲ The Sultan's Palace and traditional houses in Shibam

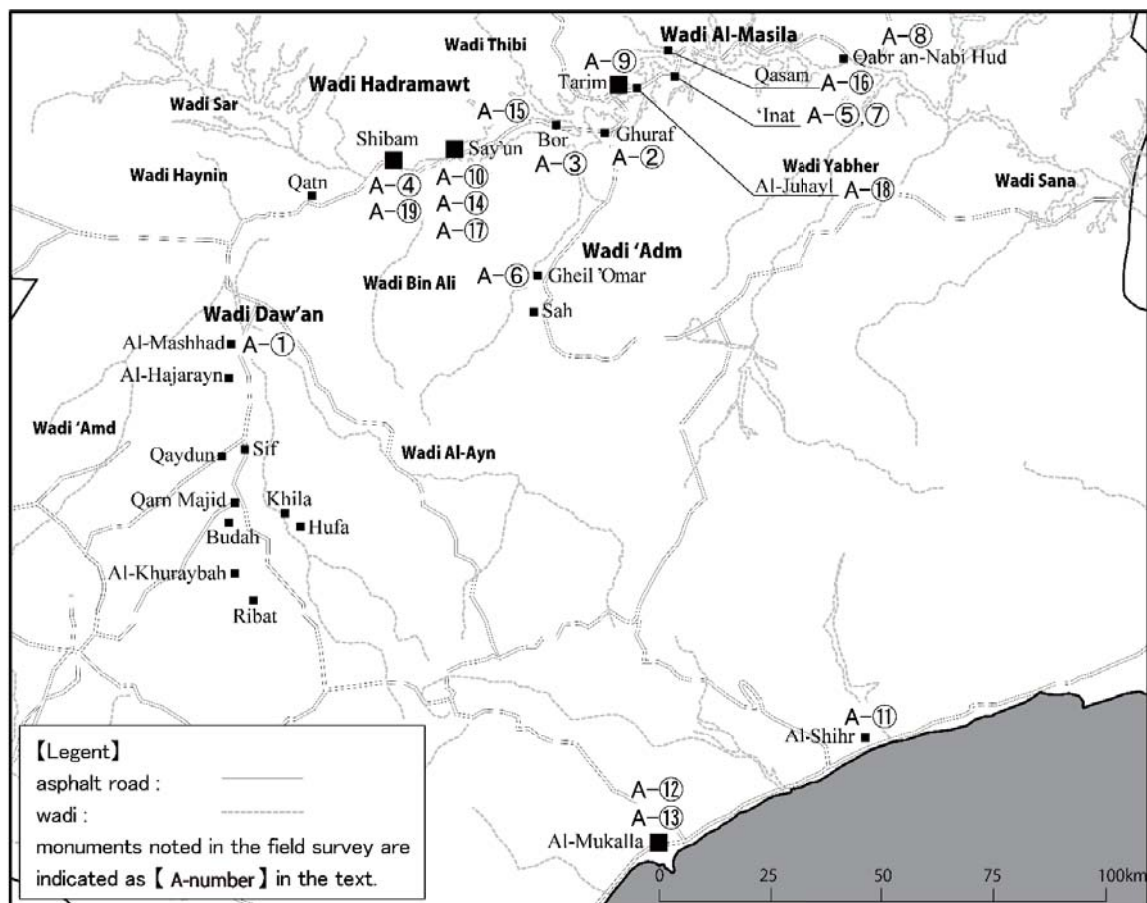


Fig. 0-1 Distribution of architectural heritage sites in the Hadramawt Governorate noted in the field survey.

A- ① Sun Temple in Raybun

Latitude: 15° 34'7.11"N / Longitude: 48° 18'22.68"E

Location of monuments

It is an archaeological site (Fig. 1-1) situated at the foot of a hill in an area southwest of al-Mashhad, which is near the junction of the south-to-north running Wadi al-Hajarayn [U- ⑨] and the southeast-to-southwest running Wadi al-Ayn. The width of the lowland adjoining the wadi exceeds 2km, and the ancient city is located on a small hill (Fig. 1-1). The city itself covers a widespread area, where the Sun Temple, houses, the palace, and the Venus Temple have been excavated. The temple is located on slightly elevated land in the city.

Historical background

From 1983 to 1991 a joint Soviet-Yemeni expedition conducted archaeological research in the area. The first residence dates back almost to the end of the 2nd millennium BC. In about the 3rd century BC, at least five temples were dotted around Raybun, which indicates that this area used to be regarded as a sacred place [Schiettecatte 2006]. Historical materials engraved characters from around the third and second century BC were excavated [Frantsouzoff, 1998]. These relics and materials are currently displayed at the Say'un Museum [A- ⑩].

Architectural features

The temple consists of four buildings, which are made of rectangular ashlar blocks (Fig. 1-2, 1-3, 1-4). The temple has also engraved stone drainage, a cut stone pavement, and stone stairs, which indicates that advanced cut-stone architecture coexisted with the mud-brick architecture that is prominent in Hadramawt today (Fig. 1-4, 1-5). Marks on the mud-brick walls above the stone foundations indicate that wood materials were once attached. This kind of architectural technique can also be seen in the archaeological site at Ghuraf [A- ②].

Damage description

The archeological site was neglected after its excavations, and as the eastern area of the city is close to the river, it was washed away by a flood. Some of the excavated places, including the Sun Temple, were initially covered with tarpaulin. However, this fell away to expose the site to the elements, which was eroded by rainfall over the years. In particular, the decorated wall paintings have disappeared without leaving any trace.

Prospects for renovation

The concrete foundations for the tarpaulin at the Sun Temple, that were to be constructed during the South Yemen embraced socialism from 1967 to 1990, tumble out of the site and seem symbolic of the destruction of archaeological sites that can result from excavation. The restoration and conservation of the archaeological site for future generations would be a major challenge, now that it has been awakened from its slumber. The people of Hadramawt still suffer from poverty, and the government could not afford the cost of restoration in addition to the damages sustained in the flood. Under such circumstances one might conclude that it is best to backfill excavated areas after excavations.



Fig. 1-1 **The site of Raybun**
(Google Map : image 2009 Digital Globe).



Fig. 1-2 **The layout of the temple site** [Sedov 2000].



Fig. 1-3 **The wall of the temple in the western area.**



Fig. 1-4 **Rectangular ashlar masonry.**



Fig. 1-5 **The remains of stone stairs in the eastern area.**



Fig. 1-6 **The remains of a drainage ditch.**

A- ② Archaeological site in Ghuraf

Latitude: 15° 58'0.22"N / Longitude: 48° 59'13.57"E

Location of the monuments

The archaeological site (Fig. 2-1) is a mound of just over 100m², located about 700m southwest of the town of Ghuraf downstream of the south-to-north Wadi 'Adm [U- ⑧].

Historical background

It was excavated by a Yemeni expedition in 1981, but it has not been reported, apart from one recent research report about unearthed clay vessels and a limestone plaque sculptured with griffin and ibex [Sedov and as-Saqqaf 1996]. According to the report, this site dates to the second and the third century. Mud-brick buildings were discovered by the excavation. At the top of the site, there are the remains of a tower that appears to be from the Islamic period.

Architectural features

Currently the unearthed remains are unattended. There is a high fortress-like building in the westerly central area, and its western area was excavated (Fig. 2-2). The eastern area is a gentle slope that has not been excavated.

At the bottom centre part on the western area, the walls of the building are masonry (Fig. 2-3). The wall is layers of split stones, each about 25cm wide and about 15cm long, mortared with thick joint seal material and finished with a reddish coating that recalls to be fired (Fig. 2-4). Behind the wall, a building frame of mixed small-stones-and-dirt has been exposed. Jutting mud-brick walls stand side-by-side with masonry walls, which implies both architectural methods coexisted at the time.

The upper part located in the south is divided into some rooms by mud-brick walls, which have marks that wood materials were attached in a longitudinal direction (Fig. 2-5). The wall is of two bricks thick, which reaches almost 1m. Split stones are piled up on the top of foundation of these rooms (Fig. 2-6).

According to a 1999 research report by Zimmerman from the University of Pennsylvania, "At least three structures visible, in part due to soil excavation in the area. All buildings appear Pre-Islamic." [Zimmerman, 1999]. There is a well and some green space located in the southwestern part of the site, and the western part leading to fields.

Damage description

Flood damage cannot be confirmed, but there is evidence of erosion by rainfall due to the lack of maintenance. Most archaeological sites in Hadramawt are likely to suffer substantial damage from rainfall if left unattended after excavation, due to their mud-brick structure. After they have been recorded, efforts need to be made to protect the sites, including re-burying them in their original place.

Prospects for renovation

Most excavated materials have been processed and conserved at the Say'un Museum, however for the most part the site itself has been left neglected. The mud-brick parts were originally covered with soil that was removed during the excavation, exposing it to greater erosion than the stone-built part. Countermeasures to conserve the site therefore need to be taken after the excavation, including the option of backfilling the site.



Fig. 2-1 The remains of the fortress in Ghuraf
(Google Map : image 2009 Digital Globe)



Fig. 2-2 Viewing the remains of the fortress from the southwest side.



Fig. 2-3 The wall located at the bottom centre part on the western area.



Fig. 2-4 Split stones embedded on a wall.



Fig. 2-5 The remains of rooms on the upper part of the south side.



Fig. 2-6 A masonry wall found in the remains of rooms.

A- ③ The Friday Mosque in Bor

Latitude: 16°0'37.57"N / Longitude: 48°52'17.94"E

Location of monuments

This is the Friday Mosque, located in Bor [U- ④], which lies slightly to the north of the road running east to west between Say'un and Tarim in Wadi Hadramawt. It is situated on a small hill that is nearly at the centre of the settlement, and its establishment dates back to the middle of the 10th century. This is one of the sites built in the Islamic architectural style in Hadramawt in early medieval times, however the present building, which has functioned as Bor's mosque (Fig. 3-1), is the result of renovation and extension work.

Historical background

This mosque was constructed around 951 by al-Sayyid 'Ubayd Allah b. Ahmad b. 'Isa, who was son of Ahmad b. 'Isa al-Muhajir whose descendent of the Prophet Muhammad, moved from Iraq to the Wadi Hadramawt. Before its restoration the *qibla* walls had collapsed, the ceiling had fallen down, and only some columns with pointed horseshoe arches remained [Lewcock 1986, p. 31]. It was originally a one-story mosque with columns surrounding the courtyard, however in the 15th century the current first story was added to the first floor¹. It was repaired by Yemen's Ministry of Culture.

Architectural features

This mosque measures about 40m by about 20m, and consists of an old prayer hall on the north side, and a newly added prayer hall and *madrasa* (place for learning Islam). In addition, a prayer hall for winter is prepared in the basement. The old prayer hall has one entrance on the northern side and two on the eastern side, and its upper part stands on a basement including the ground floor. It is a mud-brick structure with a flat ceiling, and the wall surfaces have been repeatedly re-covered in white plaster. A *minaret* (tower for calling prayer) is located to the southeast of the old prayer hall, and is now in the centre of the eastern façade (Fig. 3-1). The *minaret* is rectangular in shape from the platform to the rooftop, but it becomes a circular above the rooftop, and at the tip there is a small pointed dome. Its form resembles the *minaret* of Masjid al-Faqih in 'Inat.

The old part of the building, the courtyard, used to occupy a space of four bays by four bays, and in case of rain, the upper part was covered with a ceiling supported on all four new fixed columns (Fig. 3-2). On the eastern and the northern sides of the courtyard there used to be a corridor one bay depth, and at the southern side a corridor two bays depth. The prayer hall occupied west side towards Makka has dimensions of seven bays width by three bays depth, featuring a colonnade of pointed horseshoe arches (Fig. 3-3). The *qibla* (direction toward Makka) wall with the *mihrab* (nich indicating the direction of Makka) are located in the west, where there are two *mihrabs* and a *minbar* (pulpit) in between. The minbar has been designed so that it can be accessed from stairs built in a south *mihrab* niche (Fig. 3-4).

The prayer hall in the basement is largely occupied by wall area rather than floor space (Fig. 3-5). The ceiling is extremely low, and the aisles and width of the arch openings are narrow (Fig. 3-6). However, its scale is almost the same as that of the upper part.

Damage description

There is no evidence of flood damage following the restoration work. Regular maintenance seems to have been done, and its wall and colonnade arches are repeatedly over-painted with waterproof white plaster. However, in recent years the wooden material used in the entrance and the platform has been partially damaged by termites.

Prospects for renovation

It is a piece of Islamic religious architecture that has managed to retain most of its authenticity, and is frequently used for life events. Because it has a basement, it needs to apply not only a rough coating of white plaster but also more specific treatment for controlling humidity.

¹ This is based on a document by a historian, 'Abd al-Qadir al-Sabban (<http://www/shibamonline.net/eng/wadi19.php>).



Fig. 3-1 The Friday Mosque in Bor, the east façade of the building.



Fig. 3-2 The interior of the mosque, the former courtyard.

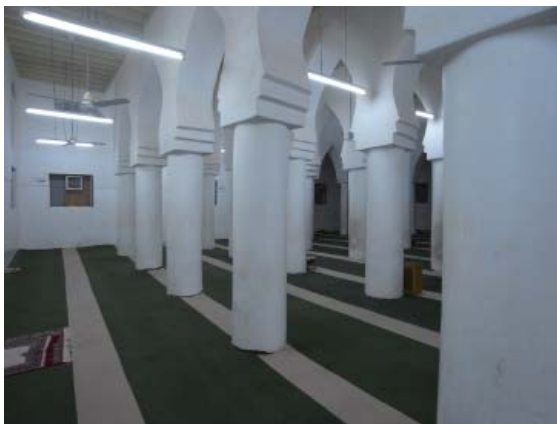


Fig. 3-3 The prayer room with pointed horse-shoe arches.



Fig. 3-4 Minbar installed between *mihrabs* (niche).



Fig. 3-5 The prayer hall in the basement, central aisle.



Fig. 3-6 The prayer hall in the basement, narrow aisle.

A- ④ The Friday Mosque in Shibam

Latitude: 15°55'35.61"N / Longitude: 48°37'32.28"E

Location of the monument

The mosque is located in Shibam [U- ③] in the west-east running Wadi Hadramawt. It is situated south-west of the centre of the old city in Shibam (Fig. 4-1). The west direction is *qibla* (direction toward Makka), and it functions as the Friday Mosque.

Historical background

It was established in 753 during the early years of the Abbasid Caliphate period. It is currently a mud-brick mosque, but some partially burned brick remains that is typical of the Abbasid Caliphate period of the 9th century, representing reconstruction work by Caliph Harun al-Rashid of the Abbasid [Lewcock, 1986, pp. 49-50]. The present form was developed in the 14th century, and is similar to the mosque in Bor [A- ③]. The *minaret* located at the southeastern corner of the mosque was rebuilt in the 16th century, on the spot of the original tower (Fig. 4-2). In recent years, restoration work was carried out by GTZ and some differences between now and the structure in pictures taken in the late 20th century can be seen.

Architectural features

Its rectangular exterior wall is 40m from east to west, and 25m from north to south. On the western side is a multi-column prayer hall, and on the eastern side is a colonnaded courtyard (Fig. 4-3). At the northeastern corner of the premises, an building of approximately 30m (east to west) and 15m (north to south) juts out, and in this building a partly two-story of closed prayer hall is on the eastern side and a water facility is on the western side. A square-shaped *minaret* is attached to the southeastern corner.

Another water facility can be found alongside an entrance equipped with porch, on the eastern face of the mosque. Two more entrances are located on the southern face, and another one is located on the northern face. The exterior walls are articulated with arch shapes that conform to the location of the interior columns. Lattice work of cornice and battlements has been added to the upper edge of the façade, but it is impossible to find it in old pictures².

The courtyard occupies an area of 12.5m from east to west, by 17m from north to south, and is rectangle in shape but features an irregular numbers of arches. On west side of 6 bays, other three sides of 5 bays are articulated. Creating an arcade effect with a series of arches, the flat ceiling has a bridging joist that bisects the arcade at right angles.

The prayer hall on the western side is a structure divided into two parts. The prayer hall that opens on to the courtyard on the eastern side has a space of 8 bays width by two bays depth, and there is a pointed arch above columns that cross towards the front. The wall on the west side of the room has 8 openings, and in the back there is a closed prayer hall. The back prayer hall is three bays depth, which have been repaired and there is lateral arcades. The area surrounding the *mihrab* is covered in white tiles, and a white modern coating material has been used in restoration work (Fig. 4-4). The old *minbar* (pulpit) has been repaired, and was moved to the newly-established Minbar Museum (Fig. 4-5).

The *minaret* has a rectangular shape. Each surface is articulated with columns and round windows, whilst the prayer hall is divided into two parts t above the rooftop is divided into three parts. The uppermost part is octagonal, with a dome on the top (Fig. 4-6).

Damage description

There are no observable signs of flood damage. GTZ has conducted renovation and maintenance work on the site. However, it is regrettable that some changes were made during the rebuilding, and new materials, including tiles, have been used in addition to traditional ones.

Prospects for renovation

A model of the mosque is displayed with the old *minbar* in the Minbar Museum. The drawings and pictures are necessary to show the changes that have occurred during the restoration process. As it is difficult for non-Muslims to enter mosques in Hadramawt, a museum featuring mosques will be useful for tourism.

2 In a book published in 1986, the cornice and battlements in the courtyard and on the exterior walls are not exceptionally articulated [Lewcock 1986, pp. 48-49].

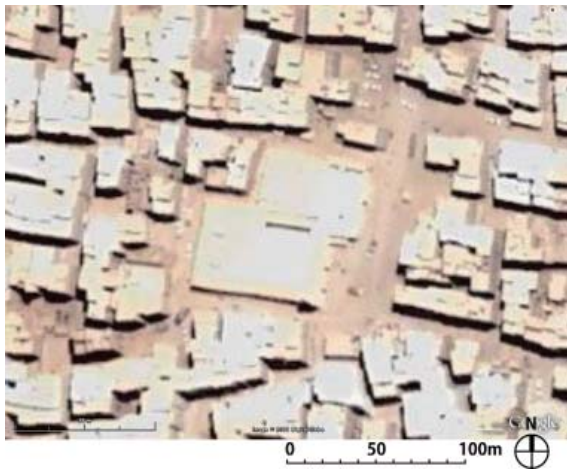


Fig. 4-1 The Friday Mosque in Shibam (The central building)
(Google Map : image 2009 Digital Globe).



Fig. 4-2 The east façade of the building.



Fig. 4-3 The courtyard viewed from the west.



Fig. 4-4 Qibla walls and the mihrab in the back prayer hall.

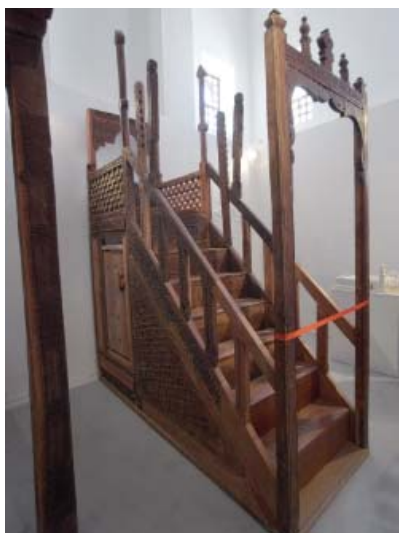


Fig. 4-5 Minbar (pulpit)*.



Fig. 4-6 The Friday Mosque in Shibam, full model*.

* Now displayed in the Minbar Museum in the old city of Shibam (opened in March, 2009).

A- ⑤ Masjid al-Faqih ('Inat)

Latitude: 16°4'15.43"N / Longitude: 49°8'52.30"E

Location of the monument

The mosque is located in 'Inat, downstream of the Wadi Hadramawt, which is to the south of the west-east running Wadi al-Masila [U- ⑥]. It is also situated in the middle of the town, which has been built on a slope. To fulfill its function as a mosque, a carpet for a religious service is put down in a room, and a fan and a microphone are placed nearby (Fig. 5-1).

Historical background

According to Mr. Abudulrahman al-Saqqaf, Director of the Palace Museum in Say'un, it dates back 700 years. It has a mud-brick structure, and a tunnel vault method has been used in the multi-column prayer hall, a same construction method also used in the prayer hall of Shaykh Umar Ba Wazir [A- ⑥] in the town of Ghayl 'Umar (although the form of the horseshoe arch is different). While uncertainty remains over when it was founded, the form of the traditional multi-column prayer hall provides a clue. Because the mosque is located in a religious city, 'Inat, it is presumed that it has some kind of relation to the saint, *shaykh* Abu Bakr b. Salim (1514-84), who was buried in the tomb in 'Inat [A- ⑦].

Architectural features

It is a mud-brick, white coated building. The mosque has two multi-column prayer rooms on the western side, a courtyard and a *minaret* on the eastern side of the premises, a main entrance on the southern side, and a sub-entrance on the western side (Fig. 5-2). The double scheme of prayer hall resembles the great mosque in Shibam, however, Masjid al Faqif does not have corridors around the courtyard.

The double scheme of prayer hall consists of an eastern prayer hall opening on to the courtyard, and a small prayer room in the back (Fig. 5-3). The eastern prayer hall is a colonnade room of five bays width by three bays depth. Pointed horseshoe arches bridge the columns laterally, and three tunnel vault running parallel to the façade bridge the ceiling (Fig. 5-4). In the central part, a twisted column and a *mihrab* that features pointed horseshoe arches can be found (Fig. 5-5). The *mihrab* is flat and decorated with relief engravings of *nura* (plaster), and the rectangular frame that surrounds the arch is equipped with buttress-like projecting parts near the top. This projecting part is common to entrance (Fig. 5-7) and the façade of prayer hall (Fig. 5-3), and the upper decorations on *minaret*. On the southern end of the *mihrab* walls, there is a wooden door leading to a small prayer hall in the back. The small prayer hall is three bays width by three bays depth, and as in the case of the eastern prayer hall, it features horseshoe arches bridging the columns. The ceiling is also a tunnel vault design. The decoration of the *mihrab* is also the same as that of the eastern prayer hall, but it is concaved and has a deep space (Fig. 5-6).

The base of the *minaret* is square-shaped, and the upper part is a tapered tower with a cylindrical shape. The base is horizontally articulated into two levels, and the upper part has three levels. The cylindrical shape of the uppermost part incorporates a balcony. This form is similar to that of the Friday Mosque in Bor. The main entrance is located on a slope, so that the porch is reached by walking up some stairs. The porch has a small dome with a couple of columns at the front (Fig. 5-7). An old wooden door marks the place where the sub entrance was created by making an opening in the wall (Fig. 5-2).

Damage description

There are no observable signs of flood damage. Only the lower part of the main entrance facing the slope is still mud-painted, while the other parts of the building have been painted over in white.

Prospects for renovation

The maintenance procedures which are normally applied to frequently-used mosques seem to be sufficient here, however as a historical building, it should also be necessary to leave an academic record of any maintenance.



Fig. 5-1 Masjid al-Faqih, the west façade of the building.



Fig. 5-2 The south façade.



Fig. 5-3 The courtyard and the eastern façade of prayer hall.



Fig. 5-4 The colonnades in the eastern prayer hall.



Fig. 5-5 The *mihrab* in the eastern prayer hall.



Fig. 5-6 The *mihrab* in the back prayer hall.



Fig. 5-7 The porch of the main entrance.

A- ⑥ Shaykh Umar Ba Wazir

Latitude: 15°40'45.17"N / Longitude: 48°51'21.58"E

Location of monuments

It is an Islamic religious architecture, with a prayer hall and a mausoleum, that is located on the western upland of the south-to-north running Wadi 'Adum [U- ⑧]. The settlement of Ghayl 'Umar is located on its eastern side, across a river. It has an artificial platform that then merges with the natural rock, on the western side a mosque with an inner courtyard, and tomb architecture on the southern side of the east entrance (Fig. 6-1). In the prayer room, there is a folded carpet that has been left unattended, the courtyard and the interior of the tomb are dirty and not in good condition, which suggest that people do not use the place so often now.

Historical background

It consists of a mosque and the tomb of Umar Ba Wazir, whose ancestor is Shaykh Umar (his tomb is located in al-Mukalla) who used to be the chief of al-Mukalla during the Abbasid Caliphate in the mid 10th century, and is also a saint of Sufism. In its surrounding area, the ruins of some rooms attached to the saint's tomb are dotted about. It is said that a Sufi order used to hold a coffee-drinking ritual here³, which is corroborated by pieces of Chinese porcelain that have been found in the building.

Architectural features

Its U-shaped structure surrounds a formal-style courtyard of about 10m by about 5m (Fig. 6-2, 6-5). In the mosque on the western side is a prayer hall that measures five bays width by three bays depth. The centre column nearest the southern wall is unusually thick. Rectilinear pointed arches bridge the columns towards the front of the hall, and it was covered by three tunnel-vaults. A *mihrab* in the centre has been over-painted many times and its decoration shows deterioration, however a motif of twisted columns can still be seen on the sides.

Beyond the mosque, the tomb's architecture is covered by a cone-shaped dome. Usually the squinch and pendentive are adopting in transition from square-shaped room to the dome in Western Asia, but they have not been applied in this case. Instead an octagon shape has been made from thin timber piled up, creating the inner space of the irregular dome (Fig. 6-3, 6-4).

The northern colonnaded hall is a passageway from the entrance to the prayer room, with six continuous arches placed in grid-like formation. The ceiling is a pendentive vault that covers each bay, but some sticks have been inserted in the upper part to keep horizontal (Fig. 6-6). The door at the entrance has been replaced by an iron door.

At the northwestern corner there is a square *minaret*, which has a rectangular plane structure and architecture that resembles a fortress. In the Hadramawt region Sunnah devotees are majority, so that mosques and tombs are generally kept separate, but a prominent feature of this mosque is that the two buildings are located on the same premises.

Damage description

Flood damage cannot be confirmed, but there is evidence of erosion caused by rainfall due to the lack of maintenance. In its earliest days, the building was well-defined, but it has gradually lost its shape through erosion from the rain. From time to time, white plaster (*nura*) has been painted over the building as waterproof, however as this process is repeated over and over again, old buildings gradually become irregularly-shaped and organic in form.

Prospects for renovation

It is a piece of Islamic religious architecture that has managed to retain most of its authenticity. In combination with other Sufi order sites in the surrounding area, it needs some initial restoration work as well as maintenance work.

³ This is based on an interview with Mr. Abudulrahman al-Sakkaf, Director of the Palace Museum in Say'un.



Fig. 6-1 View from the north east.



Fig. 6-2 Viewing the courtyard from the south side.



Fig. 6-3 Looking up into the dome inside the mausoleum.



Fig. 6-4 The cenotaph inside the mausoleum.

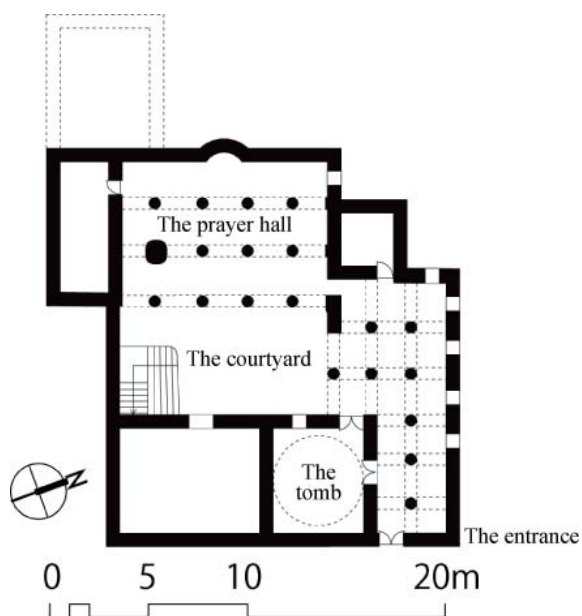


Fig. 6-5 The ground floor plan.



Fig. 6-6 The northern colonnaded hall.

A- ⑦ The tombs in 'Inat

Latitude: 16°4'21.37"N / Longitude: 49°8'56.72"E

Location of monuments

It is located in 'Inat [U- ⑥], where is to the south of the west-east running Wadi al-Masila downstream of the Wadi Hadramawt. More specifically, it is situated on flatland in the northern external area of the town of 'Inat. Because there is a riverbed between the urban area built on a slope and the enclosure of this monument, the surrounding walls are very high and firm (Fig. 7-1). The enclosure has been covered with numerous tombstones. It is an active religious site since people are still buried in these tombs, and it is filled with many visitors during the *shaykh's* birthday celebrations.

Historical background

Some of the tomb architecture are attributed to *mansabs* (a religious leader), Abu Bakr b. Salim (1514-84) and his descendants [Smith EI2 'Inat]. The *mansabs* in 'Inat are the *Sayyid* family (descendants of the prophet), who came from Tarim 440 years ago. Furthermore al Abu Bakr b. Shaykh, the father of Abu Bakr donated the *minaret* of the Friday Mosque in Tarim⁴. This surrounded cemetery has existed from the 16th century to the present.

Architectural features

There are seven mausoleums and numerous tombs within the rectangle-shaped enclosure (Fig. 7-2). The location is almost all flatland, but a part of the premises where the mausoleums stand is slightly elevated. Each mausoleum is from 6 to 7 m square and has a cone-shaped dome on the top. There are three near the south wall, two in center and two at the northeast corner of the enclosure. These mausoleums are the square room with dome, painted by *nura* (plaster), and decorated with lattice work on the cornice.

The mausoleum located at the north-eastern corner is of the first shaykh Abu Bakr b. Salim, dating back 440 years (Fig. 7-3). As the *qibla* (direction toward Makka) is west, so there is a protruding entrance on the south side, and each two windows have been inserted regularly on the other three sides. Beyond the wooden entrance door with rich carvings are two huge wooden cenotaphs, which have been placed near the southwest corner, and many small tombstones cover the floor (Fig. 7-4). The upper dome gradually changes from a square-shaped room to a circle, and its style is reminiscent of *qubba* (a dome or cupola) houses in northern Syria. A rectilinear arch is also placed on the upper part of the window.

The tomb structure at the south-eastern corner appears to have more recent additions, including a rounded dome and an ogee arch on each window (Fig. 7-5).

Tombstones come in a variety of sizes, but in many cases a cenotaph has been built as a rectangular platform, and roughly rectangular-shaped stone grave posts have been placed on the north and south edges of the grave, beneath where the head and feet lie (Fig. 7-6). In many cases inscription have also been engraved on the southern face of the south grave post and on the northern face of the north one.

Damage description

There are no observable signs of flood damage. It has been kept in a good state of repair, and the tomb structure has been completely painted over in white.

Prospects for renovation

The maintenance completed by the religious community seems to be sufficient, however as an historical building it should also be necessary to maintain an academic record.

4 This is based on an interview with Mr. Abudulrahman al-Sakkaf, Director of the Palace Museum in Say'un.



Fig. 7-1 The tombs in 'Inat, the south entrance.



Fig. 7-2 The mausoleumss and the surrounding tombstones.



Fig. 7-3 The mausoleum of al-Shaykh Abu Bakr b. Salim.



Fig. 7-4 The cenotaph inside al-Shaykh Abu Bakr b Salim.



Fig. 7-5 The mausoleum on the southeast site.



Fig. 7-6 The surrounding tombstones.

A- ⑧ Qabr Nabi Allah Hud

Latitude: 16°6'6.41"N / Longitude: 49°34'6.02"E

Location of monuments

This is a mausoleum located on the upland of Qabr Nabi Allah Hud village, which is almost the deepest part of the Wadi al-Masila [U- ⑥], and about 90km to the east of Tarim. The building is situated on the uppermost hill of the sloping settlement, and therefore people have to walk up steep stairs to enter the premises (Fig. 8-1). Huge rocks have been placed as symbols of religious belief, and the surrounding building has been constructed. Other tomb structures also exist along the slope of the town (Fig. 8-2, 8-3). During the birthday celebrations of *nabi* (prophet), this thinly populated town is filled with visitors, and accommodation for pilgrims opens up. People make a pilgrimage from the riverbed to the hilltop, walking around some springs and rocks. The birthday celebration is held from the 8th to the 10th Sha'ban month. During the research survey, accommodation for pilgrims was under construction all around the town (Fig. 8-4).

Historical background

Shrines where the prophets (*nabi*) prior to Muhammad are buried can be found throughout the Hadramawt Governorate. Many of them belong to prophets who appear in the Koran, and the most important structure among them is this Qabr Nabi Allah Hud (the prophet Hud's tomb). This structure dates back to 1673.

According to tradition, Hud is said to be the great-grandchild of Noah and is reckoned Eber, who appear in the Old Testament. In addition, Hud is the father of Qahtan, who is an ancestor of the South Arabian and Yemeni people⁵.

Architectural features

The building is single-story, and the central dome room, which features huge rocks, is enclosed by colonnades (Fig. 8-5). It is a mud-brick structure, and the exterior walls have been painted all over with white plaster.

The plan of structure is 5 bays long and wide, that is, about 14m by 14m. Only a series of five arches on the western façade is a semicircular arch, the others are all pointed arches. The doubly-articulated internal arches shade the building. In the corridor, each bay has a shallow pendentive vault (Fig. 8-6).

The size of the central dome room is 3 bays square, and a hewn huge rock was placed and leads to the south wall of the building. At the centre of the building is a pointed dome, about 7m in diameter. The interior of the dome gradually morphs from a rectangle shape to a circular shape, which is geometrically uneven.

This monument, which is located at the easternmost point of Wadi Hadramawt, is unusual in that the indigenous rocks that predate Islam as a sacred place for pilgrimage have become fused with Islamic architecture.

Damage description

There are no observable signs of flood damage. The walls and colonnade arches have been painted over repeatedly with white plaster. However, the wooden material used in the entrance and the platform has been partially damaged by termites.

Prospects for renovation

The maintenance procedures employed by the religious community seem to be sufficient, however as an historical building, it should also be necessary to retain an academic record.

5 [McLaughlin 2008, pp. 215-218]



Fig. 8-1 Qabr Nabi Allah Hud (the central building)
(Google Map : image 2009 Digital Globe).



Fig. 8-2 The west façade of Qabr Nabi Allah Hud.



Fig. 8-3 Rocks placed in the central dome space.



Fig. 8-4 Looking down on the settlement from the tomb on the hilltop.

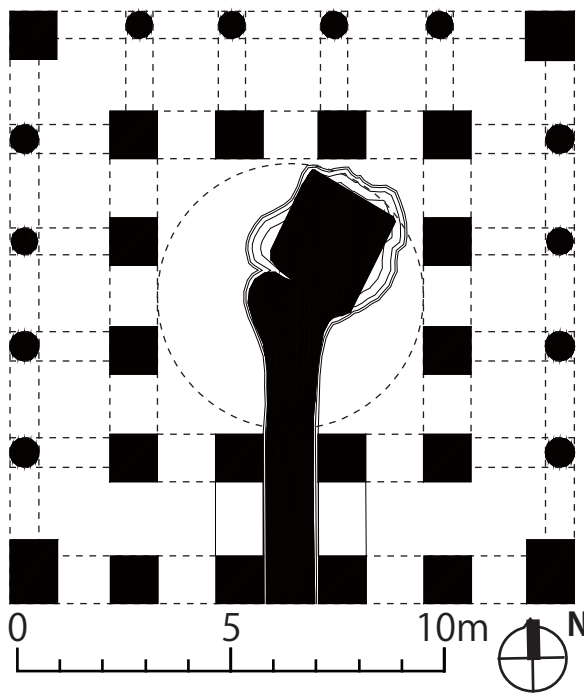


Fig. 8-5 The Floor plan.



Fig. 8-6 The colonnades and vaults.

A- ⑨ Husn al-Ranad

Latitude: 16°3'17.39"N / Longitude: 48°59'45.98"E

Location of monuments

This palace structure is located nearly in the centre of the old city in Tarim [U- ①]. The monument is across a square from the Friday Mosque and markets (Fig. 9-1). The palace covers a broad area of about 107m from east to west, and about 77m from north to south, which has gradually become a hill-shape because of frequent reconstruction work. An apparently pre-Islamic archaeological site in its platform has been discovered as a result of restoration work carried out on the upper levels, but archaeological excavation has not been completed. In addition, the palace at the lower level collapsed when they were left unattended during recent heavy rain (Fig. 9-6).

Historical background

According to Mr. Abudulrahman al-Sakkaf, Director of the Palace Museum in Say'un, this modern structure dates back to between the late 19th century and the early 20th century, and its upper palace is called *qasr* (citadel) and the lower one is called the *husn* (fort). It has flourished as a religious centre and, periodically, as a ruler's residence, in the Hadramawt region. Extensive reconstruction work was done in 1203, and the palace became the centre of the al-Kathiri family in the late 15th century. The Qu'ayti family also carried out major renovation work in 1931, employing an eclectic style that is notable for its classical influences [Damluji 1992, p. 270].

Architectural features

The building is a mud-brick and white-plastered structure. The palace currently consists of an upper stage under construction at present, a mid stage belonging *husn* above mentioned and a lower stage partly collapsed after recent heavy rain. The whole building is based on three rectangular courtyards arranged northeast, south centre and west. The complex structure includes a east lower palace adjoining the first courtyard, centre mid palace adjoining the second courtyard, and a west upper palace that adjoins the third courtyard (Fig. 9-1, 9-5). In the centre of the eastern side is the main gate, which leads to the first courtyard (Fig. 9-2), and on the southern neighbouring side is an entrance leading directly the upper level of the palace (Fig. 9-3).

The façade of the building near the eastern main gate features a series of arcades shaped by semi-circle arches and circle windows on the upper level, a common western design feature which has been applied to the part of the courtyard that leads to the back and the palace (Fig. 9-2). While a multi foil ogee arch has been applied to the main gate, in addition to Indian/Islamic architectural features, other elements of western architectural style appear throughout the building; Corinthian pilaster on the periphery of the door, baroque gables, pointed arches decorated cornice (eaves moulding), and the building's corners have been thickened by plaster to imitate corner stones. This foreign styling has been applied to all the plaster decorations, and thus the palace as a whole has a unique style that is an eclectic mixture of traditional methods and foreign decorative elements.

The upper palace is a courtyard structure that measures about 32m from east to west, and about 55m from north to south (Fig. 9-4). The building is a two-story structure and features a rooftop terrace. The palace has colonnades opening towards the courtyard on each level, and there are some rooms at the back. The corridor complements the surrounding area of the central courtyard, which leads to each room. The inside of the rooms are traditionally constructed with two columns in the centre holding up the ceiling.

Damage description

In the northeast corner of the mid palace, a part of the terrace floor has collapsed (Fig. 9-7), and at the west back of 1st courtyard, the arched wall that surrounds the courtyard has been damaged by recent rainfall (Fig. 9-7). Furthermore, although each room has avoided collapse, the plaster coating the walls is partly cracked exposing the brick wall beneath.

Prospects for renovation

The upper level of the palace is currently under repair, but it needs to be conserved as well, and the whole restoration whole plan needs to include the courtyard and palace on the lower level. It is a highly valued historical building in Hadramawt, and an academic record should also be maintained in addition to completing the restoration work.



Fig. 9-1 Husn al-Ranad (Google Map : image 2009 Digital Globe).



Fig. 9-2 The east façade of the palace.



Fig. 9-3 The south-eastern entrance of the palace.



Fig. 9-4 The south side of the upper palace (*qasr*).



Fig. 9-5 The courtyards on the mid palace (*husn*).



Fig. 9-6 The west back of the first courtyard.



Fig. 9-7 The collapsed part of the terrace.

A- ⑩ The Palace Museum in Say'un

Latitude: 15°56'43.52"N / Longitude: 48°47'4.78"E

Location of the monuments

It is a palace building that on the north side of the *suq* square that is located in the north of Say'un [U- ②]. The palace is a glorious building that measures 52m wide by 34m high, and is a landmark in the town (Fig. 10-1). When South Yemen embraced socialism it was turned into a radio station, but a part of the building was opened up as an archaeological museum after restoration work in 1984. The exhibition floor displays objects unearthed in the Hadramawt region, collected antiques, traditional handicrafts, and old pictures of the Hadramawt governorate. According to Mr. Abudulrahman al-Sakkaf, Director of the Palace Museum in Say'un, repair work was carried out in 2000 on the tetrahedral façade and terrace of the building, at a cost of about 5 million Riyals.

Historical background

This is a palace of the Sultan, al-Kathiri family, who placed their political stronghold in Say'un. The palace of the al-Kathiri family was located on the western slope in ancient times, but it was built on the current site in the 1920's, and functioned as a palace until 1967. The site was originally a fortress, but after that additional construction work was repeatedly done to convert it into the al-Kathiri family's palace, which currently boasts 90 rooms [Boxberger 2002, p. 69].

Architectural features

The building is mud-brick structure with white plaster coating, and is six stories including a rooftop terrace (Fig. 10-2). The palace consists of the lower building with vast enclosure as a rooftop leading from the main gate towards a square in the south, and an upper building equipped with a cylindrical *burj* at each of the four corners. During the sultan period, the first floor was used as a hall for meetings or ceremonies; the second floor was used to store food, weapons, or as servants' quarters; the third floor included private rooms for the sultan and meeting rooms; the fourth floor was used as living space for the sultan's family; the fifth level included service rooms for visitors; and the two rooms on the uppermost floor were the most important VIP rooms (Fig. 10-4).

The façade of the lower building has strong elements of western architectural style, including a semi-circular arch on the main gate, a pediment (triangle gable) on the upper part, and a series of pointed arches on the balcony that surrounds the lower level building. On the other hand, the façade of the upper level building has a more eclectic style; in addition to a pair of horseshoe arches that can be seen in the transom of the wooden windows, it features traditional elements such as buttress on the terrace, and Indian/Islamic elements like the ogee arches on the upper part of the frame that surrounds the windows (Fig. 10-3).

The palace is a courtyard structure that has an open ceiling space in the centre of the building (Fig. 10-5). The composition of rooms that are distributed along a corridor that surrounds around the courtyard. One of the exhibition room was formerly the main room of the palace, and is located in the south-eastern part of the building. The frame structure of the ceiling uses four bracket columns to support two beams, and blocks have been placed on the beams in what is said to be a traditional manner (Fig. 10-6).

Damage description

It has avoided the flood damage. As a whole, the exhibition room of the museum and the office room have been kept in a relatively good state of repair. However, the ceiling has settled slightly under the weight of the upper floor, probably the effect of rainfall, and the plaster coating on the walls has cracked exposing some fractures beneath.

Prospects for renovation

The current level of conservation would be fine if restricted to the parts operating as a museum; however, there are many vacant rooms in the lower floors that need to be utilised in more constructive ways.



Fig. 10-1 The Palace Museum in Say'un (Google Map : image 2009 Digital Globe).



Fig. 10-2 The view from south, The main facade of the building.



Fig. 10-3 The upper part of palace, the south façade.

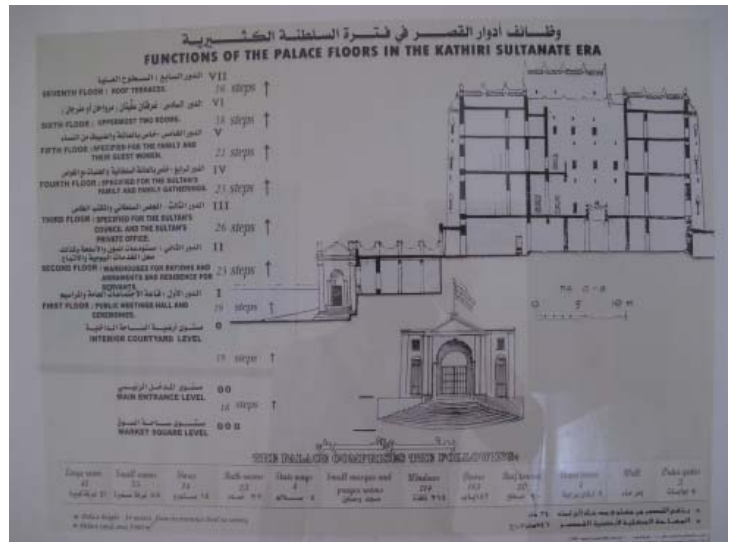


Fig. 10-4 The palace, North-South section.



Fig. 10-5 Light court.

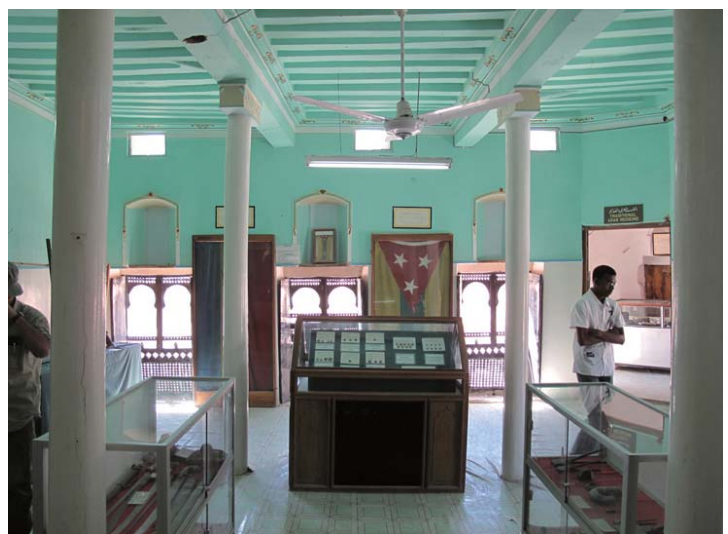


Fig. 10-6 The main room of palace.

A- ⑪ Husn bin Ayyash

Latitude: 14°45'19.08"N / Longitude: 49°36'15.85"E

Location of the monuments

It is a new palace located nearly in the centre of al-Shihr, southeast of the old northern palace, which had a military function. A square, measuring 130m from east to west and 85m from north to south, lies between the new palace and the northern one (Fig. 11-1). It is approximately 350m from the old coastline.

Historical background

The first Sultan 'Abd Allah b. 'Umar of the Qu'ayti began to build the palace in 1868, naming it Bin Ayyash after a soldier from Yafi'i. It was designed by an architect, Mabhut al Juaidi from Wadi 'Amd, who had travelled to Hyderabad in India [Damluji 2007, p. 172]. The Qu'ayti family relocated their political centre to al-Mukalla from around 1879, and, although incomplete, the building functioned as a palace of the Qu'ayti family and for the ruler of al-Shihr for the first half of the 20th century. In 1960 it was converted into a school under the Sultan. In 1974, during South Yemen's independence, a second floor was added, creating classroom for boys on the lower level and the one for girls on the upper level. It functioned as school until 2008, when it was replaced by a new school, with implications for the conservation project that is now beginning⁶.

Architectural features

This rectangular building is 50m from east to west and 70m from north to south, with a central courtyard that measures 20m from east to west and 25m from north to south (Fig. 11-1). At the north-western corner and the south-eastern corner, square towers just out slightly from the façade. The front of the palace faces north, and there is a grand staircase the width of the building facing the square and two wooden entrances in the centre of the wall (Fig. 11-2). The exterior walls are undecorated, and the original buttresses on the first floor can still be seen against the southern and western façades (Fig. 11-3).

The plan is axisymmetrical, and the courtyard is about 60cm below the terrace that surrounds it (Fig. 11-4). This kind of courtyard composition is common in the caravansary of western Asia, including Iran. There are halls with underground rooms on both the north side and the south side of the courtyard. The northern hall is the main room, with five Mughal multifoil-shaped arches facing the courtyard, and thick beams bridging the ceiling joists (Fig. 11-5). It is divided by an added wall constructed during the time that it was used as school, and the effects of western classicism can be found in plaster decorations on the wall's surface.

Narrow rooms can be found in the eastern and western sides of the building, beyond the corridor facing the courtyard, which is punctuated by a series of seven arches. Decorative features such as the pier pilaster articulating the façade of the courtyard, and the ogee arch that bridges it, are heavily influenced by Deccan architecture rather than Mughal architecture (Fig. 11-6). There is a well at the south-western corner of the building. There is also a reservoir to store water during the rainy season.

Damage description

There does not appear to be any direct flood damage to the building. However, the roof on the south-western part of the building that has not been used as school has fallen off, and left unattended has become a dump.

Prospects for renovation

Because the building had a military function, its decoration is limited. As an important building in a port city in the late 19th century, however, it does show signs of the region's interaction with India, the west, and also with the Middle East. It would best serve as a museum in al-Shihr, although the possibilities of restoration, including the part used as a school in the late 20th century, would need to be discussed. The museum currently found at the al-Shihr north gate occupies only a small area.

⁶ This is based on an interview with Mr. Khaled Dafary, director of the Museum in al-Shihr.



Fig. 11-1 **Husn bin Ayyash**
(Google Map : image 2009 Digital Globe).



Fig. 11-2 **The north front façade of the palace.**



Fig. 11-3 **The south façade of the palace.**



Fig. 11-4 **Looking out over the courtyard from north.**



Fig. 11-5 **The northern hall facing the courtyard.**



Fig. 11-6 **A series of ogee arches around the corridor enclosing the courtyard.**

A- ⑫ Qasr al Mu'een

Latitude: 14°31'53.12"N / Longitude: 49°7'38.96"E

Location of monuments

It is a palace located about 1km west-north-west of the cape-shaped old city of al-Mukalla [U- ⑬]. The narrow building measures 70m from east to west, and 25m from north to south, and has three-floors consisting of east and west wings (Fig. 12-2). The east wing has become the Palace Museum, while the west wing has been left unattended. The public northern garden occupies a broad area that measures 140m from east to west, and 55m from north to south. There is a pool almost in the centre, and it has been developed as a front garden for the museum. The more private garden located on the southern side of the building, facing the sea, measures 80m from east to west, and 40m from north to south (Fig. 12-3).

Historical background

The east wing is an old building, constructed around 1924 by Sultan 'Umar bin 'Awad (died 1936) of the Qu'ayti family. The west wing and the uppermost level of the east wing were added by Sultan Salih b. Ghalib (died 1956) in the 1940's [Damluji 2007, p. 155]. Both buildings were built by workers from India, and feature a mixture of Gothic and India/Islamic details⁷ (Fig. 12-3).

Architectural features

The east wing is a public space consisting of audience halls, throne halls, and guest rooms. The west wing is a private space including living quarters and servant rooms (Fig. 12-4).

The east wing has a symmetrical structure that contains the northern façade as the front, towers with conical roofs on both sides, and a half-octagonal structure jutting out internally, whilst the central parts consist of a series of five arches on the lower level and a columned balcony on the upper level. The influences of gothic and western classical architecture styles can be found in the steep pointed arches, triple foil arches, stained glass, and the balustrade. On the other hand, the influence of Indo Islamic architectural styles can be seen in the wooden eaves, the balcony (veranda), and brackets (Fig. 12-5). The uppermost level, which was added as a music room in the 1940's, breaks the symmetry of the façade.

The west wing has an irregular plan, consisting of a key-shaped inner yard neighboring the western side of the east wing, and a part that juts out on the southern side (Fig. 12-6). The gothic details have disappeared from the northern façade, but the influence of the classical style can be still found in a pediment (triangle gable) and an asymmetrical balustrade (Fig. 12-7). The wooden balcony and bay windows are largely used as living space. Even though it has been short period nearly about 25 years, the building has experienced numerous extension and alternation work.

Damage description

The museum has been closed since the flood. The roof tiles are cracked on the conical towers located on either side of north facing façade on the eastern wing, and there are signs of water damage on the walls.

Prospects for renovation

It is an eclectic architecture that illustrates how al-Mukalla flourished in the first half of the 20th century from the Indian Ocean trade, and it is desirable to maintain its function as a museum. However, the uppermost level on the west and east wings have been left unattended since before the flood, and regular maintenance work has not been carried out apart from coating the exterior wall with white plaster. In particular, because it is located on the coast and its wooden elements are largely damaged, it should receive prompt attention. However, in order to support its role as a museum, maintenance work and management policies for the whole building (including the gardens) need to be considered, not only restoration work on the parts damaged by rainfall.

⁷ Damluji calls it the "Neo-Rococo style" of the Qu'ayti family [Damluji 2007, p. 155].



Fig. 12-1 **Qasr al Mu'een**
(Google Map : image 2009 Digital Globe).



Fig. 12-2 **The north façade.**



Fig. 12-3 **View from northeast.**



Fig. 12-4 **The east wing façade.**



Fig. 12-5 **The balcony on the east wing.**



Fig. 12-6 **The courtyard in the west wing.**



Fig. 12-7 **The west wing façade**

A- ⑬ Husn al-Ghuwayzi

Latitude: 14°33'30.07"N / Longitude: 49°8'11.17"E

Location of monuments

It is a fortress structure located upstream of the wadi that flows from north to south to the west of al-Mukalla [U- ⑬]. The fortress is about 3km inland from the sea by air (Fig.13-3). There is a pair of buildings on both sides of the path running toward al-Shihr [U- ⑭] from al-Mukalla. The building on the western side of the road is a three-story castle located on high rock (Fig. 13-1). The building on the eastern side is a two-story rectangular castle that is located on low rock (Fig. 13-2). The buildings are about 70m apart, which implies that they were interrelated.

Historical background

These are two of the forts built by the Qu'ayti family in 1884 to protect their capital al-Mukalla. When the capital city moved from al-Shihr in 1881, the cape city of Hayy al-Biladas old city sprawled and developed a new town called Hāffat al-Hārah in the western direction [Damluji 2007, pp. 153-154]. Ten years ago the Yemen government conducted repair work on the two forts, and completed a garden that surrounds the west fort⁸.

Architectural features

The castle on the western side of road consists of a piled-up rubble-stone structure on the first and second levels, and a mud-brick structure on the third and fourth levels (Fig. 13-1). As it is built on unshaped stone, it has concave and convex corners to adapt the premises to the foundations. The entrance is reached by walking up some stairs. Inside the building there are only a few openings, and the flat ceiling is covered with twigs and mud resting on beams bridges above thick walls (Fig. 13-4). While the piled-up rubble stone is exposed below the second level, the third level upwards is coated with mud and the uppermost level is painted with white plaster.

The castle located on the eastern side of the road has a similar composition, although it is almost rectangular in shape. The surface of the lower and the upper parts are painted white, and the middle part is coated with mud.

Damage description

Although it was repaired ten years ago, the upper floors of the building on the western side of the road have collapsed (Fig. 13-5, 13-6). Because the castle itself is located on an elevated area on rocky ground, it would appear that it was directly damaged by rainfall rather than by the flood. It was in a good state of repair when visited in the summer of 2008, however insufficient attention might have paid to the drainage system during the restoration work. For a mud-brick structure that is vulnerable to water-damage, it is clear that regular inspection of the drainage needs to be carried out after rainfall, in addition to other maintenance work.

Prospects for renovation

The gulf region of the Hadramawt Governorate is considerably wealthy compared to the inland areas, and construction projects have been well-conducted. In al-Mukalla and al-Shihr, traditional houses have been replaced by new buildings even in the old city. Following this trend, some historical sites related to the Sultan have been developed into a park that helps to prioritize certain buildings for repair. Consequently, a daily upkeep system for the archaeological park has to be prepared in addition to cyclical maintenance work.

⁸ This is based on an interview with Mr. Abudulrahman al-Sakkaf, director of the Palace Museum in Say'un.



Fig. 13-1 Husn al-Ghuwayzi, the western fortress.



Fig. 13-2 The eastern fortress.



Fig. 13-3 Al-Mukalla city, location of the fortress.



Fig. 13-4 The flat ceiling in the western fortress.



Fig. 13-5 The northern side of the western fortress, before the flood (July, 2008).



Fig. 13-6 The northern side of the western fortress, after the flood.

A- ⑭ Al-Fales Fortress

Latitude: 15°56'38.75"N / Longitude: 48°47'59.98"E

Location of monuments

It is mud-brick structure, and one of the fortresses that utilizes traditional methods (Fig.14-1). The building was constructed on a small rise of land at the foot of the hill, which locates to the east of the old city of Say'un [U- ②](Fig. 2-1: d). A piece of the former city wall still remains near the eastern side of the building (Fig. 2-1).

The building was expected to open as a museum for sightseers after restoration work on the 150-year-old fortress was completed, which the governorate spent about 22 million riyals on two years ago. Records have been kept on the restoration work, which has taken one year and eight months and involved the work of an architect, Mr. Abdullah Mohamed al-Sakkaf who is the member of restoration committee. As of February 2009, the restoration work was almost complete, but the building has not been opened as a museum because of fiscal constraints on finishing the stairs that lead to the entrance. Maintenance work on the building is conducted once a year⁹.

Historical background

It is similar to the old *husns* (fortresses) that are distributed across the Hadramawt Governorate in the 19th century. It is assumed that the al-Kathiri family, who chose Say'un as their main stronghold, constructed the fortress for military purposes in order to oppose the rise of the Qu'ayti family based in Shibam. The building is been located alongside the city wall in the north-east of Say'un, which implies that it had a strategic role in the city.

Architectural features

The building is a three-story structure, with a terrace on the rooftop. There are cylindrical *burj* on the four corners of the exterior walls for observing the enemy, which gives the building a robust, fortress-like appearance similar to the palace in Say'un [A- ⑩] and the *shaykh's* house in Qasam [A- ⑩] (Fig. 14-2).

The site is composed of a nearly square-shaped building with various rooms on each level branching off from the central east-west corridor. It has a closed structure (Fig. 14-5) compared to the central light-court design of the *shaykh's* house in Qasam, and the house of Abdulrahman [A- ⑪]. On the first floor, the main room extends to the four corners of the building, with the corridor running through the center, and narrow rooms, including a kitchen and a bathroom, occupying the spaces in-between. In the main room windows at the walls is almost at the same level as the floor and leads to an exterior *burj* (Fig. 14-3). The *burj* wall has holes for firing a gun, and small observation windows. The walls in the main room are dotted with small niches that are said to be kilns, used to make coffee by the soldiers who used to be stationed at the fortress (Fig. 14-4). The structure is further characterized by the ceiling, which is held up by a bracket and beam atop a column (Fig. 14-7).

There is a millstone for making flour in the kitchen, which was once used for making bread (Fig. 14-6).

In order to protect the building from rain damage, the plaster floor of the rooftop terrace (Fig. 14-8) has been painted over. In addition, the floor has a drainage slope to release trapped water outside (Fig. 14-9).

Damage description

Flood damage cannot be confirmed. It is in a good state of conservation as restoration work was quite recent.

Prospects for renovation

As a building that symbolises the history of Say'un, it is essential to focus on utilizing it and managing the expenses involved. In order for regular maintenance work to be carried out, it needs to generate some sort of income. It would cost between 3-5 million riyals to improve the road that rises up the slope leading to the entrance of the fortress. However, it is important for people to have smooth and easy access to the museum.

⁹ According to Mr. Abdullah Mohamed al-Sakkaf, maintenance work is needed on the mud walls once every five years, and on the plaster once every two years (although for the exterior walls it is once a year).



Fig. 14-1 Al-Fales Fortress, the western façade.



Fig. 14-2 The façade of the front entrance of the fort.



Fig. 14-3 Interior view of the main room on the second floor.



Fig. 14-4 A coffee making kiln.

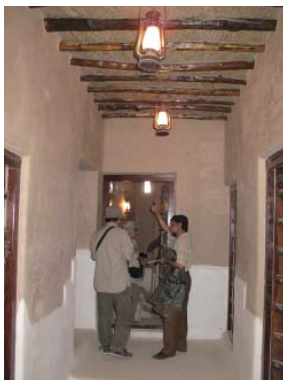


Fig. 14-5 The central corridor on the second floor.



Fig. 14-6 The kitchen on the second floor.



Fig. 14-7 The ceiling, supported by a bracket and beam atop the column.



Fig. 14-8 The rooftop terrace.



Fig. 14-9 The drainage on the bottom part of the wall.

A- ⑮ Kut al-Nakhr

Latitude: 15°59'2.85"N / Longitude: 48°51'47.60"E

Location of monuments

Kut al-Nakhr is a fortress located between Say'un [U- ②] and Tarim [U- ①], and was built by the Sultan of Hadramawt about 100 years ago to manage caravans. It is on the northern side of the road, and positioned in the centre of a slight hill-shaped rectangular premises, with the wadi flowing to its north.

In 2005, Yemen's Ministry of Culture conducted repair work on the site, spending 7 million riyals with the intention of opening it as a museum of trade¹⁰. During the repair work, its platform was reinforced with stone, and stone walls were constructed on its perimeter. It would appear, however, that it was not opened as a museum before the flood (Fig. 15-1).

Architectural features

The building is a mud-brick, three-story structure, and almost rectangular with towering parts that jut out in the north-eastern and south-western areas. The third level has a terrace, which doubles as a courtyard. Around the building there are some facilities for example reservoir and the basement of enclosure. A draft of the structure was produced by Yemen's Ministry of Culture.

The state of the building prior to the repairs is unknown, but judging from the exposed interiors of the south-eastern façade by the damage of flood, the rooms on the first level has an arch construction, and the ceiling is held up by vault construction (Fig. 15-2).

On the southwest and northeast corners, there are tower like projection, and the center of south façade above the entrance, there is also. Because a drainage pipe just out at the centre of each level on the north façade, the plan of the building can be assumed to have a passage in the centre of south-north direction and room units were arranged on its east and west sides (Fig. 15-3, 15-4). A drainage chute can be found in the centre of the north-facing rear façade (Fig. 15-5).

Damage description

It suffered substantial flood damage caused by the wadi running from the west to east that lies to the north of the site. Part of the building to the east of the south entrance has collapsed, and the interiors have been exposed. Furthermore, the water level came higher than the repaired stone platform, the mud-bricks on the platform that juts out to the south-west were hollowed out in an area 30cm high and 20cm deep, and the juttied part itself comes away from the main building. In the surrounding area of the building, sediment deposits can be found which are 1m higher than the primary ground level (Fig. 15-6).

Prospects for renovation

The platform and the south-eastern collapsed part have been heavily damaged and should be reconstructed if possible. Removing sediment from flooding also will also make it necessary to conduct ground maintenance; if the damaged areas are reconstructed, consideration must be given to placing a protective wall on the northern side since the location is very close to the wadi.

Once restored and opened as a museum, it is expected to become a huge tourist attraction, because this is a good example of public architecture that uses traditional construction methods in the Wadi Hadramawt, and it faces the road between Say'un and Tarim.

However, in the cases of the al-Fales fortress [A- ⑭] in Say'un, Husn al- Guwayzi [A- ⑬] in al-Mukalla and this building, all efforts will have been in vain if post-restoration management work is not carefully considered. Consequently, it is important in Hadramawt to consider how to subsidize site management in addition to the expense of restoration.

¹⁰ This is based on an interview with Mr. Abudulrahman al-Sakkaf, Director of the Palace Museum in Say'un .



Fig. 15-1 Kut al-Nakhr, the southwards facing front.



Fig. 15-2 The exposed part of the interior, arch construction.



Fig. 15-3 The western façade.



Fig. 15-4 The eastern façade.



Fig. 15-5 The back of the building in the north-east.



Fig. 15-6 The south-western platform is hollowed out.

A- ⑩ Shaykh's house in Qasam

Latitude: 16°7'51.17"N / Longitude: 49°9'3.77"E¹¹

Location of monuments

It is one of the traditional mud-brick residential structures in Qasam, located in Wadi al-Masila [U- ⑥]. It is located facing the square in front of the Mosque on the outskirts of the settlement. This building was called Husn Bin Yamani.

Historical background

This building was constructed by a *shaykh* in Qasam village 200 years ago. It is currently owned by Qays b. 'Abbud b. 'Ali Bin Yamani al-Tamimi, who is the *shaykh* in Qasam now. The *shaykh* customarily has tremendous authority over the wadi between Qasam and Sana'a, from the desert in the north to the sea in the south. The current *shaykh* lived in the village until 1967, but left his home after the Yemen Revolution in 1962 abolished of the monarchy, and fled to Abu Dhabi. After the unification of north and south Yemen in 1993, he returned to Qasam and restored the house, which has been passed down through generations of his family, using traditional construction methods¹² (Fig. 16-1).

Architectural features

The building has a three-story structure, and is a courtyard house with a rectangular light court (Fig. 16-2). The ground floor is used as a warehouse and for livestock storage, and the first floor upwards are used as living space. All four exterior corners are equipped with *burj* to look out for enemies, and it generally has a robust structure like other *husn* (fortresses) scattered throughout Wadi Hadramawt.

The building itself is nearly square-shaped, consisting of the central light court surrounded by a corridor, and main rooms that are placed on four sides. The room in the south-eastern corner on the first floor is a *majlis* (a reception room) for male guests of honour (Fig. 16-3). On the western wall of the room, there is a *mihrab*, painted with thick plaster (Fig. 16-4), suggesting that religious services are held there. According to the owner, each level has the same floor plan, with four main rooms on each floor, and twelve rooms in total.

The main room has roughly level, and there are three windows depth by four windows width windows. Its ceiling is about 5m high, and there are six columns with brackets to support the beam and ceiling. The ceiling is covered with logs that are arranged over a beam, and leaf stems of date palms are decoratively placed on top of that¹³ (Fig. 16-5).

Across the light court, the building can be divided into the eastern side with its guest space, and the western side with its living space for family. There are two main gates in the southern part of the building; the south-eastern gate is for guests, and the south-western one is for the family. As to dividing the flow line from entrance to main rooms, each unit are distributed from the lower levels to the upper floors. The door of the main gate is old, and features an arabesque pattern wooden grating, and a wooden carved horseshoe arch (Fig. 16-6). The eastern passage at the entrance for guests is L-shaped, and leads to the central staircase (Fig. 16-7). The firm mud on the passage floor has a polished appearance. In addition, the tread surface on the stairs is engraved with a characteristic elliptic form motif, in an attempt to prevent slips and to provide an interesting optical effect, which shows great sensitivity towards important guests (Fig. 16-8).

Damage description

The front of the building has not been painted with white plaster, but the whole surface of the façade has been finely maintained by painting mud. On the other hand, all the rooms on the lower levels are locked and unused, and the wall that surrounds the light court is visibly deteriorated.

Prospects for renovation

The current state of restoration is adequate, however, there is room for further restoration and improvement in utilizing the vacant rooms on the lower levels, and in the light court. It needs to be restored as an example of other damaged traditional houses distributed throughout the surrounding area.

11 The location of this building cannot be pinpointed on Google Earth, therefore latitude and longitude are indicated instead.

12 This is based on an interview with Qays b. 'Abbud b. 'Ali Bin Yamani al-Tamimi.

13 The design of the ceiling is typical in this region. The leaf stems of date palms are woven into a diamond shape within the space made by crossing logs. The leaf stems of date palms presented in three colors including red, white and black, which are arranged in an alternating pattern.



Fig. 16-1 The south-side front of the shaykh's house in Qasam.



Fig. 16-2 The light court of the house.



Fig. 16-3 The second floor, *majlis* in the southeastern part.



Fig. 16-4 A *mihrab* on the western wall of the majlis.



Fig. 16-5 The frame of the ceiling, and the bracket.



Fig. 16-6 The wood carving on the front door.



Fig. 16-7
The ground floor, a walkway
at the entrance.



Fig. 16-8
The stairs, a design made
on the tread surface.

A- ⑰ The house of Abdulrahman al-Kaf in Say'un

Latitude: 15°56'44.72"N / Longitude: 48°48'2.90"E

Location of monuments

It is a traditional mud-brick high-rise house. The building is situated in an area of the new city to the south-east of the old city of Say'un [U- ②] where the Palace Museum can be found (Fig. 2-1). This area is well known for its glorious palace, built by families from Tarim as a holiday home during the 19th and the 20th centuries.

Historical background

This house was built by Sayyid Abdulrahman al-Kaf¹⁴, of the 'Alawi Sayyid family. He was a religious writer, and famous for his charity work. Born in Singapore in 1886, he spent his childhood in Hadramawt, move his base to Singapore again in 1907, before finally returning to Hadramawt in 1932. This house was constructed when he lived in Say'un for four years, from 1914. Since 2003, it has functioned as a culture centre, where lectures of history and sociology are held every Wednesday, which even women sometimes attend the lectures. The building receives regular maintenance.

Architectural features

The building consists of a four-story house with a roof terrace and surrounding walls (Fig. 17-1). The lower floor is used as storage. The upper floor has a light courtyard in the centre that is surrounded by a passageway that has rooms branching off. The whole site is enclosed by walls, and there are remains of a small prayer hall and ruin of a bathing place in the north-eastern corner (Fig. 17-2). The layout has a simple design, and the scale of each room is determined by the number of windows surrounding it (Fig. 17-5)¹⁵.

The ground floor has a pair of entrances in the centre of the southern side. There is an entrance in the high-ceilinged, L-shaped corridor on the western side, which also has a staircase in the centre (Fig. 17-3). The first floor has nearly symmetrical composition around a central light-well (Fig. 17-4). The room at the south-western corner is used as reception room, and next door there is a dining room (Fig. 17-6). When meals were ready, they used to knock on the dining room wall to tell the guests. The room at the south-eastern corner is equipped with a living room for a family, a kitchen on the north side of the light-well, and toilets and a bathroom on either side of the wall.

From the layout of the rooms, conductive flow lines and location of doors, it is possible to classify the western side as a public space for guests, and the eastern side, centered on the light-well, as a living space for the family, which matches the spatial composition of the *shaykh's* house in Qasam [A- ⑯].

Damage description

There are no observable signs of flood damage. However, structures attached to the main building are unattended and in poor condition, and are liable to rainfall damage.

Prospects for renovation

This can be seen as a pioneering example of a private building gaining a public role through the establishment of a private foundation. However, only the classrooms, southwest corner room in the first floor are currently used, although many of them are locked and untended. A mechanism should be created that allows the building to be used effectively, and for maintenance work to be done for the whole site with public support.

14 He is the grandfather of Mr. Abudulrahman, director of the Palace Museum in Say'un. The following is based on an interview with him.

15 The room located in the south is 3 bays width by 3 bays depth and; on the other hand, the room located on the north side is 2 width by 3 bays depth, for it is clear from the location of columns.



Fig. 17-1 The front façade of the house on the southern side.



Fig. 17-2 The back of the building looked at from the northwest.



Fig. 17-3 The central corridor at the front entrance.

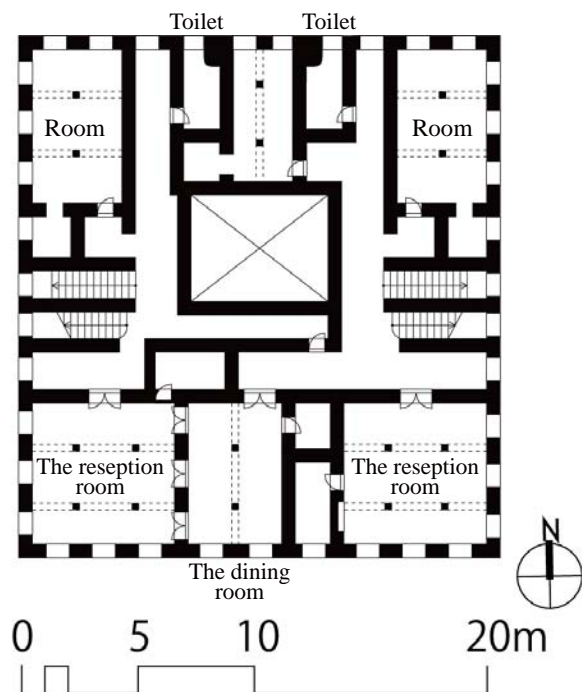


Fig. 17-4 Plan of the first floor.



Fig. 17-5 The windows with lattice work.



Fig. 17-6 The upper frame in the reception room.

A- ⑱ *Nura factory in Al-Juhayl*

Latitude: 16°2'57.44"N / Longitude: 49°3'45.59"E

Location of monuments

It is a factory with a traditional mud-brick kiln to produce white plaster (*nura*) that is distributed across Wadi Hadramawt. In the area surrounding al-Juhayl [U- ⑥] eastwards of Tarim, small factories with traditional kilns to produce plaster can be found. And this factory has five kilns.

Historical background

According to craftsmen we visited for the survey, the factory was established about 15 years ago. This kind of plaster-producing factory is located apart from traditional settlements, and is situated on land that has been recovered by excavating the wadi valley (Fig. 18-1). After the unification of north and south Yemen, it would have been necessary to construct and repair many traditional houses in Hadramawt, leading to a high demand for plaster and this kind of factory. It is interesting that traditional manufacturing processes were preferred over more modern mechanized methods.

Architectural features

There are kilns to burn limestone, a prefabricated hut to knead plaster blocks, and a stirring machine to mix plaster and water (Fig. 18-6). And two or three kilns are working.

The kiln of the factory is constructed from mud bricks, piled up and mortared together using mud (Fig. 18-2). The firing room is approximately 6m, and consists of a combustion chamber to burn firewood in the front, and a firing chamber to produce plaster in the back (Fig. 18-3, 18-4, 18-5). The firing room is almost cylindrical, with a diameter of 2.5m, and its upper part is open (Fig. 18-4).

The finished plaster is sold for about 700 riyals per 40kg bag. The limestone for the plaster material is extracted from the mountains and riversides in the surrounding area, and is burned for two days in the kiln (Fig. 18-7).

Damage description

The storage area located on the cliff edge has collapsed due to some kind of landslide. There is also a kiln near the storage, which, although intact, has not been used. Furthermore, one of the kilns that are not used at present has been damaged by rainfall; the opening of the rear firing room has cracked, and the stairs have partly crumbled. This is because the kiln has not been coated with waterproof plaster, as is not necessary for its operation, and therefore it is vulnerable to rainfall.

Prospects for renovation

The present condition is sufficient for the factory to function, however, the treatment of effluent from the kilns during rainfall remains an issue. An academic record of the site should be maintained, as it is one of the few places left that can pass on the process and history of making plaster, an important traditional material in Hadramawt.



Fig. 18-1 The location of the *nura* factory.



Fig. 18-2 A kiln of mud bricks.



Fig. 18-3 Looking out the hole protruding from the firing room.



Fig. 18-4 The firing room part.

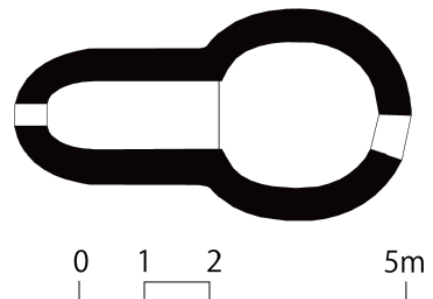


Fig. 18-5 The kiln, plan view.



Fig. 18-6 The stirring machine.



Fig. 18-7 Plaster-forming limestone.

A- ⑱ The Sultan's Palace and traditional houses in Shibam

Latitude: 15°55'34.19"N / Longitude: 48°37'38.93"E

Location of monuments

It is a palace and a house that forms a component of some high-rise architecture in Shibam [U- ③], registered as a world heritage site. The palace is located facing the square near the south city gate, and is currently an office of GOPHCY and GTZ. The house of 'Alawi bin Sumayt is one of the high-rise houses in Shibam, and is located in the former *suq* square in the centre of the city (Fig. 3-1).

Historical background

The northern part of the sultan's palace in Shibam was built by the al-Kathiri family, who governed the Hadramawt region from the late 15th century to 1858. Afterwards, its ownership shifted to the Qu'aiti family, who came to prominence around 1830, and who improved the southern part of the palace in the late 19th century (Fig. 19-3).

After a flood in the 16th century, the construction of city walls brought about a recovery in the number of houses, and in the 19th century about 500 high-rise houses were packed within the city walls of Shibam (Fig. 19-5). The *suq* square, where the house of 'Alawi bin Sumayt is located, is one of the crowded places where caravans from every region of the country, including Sana'a, brought various kinds of goods to market [Boxberger 2002, pp. 78-85]. Furthermore, it can be assumed that this was one of the core areas that formed the current city centre, because the Friday Mosque [A- ④], established in the 8th century, is located facing the western side of the *suq* square.

Architectural features

The Shibam palace consists of the northern building, which retains the style of the al-Kathiri period, and the southern building, which was improved during the Qu'aiti period (Fig. 19-3). There is an open corridor between these buildings, leading to the main gate in the west. The northern building is older and smaller than the southern one. Both of them have a four-story structure with a rooftop terrace, and are painted with white plaster. It can be seen from the elevation of the northern building that the doors and windows on the western side have a simple style that is common to any other high-rise building in Shibam [Damluji 1992, pp. 94-95] (Fig. 19-1). In contrast to the northern building, the southern building has a semi-circle arch on the frame that surrounds the opening, small round windows, pilaster, and bay windows, suggesting design influences as remote as Western Europe and India.

The layout of the palace does not include a light court, but has rooms on both sides of the north-south central corridor (Fig. 19-2). The ground and first floors have small narrow rooms on both sides of the central corridor, whilst the second and third floors have main rooms located in the four corners. It can be assumed that the lower levels used to be used for food and weapons storage, whilst the upper levels were used as living room and reception room. The staircase is located close to the centre of the layout. On the upper level, a part of the floor is opened, which indicates that there was extensive interaction between every floor (Fig. 19-4).

The house of 'Alawi bin Sumayt consists of a five-story apartment with a northern rooftop terrace, and a southern front courtyard and attached building [Damluji 1992, pp. 101-103]. In the eastern area of the site are the main gate to the apartment, the sub entrance to the front courtyard, and also the entrance to the storage. The apartment includes storage space on the ground and first floors, rooms for men on the second floor, rooms for women on the third floor, and various rooms and the terrace on the fourth floor. The upper floors tend to be private (Fig. 19-7).

The site is composed of various rooms leading off from both sides of the central corridor, which runs east to west (Fig. 19-8). The stairs are situated in the centre of the building. The living space on the upper floors can be divided into the area on the west side of the stairs, which is for the family, and the area on the east side, which is for guests. The *majlis* (living room or reception room) on the eastern edge of the upper floor is particularly spacious (Fig. 19-6). The second floor is used as service room for men, and the third floor is used as a room where women living in the neighborhood get together.

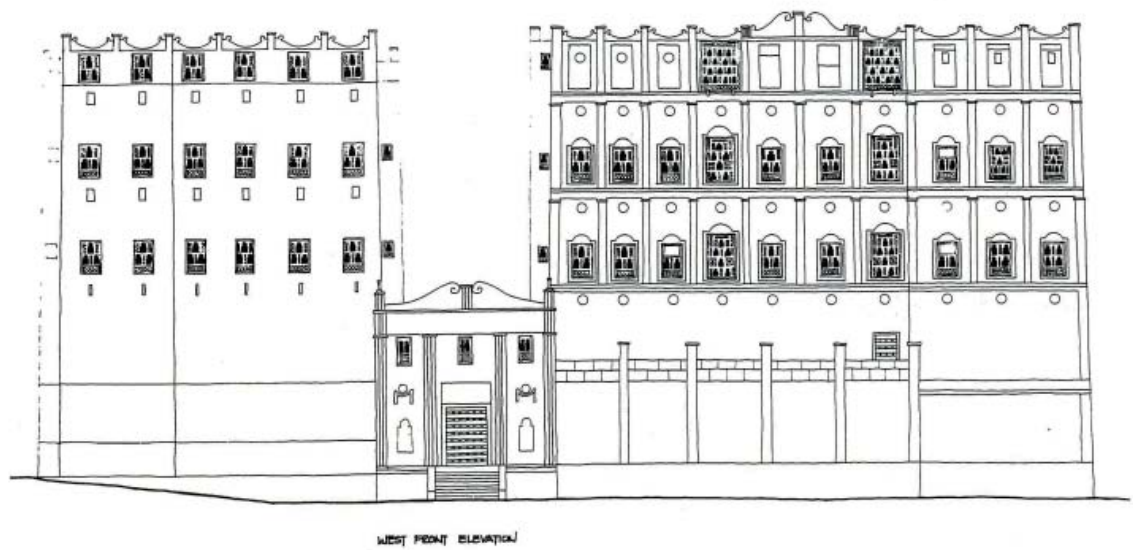


Fig. 19-1 The Shibam palace, elevation plan of the western side [Damluji 1992, p. 95].

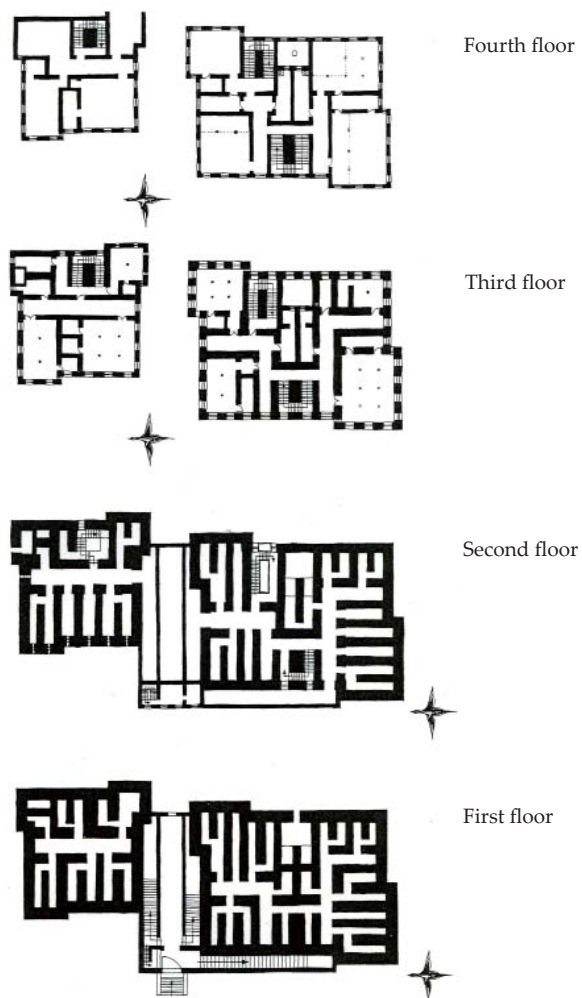


Fig. 19-2 The Shibam palace, ground plan [Damluji 1992, p. 94].



Fig. 19-3 The palace, front façade.



Fig. 19-4 The central corridor on the third floor of the palace.



Fig. 19-5 The high-rise houses in Shibam.



Fig. 19-6 The reception room on the upper floors of the building.

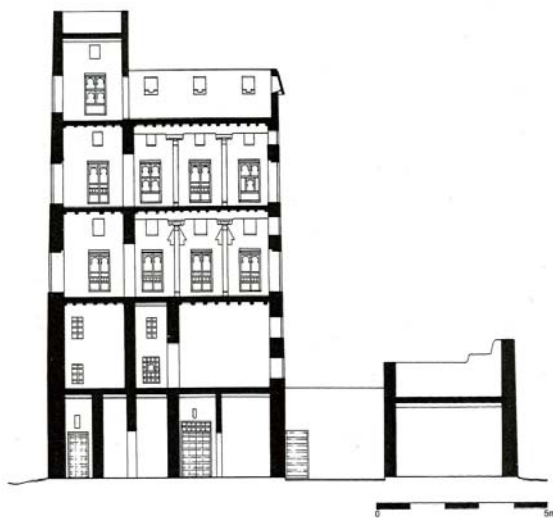
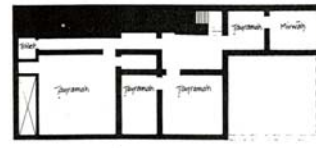
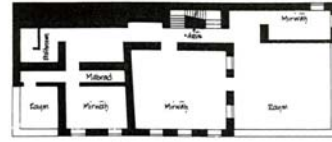


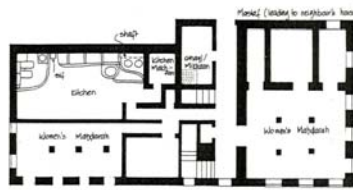
Fig. 19-7 The sectional of the house of 'Alawi bin Sumayt, [Damluji 1992, p. 101].



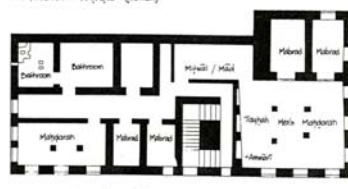
Sixth floor



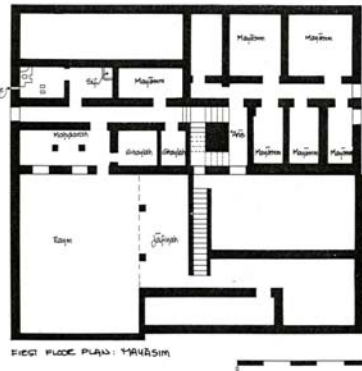
Fifth floor



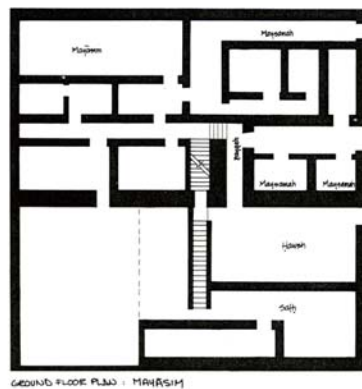
Fourth floor



Third floor



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First floor

Main entrance

Sub entrance

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BIBLIOGRAPHY

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Aithie, C. and P. Aithie, *Yemen – Jewel of Arabia*, (London: Stacey International, 2001).

Boxerger, L., *On the Edge of Empire – Hadhramawt, Emigration, and the Indian Ocean, 1880s-1930s*, (New York: State University of New York Press, 2002).

Beeston, A.F.L., “Hadhramawt”, *Encyclopedia of Islam*, 2nd edn (Leiden: Brill), pp. 51-53.

Beeston, A.F.L., G.R. Smith and T.M. Johnstone, “Hadhramawt”, *Encyclopedia of Islam*, 2nd edn (Leiden: Brill), pp. 336-341.

Camelin, S., “Reflections on the System of Social Stratification in Hadhramaut, Hadrami Traders, Scholars, and Statesmen in the Indian Ocean, 1750s-1970s”, Freitag, U. and W.G. Clarence-Smith, eds., *Hadhrami Traders, Scholars and Statesmen in the Indian Ocean, 1750s-1960s*, (Leiden: Brill, 1997).

Damluji, S.S., *The Valley of Mud Brick Architecture – Shibam, Tarim and Wadi Hadramut*, (Berkshire: Garnet Publishing Limited, 1992).

Damluji, S.S., *The Architecture of Yemen: From Yafi’ to Hadramut*, (London: Laurence King Publishing Limited, 2007).

Daum, W., ed., *Yemen – 3000 Years of Art and Civilization in Arabia Felix*, (Innsbruck: Pinguin Verlag, 1988).

Frantsouzoff, S.A., “A Parallel to the Second Commandment in the Inscriptions of Raybūn”, *Proceedings of the Seminar for Arabian Studies*, Vol. 28, (London: 1998), pp. 61-67.

Freitag, U. and W.G. Clarence-Smith, eds., *Hadhrami Traders, Scholars and Statesmen in the Indian Ocean, 1750s-1960s*, (Leiden: Brill, 1997).

Government of Yemen, the World Bank, the United Nations International Strategy for Disaster Reduction, the International Federation for the Red Crescent and Cross, supported by the Global Facility for Disaster Risk Reduction, Damage, Losses and Needs Assessment, *Tropical Storm and Floods, Hadramout and Al-Mahara, Republic of Yemen*, (Sanaa: United Nations, October 2008).

- Grohmann, A., "Shibam", *E.J. Brill's First Encyclopedia of Islam 1913-1936*, Vol. VII, (Leide : E.J. Brill, 1993).
- Ho, E., *The Graves of Tarim – Genealogy and Mobility across the Indian Ocean*, (Berkeley: University of California Press, 2006).
- Jerome, P., *Shibam World Heritage Site Wadi Hadhramaut, Yemen: Draft Report on the Effects of the 23-24 October 2008 Flash Flood*, (New York: January 2009).
- Jerome, P., G. Chiari and C. Borelli, "The Architecture of Mud: Construction and Repair Technology in the Hadhramaut Region of Yemen", *APT Bulletin*, Vol.30, No. 2/3, (Springfield : Association for Preservation Technology International 1999), pp. 39-48.
- Kuriyama, Y., "16-17 seiki ni okeru Hadramawt no hitobito no idou, ijyuukatudou", *The Society for Western and Southern Asiatic Studies*, No. 61, (2004), pp. 47-66 (in Japanese).
- Lewcock, R., *Shibam and Wadi Hadramawt*, (Paris : UNESCO, 1982).
- Lewcock, R., *Wadi Hadramawt and the Walled City of Shibam*, (Paris: UNESCO, 1986).
- McLaughlin, D., *Yemen*, (The Brad Travel Guides 2008).
- Office for the Coordination of Humanitarian Affairs, *Regional Office for the Middle East, North Africa and Central Asia, ROMENAC, Regional Humanitarian Update*, (New York, Geneva: United Nations October 2008).
- Office for the Coordination of Humanitarian Affairs, "Yemen-Floods", *Situation Report*, No. 4, (New York, Geneva: United Nations November 2008).
- Robin, C. and A. Rouaud, "Shibam", *Encyclopedia of Islam*, 2nd edn., (Leiden: Brill), p. 425.
- Schiettecatte, J., "Urbanization and Settlement Patterns in Ancient Hadramawt (1st Mill. BC)", *Bulletin of archaeology, the University of Kanazawa*, No. 28, (2006), pp. 11-28 (in Japanese).
- Sedov, A.V., "Temples of Raybun Oasis in Wadi Hadramawt, Yemen", *Adumatu* 2, (2000), pp. 15-26.
- Sedov, A.V., and A. as-Saqqaf, "Al-Guraf in the Wadi 'Idim. Notes on an Archaeological Map of the Hadramawt, 2", *Arabian archaeology and Epigraphy*, Vol. 7, (Copenhagen: Munksgaard, 1996), pp. 52-62.
- Siebeck, D., *Republic of Yemen–Shibam Hadhramaut*, (Hadhramaut Governorate: Office of Culture and Tourism Seiyun, 2003).
- Smith, G.R., "Inat", *Encyclopedia of Islam*, 2nd edn (Leiden: Brill), p. 420.
- Smith, G.R., "Say'un", *Encyclopedia of Islam*, 2nd edn (Leiden: Brill), p. 115.
- Smith, G.R., "Tarim", *Encyclopedia of Islam*, 2nd edn (Leiden: Brill), pp. 302-301.
- Smith, G.R., "Al-Shihr", *Encyclopedia of Islam*, 2nd edn (Leiden: Brill), pp. 4392-440.
- UNESCO World Heritage Center, *Report on the Effect of the 23-24 October 2008 Flash Flood*, (Paris: World Heritage

Center, 2008).

Van Donzel, E., "Al-Mukalla", *Encyclopedia of Islam*, 2nd edn (Leiden: Brill), pp. 496-497.

Von Wissmann, H. and D. Van der Meulon, *Hadramawt*, (Leyden: 1932), pp. 116-118.

Zimmerman, P.C., *Middle Hadhramawt Archaeological Survey, 1999*, Report to the General Organization for Antiquities, Manuscripts, and Museums, San'a, Republic of Yemen, (1999).

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