

Coral Buildings at Raya and al-Tur in Sinai, Egypt

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Abstract. Several coral buildings on the Red Sea coast of Egypt dated to the medieval, Islamic period and later have been detected by the systematic archaeological excavations in recent decades, and shed new light in the field of study on the coastal trading activity between Europe and Asia. In this paper, two important port cities in Egypt are dealt with in the context of the history of coral buildings erected along the Red Sea coast. The vast site of the port city Raya (6th-12th or 13th century AD) lies on the coast of South Sinai near al-Tur, where a large square-shaped fort with nine towers was constructed. The foundation of the enclosure wall consists of coral blocks, and mud bricks seem to be installed to the top of the wall. The main gate with portcullis is however, strengthened by sandstone blocks, presumably transported from a quarry far apart from the site. It is remarkable that various architectural materials must have been gathered and applied according to their structural and ecological advantages. After abandonment of this port city, al-Tur (especially al-Kilani area: 14th-20th century AD) presumed to have been established near the previous trade harbor. At al-Kilani site, many two- and three-storey houses have been constructed using coral blocks. For strengthening of the buildings, wood fragments of vessels are reused and incorporated into the coral walls. At the corner of the exterior and the keystone of the arch at the top of the main entrance, sandstone blocks are also installed here.

Key words: Harbor, Port city, Red Sea, Trade, Ecological use.

Introduction

Recent archaeological investigations have revealed the coral buildings of the trade cities located along the Red Sea coast. From the viewpoint of the historical study of cultural and economic exchange between the Western (European) world and the Eastern (Asian) world, the systematic architectural research on these coral buildings is needed.

One of the monumental volumes on the coral buildings at the port city would be Greenlaw's work concerning the houses of Suakin in Sudan (Greenlaw 1995, first published in 1976). He reports the present condition of the multi-storey houses around the port, and shows the planning method, construction phases, tools, scale, applied decoration, details of wood door leaf and window, and other impressive architectural information.

Similar remarkable port cities exist in Egypt, and some coral buildings have been erected. In Quseir, the impressive enclosure walls of the fort have been constructed from coral blocks (Le Quesne 2007).

However, the older and larger fort is seen at Raya (Dahari 2000; Kawatoko 2005), where the coral blocks have been used at the foundation of the enclosure wall. After the abandonment of this city, the new port city seems to be created at al-Tur near Raya,

and many coral houses were built in the residential area.

In this paper these coral buildings are examined, and discussed on the architectural features.

Material and Methods

The two sites of Raya and al-Tur are noteworthy to study the coral buildings in Egypt. The joint investigation team of the Research Institute for Humanity and Nature in Kyoto, and the Research Institute for Islamic Archaeology and Culture in Tokyo have been associated, and architectural investigation work in Egypt was conducted in 2009 and 2010 at the both sites of Raya and al-Kilani (the historical residence site at al-Tur).

At the site of Raya, the construction technique of coral blocks was recorded from the viewpoint of architecture.

At the site of al-Kilani, the main six houses are recorded for the study of restoration.

Results

At the fort of Raya, the use of coral blocks seems to be limited, and chiefly the blocks have been installed at the foundation of the massive enclosure walls. The largest size of the coral block is ca. 60 cm in length, and tool marks of flat chisel have been observed. The

blocks are not trimmed in square, and used almost in natural shape.

On this foot of the wall, mud bricks are laid to the top of the enclosure. At the main entrance, the traces of portcullis are visible, constructed from sandstone blocks (Kawatoko 2005).

At al-Kilani site, the size of coral blocks is smaller, ca. 50 cm in length. Coral walls are usually strengthened by inserted wood support. Reused wood pieces have been detected in the site, and frequently the wood fragments of vessel are observed. Some of them have still preserved original colors, traces of holes and joints.

The thickness of wall is reduced according the height; in the case of House No. 33, the walls of the first floor are ca. 60-65 cm. At the second floor, it is reduced to approximately 50 cm, and at the penthouse, light construction walls are constructed. This light partition wall, ca. 10 cm in thickness, is framed with wood, and filled with coral fragments, pebbles and mortar.

The wall is finished with the white hard coat of plaster, ca. 1 cm in thickness. This final layer is now easily flaked off. The salt crystallization is frequently observed at the foot of walls of the building. To find a radical preservation method could be problematic, because of the location of these houses near the coast, and the groundwater level seems to be fairly high.

Door and window frames are fixed with nails to the inserted wood supports. For the lintel and sill, wood board of ca. 1 cm in thickness is usually applied. The same board is used at the floor, which is supported by the rafters, approximately 10 cm by 10 cm in section. On the wood deck, after extending cloth, the layer of fragments of coral and sand is executed. Final coat of the floor is mud, or cement layer.

In the rooms such as magazine or storeroom, the reed mat with the bundle of reed stalks are widely used. This construction seems not to be used in the formal room.

Sandstone blocks are also used at the corner of the exterior, and the keystone of the arch at the main entrance.

Discussion

The simple rectangular plans of the House No. 33 show finely balanced arrangement of walls. Basically symmetrical dispositions of the walls are remarkable. The five cross walls are regularly arranged, and the three longitudinal walls tie structurally these cross walls.

The parallels of the coral buildings of the Red Sea coast outside Egypt are recently reported, however the construction technique seems to be quite different from the houses at al-Tur. Further architectural

investigation and the comparative study is strongly hoped.

Acknowledgement

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References

- Dahari U (2000) Monastic Settlements in South Sinai in the Byzantine Period: The Archaeological Remains. Israel Antiquities Authority, Jerusalem
- Greenlaw JP (1995) The Coral Buildings of Suakin: Islamic Architecture, Planning, Design and Domestic Arrangements in a Red Sea Port. Kegan Paul International, London New York (First published privately in 1976)
- Kawatoko M (2005) "Multi-disciplinary Approaches to the Islamic Period in Egypt and the Red Sea Coast," *Antiquity* 79:844-857
- Kawatoko M (2007) Archaeological Survey of the Raya/al-Tur Area on the Sinai Peninsula, Egypt, 2005 and 2006. Kuwait and Tokyo
- Kawatoko M (2008) Archaeological Survey of the Raya/al-Tur Area on the Sinai Peninsula, Egypt, 2007, Kuwait and Tokyo.
- Mouton JM (2000) *Le Sinaï médiéval: un espace stratégique de l'Islam*. Presses universitaires de France, Paris
- Le Quesne C (2007) *Quseir: An Ottoman and Napoleonic Fortress on the Red Sea Coast of Egypt*. American University in Cairo Press, Cairo New York
- Siliotti A (2000) *Sinai*. American University in Cairo Press, Cairo New York
- Whitcomb D and Johnson JH (1982) *Quseir al-Qadim 1980: Preliminary Report*. American Research Center, Malibu



Figure 1: House No. 33 at al-Tur, south elevation

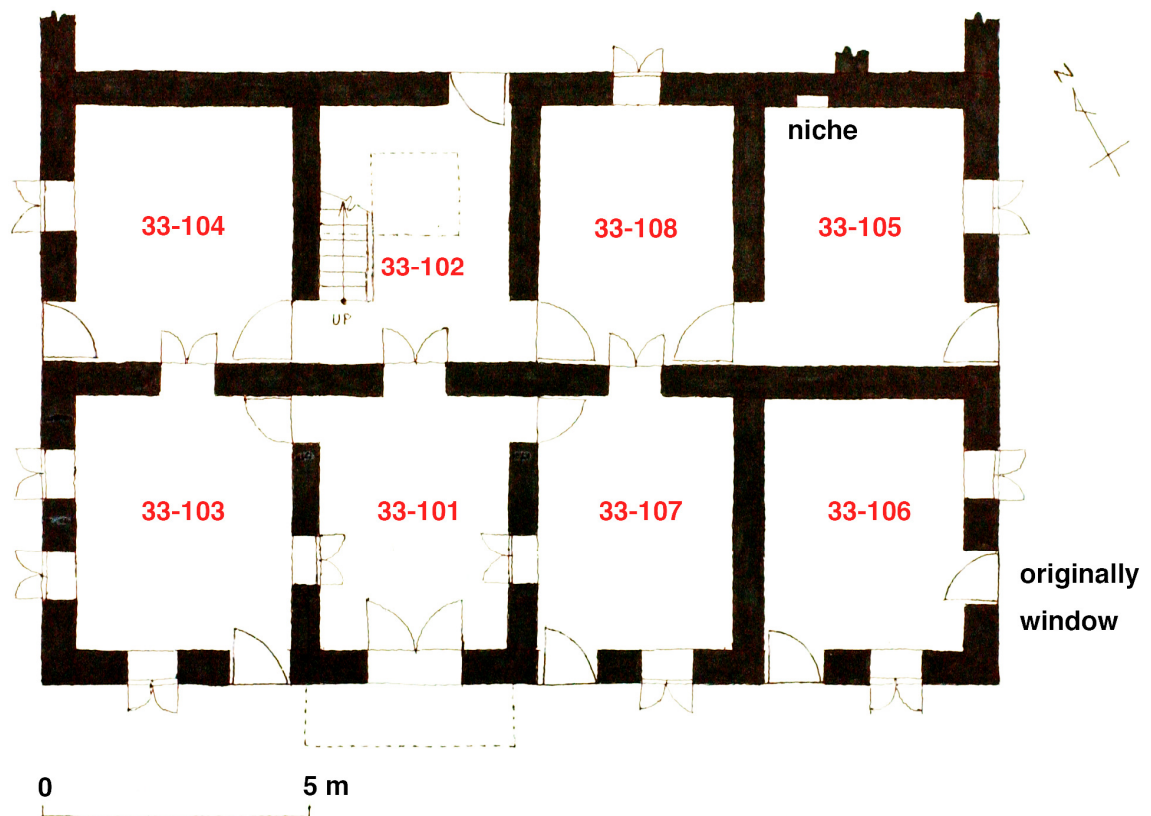


Figure 2: House No. 33 at al-Tur, first floor, plan

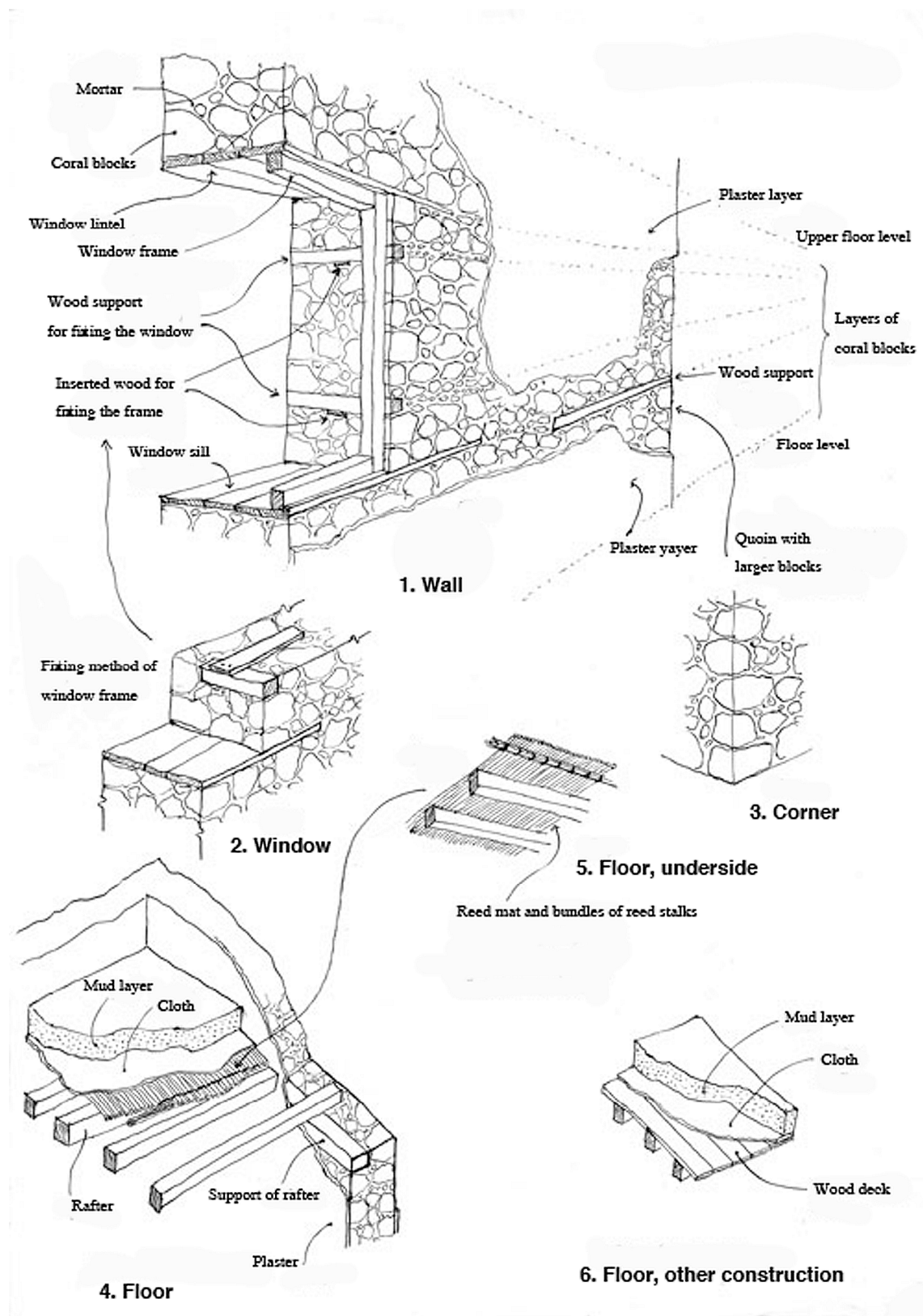


Figure 3: Construction of the houses at al-Tur