The roof tiles in the later period of Champa:

a consideration for its origin and diffusion

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中部ベトナムの後期チャンパ王国（約10世紀以降）で用いられた瓦（尖状平瓦）について、クアンナム省とビンディン省を中心に資料紹介を行い、形態分類と編年的見通しを提示した。そして、周辺地域の資料を提示し、東南アジア大陸部を中心に類似例が存在するものの、チャンパの当該期の瓦は、その祖形がマレー半島西岸のThung Tuk遺跡などに存在し、さらにはインド方面へ遡源していく必要があることを指摘した。またチャンパの瓦がホアルー時代以降の北部ベトナムにも伝播して、変容していることも指摘し、こうした建築材の伝播・変容には建築文化自体の伝播・変容が関わっていると考える。

Keyword : Central Vietnam, roof tile, Champa, Northern Vietnam,
Malay Peninsula, Indianization, 9-10th Century

1. Introduction

The brick-built tower shrines and their related architectures in the central Vietnam well represents that the ancient Champa kingdoms were Indianized states as same as the other early states in Southeast Asia. These architectural sites have contributed a lot to the studies of history, art history and material culture. Recently archaeological researches and conservation projects were also set about at several sites（i.e. Mỹ Sơn in Quảng Nam）. Especially some large-scale excavation researches are going to provide new recognition on the Champa architectural history[1)]. However, here I would like to address that one typical architectural remains of these sites are still overlooked for reconstructing the architectural history and cultural exchange in the regional studies. That is roof tile.

As was presented in the studies of Chinese-style roof tiles in the East Asian regions, the roof tile is one of the keys to understand the cultural interaction between the regions. Several studies already have been conducted to the earliest types of the central and northern Vietnam with the viewpoints of comparison with the

1）Bùi Chí Hoàng và Nguyễn Quốc Mạnh 2009 Khai quật tháp Dương Long（Bình Định）. *Khảo cổ học* số 1/2009: 62–84



Fig.1 Major sites of the Mainland Southeast Asia mentioned in this article

further north[2]. Also recently one comprehensive study about the roof tiles in India[3] proposed a general historical view of the roof tiles in India from the 1st century BC to the present and pointed out that some early types of the roof tiles unearthed in the Lower Mekong Delta[4] and Burma of the 1st millennium AD originated in India and later type like the flat style in the southern or eastern India were also possibly introduced to Southeast Asia. In this article, I introduce the roof tiles, which were excavated and collected from the tower shrine and several other sites in the coastal area of the central Vietnam. Then bearing these previous studies in my mind, I will discuss about its origin and dispersal in time and space.

2. Tapered flat roof tiles in the Champa sites of the central Vietnam

A. Before the appearance of the tapered flat roof tiles

Up to now, the cylindrical Chinese-style roof tiles were excavated from the some early period's Champa citadels[5]（Trà Kiệu in Quảng Nam, Thành Hồ in Phú Yên, Cổ Lũy in Quảng Ngãi and An Thành in Bình

2）Yamagata Mariko 2007 Roof tiles of the Han and Six Dynasty unearthed from Vietnam. In Silk-road Research Center ed. *Transition of the Chinese Silk-Road.*: 240–271.（in Japanese）, Nishimura Masanari 2007 Materials and recognitions on the ceramic from the later 1st century to 2nd century AD in the Red River Plain, Northern Vietnam. *East Asian Archaeological Forum* vol. 3, Chungcheong Research Institute of Cultural Heritage, Gongju（in Japanese, Korean and Chinese）.

3）Otani Kōji 2008 Characteristics of the roof tiles in the ancient India. In *Life and culture in Southeast Asia I: residence and roof tiles. The Japan Society for Southeast Asian Archaeology monograp* No.6: 47–58. The Japan Society for Southeast Asian Archaeology（in Japanese）

4）Hirano Yuko 2006 The development of cultural exchange networks of Oc Eo port site. *The Japan Society for Southeast Asian Archaeology monograph* No.4: 27–39.（in Japanese）

5）Yamagata Mariko "The early history of Lin-I viewed from archaeology" *Acta Asiatica* No.92, 1–30, 2007, Research by the author in March, 2009 at Bình Định Provincial Museum. Lâm Mỹ Dung và Nguyễn Anh Thư 2009 Cổ Lũy-Phú Thọ（Quảng Ngãi）trong bối cảnh văn hóa Champa nửa đầu thiên niên kỷ I công ngyuên. *Khảo cổ học* số 1/2009: 45–61.

Định）and settlement site[6]（Gò Cấm in Quảng Nam）. The roof tile assemblage of Trà Kiệu and Thành Hồ are composed of cylindrical roof tile and its eave tile. From the comparison with the northern Vietnamese and Chinese contemporaries, they can be dated to the 2nd and 3rd Century AD. The eave-tile and wide concave under tile recently were also discovered at An Thành in Bình Định. The eave-tile retains Chinese Tang style characteristics. These specimens can be categorized as the Early Champa Period roof tiles.

On the other hand, most of the roof tiles discovered from the brick-built Champa tower shrines in the later period are different in morphology compared with the above ones. They are flat elongate body with tapered distal end and its upper end was bent for hooking at the roof. In Vietnamese archaeology they are usually called “Ngói mũi lá（Leaf-shaped pointed roof tile）”.

In the following I introduce several roof tile materials associated with the Champa sites.

B. Roof tiles in Quảng Nam

B–1. An Phú

The site is one architectural basement close to the Chiến Đàn tower shrine site, southern Quảng Nam province and it was considered belonging to the 10th century[7]. The excavated roof tiles are divided into the two types[8]. One is flat tapered shaped（QN-1 type: Fig. 2–1,2, Pl.1,3）and the other is wide flat rectangular shaped（QN-2 type: Fig.2–3,4, Pl.4）. The former type is major in quantity in the whole collection. Both of the upper ends are bent for hooking at the batten of roof. They show right brown in color and the fabric is rather soft and fine sand is tempered. The outer surfaces usually retain prints of the rice husk, plant seeds and leaves caused by ash-bed during making process.

No. S6826/6428（Fig. 2–1, Pl.1）has approximately 6.8cm in width and 28cm in length. It is swelled in the vertical section of the tapered part and retains prints of rice husks and leaves on the outer surface and linear trace caused by piling of the clay laminates at the side surface of the tapered part. The side surface of the bent top was shaved off in horizontal direction. Since the shaving trace was observable at the whole inner surface, it can be concluded that shaving was done prior to bending. At the upper part of the inner surface retain depression caused by stacking another tapered roof tile on before firing[9]. This is an evidence of piling

6）Yamagata ibid.

7）Trần Ánh 2009 *Phế tích kiến trúc Chăm ở Quảng Nam.* Trung tâm bảo tồn di sản di tích Quảng Nam, Tam kỷ.

8）The roof tile assemblage shows quite uniformed color and fabric. According to Mr. Nguyễn Thượng Hỷ（Researcher, Quang Nam center for management of monuments and beautiful landscape.）, the roof tiles were excavated like a cache at one location near the basement and they seem to be not yet used. If this is true, it is also possible that they were one kiln product. Ishii Ryuta recently studied the An Phú collection and based on the experimental study he pointed out that they are mold-made. See Ishii R. 2009 Ngoi mui in the central Vietnam. Paper presented at the annual conference of the Japan Society for Southeast Asian Archaeology, Tokyo.14th, Nov., 2009（in Japanese）. I basically agree with his explanation but several technological points were dismissed in his discussion. Also he did not mention anything about the flat rectangular roof tiles and did not use them for his reconstruction model of the architecture.

9）Ishii Ryota ibid.

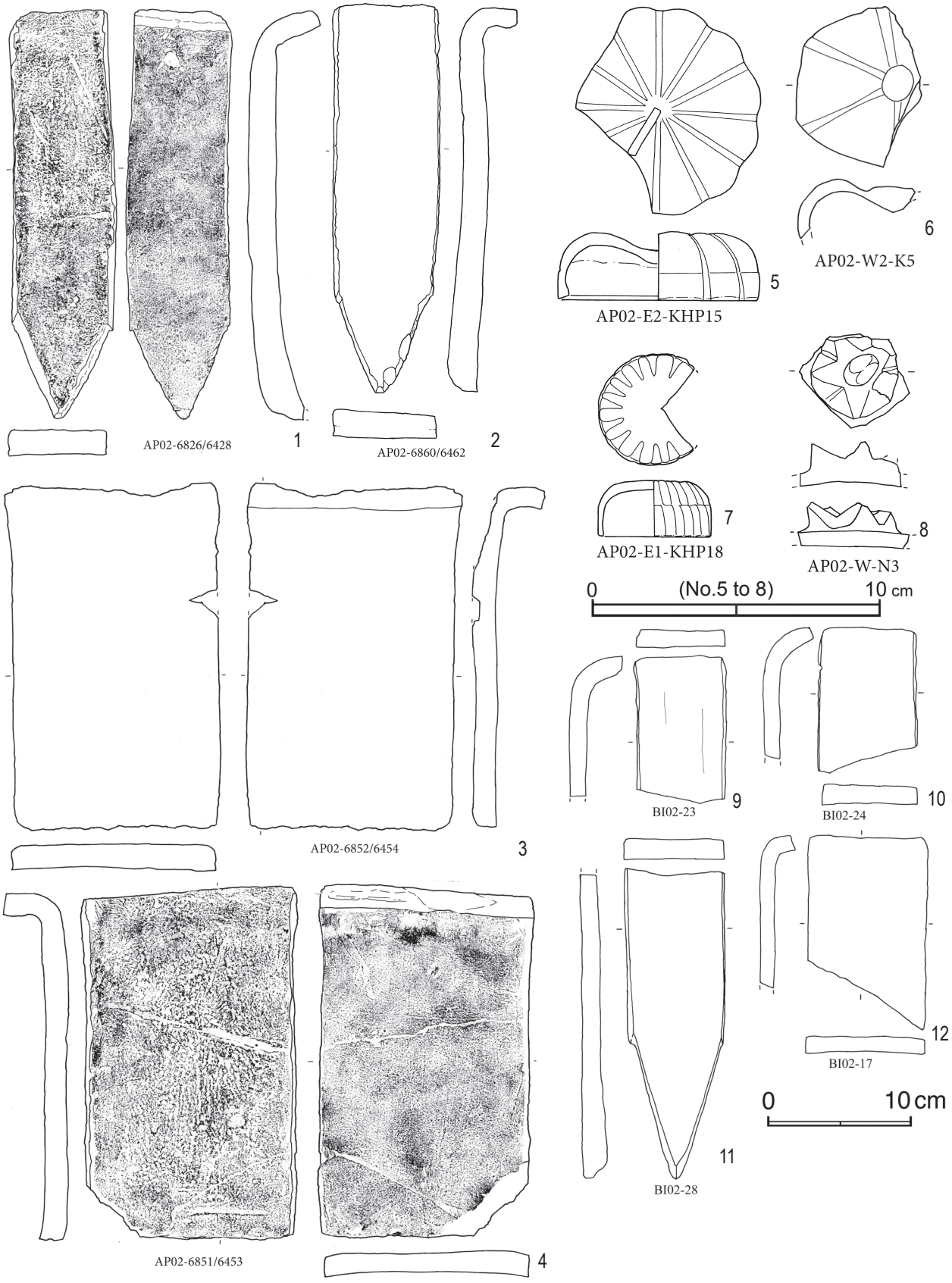


Fig.2
Roof tiles (1-4) and Chinese ceramic (5-8) of An Phú
and flat tapered rooof-tiles of Bánh Ít (9-12)

way for firing. No. S6860/6462（Fig. 2–2, Pl.2）has approximately 7cm in width and 26.5cm in length and retains linear shaved traces at the inner surface. The horizontal cross section shows depression at the both sides and layered structure. The outer surface of the bent part retains finger depressions. The depressions at the side surfaces（Pl.3）and layered structure figured in the traverse section were probably caused by filling clay laminates in a mold twice times or more. This inference is also supported by the collapsed part at the outer surface of the bent part, which was probably caused by air pocket during firing process because of the insufficient wedging clay.

No. S6852/6354（Fig. 2–3, Pl. 4）approximately 14cm in width and 23.8cm in length. It also retains fiber prints on the outer surface and smoothed trace but no linear trace at the bent corner. This was possibly bent before smoothing. The horizontal cross section shows slightly concaved at the middle of the side surface. No. S6851/6453（Fig. 2–4）approximately 14.5cm in width and 24cm in length. It retains prints of rice husks and leaves on the outer surface and inner surface was smoothed in vertical direction. Since the trace of shaving is observable at the bent part, it can be concluded that the upper end was bent after smoothing. The both edge part are slightly depressed at the middle of the outer surface. All the side surfaces except the lower end retain slightly linear depressed lines.

The small number of the excavated ceramic fragments includes 4 Chinese glazed wares, which are instructive for the architecture date. All of them are lids of the white glazed perfume box（Fig. 2–5 to 8, Pl.5）. The glazed body colors of the all specimens show slightly bluish white in color, which can be recognized as the Jingdezhen kilns products. They can be dated to the 11th to 12th century[10].

B–2. Other sites in Quảng Nam

The site museum at Mỹ Sơn tower shrines complex site exhibited some roof tiles which were excavated in 2005. They are flat tapered roof tiles（Pl. 6,7）. While the morphological proportion seems similar to QN-1 type（Fig. 2–1,2）, they seem much thicker and smaller in size. In addition, the lower end is not confirmed, but a wider type was also unearthed（Pl. 8）.

Also at Trà Kiệu citadel or its surrounding, several complete pieces of the flat tapered roof tiles were included in the Father Anton collection near the Trà Kiệu Church（Pl. 9）. Their morphology in plan and vertical section of the upper end are rather similar to those of BD-1A type in Bình Định.

C. Roof tiles in Bình Định

This is tower shrine complex site on the small mountain and its construction was dated soon after moving capital, from Indrapura（Trà Kiệu citadel）in the present Quảng Nam to Vijaya（its capital citadel should

10）Same types were also reported in Sambor Prei Kuk, Cambodia. See Shimamoto Sae, Yamamoto Nobuo and Nakagawa Takeshi 208b Re-examination of on the dating of the dating of Sambor Prei Kuk found by B.P. Groslier. *Journal of Southeast Asian Archaeology* No.28:47–60.（in Japanese）

be An Thành or Chà Bàn[11]) in the present province of Bình Định in 1000AD. The excavation and general survey research left several roof tiles collections at the Provincial Museum.

C–1. Banh Ít

The excavations at the main tower and gate revealed more than 1000 pieces of the tapered flat roof tiles[12] and its assemblage was divided into 6 major types as the following.

BD-1A type (BI02–23, BI02–24, BI02–17: Fig. 2–9, 10, 12, Pl.10) is single tapered type with 6 to 7 cm in width. Its bent is not angular but rather gently curved by hand. The outer surfaces was smoothed and inner was shaved in vertical direction. The fabric includes sand and reddish soil particles and show right yellowish brown in color. BI02–28 (Fig. 2–11) is tapered part with swelled end. Both the ends of the triangular sides have small projections. The side surfaces retain shaved trace for shaping. BI02–17 is same morphology in section as BD-1 type but its body is wider.

BD-1D type (BI02–18, BI02-KHB-16: Fig. 3–1 & 2, Left in Pl. 11, Pl. 12) is dent at the vertical central axis of the outer surface and has an angular crook. They include reddish soil particles and fine sand. The inner surface except bent part was shaved in vertical direction. BI02-KHB-16 (Fig. 3–2, Pl. 12) shows linear depressions at the both side surfaces (see ink-rubbing of Fig.3–2), which was caused by mold-making. The outer surface retains slightly convex relief shaped like reversed triangle, which was also stamped by the mold. BI02-KHB-29 (Fig. 3–4) is probably lower end of this type. Their width ranges from 7.5 to 8.5cm.

BD-2A type (BI02–25: Fig.3–3, Right in Pl.11) has slightly wider body (approximately 9cm in width) than those of the previous types and its bent was cut out at the both sides for shaping narrower rectangular form. The surface of the bent part remains depression by hand making. The horizontal section is shaped in rectangular and the inner surface retains the shaved trace in vertical direction.

BD-3A type is a wider flat roof tile with a small bent at a right angle. BI02–26 (Fig.3–5, Pl.13) may have approximately 20cm width and includes fine sands and right reddish brown in color. Its outer surface at the corner and side surface of the bent end were shaved in horizontal direction and inner surface was shaved in vertical direction.

BI02–3 and BI02–6 are probably used at the ridge of the roof (Fig. 3–6, Pl.14). They include large sand and reddish soil particles. The bottom is hollowed for fitting.

C–2. Dương Long

This tower shrines site was newly excavated from 2006 to 2008[13]. The flat tapered roof tiles exca-

11) Lê Định Phụng 2002 *Di tích văn hóa Champa ở Bình Định*. Nhà xuất bản khoa học xã hội., Hà Nội.

12) Lê Định Phụng and Định Ba Hòa 2003 Khai quật Tháp Bánh Ít (Tuy Phước, Bình Định). *Những phát hiện mới về khảo cổ học Việt Nam năm 2002*:819–820.

13) Bùi Chí Hoàng và Nguyễn Quốc Mạnh 2009 Khai quật tháp Dương Long (Bình Định). *Khảo cổ học* số 1/2009: 62–84

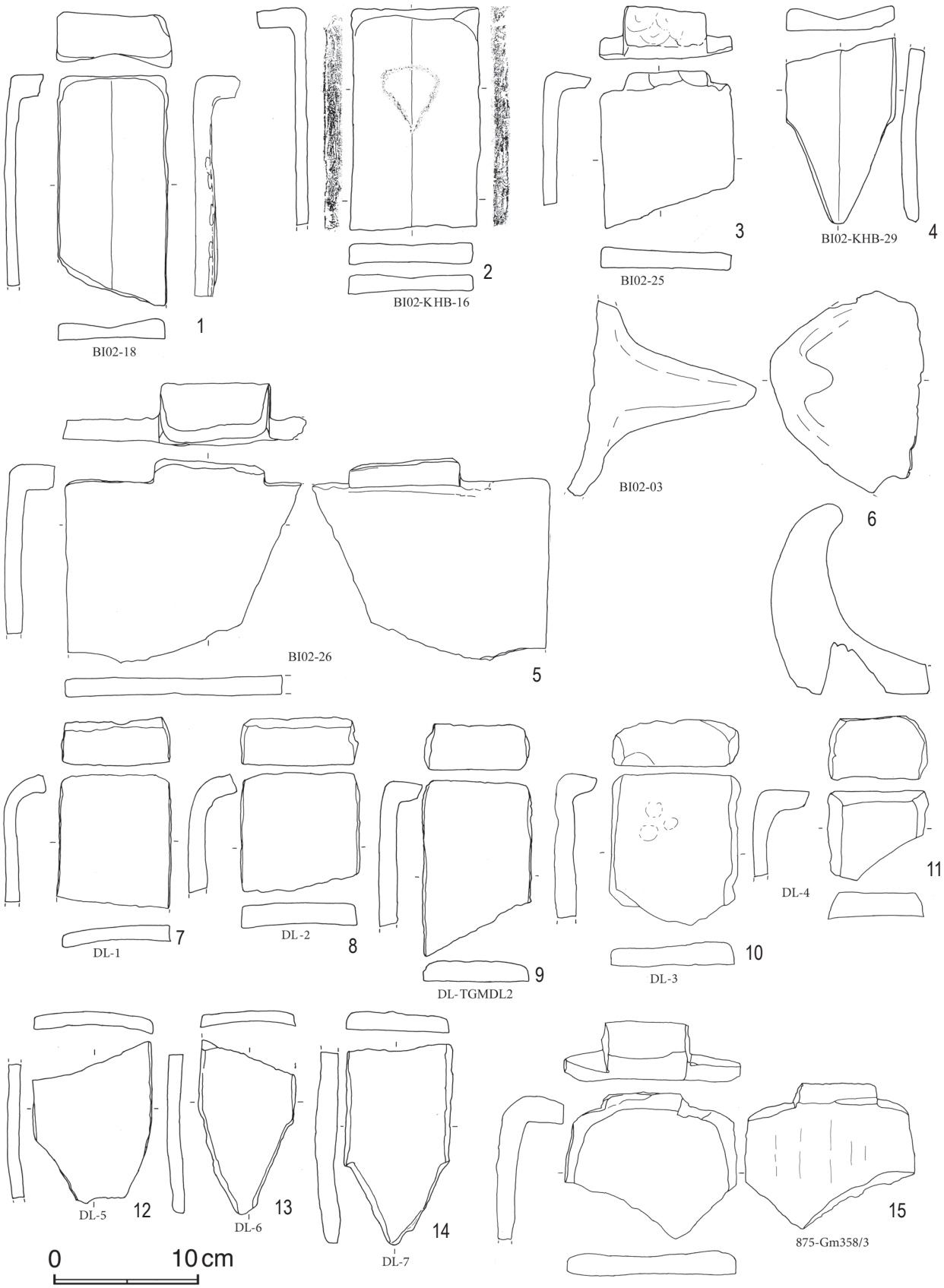


Fig.3 Flat Tapered roof tiles of Bánh Ít (1-6), Dương Long (7-14), An Thành (15)

vated here include two major morphological types. One is simple narrower type（BD-1A type Fig.3–7 to 12）and the other is wider type（BD-2 type）.

BD-1A type: DL-1 is（Fig.3–7）has approximately 7.8 cm width and shows dark grayish brown in color and not soft in hardness. It was fired in the closed chamber kiln. The upped end was gently bent. DL-2（Fig.3–8）has approximately 8.3 cm width and includes red clay and fine sand particles in the fabric and is right brown in color. Both the specimens were mold-made.

BD-1B type: DL-TG-MD-L2（Fig.3–9）and DL-3（Fig.3–10）has 7.5 cm and 8.8cm in width respectively and include small fine white particles and reddish brown in color. The both retain shaved trace at the inner surface.

BD-1C type: DL4（Fig. 3–11）has approximately 6.5cm in width and shows right brown in color with the sand-tempered fabric. Its horizontal section is trapezoid shaped. The fins remaining at the side surfaces indicate they are mold-made.

DL5（Fig.3–12）, DL6（Fig.3–13）and DL 7（Fig.3–14）are lower ends of type 1. Refitting study is not yet done so that it is quite difficult to confirm which specimen is fit with the subtypes of Type 1 group. All of them includes fine sands and shows reddish brown or right brown in color. All the inner surfaces retain shaved trace after molding. DL6 and DL7 have small projection at the tapered basis. DL 7 is thicker than DL5 and DL6, and it accords well with the thickness of DL-TG-MD-L2 and DL3（type BD-1B）.

As to the tower shrines of Dương Long, the former studies proposed that the construction date was placed around the end of the 12th or early 13th centuries[14]. The recent Vietnamese studies also succeeded to its dating concept[15]. The excavated ceramic assemblage includes the Chinese and Vietnamese glazed and unglazed one from the 11th to 19th century. Among them, the Chinese celadon bowls with the stamped decoration by mold, of the Yaozhou kiln tradition（Pl. 15）and white porcelain bowls and dishes（Pl.16, 17）can be dated to the 11th and 12th century.[16] The excavation revealed the brick-built basements of the architecture, which can be dated to the earlier period than the present triple tower shrines. Therefore, I infer that the early types of the ceramic and roof tiles assemblage here may go back to the 11th century.

C–3. An Thành

This is a citadel located at the middle of the Côn River Plain and another name of this site is Trà citadel.

BD-2B type: No. 875GM358/3（Fig.3–15, Upper left of Pl. 23）has 12cm in width and includes rather large sand particles and is rather hard in quality. Its outer surface is grayish brown and inner one is red-

14）Stern Phillipe 1942 *L'art du Champa*（*ancien Annam*）*et son evolution.* Toulouse.

15）Lê Định Phụng 2002 *Di tích văn hóa Champa ở Bình Định*. Nhà xuất bản khoa học xã hội, Hà Nội.

16）As to the dating of the ceramic, I referred the following studies. Yamamoto Nobuo 2000 *Dazaifu Jôbôato XV: classification of the ceramic. Cultural property in Dazaifu city No.49,* Board of Education, Dazaifu city（in Japanese）, *The museum of the Oriental ceramics, Osaka 1997 The masterpieces of Yaozhou ware.* Asahi Shinbun.（in Japanese）

dish brown in color. The upper end was bent after taking off from the mold and both the ends was cut out to form square shape. The outer surface remains vertical trace of the smoothing and inner surface and outer corner of the bent retain vertically shaved traces. The upper horizontal section shows gentle depression at the central.

BD-1D type: No. 875GM358/4（Fig.4–1, Lower right of Pl. 23）has 7.5cm in width and includes red clay particles in the fabric and right brown in color. Its inner surface and corner between body and bent were shaved in vertical direction and upper horizontal section is depressed at the central.

In addition, BD-2A type was also confirmed in the assemblage（Lower ones of Pl.23）.

C–4. Gò Sành, Gò Hời and Gò Cây Me

These are ceramic kiln sites. Based on the excavation results at Gò Sành and study of the association with the foreign ceramic in Philippine, Thailand and other countries, the kiln products were dated to the 14th and 15th century[17]. The following tapered flat roof tiles are included in the product assemblage. Some of them are stoneware quality and glazed.

BD-1D type: GS94–3（Fig. 4–2）belongs to this type of stoneware quality. It has 8.3cm in width and includes fine sand in the fabric and blackish gray in color. Its horizontal section is slightly dented at the outer surface and inner one is curved. The inner surface retains shaved trace in vertical direction. GS94–1（Fig. 4–3）also belongs to type BD-1D. It has 8.5cm in width and shows dark grayish brown in color and includes fine sands. The both sides at the bent still retain clay fins caused by molding. The inner surface was vertically shaved during molding and side surface of the upper end was horizontally shaved after removing from the mold.

BD-1E type: GS92–1（Fig.4–4）is morphologically rather similar to GS94–3 and GS94–1, but is different in vertical section at the upper end. It has approximately 8cm in width. The fabric includes fine sands, right brown in color and softer in hardness. The upper horizontal section is depressed at the central. Its bent remains the finger-nail's depressions by bending and the inner surface of the body retains the shaved trace. GS-053（Fig.4–5, Pl.20）has 7.8cm in width and is possibly a lower part of BD-1E type. It includes small gray and black particles in the fabric. The outer surface and peripheral area of the inner surface remains natural glaze（Pl. 20）, which indicate that it was also kiln-fired product but stacking way of the roof tiles in the kiln was different from that way of An Phú（Fig.2–1 and Pl. 1）.

BD-2C type: GS91–12（Fig.4–6, Pl.18）is a complete piece. It has 12.5cm in width and 33.7cm in length. It includes sand particles, reddish brown in color and is of stoneware quality. The lower half of the outer surface is glazed. The bent part was formed in angular shape and remains the trace of traverse shaving. The outer surface was vertically smoothed and inner one was shaved. The lower surface is depressed at the

17）Aoyagi Yoji and Hasebe Gakuji ed. 2002 *Champa ceramics: production and trade.* The study group of the Go Sanh kiln sites in Central Japan. Tokyo

central vertical axis but not at the upper. The both side surfaces of the tapered part retain molded trace.

BD-3 type: GS94–4（Fig.4–7）includes fine sands and right brown in color. Its width is around 14 cm and smaller than that of BI02–26（Fig. 3–5）. Since its crook part was broken off, it is impossible to identify typologically same as BI02–26 or not. Both the outer and inner surfaces are shaved for flattening. The side surface remains molded fins. GS-94–2（Fig. 4–8, Pl.21）is probably lower part of type 3. Its width ranges from 13 to 14 cm. The outer surface is heavily fired with natural glaze and fabric is quite hard in black color. The vertical central axis at the outer surface is slightly ridged at the lower end and its horizontal cutting section is slightly distorted.

GS92–246（Fig. 4–9, Pl.22）is probably decoration part of the ridge tile. It is stoneware quality and dark deep red in color. A cross mark was inscribed at the one main surface.

GH02–112（Fig. 4–10, Pl.19）is from Gò Hơi site. It has 8.3cm width and a lower part of the type 1E. It is dark deep red in color and of stoneware quality. The lower end was slipped and glazed. The glaze is olive green in color. The tapered end has small angular corners at the both sides. The horizontal section at the lower part is slightly depressed at the central but not at the upper part. The inner and side surfaces were shaved after taking off from the mold.

GCM9254（Fig. 4–11, Pl.24）is from Gò Cây Me and probably a miniature product of the architectural decoration for crowing at the brick-built tower shrine. It is stoneware quality and decoration part is glazed in deep olive green color.

D. Chronological perspective

Table 1 shows typological frequencies among the above mentioned sites.

	QN-1	QN-2	BD-1A	BD-1B	BD-1C	BD-1D	BD-1E	BD-2A	BD-2B	BD-2C	BD-3A
An Phú	●	●									
Mỹ Sơn	similar										
Trà Kiệu			similar								
Banh Ít			●			●		●			●
Dương Long			●	●	●						
An Thành						●		●	●		
Gò Sành						●	●	●		●	

While the roof tiles collections may not include all of the types at the site and my study does not always cover the whole museum collection at the above mentioned sites, this frequencies imply some chronological tendencies as the following.

Granting that QN-1 and QN-2 types are dated to the 11th or 12th century based on the excavated Chinese ceramic, wide roof types of BD-2A and BD-2B can be placed as the later types because of the morphological gap. Also the usage of BD-1A, 1B and 1C types at Dương Long and their absence at Gò Sành indicate BD-1A, 1B and 1C can be placed in the early period（11th to 13th century）.

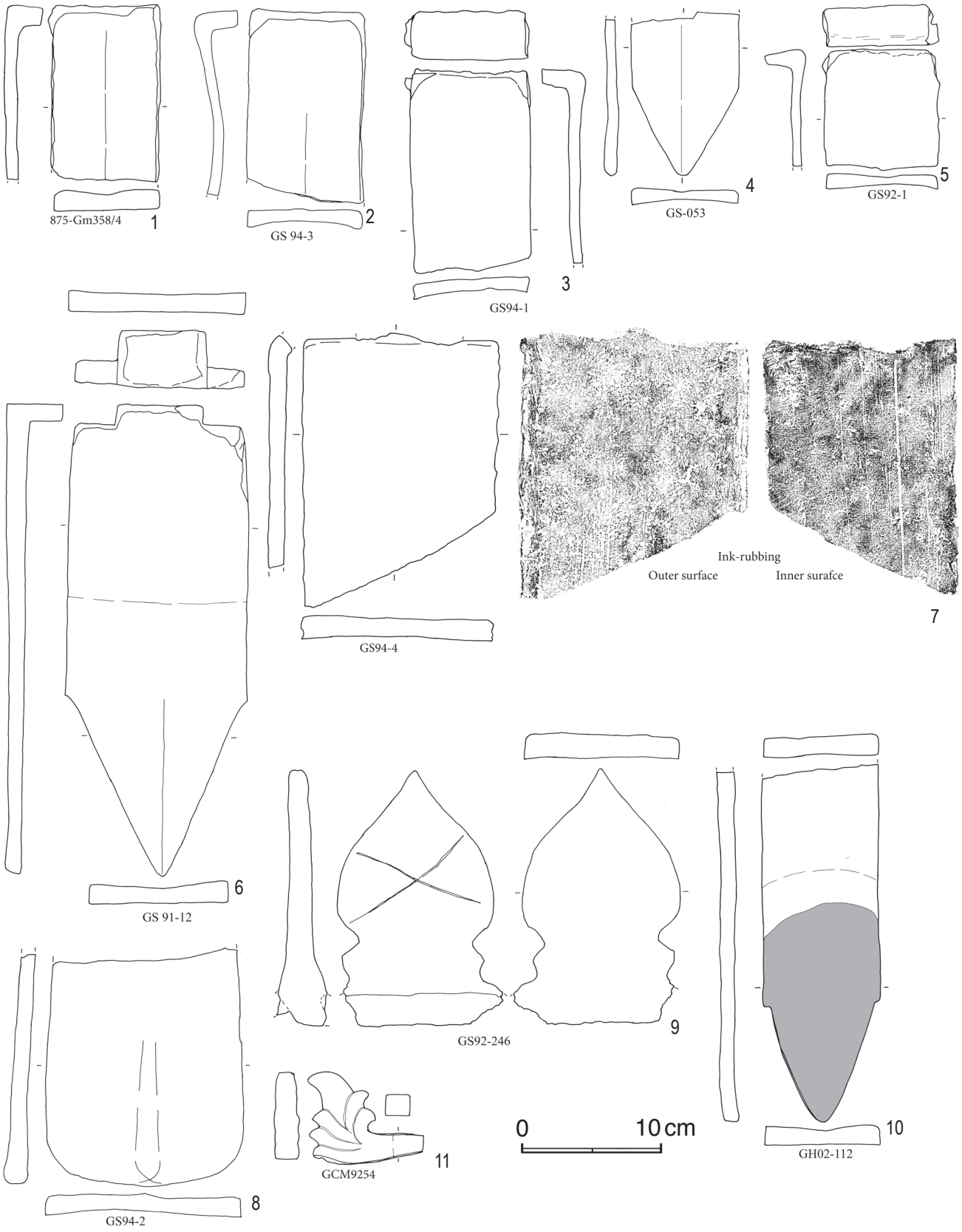


Fig.4
Roof tiles and architectural decoration of An Thành (1), Gò Sành (2-9), Gò Hời (10) and Gò Cây Me (11)

E. Other Champa sites

Po Hai is shrine tower complex site in the suburb of Phan Thiết of Ninh Thuận province（Fig. 1）. During my personal survey in June, 1996, three upper end fragments of the tapered roof tiles were identified at the central tower shrine（Pl. 26）. They have 10.5cm, 12.5cm and 16cm in width respectively and the bent of the former two specimens（① and ② of Pl.26）are same as those of QN-1 type and the last one（③ of Pl.26）is same as BD-2 type. All of them have shallow depression at the central outer surface. The former 2 specimens are fired in rather high temperature so that they are harder than the last. The brick architectures were dated around the end of the 8th and 9th century[18].

The photograph of To-ly temple（Bình Thuận）taken before 1928, where the King Po Klaun Gahul of the 17th century is enshrined, shows one of the architectures was also roofed by the flat tapered tiles[19]. It is very possible that this roofing style continued to the recent times in the Cham-living region.

3. Comparison with the other region

A. Thung Tuk and Bujang Valley

Thung Tuk is ancient port and settlement site located at the western coast of the northern Malay Peninsula, near Ta Kuapa, Thailand（Fig.1）[20]. The excavation research in 2003 revealed rectangular brick-built basements of the shrines（Site No.1, 2 and 6）. All of the excavated roof tiles belong to the tapered flat roof tiles（Fig. 5–1~8, Pl.27）.

They show light yellowish brown in color and the tempering agents of the fabric are fine sand particles and plant fibers including rice husks. They seem to be uniformed in one size variant. Usually the inner surfaces are smoothed or shaved, the lower ends retain cutting trace and the upper end was bent by hand. Three morphological types are identified for the tapered ends. The most frequent type is triangular shaped（Fig. 5–7, 8）and the other two are round（Fig. 5–6）and double triangular shaped（Fig. 5–5）. The last type has small pierced hall between the two triangular parts, which is probably guiding point for cutting the end.

The Chinese ceramic excavated at this site includes celadon bowls of the Yue kilns（Fig. 5–9）, ash-glazed bowls with five spurs mark（Fig. 5–10）and 4 or 6 handled jar produced in Guangdong（Fig. 5–11）, celadon spouted jars and bowl of the Changsha kilns. The Islamic blue color glazed ceramic（Persian ware）was also excavated[21]. In my opinion these excavated ceramic types mainly are dated to the 9th century and this is applicable to the roof tiles. This dating range was also confirmed by previous excavation research in the

18）Stern, Philippe 1942 *L'art du Champa（ancien Annam）et son evolution*. Paris

19）Maspero, Georges 1928 *Le royaume de Champa*. Les editions G.Van Oest, Paris&Brussels

20）Boonyarit Chaisuwan and Rarai Naiyawat 2009 *Thung Tuk: a settlement linking together the maritime silk route*, Trio Creation, Bangkok

21）Chaisuwan and Naiyawat ibid.

same region[22].

The same-type roof tiles in the morphology were also excavated at several monument sites at Bujang Valley, northwestern Peninsular Malaysia[23].

B. Monument K at Giồng Cát of Óc Eo southern Vietnam

Only several pieces of flat roof tiles with nib were identified in the Óc Eo Culture sites of the Lower Mekong River Plain. Since no associated artifacts were reported, it is rather quite difficult to infer their dating. In the Óc Eo site group, Monument K at Giồng Cát, a number of the roof tiles were discovered (Fig. 5–12, 13)[24]. They seem like wider type like BD-3 Type. The latter one is depressed at the central area same feature is identifiable in the specimen, No. ③ of Pl.26 at Pho Hai, Ninh Thuận. The lower end part was not reported so that it is not yet sure they belong to the tapered type or simply rectangular shape.

The roof tiles at Gò Xoài in Kiên Giang (exhibition at Kiên Giang Provincial Museum) have double angular grooves at the outer surfaces with the small bent part for hooking. But they are rectangular shaped like the flat type with vertical grooves and perforation, which were frequently found in the Oc Eo Culture sites and dated to the middle of the 1st millennium AD[25]. It is possible that Gò Xoài specimens were evolved from these earlier types.

C. Hoa Lư

Hoa Lu is the capital site of the Đinh and Lê Dynasties from 968 to 1009. The excavation conducted in 1998 near the present shrines of the Đinh and Lê royal family lineages revealed the architectural remains of the palace or similar class. Beside the half-cut cylindrical roof tile of the Chinese style (including eave-tile with lotus petal), the tapered flat-roof tiles were unearthed in a certain quantity[26]. All of them have elongate rectangular body with triangular lower end and large bent at the upper end. They are divided into two sub-types. Type 1: both side edges are protruded in square shaped at the horizontal section (98DL-H2-L4–1, 98DL-H2-L4–2: Pl. 28,29). 98DL-H2-L4–2 (Fig.5–14, Pl29) is approximately 33cm in length and 10cm in width. These are probably mold made and inner surface retains shaved traces in traverse direction. Type 2:

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22) Ho Chu Mei 1991 Ceramics found at Excavations at Ko Kho Khao and Laem Pho, Southern Thailand. *Trade Ceramics Studies* 11: 53–80 (In Japanese with English summary).

23) Chaisuwan and Naiyawat ibid.

24) Malleret, Louis 1959 *Archéologie du Delta du Mékong.* Tome I, École Fracais d'Extrême-Orient, Paris.

25) Lê Thị Liên 1997 Về vật liệu hợp mái của kiến trúc văn hóa Óc Eo. Phạm Đức Mạnh ed. 1997 *Mốt số vấn đề khảo cổ học ở miền Nam Việt Nam.* Nhà xuất bả khoa học xã hội. Hà Nội, 437–444. Hirano Yuko 2008 The roof tiles unearthed from the Mekong Delta. *Life and culture in Southeast Asia I: residence and roof tiles. The Japan Society for Southeast Asian Archaeology monograph* No.6: 59–66. The Japan Society for Southeast Asian Archaeology (in Japanese)

26) Tống Trung Tín, Trần Anh Dũng, Lê Thị Liên và Bùi Xuân Quang 1999 Kết qủa thám sát và khai quật khu di tích cố đô Hoa Lư (Ninh Bình) năm 1998. *Khảo cổ học* số 2/1999: 44–60. Đặng Công Nga 2002 *Kinh đô Hoa Lư thời Đinh Tiền Lê.* Sở văn hóa thông tih Ninh Bình, Ninh Bình.

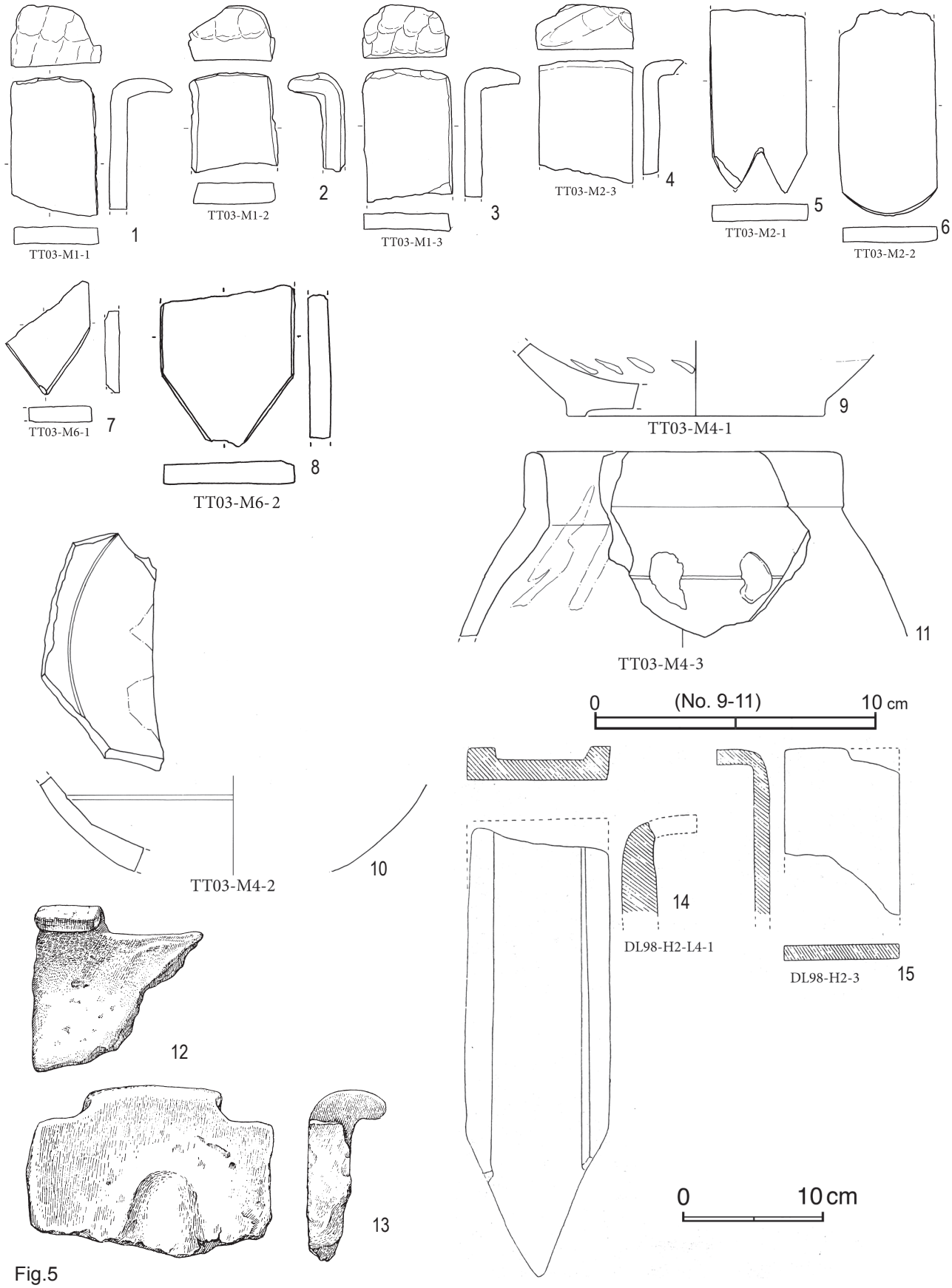


Fig.5
Flat tapered roof tiles (1-8) and Chinese ceramic (9-11) at Thung Tuk, Monument K, at Giồng Cát (12,13: Malleret 1959), Hoa Lư (14,15: after Đặng Công Nga 2002)

body is simply flat（98DL-H2–3: Fig.5–15）. Up to now, this is the earliest archaeological evidence of the flat tapered roof tiles in the northern Vietnam.

C. Thăng Long citadel and its surrounding sites in the Red River Plain of the Lý Dynasty.

The recent large-scale excavations at the central area of the Thăng Long citadel in Hanoi, northern Vietnam revealed various kinds of roof tiles from the Tang（7–9th C. AD）to the Nguyễn Dynasty（19–20th C. AD）period. In the near future studies of the roof tiles, they[27] may contribute a lot to the study of architectures and roofing methods. On the flat tapered roof tiles of the early period（mainly Lý and Trần Dynasties）, four major variants were recognized dependent on the morphology of the lower end as the following. Type 1: triangular shaped（Fig.6–1）. Type 2: round shaped（Fig.6–2）. Type 3: triangular shaped with swelled end in the vertical section. Type 4: round shaped with swelled end in the vertical section（Fig.6–3）. Unfortunately the detailed archaeological contexts on the excavated artifacts are not clarified and the typological classification is not yet possible to stimulate the development of the roof tile chronology itself. However, at the following sites in the surrounding of Thăng Long, some morphological types can be confirmed in the archaeological context in association with the other artifact variants.

Bãi Hàm Rồng site at Kim Lan, at the southeastern tip of Hanoi city is a settlement site with the very long-term occupation[28]. Among the excavated archaeological features, flat tapered roof tiles were unearthed in association with the 12th century ceramic stoneware[29] at the pits Lo 2（Fig. 6–4）and No.F85（Fig. 6–5）. Both of KL01-Lo2 and KL03-F85-L2–1 are wide rectangular type like Thăng Long. They were mold-made and have a cubic shaped nib at the inner surface. Unfortunately the lower ends were not yet confirmed.

Đền Cầu Từ site, Lục Ngạn District, Bắc Giang Province is architectural complex site of the Ly Dynasty period[30]. The flat tapered roof tiles were excavated from the No.2 excavation pit（Fig. 6–6 & 7 and Fig. 7–1 to 3）. They have cubic-shaped nib at the upper end and lower ends are divided into two types. One is round shaped with swelled lower end in vertical section（Fig. 6–6 & 7）. The other is reversed triangular shaped with flat section（Fig. 7–1 to 3）. The morphological types of the stoneware and glazed bowl indicate they can be dated to the 12th century.

27）Ngô Thị Lan 2006 *Trang trí trên ngói ở Hoàng Thành Thăng Long qua tư liệu khai quật hố D4-D5-D6（Khu D）địa điểm 18 Hoàng Diệu–Hà Nội.* Luận văn thạch sĩ khoa học lịch sử. Khoa lịch sử, Trường đại học khoa học xã hội và nhân văn. Đại học quốc gia Hà Nội

28）Nishimura Masanari, Nishino Noriko 2004 *Báo cáo khai quật di chỉ Bãi Hàm Rồng, Kim Lan, huyện Gia Lam, Thanh Phố Hà Nội*. Tư liệu Bảo tàng lịch sử Việt Nam.

29）Nishimura Masanari 2006 *Archaeological studies of the Red River plain and Mekong-Dong Nai River plain.* Ph.D. dissertation, The University of Tokyo.（In Japanese）.

30）Trịnh Hoàng Hiệp 2009 *Báo cáo kết quả khai quật khảo cổ học địa điểm Đền Câu Từ 1 và Đền Câu Từ 2, thôn Cầu Từ, xã Phượng Sơn, Huyện Lục Ngận, tỉnh Bắc Giang*. Hà Văn Phùng, Trịnh Hoàng Hiệp, Trần Văn Lạng và Nguyễn Huy Hạnh 2009 Đền Câu Từ Bắc Giang qua tư liệu khai quật khảo cổ học, năm 2007. *Khảo cổ học* số 4/2009, 30–52.

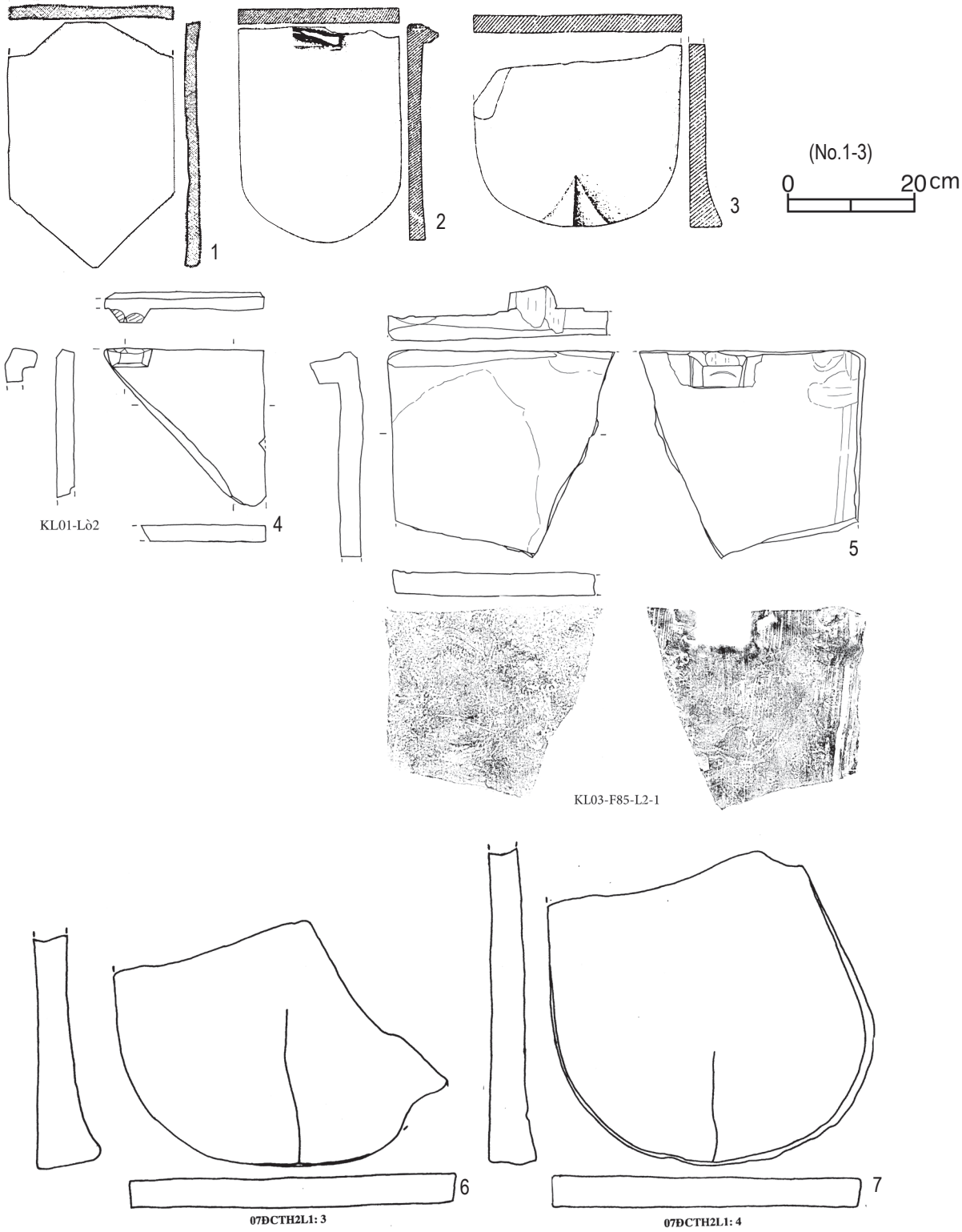


Fig.6
Flat tapered roof tiles at Thăng Long citadel (1-3:Ngô Thị Lan 2006), Kim Lan (4,5), Đền Câu Từ (6-7:Trịnh Hoàng Hiệp 2009)

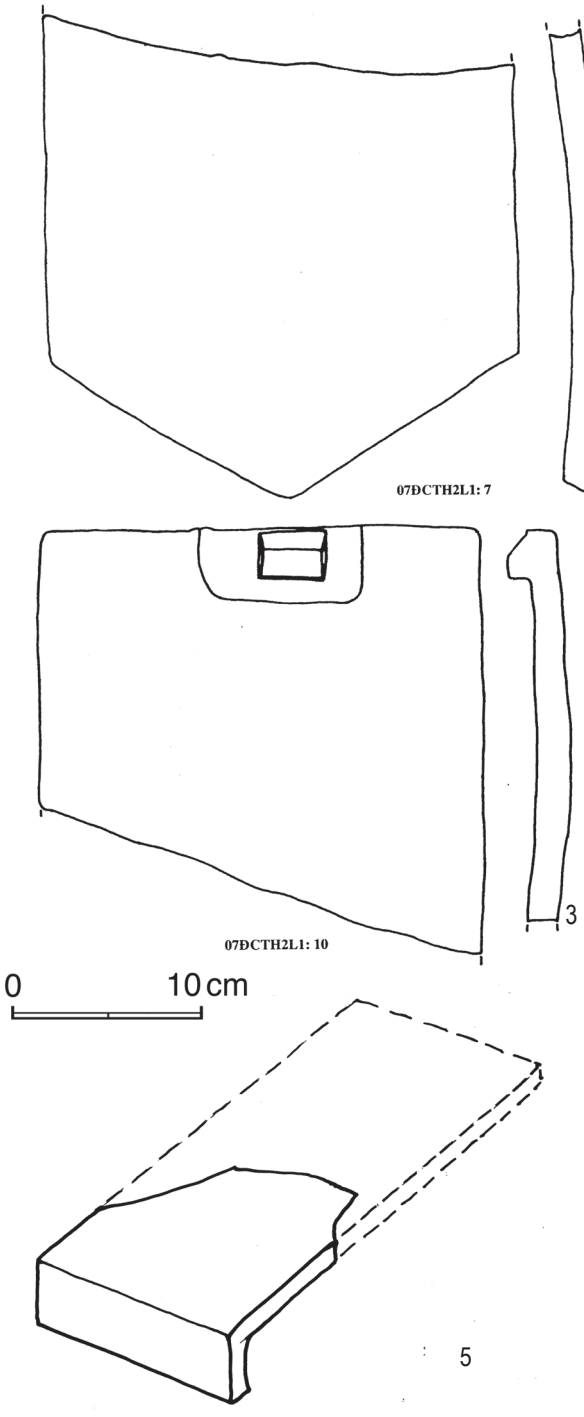


Fig.7
Flat tapered roof tiles at Đền Câu Từ
(1-3: after Trịnh Hoàng Hiệp 2009), Dương Lai Trong (4), Si Sattanak (5: after Hein et al. 1989, only no.5'scale is unknown)

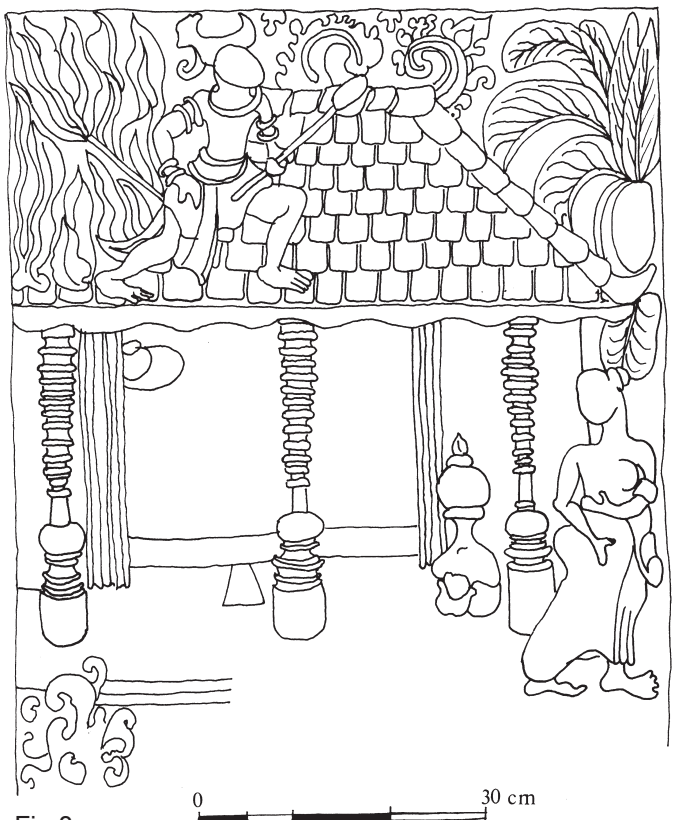


Fig.8
Building shown on relief 169 at Penataran, Java
(after Dumarcay 2003)

D.Thai, Lao and Cambodia

Tapered flat and simple rectangular roof tiles have been used to roof the present traditional Buddhist temple architectures in Thailand, Laos and Cambodia. Because of the limited published materials, it is not yet possible to discuss the earliest types in these regions.

However, the ceramic kiln sites like Phan in the northern Thailand was associated with the flat tapered roof tiles（26.5cm in length: Pl. 30）. Also simple rectangular flat roof tiles with an angular bent were also excavated at Si Satchanalai kilns in the central Thailand[31] and Si Sattanak kilns in Lao（Fig. 7–5）[32]. The former one was dated to the 14th or 15th century and latter was around mid-15th to 16th century[33].

Another interesting archaeological phenomenon is that while the flat rectangular or tapered roof tiles are widely used in the present Khmer Buddhist temples of Cambodia, nearly no archaeological evidence was confirmed at the Angkor Period sites. All the excavated types belong to so called Khmer type roof tiles（set of under and over tile with eave tile）[34] and it is also observable in East and Northeast Thailand[35]. Probably flat rectangular or tapered roof tiles were adopted widely in Cambodia after the fall of Angkor or later period.

E. Burma

One short study introduced a perspective based on the some museum exhibition materials in Burma that the flat rectangular roof tile with grooves on the outer surface in Pyu period were evolved into the simple flat rectangular roof tiles[36]. The introduced flat roof tiles in his short paper have square bent like the other flat rectangular roof tiles in the Mainland Southeast Asia（Fig. 7–5）and does not include the perforated grooved flat roof tiles, which belongs to the typical morphology of the Indian originals[37].

31）Shaw C. John 1987 *Introducing Thai ceramics, also Burmese and Khmer.* Crfatsman Press, Thailand.

32）Hein Don, Mike Barbetti and Thongsa Sayavongkhamdy 1989.*An excavation at the Sisattanak Kiln site, Vientiane, Lao PDR.* Research Institute for Asia and Pacific, University of Sidney.

33）Asian Art Museum of San Francisco 1993 *Thai ceramics: the James and Elaine Connell collection.* Oxford University Press, Kuala Lumpur.

34）Dumarcay, Jacques 2003 *Architecture and its models in Southeast Asia*. Orchid Press, Bangkok.Tabata Yukitsugu 2008 *A study of Khmer ceramics*, Yuzankaku, Tokyo, Marui Masako（Institute of Asian Culture, Sophia University）, who has been conducting archaeological research in the Angkor area, also confirmed this phenomenon. Some Khmer ceramic kiln sites provided the evidence of Khmer style roof tiles production in the 10th century and several archaeological sites indicate they may go back to the earlier date.

35）Indrawooth Phasook, Krabuansang Sinchai and Narwake Payao 2001 *Report on the excavation at Muang Fa Daed Song Yang Kamalasai District, Kalasin Province.* Fine Arts Department.

36）Uehara Mahito 1997 *Reading the roof tiles. Excavation of History* no.11. Kodansha, Tokyo (in Japanese)

37）Otani ibid.

F. Java

Flat roof tiles were also confirmed at Trowulan, capital site of the Majapahit Dynasty, eastern Java[38] The stone relief at Candi Sukuh near Surakarta in the East Java illustrates a piled house with the flat roof tiles[39]. No. 169 relief of stone terrace at Penataran shrine site in Java has also illustrates a small architecture, which is roofed by flat roof tiles with some kinds of decoration roof tiles[40]. They are dated to the 15th to 16th century.

4. Discussion

Based on the above mentioned materials, it can be concluded that the simple flat rectangular roof tiles with a bent was already widely adopted in Southeast Asia especially after the 14–15th century or later period. But, as to the flat tapered roof tiles only Malay Peninsula（Thung Tuk and Bujang Valley）and central Vietnam are recognized as the earliest cases. They were already commonly adopted in the Champa architectures till the 11th century. While it is not yet possible to confirm the earliest type among the Champa sites, the comparison between the Champa specimens（QN-1 type, BD-1A, 1B, 1C types）and single pointed type of Thung Tuk（Fig. 5–7,8）indicate less morphological gap. Additionally, this type roof tiles were not adopted in the neighbored Khmer region of the contemporary period. Therefore, I suppose its appearance in the Champa region can be placed in the end of the 1st millennium AD, probably 9–10th century because the Chinese style roof tiles were used in the previous times, and tapered type was introduced from the Malay Peninsula region.

Otani pointed out the flat roof tile with round lower end can be dated to the 7th century at least in Tamil Nadu, South India[41]. The morphological variants at Thung Tuk also include this type（Fig. 5–6）like the Indian one. The other artifacts like Islamic ware and glass also supported the contact with the further western regions across the Indian Ocean. In addition, so called Tamil inscription which was discovered at Ta Kuapa and published at first in 1913, was dated to the 9th century and mentioned about the Tamil merchants activity[42]. Ta Kuapa is located at the slightly upper river reach of Thung Tuk, only some km in the east. Therefore, it is very proper to search out its origin of the tapered roof tiles in the eastern or southern Indian Sub-continent.

38）Personal communication with Ono Kunihiko

39）Chihara Daigoro 1996 *Hindu-Buddhist architecture in Southeast Asia*. E.J.Brill, Leiden., Personal communication with Fukami Sumio

40）Dumarcay, Jacques *ibid.*

41）Otani Koji 2001 Tradition of the roof tiles in India: its appearance, development and factors. *Indo Kokogaku Kenkyu* No.22:37–58（in Japanese）

42）Karashima Noboru 2002 Tamil inscriptions in Southeast Asia and China. In Karashima N. ed. 2002 *Ancient and medieval commercial activities in the Indian Ocean: testimony of Inscriptions and ceramic-sherds. Report of the Taisho University Research Project 1997–2000.* 10–18, Taisho University

It is also necessary to pay attention about the historical relation between the Champa and Vietnamese roof tiles. One simple flat tapered roof type at Hoa Lư（Fig. 5–15）is similar to those of the Champa specimens, especially those of An Phú and Mỹ Sơn. However, they show large morphological gap from those of the Ly Dynasty period. The common types in the Lý Dynasty are much wider in width and their bent parts were also transformed into the cubic-shaped nib. Since there no any earlier flat tapered roof tiles than the Hoa Lư types in the northern Vietnam up to now, it is concluded that their origins needed to be find out in the early types of the Champa region.

Emperor Lê Hoàn carried out his expedition to Champa in 982 and occupied Indrapura in the present Quảng Nam. These Vietnamese expansion to the south have probably brought about the cultural exchanges between Champa and Vietnam in the life technology like architecture as was pointed in the previous studies[43]. Also I do not deny the possibility that the wider types of the tapered roof tiles in the Lý Dynasty period are integrated ones of the Hoa Lư type and wide rectangular type in Champa like QN-2. Furthermore morphological similarity is seen between the round end types of the Lý Dynasty（i.e. Fig.6–3, 6–6,7）and round end type in Bình Định（Fig. 4–8）. These recognitions indicates that the cultural exchange between Vietnam and Champa in the architecture occurred not in the limited single period but much longer term. The suggestion by Nguyễn Tiên Đông[44] on the relation between the Champa and Vietnamese art style also needs to be applied for the architectural technology.

Anyhow, generally looking the period from the late 10th to 11th century can be recognized as one large epoch-making in the roof tile or architectural history of the northern Vietnam.

Furthermore, in the succeeding periods, the Tran Dynasty and later period, this flat tapered roof tiles had been used as a major type before adopting French-style flat roof tile in the 20th century（see the specimen of Dương Lai Trong, which was excavated at an ordinary village of the Red River Plain and dated to the 17th century（Fig.7–4[45]）. And even now they are being produced and used.

Finally I would like to emphasize my inference that the adopting new style roof tiles（tapered roof tiles and flat rectangular roof tiles）in the Malay Peninsula（9th Century）, central coastal Vietnam（10th Century or before）and northern Vietnam（10 to 11th Century）must be closely related with the the architectural style change. However, quite a few studies are done to the architecture in those periods except the brick-built architectures. Especially wooden architectural sites, which were probably roofed by tiles, are still in indistinct in many regions of the Mainland Southeast Asia. Further studies on the roof tiles and wooden architectural sites need to be done in archaeology.

43）Momoki Shiro, Higuchi Hideo and ShigeedaYutaka 1999 *Champa: its history, descendants and architectures*. Mekong Press, Tokyo（in Japanese）. Nguyễn Tiên Đông 2008 Những yêu tố văn hóa Cham Pa ở Thăng Long và vừng phụ cặn. Bài phát biểu trong hội thảo khoa học về di tích hoàng thành Thăng Long, 23th Nov. 2008, Hà Nội.

44）Nguyễn Tiên Đông ibid.

45）Nishimura Masanari, Nishino Noriko, Hirano Yuko, Trinh Hoang Hiep and Mukai Ko. Preliminary report of the archaeological research in the summer of 1998 and 1999. *Thông tin Bách Cốc* No.10:95–145.（in Japanese）

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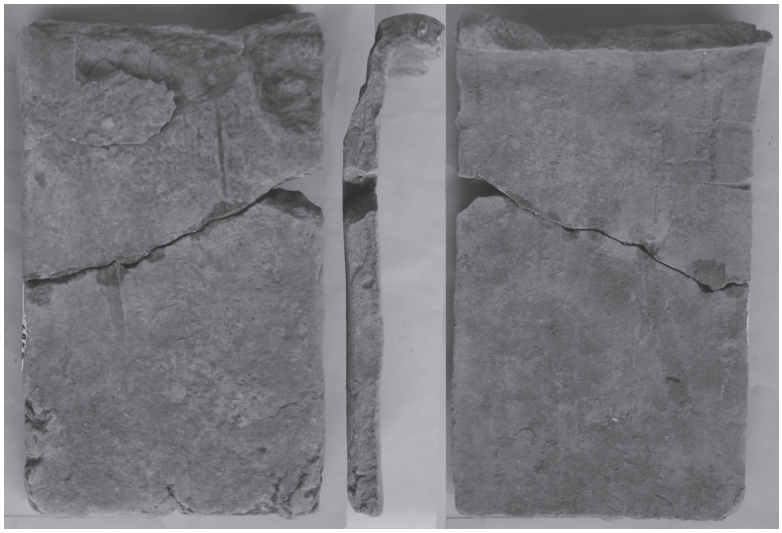
Pl.1 AP02-S6826/6428
(QN-1 type: An Phú)



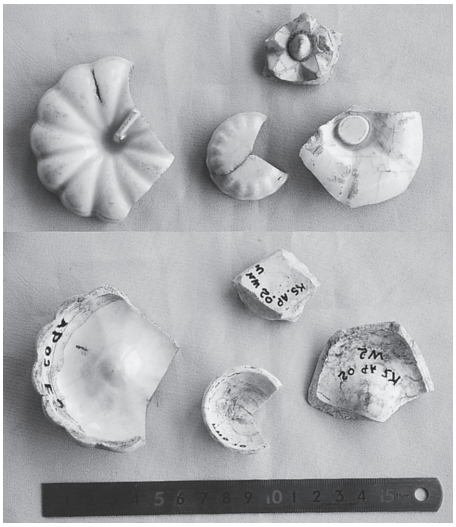
Pl.2 AP02-S6860/6462 (QN-1 type)



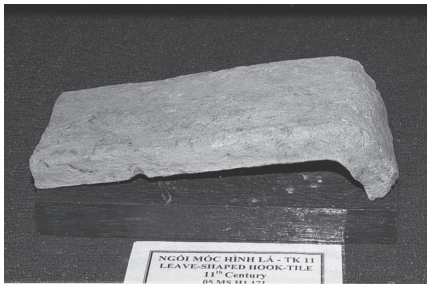
Pl.3
Magnified photo
of the left side of
AP02-S6860/6462



Pl.4 AP-S6852/6354 (QN-2 type)



Pl.5 Chinese ceramic excavated
at An Phú



Pl.6 Roof tile at Mỹ Sơn



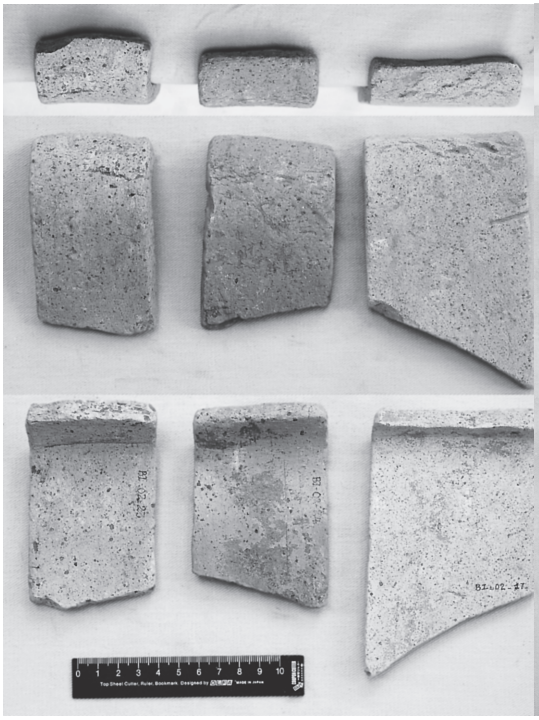
Pl.7 Roof tile at Mỹ Sơn



Pl.8 Roof tile at Mỹ Sơn
(wider type)



Pl.9
Roof tiles at Trà Kiệu



Pl.10
BI02-23 (left), BI02-24 (center),
BI02-17(right) from Bánh Ít



Pl.11
BI02-18 (left), BI02-25 (right)



Pl.12 BI02-16 (BD-1D type)



Pl.13 BI02-26 (BD-3A type)



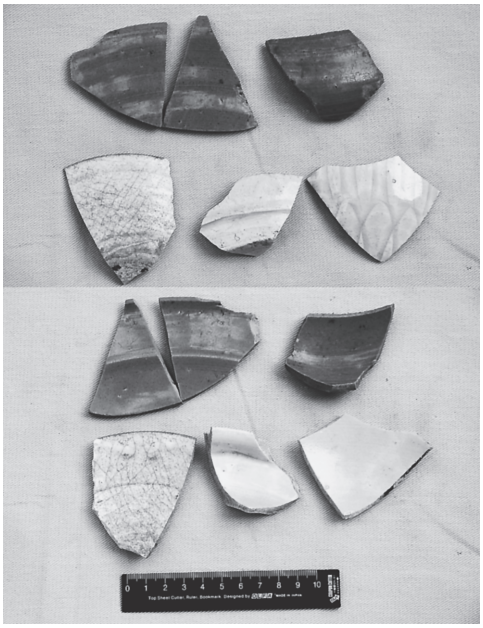
Pl.14 BI02-3 (left) and BI02-6 (right)



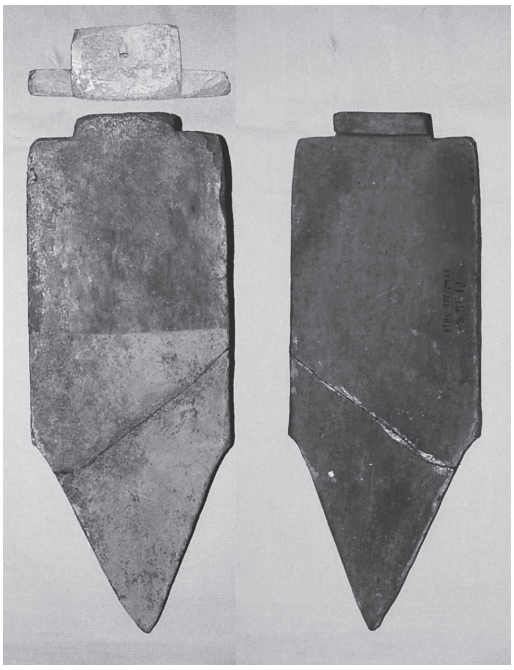
Pl.15 Chinese celadon at Dương Long



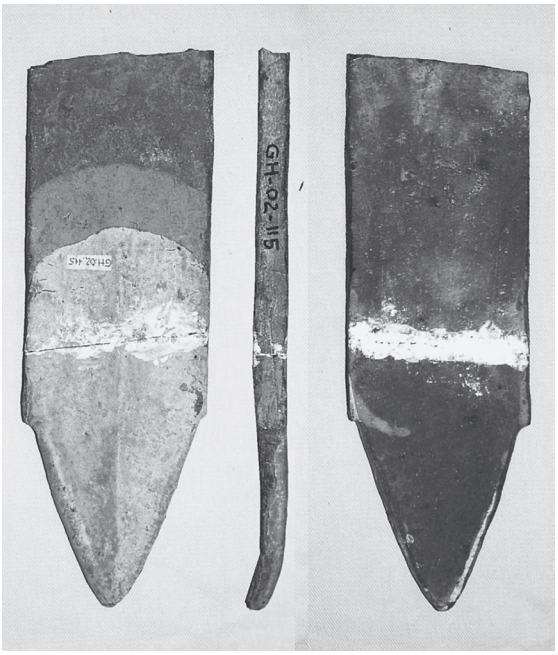
Pl.16　Chinese white glazed ceramic at Dương Long



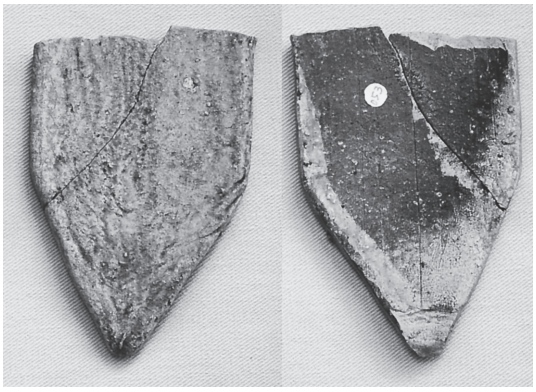
Pl.17　Chinese white glazed ceramic at Dương Long



Pl.18　GS91-12 (BD-2C type, Gò Sành)

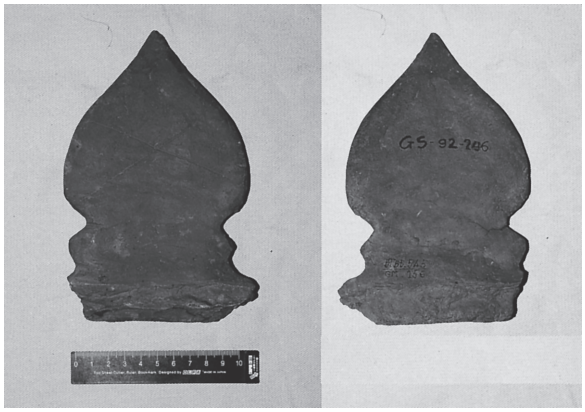


Pl.19　GH02-112 (Gò Hời)





←Pl.20　GS-053 (left)
↑ Pl.21　GS94-2 (upper)



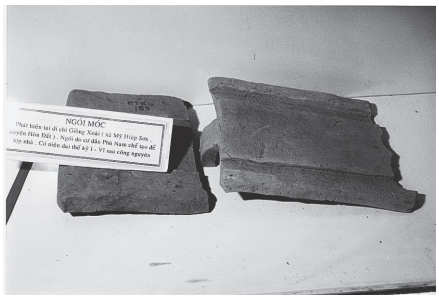
Pl.22 GS92-246



Pl.23 Roof tiles from An Thành



Pl.24 GCM9254 (Gò Cây Me)



Pl.25 Roof tiles from Giồng Xoài, Kiên Giang



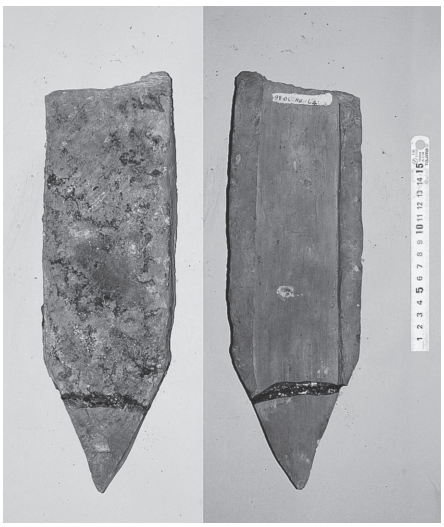
Pl.26 Roof tiles from Po Hai



Pl.27 Roof tiles from Thung Tuk



Pl.28 98DL-H2L4-1 (Hoa Lư)



Pl.29 98DL-H2L4-3 (Hoa Lư)



Pl.30 Roof tile from Phan (after Shaw 1987)