

The Spatial Composition of Buddhist Temples in Central Asia, Part 1: The Transformation of Stupas

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Abstract: This study focuses on the transformation of main stupas in terms of architectural spatial components based on bibliographic surveys concerning 59 documented Buddhist temple remains (excluding cave temples) in Central Asia. We prepared a database of Buddhist remains, and analyzed the spatial composition of each temple, judging from the extracted spatial components. We divided temples into 4 types based on their spatial composition characteristics: stupas, shrines, monasteries, the other inferior complexes; we created three-dimensional spatial schemas of each type and showed visually presented the spatial compositions of temples and the forms of stupas.

1. Introduction

There were many prosperous Buddhism cities in Central Asia, including Taxila, Gandhāra, Termez and Qocho¹. As these cities were sufficiently well-known, Chinese priests, such as Xuangzang and Faxian, visited for pilgrimages and expeditionary parties of the Great Powers of the West competed over them in the 19th century. The numerous sculptures that have been excavated in the district of Central Asia have attracted considerable attention. The features of Buddha statues which were considerably influenced by the Greek and Roman cultures and remain beautiful today, holding a fascination different from that of the statues currently seen in Japan. The statues were excavated in the construction of the Buddhist temples where many monks and nuns lived and several benefactors visited. The Buddha statue was not only placed in small shrines but also used in stupas which symbolize Nirvana to grant them magnificence.

Multiple studies in art and archeology have focused on these sculptures and their excavation. From Japan, a Kyoto University expedition including Mizuno, Nishikawa and Higuchi has conducted surveys in this area and published a detailed report of their detailed investigation².

Multiple articles by Kuwayama have been published concerning the transformation of the Buddhist temples in Gandhāra and Taxila³. In addition, the chronology of the Buddhist remains in this area is well known and has been examined and compared with the masonry chronology at Taxila's temple produced by Marshal⁴. Recently, there have been studies concerning the plinths of Buddhist temples in Gandhāra, Taxila and Swāt by Kato and others^{4,5}.

Kurt Behrendt (2004) who conducted extensive investigations and analysed, divided the Gandhāran Buddhist temple into a "Sacred Area" and a "Monastic Area". He distinguished the shrines as the worship objects on the basis of the type and the placement of various remains of ancient structures such as "Relic Shrine", "Image Shrine" and "Two-celled Shrine", and advocated his theory about the transformation

of temples. Likewise, he considered the difference in the forms of shrines in terms of worship objects such as Buddhist statues, stupas, and relics⁶.

In these studies, about the transformation of temples in each area has been collected in detail. However, as for the development way, it was not mentioned to what kind of architectural spatial component is followed and removed and added. In this study, we analyze the spatial composition, which focuses on the architectural spatial components forming temples. Our aim was to determine which spatial components developed became dominant in the Buddhist temples between around 2 B.C. and the 7th century.

In this study, we first address transformations in the forms of the main stupas, which are the most important objects of worship in Buddhist architecture.

This study focused on temples in the region bounded to the south by Taxila and Gandhāra near the Peshawar basin, to the north by Chuy valley in Kyrgyzstan, to the east by Miran in the Xinjiang Uyghur autonomous region, and to the west by Termez (Fig.1). The subjects of the study are the Buddhist remains presented in Table 1. These Buddhist remains have been excavated and drawn in reports, allowing us to distinguish their spatial compositions.

2. Method

On the basis of a literature search, we prepared a database of the locations, construction years (centuries), dynasties, cultures, drawings, and photographs of the 59 Buddhist temple remains situated above the ground. The spatial composition of each structure was analyzed and considered based on the database.

We modeled the spatial compositions according to 4 functions (stupas, shrines, monasteries and the other types of complexes) after having classified their characteristic spatial compositions. We also constructed three dimensional schemas considering to the architectural spatial components.

Table 1. Buddhist Remains of Study Subject

The Name of remains	Location	Date	No. of architectural special components included in the remain*1
1. Akhauri A, C	Taxila (PAK*)	A.D.1-5c?	2,5,6,7,15,17,27,28,29
2. Akhauri B		A.D.1-5c?	2,3,4,6,7,15,17,22,24,25,27,28,29,32
3. Bhamala		A.D.4-8c	1,3,4,5,6,7,9,15,17,18,20,22,23,24,25,27,28,29,33
4. Dharmarajika		B.C.1c-A.D.2c	1,2,3,5,6,7,9,14,16,17,18,21,23,24,25,27,28,29,32
5. Jaulian		A.D.2-5c	1,2,5,6,7,9,15,17,27,28,30,31,32,33
6. Kalawan Monastery B,C,F		A.D.3-5c	1,7,15,17,27,28,29,31
7. Kalawan Stupa Court A		A.D.3-5c	1,2,3,5,6,7,9,15,17,18,19,21,23,24,25,27,32
8. Khader Mohra D1		A.D.1-5c?	2,5,6,7,14,15,17,19,28,29
9. Kunala		A.D.2-5c?	1,2,5,6,7,17,27,28,30,33
10. Mankiala Stupa		B.C.2c-A.D.7c	3,5,6,7,9
11. Mohra Moradu		A.D.3-5c	1,2,3,5,6,7,9,13,15,17,27,28,29,33
12. Pippala		A.D.1c	1,2,3,5,6,7,15,27,28,29,33
13. Double Headed Eagle Stupa of Sirkap, A(Block G) Stupa of Sirkap ※Jain temple		A.D.1c- A.D.1c-	2,5,6,7,8 2,5,6,7,9
14. Jamal Garhi	Gandhāra, Peshawar basin (PAK)	A.D.1-5c	1,2,3,5,6,7,9,15,18,19,27,28,29,32
15. Mekhasanda Outlying Mountain Monastery		A.D.3-6c	15,18,27,28,32
16. Mekhasanda Sacred Area		A.D.3-6c	1,2,5,6,7,9,15,17,19,27
17. Ranigat East Sacred Area		A.D.2-7c	1,2,5,6,7,9,15,17,19,27
18. Ranigat Southwest Sacred Area		A.D.2-7c	1,2,5,6,7,9,15,17,27,28,30,33
19. Ranigat South Monastic Area		A.D.2-7c	14,15,17,19,27,28,32,33
20. Ranigat West Sacred Area		A.D.2-7c	1,2,5,6,7,9,15,18
21. Shah ji ki Dheri (Kanishka stupa)		A.D.2c-	1,4,5,6,7,9,10
22. Shahri-Bahlol Site A		A.D.2c-8?	1,7,14,15,17,23,24,27,29,33
23. Shahri-Bahlol Site G		A.D.2c-8?	3,4,5,6,7,9
24. Takht-i-Bahi Main Sacred Area		A.D.2-4c	1,2,5,6,7,9,15,17,18,22,23,24,25,27,28,29,30,31,32
25. Tharali		A.D.3-6c	15,17,27,28,32
26. Thareli Sacred Area D		A.D.3-6c	1,2,3,5,6,7,9,15,17,28,30
27. Thareli Upper Sacred Area C		A.D.3-6c	1,2,5,6,7,15,17,18,27,28,30,32,33
28. Amluk Dara		Swāt (PAK)	A.D.3-10,11c
29. Butkara I	B.C.2-A.D.8c		2,3,5,6,7,17,23,24,25
30. Butkara III	B.C.2c-		1,2,3,5,6,7,9,15,17,23,24,25,27,33
31. Gumbat Shrine	A.D.8-9c		2,5,6,7,15,18,24,25,27
32. Marjanai	A.D.1-5c?		1,2,3,5,6,7,8,9,14,15,17,18,23,23,27
33. Nimogram	A.D.1-3c		1,2,5,6,7,9,14,15,17,18,27,28,32,33
34. Panr	A.D.1-5c		2,5,6,7,8,9,14,17,18,27,28,32,33
35. Saidu Sharif	A.D.1-5c		2,3,5,6,7,8,9,14,15,17,18,19,27,28,29,33,38
36. Tokar Dara	A.D.1-3c		1,2,5,6,7,8,9,12,14,15,17,18,24,27,28,30,33,34
37. Shankardar	A.D.4-5c (B.C.4c-)		2,5,6,7,9
38. Parihasapura (Parihaspora)	Kashmir (PAK)	A.D.7c	2,4,5,6,7,14,15,17,27,28,29,33
39. Bagh Gai	Hadda (AFG*)	A.D.3-4c	1,2,5,6,7,9,10,15,17,23,24,25,27,28,30
40. Tapa-i-kafariha		A.D.3-4c	1,2,5,6,7,9,15,17,27,31
41. Tapa Shotor	A.D.4-5c	1,2,5,6,7,9,15,18,19,23,24,25,27,28,29,30,38	
42. Qol-i-Nader	Bagrām (AFG)	A.D.2c-	2,5,6,7,9,15,17,18,19,27,28,29,33
43. Shotrak		A.D.3c	1,2,5,6,7,9,10,13,15,17,19,27
44. Tapa Sardar	Ghazni (AFG)	A.D.3-7,8c	1,2,3,4,5,6,7,9
45. Ahin Posh	Jallalabad (AFG)	A.D.2-3c	4,5,6,7,9,15,17,19,27,32
46. Gul-Darrah	Kābul (AFG)	A.D.3-4c	1,2,4,6,7,9,10,12,13,14,15,17,27,28,29,33,34
47. Kamari		A.D.1-5	2,5,6,7,9
48. Kurrindar-Locakan		A.D.4-5c	2,5,6,7,9
49. Seh topan		A.D.3-6	2,5,6,7,9
50. Shiwaki (Shevaki)		A.D.5-7c	2,5,6,7,9
51. Fayaz Tepe		Termez (UZB*)	B.C.1c-
52. Karatepa	A.D.2-4c		1,2,5,6,7,13,17,19,27,28,33,34
53. Ajina tepa	Kurganteppa (TJK*)	A.D.7-8c	1,4,5,6,7,12,13,15,17,18,19,25,27,28,33,34,35,36
54. Ak-Beshim No.1 Temple	Chuy valley (KGZ*)	A.D.7-8c	1,14,15,17,19,22,25,27,34,35,36,37,38
55. Ak-Beshim No.2 Temple			2,4,14,15,18,23,24,26,27
56. Rawak	Khotan (Xīn*)	A.D.3-5c	1,4,5,6,7,14,15,17,24,25,27
57. Qocho City 高昌	Qara-hoja (Xīn*)	A.D.5c-14?	1,2,7,11,12,13,14,15,17,19,22,24,25,27,34
58. Yar City (Jialhe Ruins) 交河故城		A.D.5c-14?	1,2,4,5,6,7,11,13,14,15,17,19,22,24,25,27,33
59. Stupa at Miran	Miran (Xīn*)	A.D.2-5c	1,3,5,6,14,16,18,25,27

* PAK= Pakistan, AFG= Afghanistan, UZB= Uzbekistan, TJK= Tajikistan, KGS= Kyrgyzstan, Xīn= Xinjiang Uyghur

*1 Refer to Figure 2. about the list of the architectural spatial components.



Figure 1. Map of Study Areas

Our study areas included the east-west Turkistan, Afghanistan and northern part of Pakistan.

Thirty-eight architectural vocabularies were provided as the architectural spatial components when the schemas were constructed. In these vocabularies, the objects with spatial and material characters were mixed; however, this was done without distinguishing them. Spatial components with material character are comprised existing Buddhist statues, mounds and drums, which are known as the objects. On the other hand, the components with spatial character comprised domes and corridors that directly constitute the architectural space.

Figure 3 is an example of the process of creating schemas. This spatial composition is seen in Gandhāran temples of Jaulian and Ranigat East sacred area, and Tapa Shotor and Bagh-gai. There is a characteristic spatial composition by which the main stupa is surrounded by small stupas, and these small stupas are surrounded by shrines row. In other words, we can assume this spatial composition as a type of plot. The architectural spatial components seen in these temples were mounds, drums, square bases, stairways, rectangular plans, and Buddha (or Buddhist) statues. We have created three-dimensional schemas by placing these spatial components together.

In such a process, the spatial compositions of the remains in our study areas were classified as stupas, shrines, monasteries, and other types of complexes. In this study, our subject was the main stupas which were a main worship object in temples in Central Asia. We considered the transformation in the forms of the main stupas from the viewpoint of the architectural spatial components based on previous studies, and expressed our results in a flow chart with the constructed schemas. Furthermore, we used the drawings and sketches of Buddhist temples to prove our considerations.

3. Schematization of the spatial composition

We analyzed 59 Buddhist temples as study subjects and classified the characteristic types. In addition, the three-dimensional schemas were created focusing on the previously mentioned architectural spatial composition. We executed grouping the spatial compositions and schematized the constructions regarded as having similar spatial compositions. Otherwise, individual compositions related to those of other temples (even if they could only be seen in locations such as Gumbat, Ak-Besim and Qocho City) were considered⁷. As for other types of complexes, there were the spatial compositions seen at some temples or only one site, and also several examples include the schemas which expressed whole parts of temple. We classified the structures as “stupas (including main stupa, main stupa and small stupa)”, “shrines (including shrine, main stupa and shrine, shrine which includes Buddhist statue)”, “monasteries (including monastery, monastery and main stupa)”, and other types of complexes (Figure 4).

In addition, Buddhist temples contain a dining hall and an assembly facility. However, we thought that the main function is divided into sacred area and did not make it study subject for analysis about the functions to need for the life except monasteries.

We did not describe the architectural spatial components other than the main stupas in this study in terms of space requirement. However, research on shrines or monasteries other than the main stupas should be conducted in the future.

No.	1	2	3	4	5	6
Architectural Spatial Component	Buddhist statue	square base	circular base	cruciform base	mound	drum
Schema						
7	8	9	10	11	12	13
stairway	freestanding columns	pilaster (parallel wall)	bastion	square pillar	squinch arch	niche
14	15	16	17	18	19	20
boundary wall	enclosing wall	circular plan	rectangular plan	foursquare plan	long rectangular plan	cruciform plan
21	22	23	24	25	26	27
octagonal plan	front court	antechamber	main chamber	corridor	double corridor	entrance
28	29	30	31	32	33	34
cell	□-shaped plan	C-shaped plan	L-shaped plan	I-shaped plan	courtyard	dome
35	36	37	38	* The Architectural Spatial Component may be changed and added by advancing analysis in future.		
vault	iwan (eyvān)	flat roof	peristyle			

Figure 2. The List of Architectural Spatial Components

These are the 38 architectural spatial components which are found in the temples of study area. We considered the spatial composition by focusing on these components.

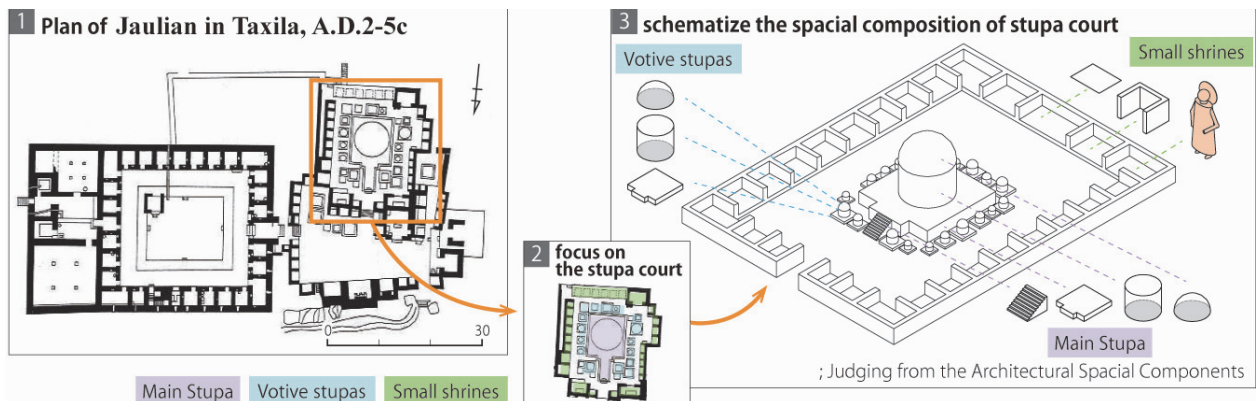


Figure 3. One Example of the Schematization in 3D of the Spatial Compositions

We created the schema by focusing on the architectural spatial components.

In this way, the form of temples has been schematized abstract; we took the characteristic spatial composition with division of function such as stupa, shrine and monastery, in order to show the one prototype.

In this schema, it showed that the stupa court (it means the complexes of the stupa and the shrine) was extracted and schematized.

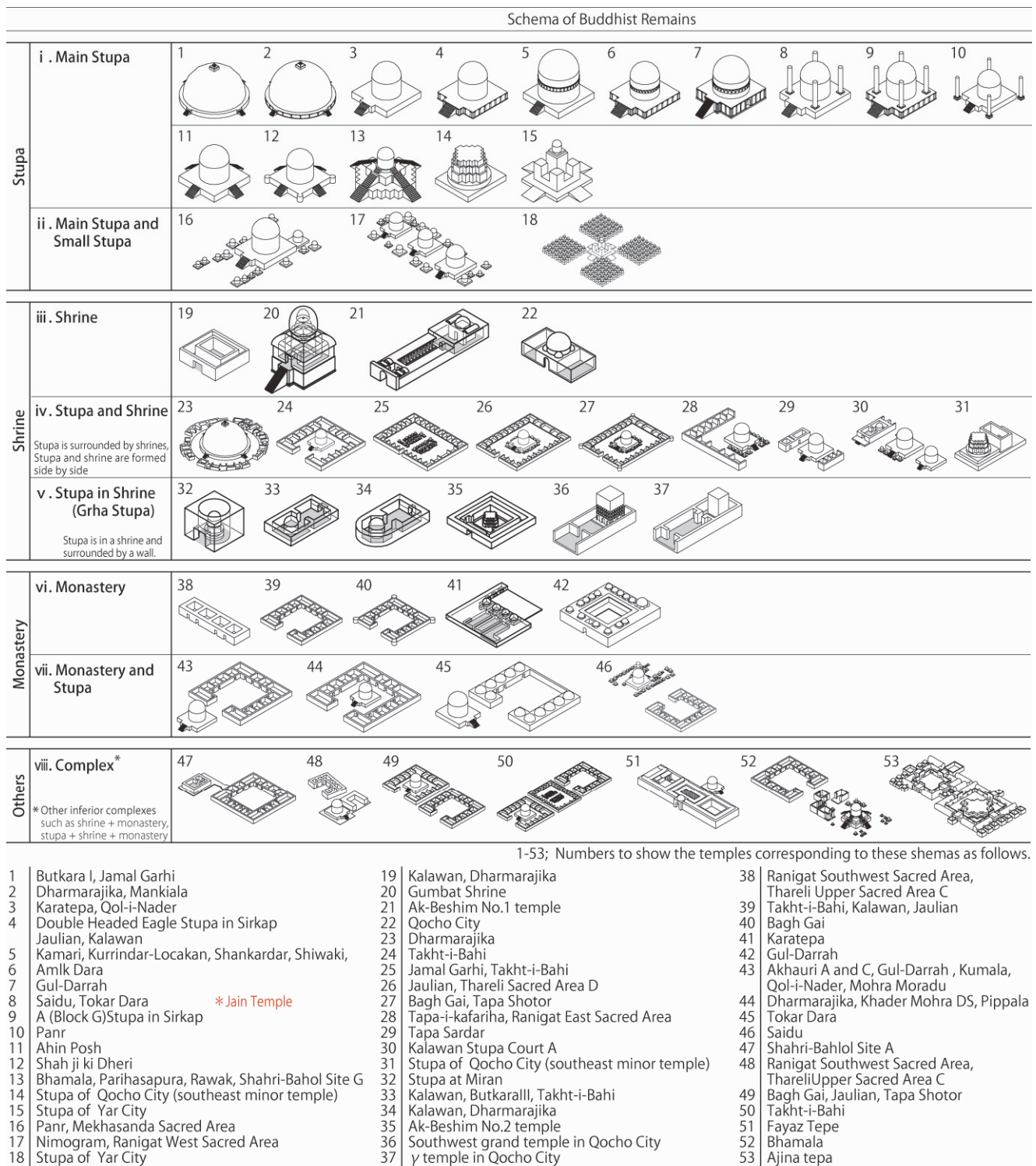


Figure 4. Schemas of Spatial Composition Based on the Architectural Spatial Components

As a result of analyzing the 55 temples based on the literature searches, we classified the spatial compositions into stupas, shrines, monasteries and the other inferior complexes.

4. Discussions about the transformation of stupas and the architectural spatial components constituting stupa such as a stairway, freestanding columns and pilasters

Besides sacred areas of worship, temples included priests' living quarters in the monastery (bedroom affairs), a dining hall, an assembly facility, a kitchen, and the warehouse where Buddhist monks lived. The worship objects, such as stupas or the Buddha

statues, are placed in the sacred areas by considering various aspects and compositions.

Therefore, in this study, we considered the transformation in the forms of stupas, the most important worship object in the sacred areas, from the viewpoint of architectural spatial components such as stairways, free-standing pillars and pilasters associated with stupas.

The schema [1] is the primitive form of the Buddhist architecture⁸. There have been examples of inverted bowl-shaped

stupas with a circular base, Jamar Garhi in Gandhāra (Figure 5), Butkara I in Swāt I (Figure 6), including India. The spatial components at this stage comprise a "circular base", a "mound (anda)" and a "stairway". Based on this schema, it is thought that the oldest structure is the 1st great stupa at Sanci in India whose form originated in approximately the 2nd century B.C. The beginning of Buddhist architecture is this mound-shaped stupa (schema [1] in Figure 7).

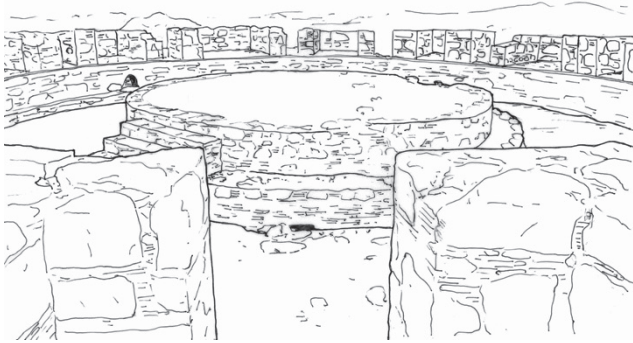


Figure 5. Main Stupa and Relic Shrine of Jamal Garhi, Court 1, in Peshawar basin

The construction of this temple had been continued about 5th century from 1st century A.D. according to the excavated coin. The stupa with a circular base is surrounded in a circle by shrine. At the south side under the sixteen steps stairway from stupa court, there is the sacred area (named court 3) including many small stupas and shrines using rectangular plan.



Figure 6. Plan of Butkara I in Swāt (modified from Faccenna, 1980, vol.3, no.1, pl. VI)

The construction of this temple had been continued about 8th century from 2nd century B.C. judging from the excavated coin.

The complexes which choked up with the constructions for worship are placed. The oldest construction is the main stupa in the middle of stupa court. The small stupas form on a circle through the corridor, and various size of stupa are placed around them.

Schema	Architectural Spatial Components	Applicable Remains
[1]		<ul style="list-style-type: none"> • Butkara I B.C.2-A.D.8c • Jamal Garhi A.D.1-5c

Figure 7. Architectural Spatial Components of Schema [1] and the Remain Concerned

The spatial components are as follows: 3. circular base, 5. mound, 7. stairways. Refer to Figure 2 about the number of the components.

Schema [2] added a pilaster to the circular base of schema [1]. There are examples of Dharmarajika (Figures 9, 10) and Manikiala (Figure 11) in Taxila.

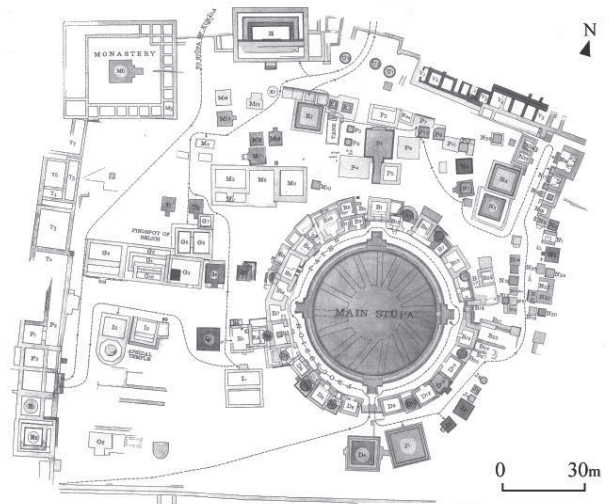


Figure 8. Plan of Dharmarajika in Taxila (modified from Marshall, 1951, pl.45)

It was thought that the construction of this temple had been started from 2nd century B. C., according to the excavated coins of the Indo-Greek Kingdom. Around the main stupa, small shrines surround it in a circle.

There was plain cell forming lengthways line (I-shaped monastery) at the east side. At the south side, there was also the slightly large quadrangular monastery with the stupa placed in the middle. The grha stupa was enshrined in the main chamber, and the shrine constituted two cells and antechamber was built. It was evident that, judging from a variety of buildings and the function, this temple was continued constructing and the extending a building and also was used for a long time.



Figure 9. Main Stupa and Relic Shrine of Dharmarajika This shows the present situation of the main stupa at Dharmarajika. The base part was decorated by the pilasters.

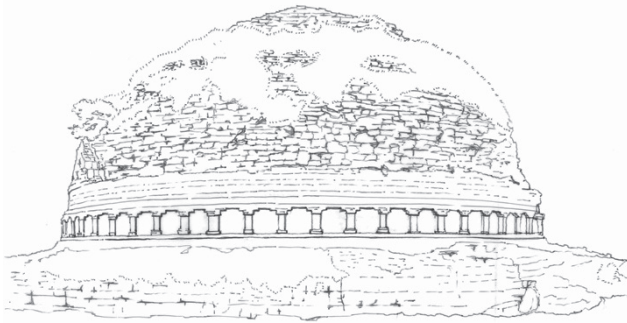


Figure 10. Manikyara stupa in Taxila

This large stupa as well as Dharmarajika was built in Taxila.

The pilasters went around the base. The detail survey about this stupa has not been carried out. However, it is one example of typical stupa which is the mound type with the circular base.

The construction of this temple goes back to the 2nd century B.C.

Schema	Architectural Spatial Components	Applicable Remains
[2]		<ul style="list-style-type: none"> • Dharmarajika B.C.1c-A.D.2c • Mankiala B.C.2c-A.D.7c

Figure 11. Architectural Spatial Components of Schema [2] and the Remain Concerned

The spatial components are as follows: 3. circular base, 5. mound, 7. stairways, 9. pilaster. Refer to Figure 2 about the number of the components.

After stupas shaped like grave mounds, the cannonball-shaped stupas that are prevalent in Taxila and Gandhāra became mainstream in Central Asia⁹.

Afterward, a significant change occurred, namely changing the base to square from circular and raising its height. The long drum was built under a mound or a short drum. The proportions of stupas dramatically changed in this manner. The stupa rose high and had the axis of upward direction by having been given a drum. Generally, the circular base had stairs in every direction. However, with a square base, it became customary to establish one stairway, thereby creating a direction for worshippers to meet at a stupa.

Schema	Architectural Spatial Components	Applicable Remains
[3]		<ul style="list-style-type: none"> • Karatepa A.D.2-4c • Qol-i-Nader A.D.2c-

Figure 12. Architectural Spatial Components of Schema [3] and the Remain Concerned

The spatial components are as follows: 2. Square base, 5. Mound, 6. Drum, 7. Stairways. Refer to Figure 2 about the number of the components.

Furthermore, the famous Double Headed Eagle Stupa of Sirkap in Taxila, used pilasters on a square base, as shown in schema [4]. The base of the stupa was decorated by molding, cornices, and pilasters like a Corinthian order carved of canthus leafs (Figure 13).



Figure 13. Double Headed Eagle Stupa in Taxila, Sirkap

It was thought the construction was 1st century A.D.

Most stupas seen in Sirkap are low, and the pilaster went around the square base.

The Double Headed Eagle Stupa has the most sophisticated outward appearance among the six stupas which were discovered in Sirkap. In the front of right and left base, there are three niches like imitated Indian Torana, the wife side of chaitya and the gabled roof of Greek temples.

The pilasters decorating the exteriors of stupas and display pillars were created on bases. Later, pilasters appeared on a drum. On the main stupa of Dharmarajika and Butkara I, the pilaster was turned around the surface of the base. The most famous architecture is the great stupa of Shankardar in Taxila, unfortunately, the damage to the base part of this building is serious. However, the drum and the mound parts have been well protected, and evidence suggests that a pilaster existed on the drum part (Figure 14, schema [5]). Other examples include Shiwaki which has recently been excavated by Franch expedition in Kābul (Figure 15), Kamari, and Kurrindar-Locakan¹⁰. Although the base is well preserved, the main body of the above-mentioned stupa of Sirkap, has not survived. We cannot confirm which decoration is early between a drum and a base in this sense. Even so, it can be supposed that the decoration of base is earlier from examples of Dharmarajika and other constructions.

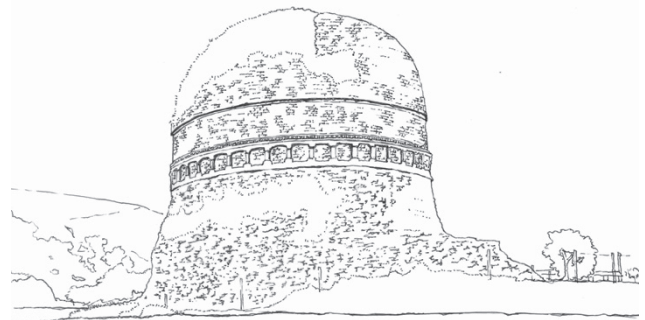


Figure 14. Shankardar in Swāt

It is thought that the stupa was visited by Xuangzang once.

It was considered that the one of the ashes which was distributed eight after Buddha entered nirvana had been buried here, in the legend.

Therefore, the original construction dates back to the 4th century B.C.

The present stupa was built between around 4th and 5th centuries.

The temple remains excluding the stupa have not been discovered. Most of the foundation was broken. The part of drum stays well. Besides, it can be seen the decoration of pilaster, the cornice, and the molding.

The huge cannonball shaped stupa is 20m in diameter and 30m in height.

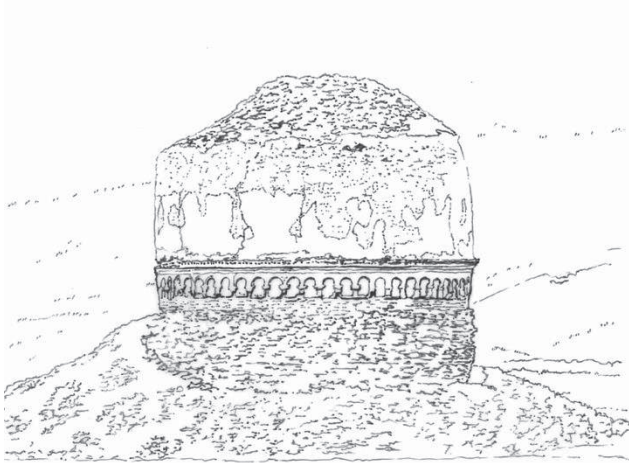


Figure 15. Shiwaki in Kābul

This is the one of stupas in which the state of preservation is the best in Kābul. The part of base almost collapsed, but the frieze has been preserved beautifully. The inscription was written with Kharosthi script, the inscription of Kushan and the coin of Roman Empire have been excavated.

Schema	Architectural Spatial Components	Applicable Remains
[4]		<ul style="list-style-type: none"> • Double Headed Eagle Stupa in Sirkap A.D.1c- • Jaulian A.D.2-5c • Kalawan A.D.3-5c

Figure 16. Architectural Spatial Components of Schema [4] and the Remain Concerned

The spatial components are as follows: 2. square base, 5. mound, 6. drum, 7. stairways, 9. pilaster. Refer to Figure 2 about the number of the components.

Stupas can be decorated by cornices and moldings, as well as by friezes of niches displaying Buddhist statues. There is a wide variety of such friezes of niche, trapezoidal and barrel vaulted niches¹¹. There are several ways: placing two types of niche in turn, or repeating one type of niche. In schema [5][6][7], we did not classify small differences in decorations on the drums of stupas. We also did not express differences in cornices and moldings.

Schema	Architectural Spatial Components	Applicable Remains
[5]		<ul style="list-style-type: none"> • Kamari A.D.1-5 • Kurrindar-Locakan A.D.4-5c • Shankardar A.D.4-5c • Shiwaki A.D.5-7c

Figure 17. Architectural Spatial Components of Schema [5] and the Remain Concerned

The spatial components are as follows: 2. square base, 5. mound, 6. drum, 7. stairways, 9. pilaster. Refer to Figure 2 about the number of the components.

The main stupas developed into a solemn construction afterward because their bases became higher and the surfaces of both the bases and drums were decorated. Schemas [6][7] include these aspects. The examples include Amlk Dara in Swāt (Figure 18, and schema [6]), and Gul-Darrah in Kābul (Figure 20, and schema [7]).

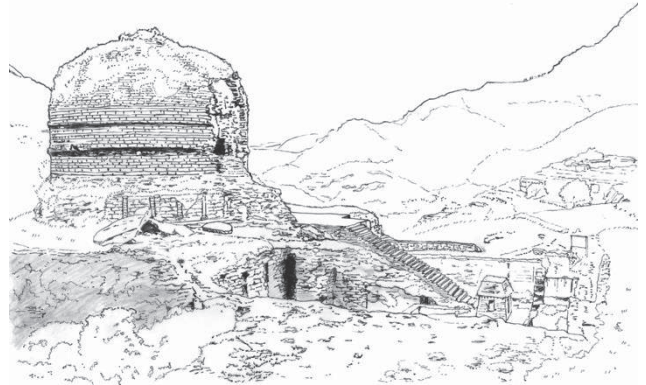


Figure 18. Amlk Dara in Swāt

The damage of the base part is intense. It is understood that the base is higher than the stupas of Gandhāra and Taxila, according to the remains of ancient structure. The circular base of approximately 30m in diameter was built on the square base with one side of approximately 37m and 10m in height.

The drum of diameter approximately 23m and 18m in height was constructed above the circular base.

The huge stupas exceeding 30-meter height were built in Swāt frequently.

Schema	Architectural Spatial Components	Applicable Remains
[6]		<ul style="list-style-type: none"> • Amluk Dara A.D.3-10,11c

Figure 19. Architectural Spatial Components of Schema [6] and the Remain Concerned

The spatial components are as follows: 2. square base, 5. mound, 6. drum, 7. stairways, 9. pilaster. Refer to Figure 2 about the number of the components.

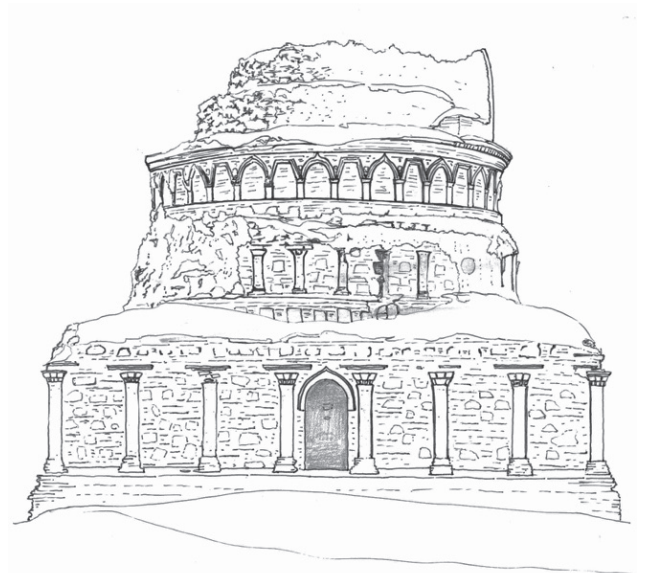


Figure 20. Gul-Darrah in Kābul

It has been thought that this temple was erected between 3rd and 4th century. This stupa is the best preserved state in Kābul, and was refined beautifully. There was once the monastery at the northeast. There is a stairs on the southwestern side of the stupa.

Schema	Architectural Spatial Components	Applicable Remains
[7]		• Gul-Darrah A.D.3-4c

Figure 21. Architectural Spatial Components of Schema [6] and the Remain Concerned

The spatial components are as follows: 2. square base, 5. mound, 6. drum, 7. stairways, 9. pilaster, 13. niche.

Refer to Figure 2 about the number of the components.

Furthermore, a stupa was built with free-standing columns on the four corners of a square base, as one of the classifications of the stupa bases. It was found in Saidu and Tokar dara.

Besides, the existing architecture is the A (Block G) stupa in Sirkap to being thought Jainism (Figure 23, and schema [9]). An example of the same level of stupa above the ground is found in Panr at Swāt (Figure 24, schema [10]). It is thought that in many cases, lion images were probably appeared on the heads of these columns.

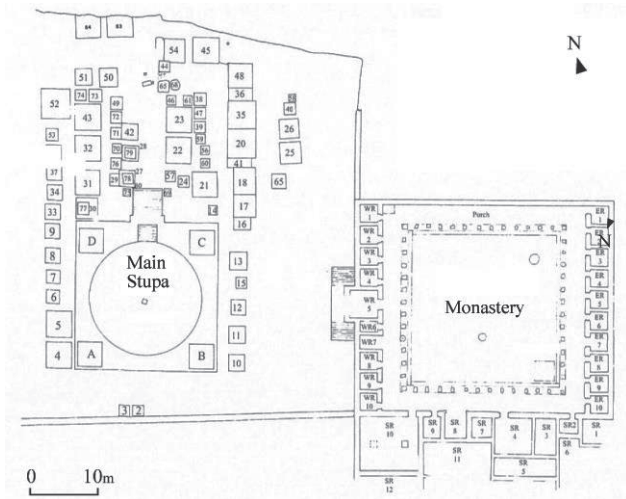


Figure 22. Plan of Saidu in Swāt (modified from Faccenna, 1995, figs.22, 23)

Saidu is the largest temples of satellites of Butkara I. The main stupa was reconstructed. It is thought that the construction was between 1st century and 2nd century A. D. The tall free-standing columns with a lion image on a capital stand in the four corners of the main stupa's base. In addition, the narrative frieze (narration sculpture of the Buddhism) decorated the drum.

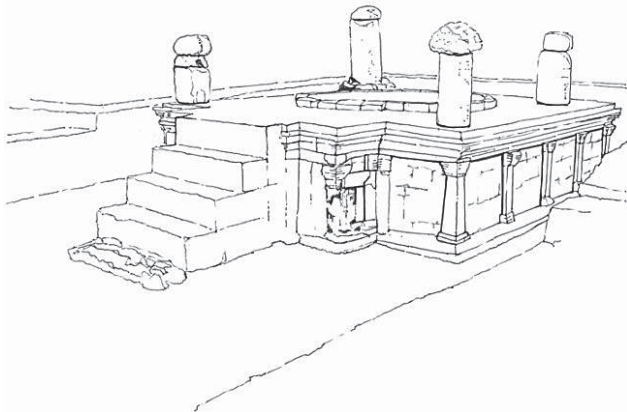


Figure 23. A (Block G) Stupa in Taxila, Sirkap

This is the "A stupa" of the Jainism. The pillars stand in the four corners of square base. It is quite thought with construction from the 1st century B.C. to 1st century A.D.

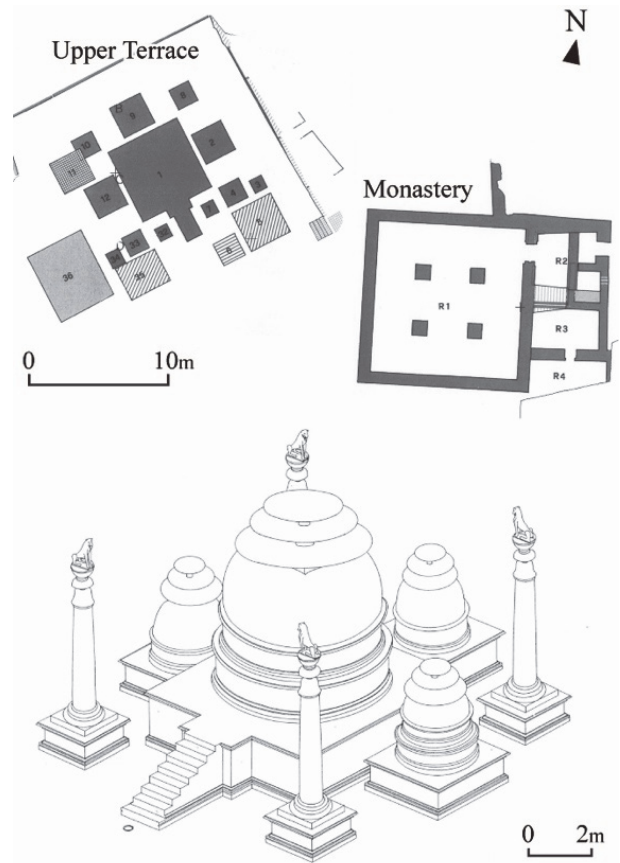


Figure 24. Plan and Axonometric Reconstruction of Upper Terrace at Panr, in Taxila (modified from Faccenna et al., 1993, figs.87, 139)

As well as Saidu, this temple is the satellites of Butkara I. Four free-standing columns stood outside of the square base of stupa, at upper terrace. The coins of Great Kushan were excavated.

Schema	Architectural Spatial Components	Applicable Remains
[8]		• Saidu • Tokar Dara A.D.1-5c A.D.1-3c
[9]		• A(Block G) Stupa in Sirkap * A.D.1c *Jain Temple
[10]		• Panr A.D.1-5c

Figure 25. Architectural Spatial Components of Schema [8], [9], [10] and the Remain Concerned

The spatial components of schema [8] and [10] are as follows: 2. square base, 5. mound, 6. drum, 7. stairways, 8. free-standing columns.

The spatial components of schema [9] are as follows: 2. square base, 5. mound, 6. drum, 7. stairways, 8. free-standing columns, 9. pilaster.

Refer to Figure 2 about the number of the components.

On the other hand, stupas with cruciform plans, as an alternative development of the cannonball-shaped stupa, also

appeared. This cruciform plan had a square base, including stairs in every direction. The examples include Ahin Posh (schema [11]) and Shah ji ki Dheri (Kanishka stupa), which attached circular bastions to the four corners of the wall (Figure 27 and 28). Moreover, examples of another developmental type of cruciform-shaped stupa included, Bhamala (Figure 29 and 30), Shahri-Bahol Site G, Parihasapura, Rawak (Figure 31 and 32) and others (schema [13]). Differences from Ahin Posh included the fact the cruciform having projections at the four corners of a square base, had a more sophisticated plan, and was raised to greater height by piling up the bases on several stages.

Schema	Architectural Spatial Components	Applicable Remains
[11]		• Ahin Posh A.D.2-3c

Figure 26. Architectural Spatial Components of Schema [11] and the Remain Concerned

The spatial components are as follows: 4. cruciform base, 5. mound, 6. drum, 7. stairways. Refer to Figure 2 about the number of the components.

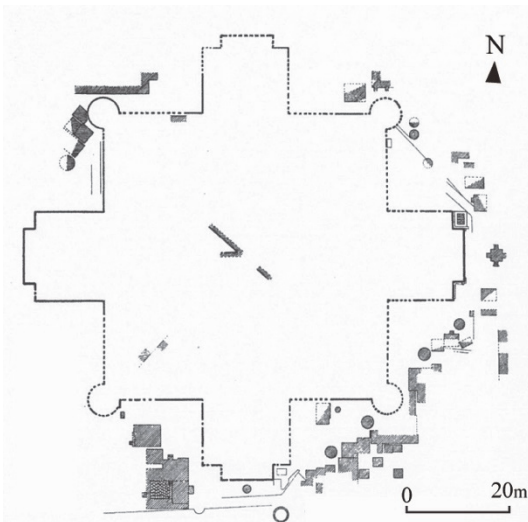


Figure 27. Plan of Shah ji ki Dheri in Peshawar basin (modified from Hargreaves, 1914, pl.XIII)

This is the great stupa that Foucher has identified as the construction by Kaniska. The construction was the 2nd century A. D., according to him. As a result of excavation, it became clear that the stupa with a circular base changed forms for three times into a square and a cruciform. This stupa is the one example to become a model in discussing about the transformation of the stupa form.

Schema	Architectural Spatial Components	Applicable Remains
[12]		• Shah ji ki Dheri A.D.2c-

Figure 28. Architectural Spatial Components of Schema [12] and the Remain Concerned

The spatial components are as follows: 4. cruciform base, 5. mound, 6. drum, 7. Stairways, 10. bastion. Refer to Figure 2 about the number of the components.

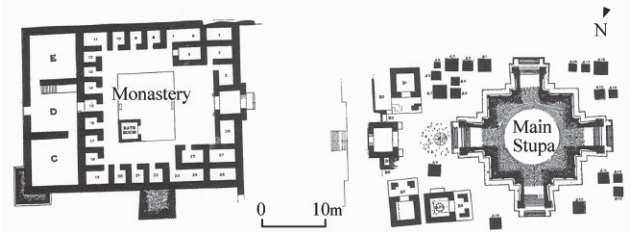


Figure 29. Plan of Bhamala in Taxila (modified from Marshall, 1951, pl.114)

The coins of between middle 4th century and 5th century were excavated. However, the main stupa was a cross-shaped plan, and it resembled the stupa seen in Kashmir and Afghanistan between about 7th and 8th centuries. The shrines are seen in the west of sacred area. The grha stupa is enshrined in the B8 shrine. The cruciform stupa is very rare in Taxila.

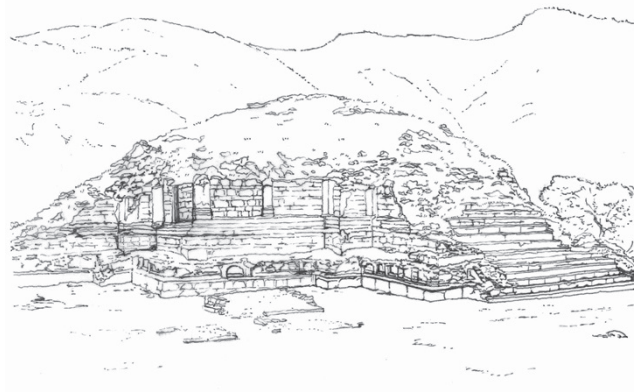


Figure 30. Main Stupa of Bhamala

This is the stupa having cruciform base. The upper part above the drum has not been preserved, but it is one of the few examples that can confirm the condition of the base in a cruciform stupa.

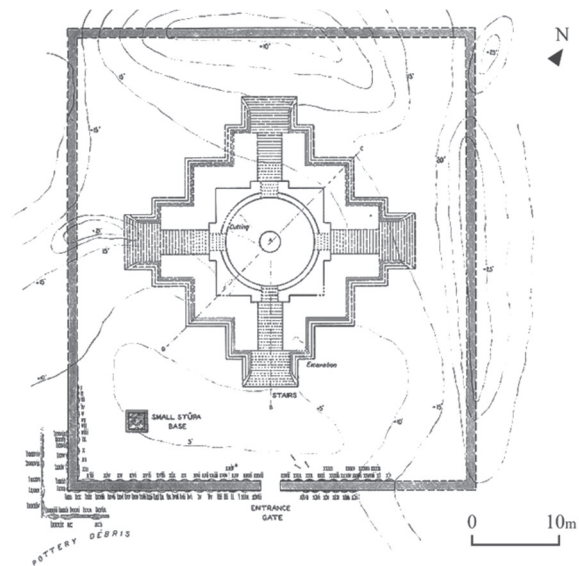


Figure 31. Plan of Rawak in Khotan (modified from Stein, 1907, fig. XL)

The cruciform stupa was built in the center of the courtyard surrounded by double boundary walls.

It is thought that it was constructed in the 3th to 5th centuries.

The statues were attached onto the internal and external boundary walls so that statues face to the corridor surrounded by walls.

The inside wall is the short side 33.5m and the long side 40m.

The boundary wall has the deep relations with the cruciform-shaped stupa.



Figure 32. Main Stupa of Rawak

The foundation was approximately 24 square meters and 9.5m in height. Long stairs with 12m spread out in every direction from the central stupa. The width of stairs is 4.3m.

Schema	Architectural Spatial Components	Applicable Remains
[13]		<ul style="list-style-type: none"> • Bhamala A.D.4-8c • Parihasapura A.D.7c • Rawak A.D.3-5c • Shahri-Bahlol Site G A.D.2c-8?

Figure 33. Architectural Spatial Components of Schema [13] and the Remain Concerned

The spatial components are as follows: 4. cruciform base, 3. circular base, 5. mound, 6. drum, 7. stairways. Refer to Figure 2 about the number of the components.

The stupa of Qocho City in Xinjiang Uighur had a form by which cruciform-shaped layers with projection were piled onto a circular base and a square base. This stupa was excavated and documented by Oldenburg (Figure 34). Unfortunately it is impossible to confirm the top of them, but it is thought the development type of the form with a base which attached convex corners in four directions, for example, Bhamala and Rawak. However, the stupa was placed next to shrine there, and stairs were not established (schema [14]).

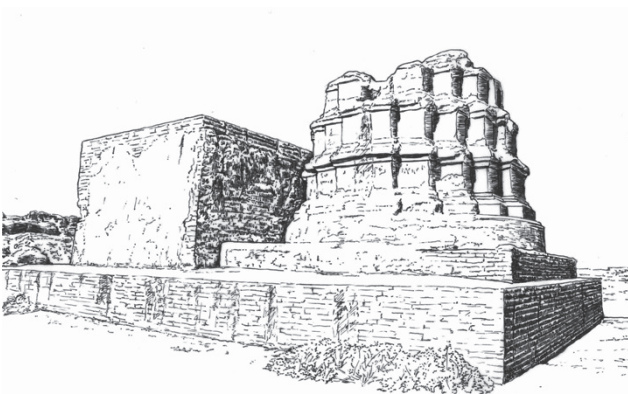


Figure 34. Stupa at Qocho City(southeast minor temple)

It is thought with the construction of from 5th century to 7th century. This stupa is the form that piled the cruciform layers on the square base and circular base. The stairs to access the stupa directly were not seen. The quadrangular shrine is next to the north side of this stupa.

Schema	Architectural Spatial Components	Applicable Remains
[14]		<ul style="list-style-type: none"> • Qocho City A.D.5c-14?

Figure 35. Architectural Spatial Components of Schema [14] and the Remain Concerned

The spatial components are as follows: 4. cruciform base, 3. circular base, 4. Square base, 13. niche. Refer to Figure 2 about the number of the components.

At Yar City, which was also excavated by Oldenburg, there was a great stupa with a higher and more sophisticated base (Figure 36). Close to the longer side of the highest tower of the central foursquare plan, four towers with square plans of approximately the same area soared into the sky. This configuration gave the viewer a feeling of the direction of the sky. It is a very symbolic form and has no directionality of east, west, north, and south. It was presumed that there was a circular base, drum and mound in the upper parts of this high cuboid stupa based on photographs and record by Oldenburg. One hundred small stupas formed an orderly line around the main stupa. This spectacle may have presented dynamic effect, giving worshippers solemn feelings.



Figure 36. Stupa at Yar City

This huge stupa is believed to be built between 5th and 7th centuries in the most western part of Yar city. There were stairways in every direction.

Four cuboid towers were built along the high cuboid centered-tower. It is the symbolic form letting us feel the axuality to the upward. Around the main stupa, a hundred small stupas form in an orderly line. It can be assumed that it is the last arrival point of the bases, by the high stratification and increasing in the size.

Schema	Architectural Spatial Components	Applicable Remains
[15]		<ul style="list-style-type: none"> • Yar City A.D.5c-14?

Figure 37. Architectural Spatial Components of Schema [15] and the Remain Concerned

The spatial components are as follows: 2. cruciform base, 5. mound, 6. drum, 7. Stairways, 11. square pillar. Refer to Figure 2 about the number of the components.

Based on the above considerations, we conclude that stupas transformed in the following way: the base of the stupa was changed to cruciform from circular or square shape, and became higher. Therefore, the form of the stupa transformed from a simple plan to a sophisticated plan. In addition, the axially of the vertical direction rising up into the sky was created because the drum was given by changing the form of the base from a circle

into a square. At the same time, the stupa with the mound putting on the circular base has changed to the stupa having the drum. The verticality of stupas was emphasized afterward by raising the base higher and increasing the sizes of stupas themselves. It may also be said that the surfaces of the stupa came to be decorated with Buddhist statues and other sculptures, pilasters, friezes and cornices, using various techniques (Figure 38).

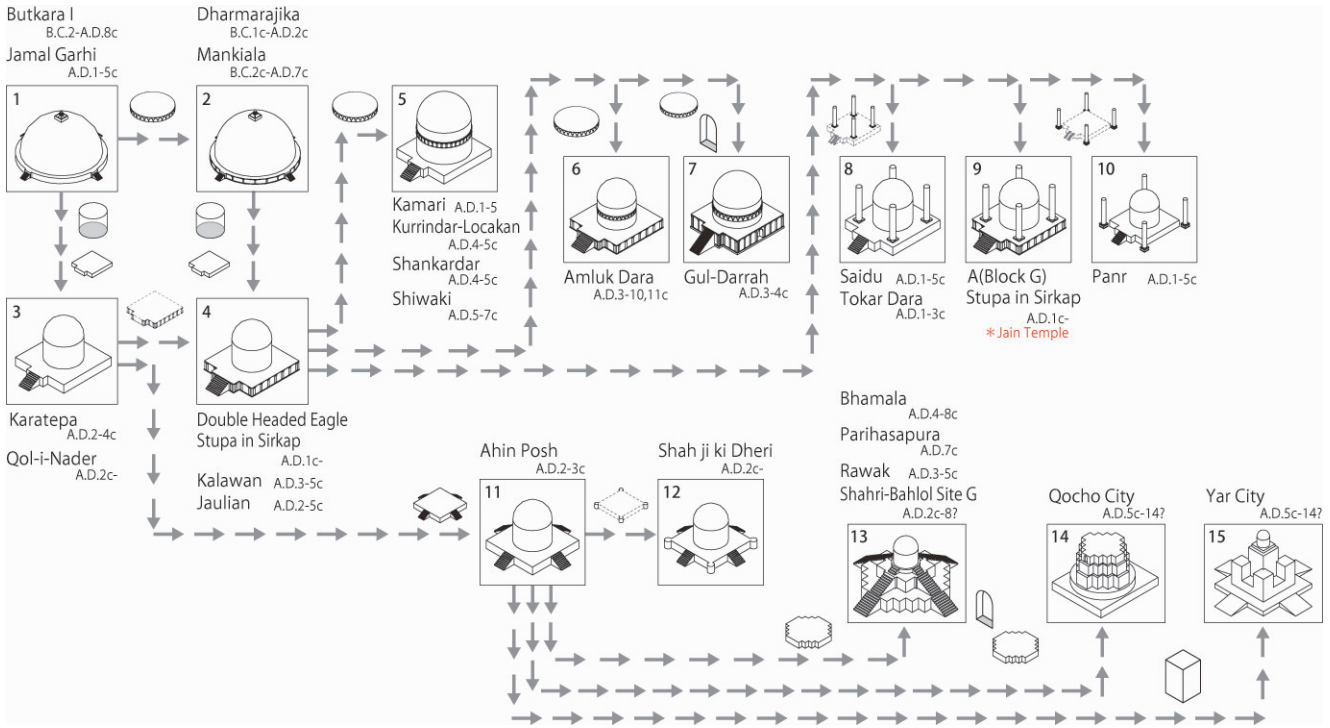


Figure 38. Transportation of Stupas

The primitive stupa with the mound built on the circular base, had transformed into the stupa which the mound built on the drum and the square base, and were given the high degree of decorativeness. The stupa had changed into cruciform plan between around 7th and 8th century, and became high stratification and increased in the size.

5. Conclusion

The final goal of our study is to establish a new method in for clarifying the architectural spatial compositions of Buddhist temple remains in Central Asia, treating these remains as an architectural space and considering about their transformation by modeling their spatial compositions.

As the first stage of this project, we were able to propose types of the spatial composition according to 4 functions (stupas, shrines, monasteries and other types of complexes) using visual techniques. The spatial composition of Buddhist temples in a wide area were analyzed and schematized using this method. Furthermore, we examined stupas, which are the most important constructions in Buddhist temples, and described their transformation with respect to their forms based on previous studies with drawings and sketches which were used in support of our consideration. Schematizing the spatial composition provides us with a common understanding of the visual transformation of temples. Moreover, this method can consider the transformation of the spatial compositions, Buddhist temples in this study area as well as of other areas. The method constitutes effective way to gauge cultural interchange with other areas.

In the future, when we schematize the spatial composition, we will closely re-examine that we express what kinds of component as schema and omit it, and arrest it as a common component. Because there is the possibility may overlook the

thing which is an important component when we consider the transformation. The extraction of the architectural spatial components targeted remains provides valuable knowledge for clarifying the sorts of transformations through which the Buddhist architecture passed. Applying this knowledge, we will consider the transformation of Buddhist spatial composition from the viewpoint of the architectural spatial components in the future. In addition, we are planning to consider the temples that we were unable to treat in this study as well as shrines, monasteries and other types of complexes, for schematizing their spatial transformation processes.

Endnotes

1. Central Asia: We defined that it includes East-West Turkestan, Afghanistan and the northern part of Pakistan.
2. Refer to the references from No.21 to No.26 about the documents by Kyoto university expeditions.
3. Refer to the references from No.27 to No.29 as to the main book of Kuwayama about the transformations of Taxila and Gandhāran temples.
4. Refer to the references No.14 and No.15 about the chronology of masonry work in Taxila temple according to Marshall.
5. Refer to the references from No.16 to No.18 about the transformations of stupa plinths in Taxila, Gandhara and Swāt.
6. Refer to the references No.3and No.4 about the transformation of Gandharan temples by Kurt Behrendt. In addition, Behrendt lumps a

wide range of areas having the same cultural sphere together using expression called Greater Gandhāra, but Gandhāra generally points to the Peshawar basin in a narrow sense.

7. Gumbat, Ak-Besim and Miran etc. Conversely, as for the building which we judged to be irregular, and having the character that was different from the tide, we did not schematize it (e.g. Butkara III etc.).
8. We schematized them with omitting Torana and Vedika.
9. We schematized them with omitting Chatra, Harmika and Yasti. Because it is rare that the upper parts of the drum have been preserved, also the details of them were missing. We did not schematize Vedika for a similar reason either.
10. Refer to the reference No.11 about the report of the temples in Kābul where the French expedition performed excavation in recent years.
11. Barrel vaulted niche : the niche having the pointed arch that the top became narrower / Trapezoid niche : the niche which the upper side is shorter than the downside

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