LOST KINGDOMS

HINDU-BUDDHIST SCULPTURE OF EARLY SOUTHEAST ASIA

John Guy

With essays by

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Stone Types and Sculptural Practices in Pre-Angkorian Southeast Asia

Federico Carò and Janet G. Douglas

Early Khmer sculptures of divinities in the round were typically carved from stone material whose aesthetic attributes, such as color, texture, and capacity to attain a polish, were favored at least until the ninth century. Moreover, from the sixth to the ninth century, except for rare exceptions,[1] the stone selected to represent gods was consistently different from that used for architectural and decorative elements, such as cladding slabs and steles. Technical observations also show that statuary stone continued to be different during the Angkorian period, from the ninth to the fifteenth century—a distinction that supports the idea that this could have been a deliberate choice.[2] Although it would be easy to interpret these differences solely on the basis of geographical circumstances, that approach may be too simplistic, especially in the complex case of pre-Angkorian sculpture production.

At first glance, the number and typologies of stone materials used by the Khmers, compared to other ancient cultures, seem relatively straightforward.[3] Khmer sculptures in the round were made almost exclusively of sedimentary rock, mainly sandstone, and sedimentary rock predominates in architectural production as well.[4] However, a close analysis reveals a wide variety of sandstones, sometimes subtly differentiated, which may reflect geographical, political, cultural, artistic, and technical factors, possibly evolving over time.

Sandstone is composed of an assemblage of mineral grains originating from the disaggregation of preexisting rocks whose fragments were transported, deposited, compacted, and cemented through geological processes. Widely represented and exposed in present-day Cambodia, Thailand, Vietnam, and Laos,[5] sandstone has been used for temples and sculptures since pre-Angkorian times.[6]

Analytical methodologies can help determine geological and geographical origins, usage by early Khmer artisans, and patterns of trade of stone materials in Southeast Asia. Among the available techniques is petrographic analysis, the study of the mineral content and texture of rocks through microscopic examination of thin sections.[7] It has been used by scientists to characterize, for conservation and provenance purposes, architectural stone employed in Angkor and more generally in the Khmer Empire.[8] Similarly, petrographic studies of Khmer sculptures of divinities include surveys of pre-Angkorian to post-Angkorian works[9] as well as analysis of productions more restricted in time and space.[10]

According to the limited petrographic data on pre-Angkorian sculptures in the round, mostly collected from well-provenanced works in the National Museum of Cambodia, Phnom Penh, and the Musée Guimet, Paris, the majority of these sculptures were produced from compositionally and texturally immature sandstones[11] of similar characteristics.[12] Macroscopically, these sandstones appear compact and dark in color, ranging from gray to green. Some clearly exhibit poorly sorted[13] texture, being flecked with visible angular black grains and tabular white grains. Many surfaces bear traces of a highly polished finish. While these sandstones have similar characteristics, detailed examination reveals slight variations that suggest a complex scenario in which various geological and geographical sources coexisted for the selection of stone material for sculpting the pre-Angkorian gods.

The geological origins and quarry locations of the stone used for pre-Angkorian sculptures remain speculative, largely because detailed geological mapping and petrographic studies are still lacking. Available data, most collected during early field research in Cambodia (third quarter of 20th century),[14] point to a vast, heterogeneous, and poorly studied Triassic sedimentary sequence as the possible source of the favored sandstone types. Triassic sandstone and shale are exposed in several provinces in central, eastern, and southern Cambodia, such as Kampong Cham, Kratie, Kampong Thom, and Mondolkiri, and they are scattered in isolated outcrops in Kampong Speu and Takeo provinces, also in the south.[15] Triassic sedimentary rocks are present in northern Cambodia as well[16] and they extend into Thailand. To date, petrographic analysis of Triassic sandstones exposed in Kampong Speu and Takeo appears to exclude these provinces as sources for pre-Angkorian sculptures of divinities.[17] Altogether, the existing data indicate that the Triassic sedimentary sequence overall is heterogeneous and that it includes numerous types of sandstone varying in their composition, texture, and diagenetic history.

While the Triassic sandstone formations are the most likely source of pre-Angkorian sculptural material, other possibilities, such as Devonian sedimentary formations in southern Cambodia and Vietnam, are being investigated.[18] On the other hand, the provenance of sandstone used for architectural elements is better understood, having been identified as sedimentary formations of the Jurassic and Cretaceous periods.[19]

Current research aims to characterize the stone used in pre-Angkorian and Angkorian sculptures in museums and archaeological excavations as well as that found in natural outcrops and possible quarries. The research, when supported by archaeological and art-historical findings, will significantly enhance our knowledge of stone sculpture traditions during this early period of Khmer history.

For this exhibition and publication, petrographic analysis was performed on samples collected from twelve sculptures in cooperation with the National Museum of Cambodia, and the National Museum of Vietnamese History, Ho Chi Minh City.[20] The sandstones of two objects have been chosen to represent the two main traditions of pre-Angkorian sandstone carving: a standing Viṣṇu, a sculpture in the round that would have occupied the central position in a pre-Angkorian shrine; and a lintel, an architectural element typically located above a temple's entryway.

Opposite: *Devī*, probably Umā (detail of cat. 94)

Standing Viṣṇu

The late fifth- or early sixth-century representation of Viṣṇu (cat. 57) from Tuol Koh, Takeo province, southern Cambodia, is made of sandstone with a composition and texture very similar to that of other pre-Angkorian sculptures in the present publication that have been studied, such as a seated Buddha from Angkor Borei (cat. 43). It is composed primarily of fine-grained (average grain size 0.18 mm), poorly sorted grains of quartz, feldspar, and lithic fragments varying in shape from subrounded to angular (fig. 148A).

About 30% of the grains are quartz, in both monocrystalline and subordinate polycrystalline varieties. Feldspar grains—about 36% of the framework—are primarily plagioclase and rare alkali feldspar; they are mostly weathered and often replaced by calcite. Lithic fragments (34%) are mainly volcanic rock and subordinate metamorphic and fine-grained sedimentary rocks. In this sample, volcanic lithic fragments show characteristic microlithic texture, with feldspars and opaque minerals dispersed in a vitreous groundmass. Often such fragments of volcanic rocks are altered, and the groundmass is devitrified and replaced by chlorite. Accessory minerals are abundant epidote, apatite, clinopyroxene, titanite, rutile, ilmenite, zircon, and iron oxides. Secondary calcite, replacing other grains and filling the pore spaces, is particularly abundant in this sandstone (fig. 148B); the presence of other authigenic minerals, such as chlorite, epidote, and sericite, suggests a minor degree of incipient metamorphism.

Most of the other stone samples from sculptural deities share a similar petrography and diagenetic history, which places them among compact, immature sandstones rich in volcanic lithic fragments and most likely belonging to the Triassic sandstone formations of Cambodia. However, within this group, variation in composition and texture can be noticeable, as in the stone of the standing Buddha from Tuol Ta Hoy (cat. 50), which is very fine grained (average grain size 0.13 mm) and particularly poor in lithic fragments (12%) when compared to the average composition of the studied sculptures.

Only two sculptures studied to date, a Śiva (cat. 96) and a representation of Śiva's footprints (*śivapāda*; cat. 83), both from northern Cambodia, were made with sandstone from the same Jurassic formation, which was exploited intensively for building purposes during the Angkor period.

Lintel with a King's Consecration

The lintel showing a king's consecration (cat. 88), from Kampong Svay district, Kampong Thom province, central Cambodia, is dated to the mid-seventh century. The stone is a typical example of the Upper Jurassic–Cretaceous quartz-rich sandstone used for decorated lintels and ornamental elements in pre-Angkorian brick temples as well as later Angkorian monuments. The light brown quartz arenite has well-sorted fine grains (average grain size 0.21 mm; fig. 149A), the majority (about 85%) of which are quartz, with subordinate feldspar (5%) and lithic fragments (10%). The grains, which range from subrounded to subangular, are cemented by abundant authigenic quartz and kaolinite (fig. 149B). A thin layer of reddish iron oxides and hydroxides often coats the grains. The few lithic fragments are composed of aphanitic volcanic rock, low-grade metamorphic rock, and argillaceous mudstone, often deformed and squeezed between other grains to produce a fine-grained matrix. The scarce accessory minerals include epidote, apatite, zircon, ilmenite, rutile, and iron oxides. A similar light brown quartz arenite, although poorer in lithic fragments, was used for the lintel in the style of Sambor Prei Kuk in the Metropolitan Museum's collection (cat. 18).

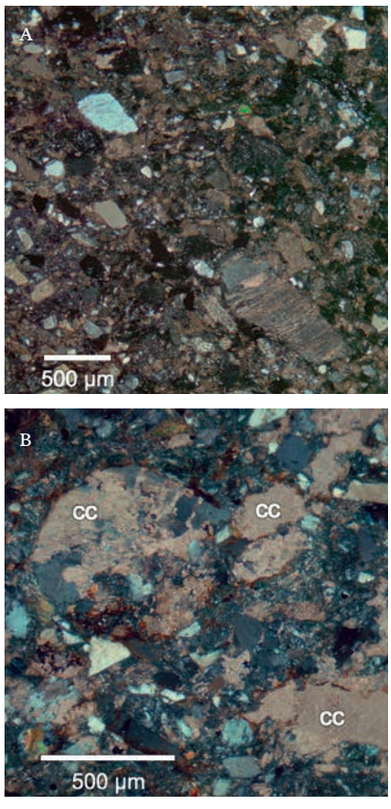

Fig. 148A: Thin-section micrograph of sandstone from standing Viṣṇu (cat. 57). Note heterogeneity of composition and size of constituent grains. 148B: Detail of sandstone from standing Viṣṇu showing abundant calcite (cc) replacing feldspar grains and filling pore spaces. Images were taken with a petrographic microscope with crossed polars.

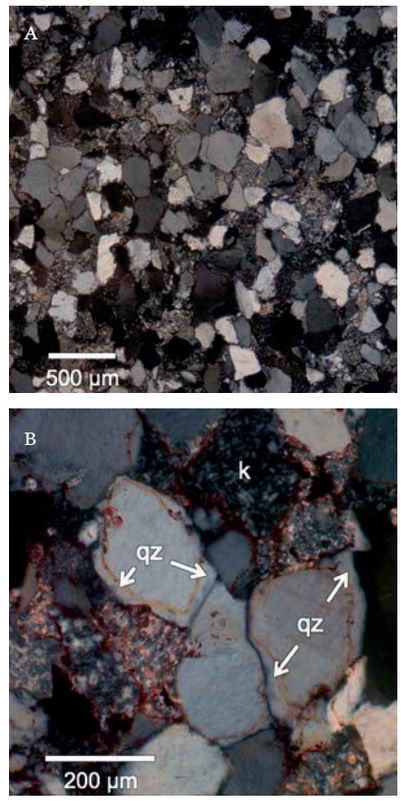

Fig. 149A: Thin-section micrograph of sandstone from lintel with a king's consecration (cat. 88). The grains are well sorted and mostly constituted of quartz. 149B: Detail of sandstone from the same lintel showing quartz (qz) grains cemented by authigenic quartz (arrows) and kaolinite (k). Images were taken with a petrographic microscope with crossed polars.

literature. For a detailed discussion of these objects, see Piriya Krairiksh 1974b; Murphy 2010. For an overview of their distribution throughout northeastern Thailand and central Laos, see Murphy 2013. For examples from early Cambodia, see Boulbet and Dagens 1973.
3. Phonpha Laosirinat and Suthilak Chaisot 1974, p. 383. See also Woodward 2003, pp. 108–12, pl. 27.
4. For a fuller discussion of this phenomenon in northeastern Thailand, see Murphy forthcoming.
5. Phasuk Indrawooth 2001, p. 104.
6. Khemica Wangsuk 2000, pp. 42–43.
7. Ibid., p. 45, defines this as a *vihāra*; however, because of the presence of *sema* stones, I argue that it is, in fact, an *ubosot*; see Murphy forthcoming.

V. SAVIOR CULTS

THE TRANSFORMATION OF BRAHMANICAL AND BUDDHIST IMAGERY IN CENTRAL THAILAND, 600–800

1. In *kaṭakamudrā*, the index finger and thumb form a ring shape, and the other three fingers fold downward. This hand gesture is also known in Sanskrit as *ābūyavaradamudrā* or *ābūyamudrā*.
2. Because this region was badly affected by malaria, high officials from Bangkok avoided travel to Phetchabun. As minister of the interior, Prince Damrong Rajanubhab was curious about the region and visited it on February 4, returning to Bangkok on February 25, 1904.
3. For more information on Si Thep, see Fine Arts Department 2007b.
4. No report of this excavation has been published. The archaeological mound was looted in the late 1960s, and it is believed that a large stone Buddha now in the Norton Simon Museum, Pasadena, came from this area.
5. Woodward 2010b, p. 91.
6. Santi Leksukhum 2009, pp. 130–31.
7. H. G. Quaritch Wales believed that Si Thep was part of the "imperial trade route" that linked the Chao Phraya River valley (Lavapura) in mainland Thailand with the Khong River (Khong Chiam) in the peninsula. H. G. Quaritch Wales 1969, p. 81.
8. For more information, see Chaem Kaewkhlai 1981; Brown 1996, p. 37; Pattaratorn Chirapravati 1994, p. 377.
9. Damrong Rajanubhab 1974, pp. 145–73. This Sūrya is the only image that seems to be in high relief rather than fully in the round. This feature may indicate that it was attached to or placed on a wall or niche in the original structure.
10. During excavations at Si Thep in January 2013, a recovered fragmentary stone image of a male torso, h. 31½ inches (80 cm), was identified by the Fine Arts Department, Thailand, as Viṣṇu. *Bangkok Post*, March 30, 2013.
11. Skilling 2009c, p. 460.
12. Fine Arts Department 2007b, pp. 145–59.
13. Begley 1973; K. Bhattacharya 1961b, p. 22.
14. H. G. Quaritch Wales 1969, p. 82.
15. Sph 3/K.964; see Skilling 2003, p. 105.
16. For more information, see Skilling 2011.
17. Buddhas at Si Thep also range from 55 to 99 inches (140–250 cm).
18. Skilling 2009c, p. 460; Pal 2004a, p. 112.
19. Banejia 1985, p. 440, n. 3.
20. For more on Dvāravatī art, see Brown, "Dvāravatī Sculpture," in this volume.
21. Piriya Krairiksh interprets these figures as Vāmana, an incarnation of Viṣṇu; see Piriya Krairiksh 2012, pp. 109–10. However, similar depictions of dwarfs are common motifs adorning the bases of Buddhist monuments, such as those at Si Thep and Khu Bua.
22. For more information on *dharmacakra*s, see Brown 1996.
23. For more information on this subject, see Nandana Chutiwongs 2002, pp. 208–10; Rungrot Thammrungrueag 2009, pp. 83–87.
24. Brown 2011b, p. 23.
25. Brown 2011b.
26. Banejia 1985, p. 432.
27. Brown 1996, p. 171.
28. The double *vitarkamudrā* commonly appears on standing Buddha images from the eighth century in the Dvāravatī region. Ibid., p. 83.
29. Woodward 1997, p. 48.
30. Woodward 2003, p. 69.
31. Ibid.
32. Ibid., p. 71.
33. Ibid., p. 94.
34. Fine Arts Department 2009, pp. 46, 48. In Sri Lanka, bodhisattva images also hold their hands in this gesture.
35. Prematilleke 1995, pp. 156–59.
36. For more information, see Pattaratorn Chirapravati 2012.
37. Skilling 2009, p. 111.
38. Woodward 2003, pp. 105–6.
39. Khao Thamorat differs from other Dvāravatī caves in central Thailand, such as Khao Ngu, Ratchaburi province, and Tham Phra Phothisat, Saraburi province, where the main Buddha images are portrayed in a pendant-legged position with hands in the teaching gesture.
40. Pattaratorn Chirapravati 2012.

APPENDICES

STONE TYPES AND SCULPTURAL PRACTICES IN PRE-ANGKORIAN SOUTHEAST ASIA

1. To date, only three examples of well-provenanced pre-Angkorian sculptures have been determined to be carved from the same stone used for building purposes. One of them, the Harihara from Ashram Maha Rosei now at the Musée Guimet, was analyzed by Christian Fischer, as reported in Douglas, Carò, and Fischer 2008. The remaining two, both in the collection of the National Museum of Cambodia, are illustrated in this publication (cats. 83, 96).
2. Delvert 1963.
3. See, for instance, the work on Indian stone sculptures in Newman 1984 and the review of stone materials of ancient Egypt in R. Klemm and D. D. Klemm 2008.
4. There are only a few known sculptures in materials other than sandstone, such as shale (sedimentary) and slate (metamorphic); these rocks were usually employed for doorjambs, sills, and steles because they are easily split into slabs and can be incised in great detail. Basalt and microgranite were also occasionally used for architectural elements.
5. Workman 1977.
6. Jessup and Zéphir 1997.
7. A petrographic thin section is a slice of rock about 30 µm thick mounted on a glass slide, which may be analyzed by means of a petrographic microscope. Because the rock is sliced so thin, light can be transmitted through its constituent minerals and will interact with them, thus permitting their identification on the basis of characteristic optical properties such as relief, color, pleochroism, and birefringence. The petrographic study of sedimentary rocks, such as sandstone, includes evaluation of the mineralogy and abundance of the constituent grains; description of textural features such as grain shape, size, and spatial arrangement; and identification of the natural cementing material that binds the grains.
8. Saurin 1954; Delvert 1963; Uchida Etsuo, Ogawa Yoshinori, and Nakagawa Takeshi 1998; Kučera et al. 2008; André et al. 2011.
9. Baptiste et al. 2001; Douglas 2004; Douglas, Carò, and Fischer 2008.
10. Newman 1997; Douglas and Sorensen 2007; Carò and Douglas 2013.
11. A sandstone is said to be immature when the deposition of its constituent grains occurred quite rapidly and relatively near the parent rock source. These poorly sorted sandstones, often rich in unstable minerals and lithic fragments of variable size, are also called by the generic designation "graywacke."
12. Newman 1997; Douglas, Carò, and Fischer 2008.
13. Sorting is the measure of the dispersion of the sandstone grain size around the average. A sandstone with grains of uniform size is said to be well sorted, while it is poorly sorted when their size is extremely variable.
14. Saurin 1954; Delvert 1963; Contri 1973.
15. Dottin 1972; Dottin 1973.
16. Contri 1972.
17. Douglas, Carò, and Fischer 2008.
18. Christian Fischer, personal communication, 2012.
19. These sandstones vary in composition from quartz arenite to feldspathic arenite and are thought to belong to the Terrain Rouge (Lower–Middle Jurassic) and Grès Supérieurs (Upper Jurassic–Cretaceous) formations of Cambodia. See notes 8–10 for related bibliography.
20. The authors are particularly grateful to Oun Phalline, former director of the National Museum of Cambodia, Phnom Penh; to H. E. Hab Touch, director general for Museums, Antiquities and Monuments, Ministry of Culture and Fine Arts of Cambodia; and to Chhay Visoth, National Museum of Cambodia, for the generous help and valuable support that made this study possible. We are also indebted to Bertrand Porte, sculpture conservator, École Française d'Extrême-Orient (EFEO), for providing the samples collected from pre-Angkorian sculptures at the National Museum of Cambodia and for sharing information about the sculptures included in this study. We thank Tran Thi Thuy Phuong, former director of the National Museum of Vietnamese History, Ho Chi Minh City, for allowing us to study pre-Angkorian sculptures from southern Vietnam. Christian Fischer, research associate at the Cotsen Institute of Archaeology, University of California, Los Angeles, kindly shared the results of his ongoing scientific research on pre-Angkorian stone sculpture and provided insights into the current state of knowledge regarding early Khmer stone traditions.