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A UNIQUE SUN-FACING ROCK-CUT FEATURE AT BADAMI, KARNATAKA, INDIA

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Abstract: Badami in the valley of the Malaprabha River in northern Karnataka state of India was one of the earliest nuclei of construction of temples in stone in southern India. Among the various stone monuments built at Badami and other centres in the Valley, are rock-cut as well as structural sanctuaries of the Hindu, Jain and Buddhist faiths. Though most of these monuments were executed during the rule of the Early Chalukyan Dynasty, during the sixth to the eighth centuries CE, there are later monuments too, erected even after Badami ceased to be a capital city at the end of Chalukyan rule.

In this paper, we examine one of the smaller rock-cut 'caves' at Badami and argue that it was intentionally aligned to receive the Sun's rays at sunrise on every day of the year. We examine the orientation of the excavation and verify the incidence of the rays of the rising Sun throughout the year. We examine the legend of a leper king (Koshtaraya) prevalent in the region and associated with an enigmatic image near the rock-cut cave, and we hypothesize on the creation of this unique Sun-facing rock-cut feature.

Keywords: Indian temple architecture, Badami Chalukya temples, rock-cut temples, Sun-worship, Surya, Sun-facing temples

1 INTRODUCTION

Badami, currently a town in the Bagalkot District of Karnataka State in India, was the capital of the Early Chalukya Dynasty during the sixth to eighth centuries CE. From this capital, known as Vatapi at that time, the Early Chalukya rulers controlled a large part of southern India for nearly two centuries. They also patronized the construction of monuments in stone, primarily Hindu temples, but with several Jain temples but very few Buddhist sanctuaries. Along with the dominions of the Pallava and Pandya Dynasties in present-day Tamil Nadu, the Badami region is one of the earliest centres of construction of stone monuments in southern India (Tartakov, 1980). The sites at Aihole, Pattadakal, Mahakuta and Badami, as well as several minor sites along a 35 km stretch of the valley of the Malaprabha River, hemmed in by low, flat-topped hills of sandstone (henceforth to be referred to as 'the Malaprabha Valley'), are important for the study of the origins of monumental architecture in stone in India. Monuments in the predominantly northern Nagara idiom of temple architecture as well as the predominantly southern Dravida idiom can be seen side-by-side (Figure 1) at sites like Pattadakal and Mahakuta in the Malaprabha Valley, as well as a local style of building dubbed the 'Malaprabha idiom' by George Michell (2014).



Figure 1: The group of temples at Pattadakal, featuring both Dravida and Nagara style temples (photograph: Srikumar Menon).



Figure 2: The rock-cut 'cave' temples at Badami (photograph: Srikumar Menon).

There have also been innovative attempts to fuse Nagara and Dravida idioms, like at the Papanatha Temple at Pattadakal (Hardy, 1995). Gary Tarr (1970: 155) considers the monuments of the Early Chalukyas as "… key surviving examples of the Hindu Temple from the period in which that form was evolving out of dependence of Gupta Buddhist forms." It is evident that a spirit of innovation and experimentation prevailed among the artisans of the Malaprabha Valley, who were arguably drawn from different parts of the subcontinent, and trained in different traditions of temple-building.

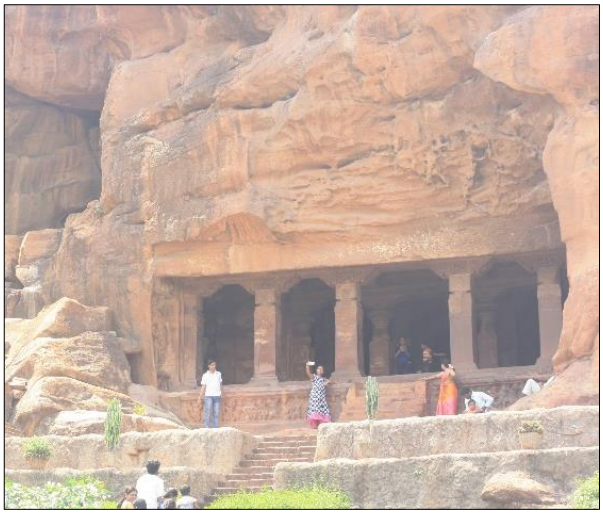
While it is the larger excavations and constructions of the Early Chalukyas that have engaged the attention of scholars given the sheer profusion of monuments which dot the Valley, this paper will focus on a small rock-cut feature, usually overlooked in discussions of Early Chalukyan architecture, which nevertheless is very important as possibly the very first among the Sun-facing stone temples of Southern India.

2 THE ROCK-CUT TEMPLES OF THE EARLY CHALUKYAS

Some of the earliest architectural ventures at Badami and Aihole were rock-cut sanctuaries (Figure 2) excavated into the sandstone cliffs that dominate the region (Tarr, 1970; Tartakov, 1980). These were large ventures, involving the excavation and removal of large masses of rock from the bowels of the living rock to create spaces for worship within. There are four rock-cut 'caves' at Badami, of which one is dedicated to the Hindu deity Shiva (Figure 3), two to the Hindu deity Vishnu, and one to the Jain tirthankara Mahavira. The largest excavation at Badami is Cave 3 (Figure 4) dedicated to Vishnu, which is dated by a dedicatory inscription to 578 CE (Padigar, 2012). The rock-cut temple at Ravulaphadi (Figure 5) at Aihole probably dates earlier (Michell, 2011; 2014). All these rock-cut temples feature carved columns and ceilings, and are profusely embellished with sculpture according to the iconographical programme associated with the deity enshrined in the sanctum at the focus.

2.1 Small-Scale Excavations of the Early Chalukyas

With an abundance of large, architectonically and sculpturally rich rock-cut temples engaging the attention of the scholars in the Malaprabha Valley, the smaller excavations of the Chalukyas, and their successors, are almost entirely neglected. However, they are quite important in understanding the evolution of rock-cut architecture in the region. For instance, Tarr (1970) opines that the small, simple, rock-cut shrine (Figure 6) to the left of the main Ravulaphadi rock-cut temple predates it. This is a simple,



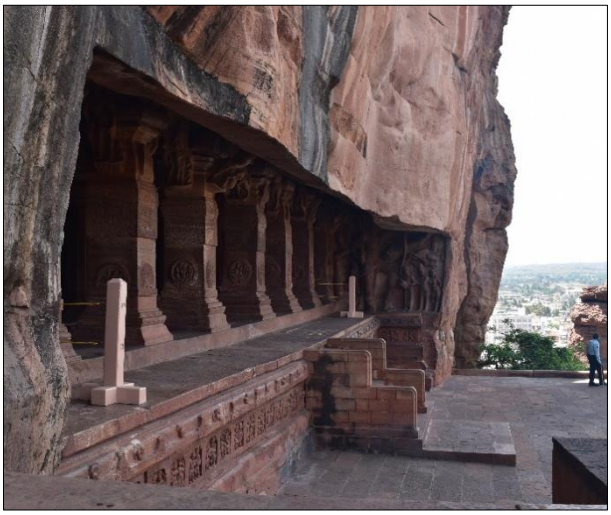


Figure 3 (left): Cave 1 at Badami, dedicated to the Hindu God Shiva (photograph: Srikumar Menon).
Figure 4 (right): Cave 3, dedicated to Vishnu, the largest rock-cut temple at Badami (photograph: Srikumar Menon).



Figure 5: The rock-cut temple at Ravulaphadi, Aihole (photograph: Srikumar Menon).

almost cubical excavation measuring 1.88 m × 1.9 m in plan, and 1.8 m high, in which a loose linga has been placed. There is no sculptural embellishment on any of the faces. One could even imagine that this was probably a test-excavation into the rock to test its soundness before embarking on the larger project, which was used as a small shrine later. There is another still smaller rock-cut feature (Figure 7) to the proper right of the main cave temple, measuring 1.0 m × 0.56 m in plan and 0.7 m high, in which again a linga is placed. In this case, a pedestal to hold the linga is carved into the rock on the floor of the excavation, signal-ling its intent to be used as a shrine.

There are small excavations at Badami, too. A small rock-cut shrine (Figure 8) excavat-ed into a cliff near the archaeological museum at Badami has sculptures of the Hindu deities



Figure 6: Small rock-cut shrine near Ravulaphadi rock-cut temple (photograph: Srikumar Menon).

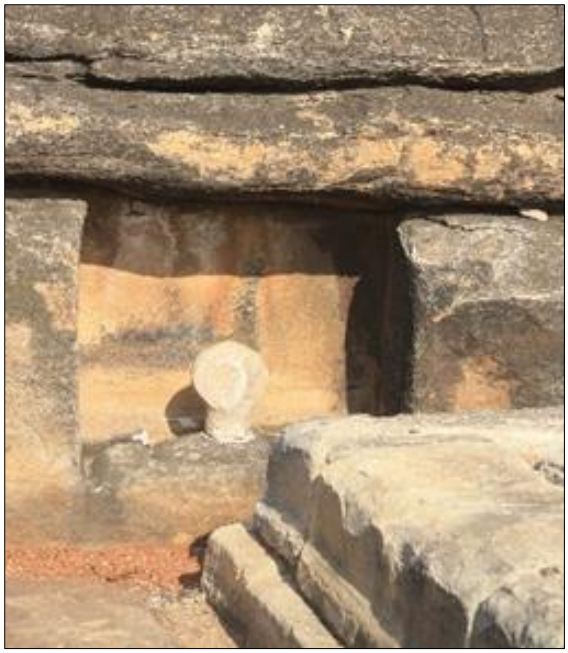


Figure 7: Another small rock-cut feature near Ravulaphadi rock-cut temple (photograph: Srikumar Menon).

Durga and Ganesha flanking the main cavity, which is unfinished. However, this small cave temple too has a pedestal to hold the deity carved into the rock which forms its floor. Soundara Rajan (1981) dates this small rock-cut temple to the end of the Chalukya reign or immediately succeeding it.

There is another small rock-cut cave (Figure 9) which is not mentioned in any of the literature on Badami, which some scholars have dubbed the 'Empty Cave' (Settar, 2016, private communication). This is at the base of a large boulder called Panchalinganaphadi, located to the east of the artificial water body known as Agastya Teertha, which dominates the landscape at Badami. It is this 'Empty Cave' that will be the focus of our attention in this paper.

2 The 'Empty Cave' in Panchalinganaphadi

To the east of the lake known as Agastya Tirtha is the Bhutnath group of temples consisting of a group of temples clustered around an eighth century Early Chalukyan temple known as Bhutnath or Bhuteshwara, dedicated to the Hindu deity Shiva. The Bhutnath Temple is scenically sited on a platform which projects into the Agastya Tirtha, and is surrounded by other shrines which were erected in later periods. However, the landscape nearby also contains other features which are not temples (Menon, 2017; Owen, 2021). Situated roughly 50 m to the southeast of the main Bhutnath Temple is a large boulder resting partly on the bank and partly projecting into the Agastya Teertha, easily noticed because of two shrines from the eleventh century CE which are perched on its top (Figure 10). This boulder, roughly 40 m at its longest and 30 m at its widest, and about 12–15 m high, must have sloughed off the edge of the sandstone massif situated more than 100 m



Figure 8: A small unfinished rock-cut cave temple at Badami (photograph: Srikumar Menon).



Figure 9: The 'Empty Cave' at Panchalinganaphadi, Badami (photograph: Srikumar Menon).



Figure 10: The large boulder called Panchalinganaphadi and the Bhutnath group of temples, viewed from the east (photograph: Srikumar Menon).

to its east, in the distant geological past. The boulder, locally known as Panchalinganaphadi, possibly because of five lingas (emblems of Shiva) which are located in and around the shrines situated on it, has been the focus of much attention of artisans from the Early Chalukyan as well as later periods. Though the most arresting feature associated with the boulder is the pair of temples built on top of it in the eleventh century CE, there are several other features on it. There is a large image of Vishnu resting on the serpent Ananta carved at the base of its south-eastern side, enclosed in a shrine of the twelfth century CE (Figure 11). The north-eastern face of the boulder, as well as the north-eastern face of a cleft running



Figure 11: A twelfth century CE shrine to Vishnu at Panchalinganaphadi (photograph: Srikumar Menon).

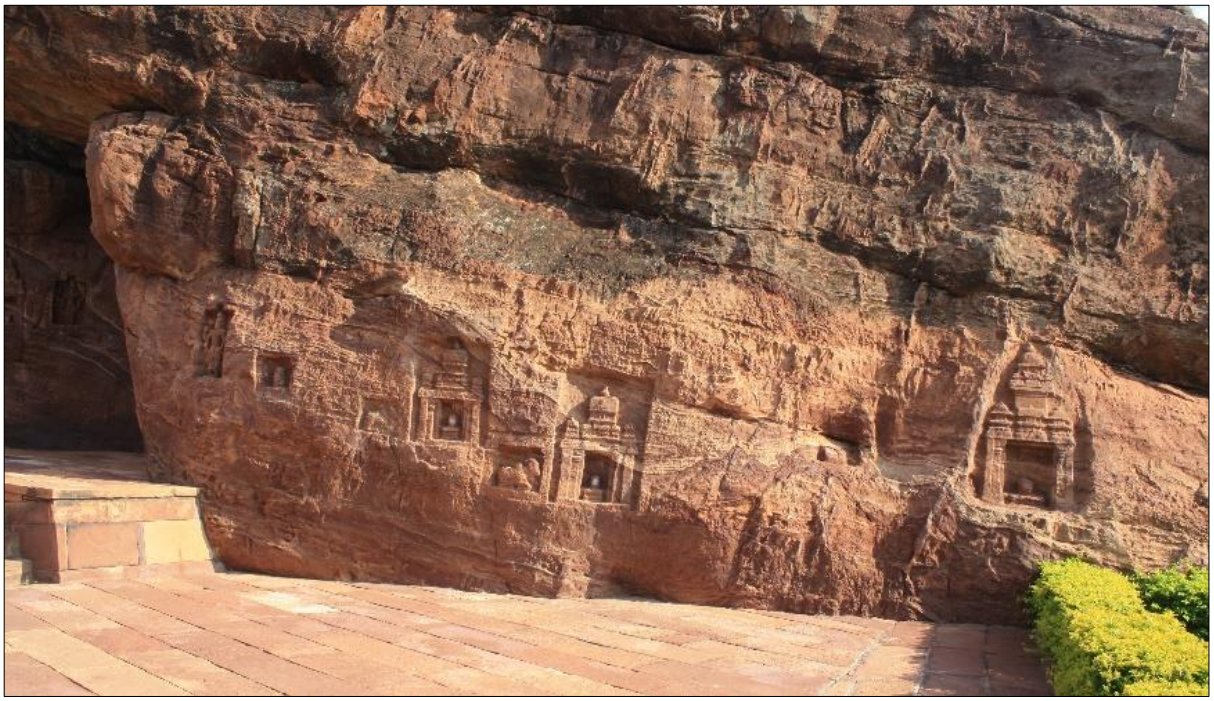


Figure 12: Relief carvings of shrines on Panchalinganaphadi (photograph: Srikumar Menon).

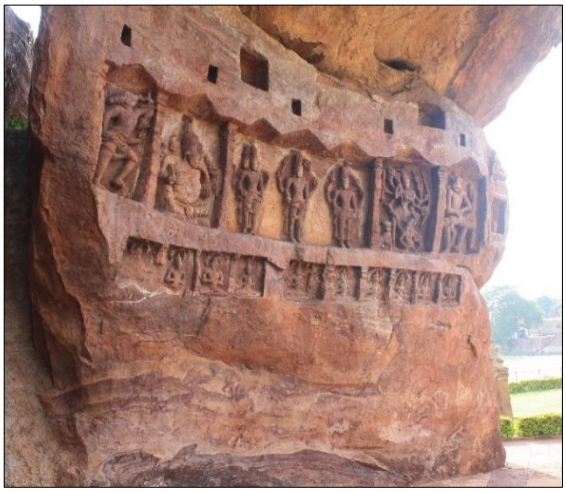


Figure 13: Large panel of carvings of Hindu deities on Panchalinganaphadi (photograph: Srikumar Menon).



Figure 14: A close-up view of the Empty Cave at the base of the eastern face of Panchalinganaphadi (photograph: Srikumar Menon).

through it in the east are covered with carvings of small shrines in shallow relief, enshrining both Shiva lingas and Vishnu images (Figure 12) from the Early Chalukyan period. These carvings have been interpreted as commemorative devices, celebrating the memory of deceased persons by Menon (2017). On the north-western face of the boulder bounding the cleft is a large panel of Hindu divinities carved high on the rock (Figure 13).

At the base of the eastern face of Panchalinganaphadi is the small excavation into the rock called the 'Empty Cave'. It is 1.9 m wide, 0.9–1.3 m deep and 1.2 m high (Figure 14). Carved as it is on the convex bottom part of the boulder, it is not exactly cubical or cuboidal in volume, the inner face being 1.5 m wide, and the outer width being 1.9 m. The inner face is 1.18 m high, while the height of the outer aperture is 1.28 m. The proper right edge of the cave is 0.9m wide at its widest and the proper left edge is 1.13 m wide at its widest. There is no deity enshrined in the cave or any provision such as a pedestal made for it, but there is a circle painted in red ochre on a whitewashed background in the centre of the inner rear face. This is clearly visible in Figure 14. However, the cave does not seem to be unfinished like the one shown in Figure 8 since it does not have tooling marks, and the surfaces are smoothly finished. There are pilasters carved on both inner corners, with brackets, giving the impression of supporting carved beams which ran on all three sides of the cave. Padigar (2023, priv-



Figure 15: View towards east from within the Empty Cave (photograph: Srikumar Menon).

ate communication) believes that this does not belong to the Early Chalukyan period, based on the form of the pilasters and the brackets. However, the chronology will have no bearing on the arguments advanced in this paper.

There is a local legend which avers that the rays of the rising Sun fall on the rear face of the cave every day of the year (Menon 2017; 2019). The ochre circle is indicative of a Sun-symbol (Shrivastava, 1972), lending credence to this story. Since it is unlikely that the finished cave was meant to enshrine any idol and that the painted Sun-symbol is possibly the deity, it was decided to verify if this claim is true, and the monument might be a shrine to the Sun.

2.1 Sun-Studies at the 'Empty Cave'

It was found that the Empty Cave faced towards cardinal east. Since the cave is splayed in plan—with the outer aperture wider than the inner rear face, it is difficult to give an exact azimuth for the direction it faces. The proper right edge of the cave has an azimuth of 94° and the proper left edge 91°. However, the ridge of a large sandstone massif obscures the horizon to the east (Figure 15). Thus, the rays of the rising Sun can fall on the cave only after the Sun rises over the cliff. The distance from the front of the Empty Cave to the base of the cliff in the east was determined to be 130 m and the height of the cliff roughly 45–50 m above the level of the cave. This arrangement was simulated in the architectural software ArchiCAD for sunrise on the equinox as well as solstice days. It was found that the cave was fully lit by the Sun's rays on equinox days (Figure 16), while it was partially lit even during the solstices (Figures 17 and 18). During the summer solstice, even during maximum illumination, the northern part of the cave is not lit by the Sun's rays (Figure 17), whereas during the winter solstice it is the southern part of the cave which is not lit (Figure 18).

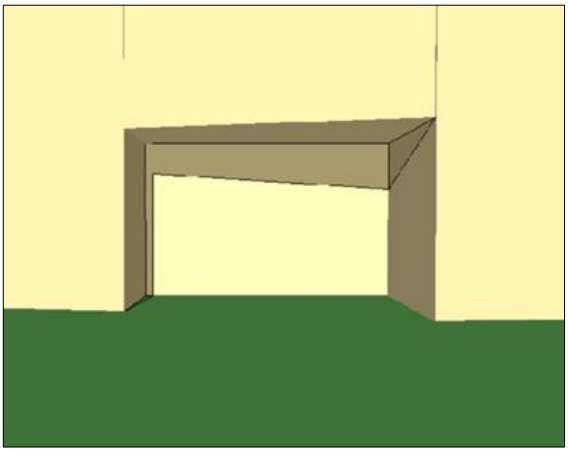
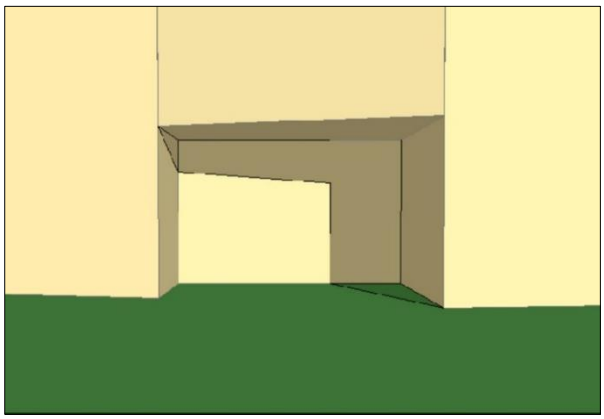


Figure 16: Showing maximum solar illumination of the Empty Cave at sunrise on the equinoxes (photograph: Srikumar Menon).



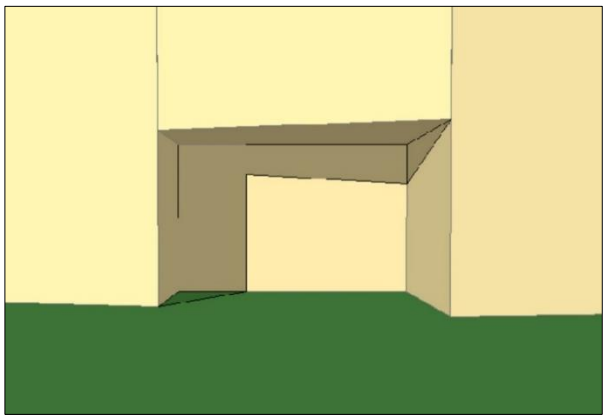


Figure 17 (left): Showing maximum solar illumination of the Empty Cave at sunrise on Summer Solstice (photograph: Srikumar Menon).
Figure 18 (right): Showing maximum solar illumination of the Empty Cave at sunrise on Winter Solstice (photograph: Srikumar Menon).

Meanwhile, a visit conducted during 31 May 2018 showed clear agreement between the simulated result for shadow pattern at 07:00 am (Figure 19) and the observed pattern (Figure 20). The cave and its surroundings were also photographed from the slopes below the cliff in the east on 27 March 2023, a week after the equinox. Although the local sunrise was at 06:27 am (IST), the boulder lay in darkness due to the intervening mass of the sandstone cliff. Only by 8:00 am did the rays of the rising Sun strike the top of tower of the shrine built on the boulder (Figure 21). At 8:20 am, the Sun's rays painted the back wall of the cave (Figure 22). The first glimmer of light falling on the cave wall strengthened to a definite light and shadow pattern seconds later. The reverse view taken from within the cave at 8:37am shows the Sun well over the ridge in the east (Figure 23), and the equivalent shadow pattern for 8:37am is shown in Figure 24.

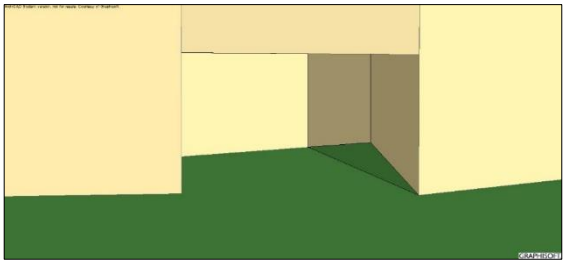


Figure 19: The simulated result for shadow pattern in the Empty Cave at 07:00 am on 31 May (photograph: Srikumar Menon).



Figure 20: The observed shadow pattern in the Empty Cave at 07:00 am on 31 May, 2018 (photograph: Srikumar Menon).

Due to the curved nature of the eastern face of Panchalinganaphadi, it is clear that the location of the Empty Cave is the only spot where such an excavation which can receive the rays of the rising Sun could have been made. Hence, it is rather obvious that the intent of the cave's creators was indeed to catch the rays of the rising Sun. Also, the dimensions of the cave ensure that at least some part of the cave is illuminated during even the extreme northerly and southerly risings of the Sun on the summer and winter solstices, respectively.

2.2 Clues from Iconography—The Testimony of Images in the Vicinity

As mentioned earlier, the boulder known as Panchalinganaphadi, as well as its vicinity, are rich in carvings and imagery. Here, we draw attention to two sculptural panels located very close to Panchalinganaphadi.

2.2.1 The Images of Surya and Ganesha

Located roughly 45 m to the southeast of the Empty Cave is another smaller boulder, on the base of which is an unfinished sculptural panel (Figure 25). This panel, which is around 1.5 m wide and 0.95 m high at its highest, is carved

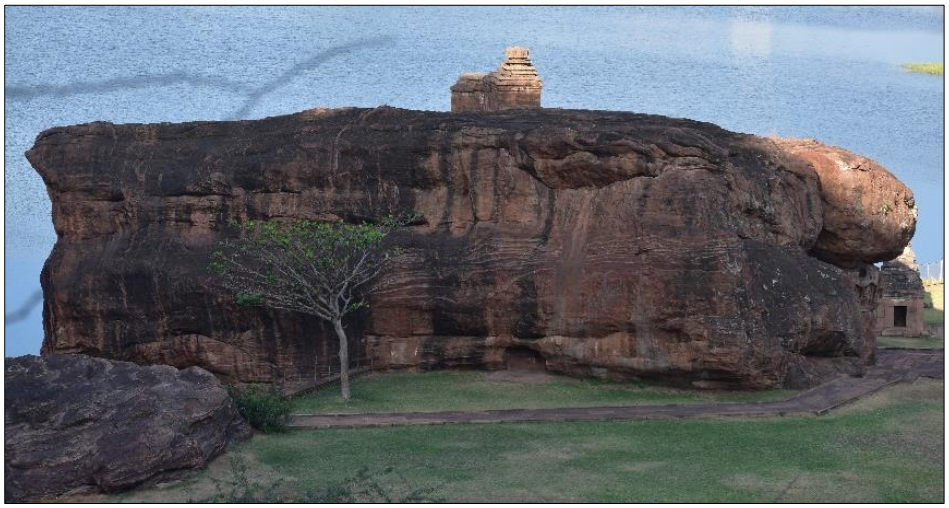


Figure 21: Solar illumination at Panchalinganaphadi at 8:00 am IST on 27 March 2023 (photograph: Srikumar Menon).



Figure 22: Solar illumination at Panchalinganaphadi at 8:20 am IST on 27 March 2023 (photograph: Srikumar Menon).



Figure 23: The Sun as seen from the Empty Cave at 8:37 am IST on 27 March 2023 (photograph: Srikumar Menon).



Figure 24: Light and shadow pattern in the Empty Cave at 8:37 am IST on 27 March 2023 (photograph: Srikumar Menon).



Figure 25: Unfinished carvings of Ganesha and Surya on a boulder near Panchalinganaphadi (photograph: Srikumar Menon).

with an overhang of 0.65 m. It contains the roughed-out images of the Hindu deities Ganesha and Surya. The elephant-headed Ganesha is the God of auspicious beginnings, and is included in most religious sculptural contexts while Surya is the Sun-God. Surya is depicted in the centre of the panel, with Ganesha to his right. To Surya's right is a blank space offering no clue to the identity of whichever deity was planned to be included there. It is clear that the main deity in the planned triptych was Surya.

The identification of the unfinished image in the centre of the panel as Surya is because of the nature and attitude of the figure depicted. A male figure is shown in a standing posture with two elongated objects held up in either hand. Surya is typically shown in a similar position—standing in his chariot, drawn by seven horses, with two lotus buds held in either hand (Rao, 1914; Sastri, 1916; Shrivastava, 1972). There are several temples from the Early Chalukyan period in Aihole and Pattadakal dedicated to

Surya, and quite a few images of Surya in other temples, too. Arguably the best sculptural panel depicting the Sun-God (Figure 26) is on the ceiling of the porch of the Virupaksha Temple at Pattadakal, where Surya is shown standing on his chariot, which is plunging through the clouds in the sky, drawn by seven horses. A close-up image of the Sun-God in this panel leaves no doubt about the identity of the unfinished image on the panel near Panchalinganaphadi.



Figure 26: A carving of Surya in his chariot in the sky, on the ceiling of the Virupaksha Temple at *Pattadakal* (photograph: Srikumar Menon).

2.2.2 The Grotto of Koshtaraya

Located hardly 20 m to the southeast of the unfinished sculptural panel is yet another tumbled sandstone boulder, which has created a sort of grotto within (see Figure 27). The entry into the grotto is through a low-ceilinged opening under the rock, through which one has to crawl inside. Once within, the ceiling, which is the sloping underside of the boulder rises, and on the rear wall of the grotto an enigmatic image has been carved (Figure 28), which has been the focus of much academic disagreement over the decades.

Locally, the image is known as Koshtaraya, or the leper-king, and the legend recounts that

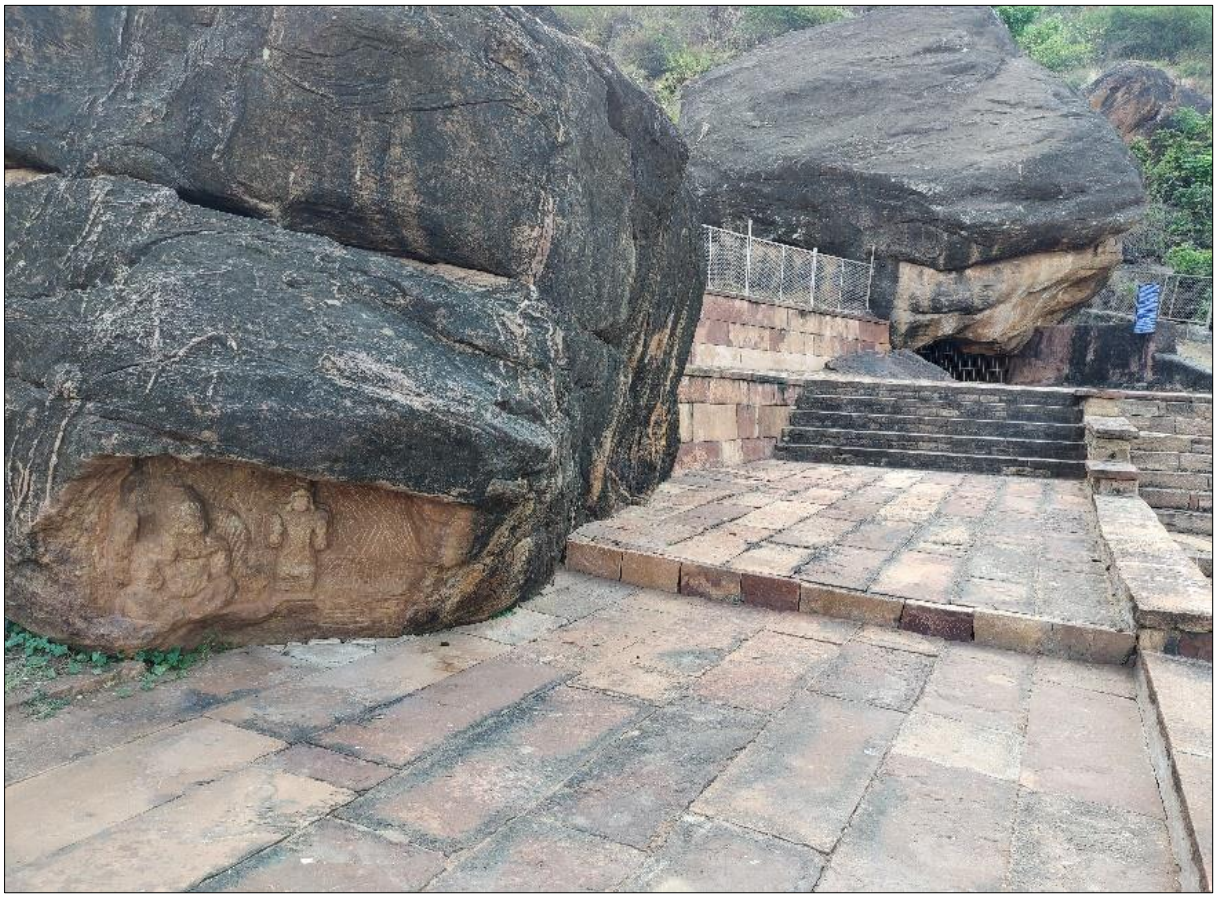


Figure 27: The grotto of Koshtaraya is located at the top of the steps, beyond the unfinished sculptures near Panchalinganaphadi (photograph: Srikumar Menon).

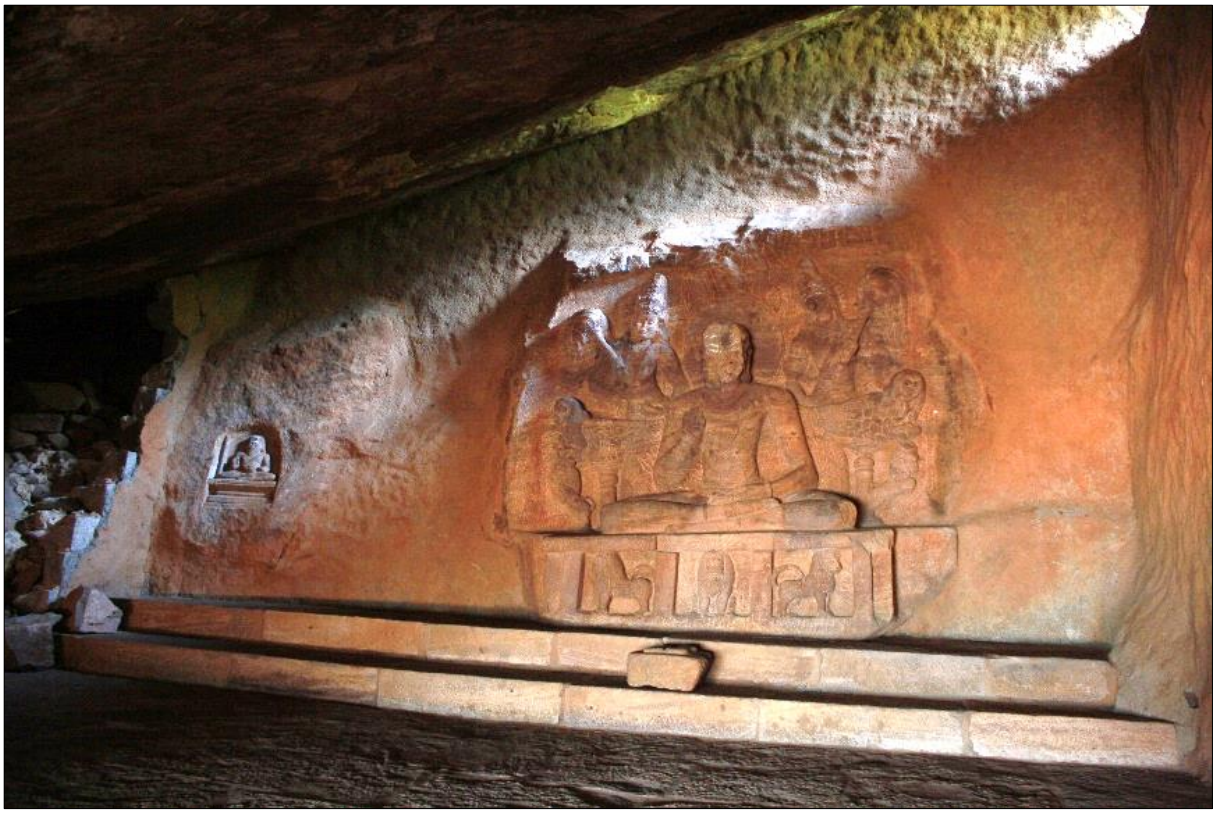


Figure 28: The rear wall of the grotto of Koshtaraya with sculptures (photograph: Srikumar Menon).

that one of the Early Chalukyan kings contracted leprosy, and got cured by bathing in the Agastya Teertha while (presumably) living in this very grotto. However, most scholars disagree, based on several features upon close observation of the image. Banerji (1928) identifies, with some uncertainty, the image as that of the Bodhisattva Padmapani. Michell (2011), on the basis of the cloak worn by the person in the image, and the tree depicted behind him, feels that the image is of the Buddha. In a later publication, Michell (2014) notes that this image of the enthroned Buddha resembles a representation of Mahavira, the 24th Tirthankara of the Jain religion, in the sanctum of the Cave 4 in Badami.

Complicating the identification with Buddhist or Jain affiliation of the image are the depictions of a conch and a discus on the backrest of the throne in the image, which points to Vaishnava (related to the Hindu deity Vishnu) affiliation. Shetti (1995) and Nagarajiah (2005) have come up with the innovative explanation that the sculpture represents the Buddha incarnation of Vishnu. Cousens (1926) and Padigar (2012) are emphatic in identifying the sculpture as that of a royal person, while Sundara (1978) narrows down that identification as the image of the Early Chalukya King Kirtivarma I. Settar (2012) quotes scholars R.S. Panchamukhi and B.R. Gopal, who have associated Kirtivarma I with the legend of the leper king. Annigeri (1958) takes a more literal meaning of the word Koshtaraya and says the image represents a treasury officer of the Chalukyas who might have later became an ascetic. Bolon (1981) quite understandably terms the identity of the person in the carving as 'enigmatic'. The debate is reminiscent of what existed regarding an equally enigmatic image on the ceiling of a two-storied structure at Aihole, whether it was an image of the Buddha or Mahavira, and which was ultimately demonstrated to be depicting Buddha (Settar, 1969).

That said, the argument of Cousens (1926: 57), is the most detailed, and appears most convincing of all:

> Upon the cliff, inside, is carved a large image in a seated Buddha-like attitude, but it is neither a representation of Buddha nor a Jina. It is without doubt a portrait statue. The image is bejewelled with necklace, bracelets and anklets, and wears the sacred thread. The hair, so far as can be seen, where not encrusted with lime and oil, is in knobbly curls, but there is the Buddha-like lump on the top of the head. The legs are in the usual cross-legged position. The right hand, which is raised from the elbow before the breast, holds a mala

> or rosary, the beads of which are being passed through the fingers. The left hand rests, Jina-like in the lap, palm upwards. The person is seated upon a lion throne, the front of which is divided into three compartments, with a lion in each. On either side of him is a *chauri* bearer, while behind him is the usual throne back, as seen behind Jina images. The whole has been fouled with constant oiling, and the top of the head and forehead are a dirty shining white. It seems to be still worshipped. The story in connection with it is that, once upon a time, there was a raja or *raya* who was afflicted with white leprosy, who, on coming to Badami; was cured of it, and this is his image. It is called Koshtharaya, i.e., the *raya* who had *kusta* or white leprosy.

The Empty Cave created to receive the rays of the rising Sun, the unfinished image of Surya, and the possible image of a leper-king who got cured of leprosy in close vicinity of each other is suggestive of distinct interconnections, which are discussed below.

3 DISCUSSION:

India has a rich collection of legends about Surya, the Sun-God as a healer of skin afflictions, especially leprosy. The most well-known of these is ascribed as the reason for the erection of the Sun Temple at Multan, now destroyed, and the Sun Temple at Konark, in Odisha (Behera, 2005; Donaldson, 2003; Mishra, 1986; Mitra, 1998). According to the legend, Samba, son of the Hindu God Krishna, is cursed by his father and contracts leprosy. He bathes in the Chandrabhaga River and prays to the Sun-God and is cured of his affliction, and builds the Sun Temple in gratitude (Quackenbos, 1917). The Chenab River at Multan is supposed to be the original Chandrabhaga, while a river of the same name flows in Konark, too. The lofty Sun Temple at Konark was supposedly erected at the site of Samba's temple, as per the local version of the same Samba legend. Historically the Sun Temple at Konark, built in the thirteenth century CE, is attributed to King Narasimhadeva I of the Eastern Ganga dynasty, and Shrivastava (1972) mentions a historical possibility that it was built by the King to get cured of leprosy.

Another instance of a story about Surya curing leprosy is associated with the Sanskrit poet Mayura Bhatta, who adorned the court of Emperor Harsha in the seventh century CE. Mayura, who was afflicted with leprosy, prayed to Surya, composing his poetic tribute to the Sun-God called *Suryasatakam* (100 verses to Surya), and got cured of the disease (Quackenbos, 1917). It is possible that this belief in the Sun-God's ability to rid devotees of skin afflictions like leprosy was brought to India from Persia (ibid.). At any rate, by the seventh century CE, this belief was obviously widely prevalent in the Indian subcontinent.

Admittedly, none of the accounts of the Early Chalukyan King afflicted by leprosy directly refers to the involvement of Surya in the curing of the malady. But the worship of Surya was prevalent in the Malaprabha Valley during Chalukyan times. The Malegitti Sivalaya, which enshrines a linga today, has been identified as a temple to Surya (Padigar, 2012). The Durga Temple at Aihole, where the primary deity is missing, has also been identified as a Sun Temple (Padigar, 1977; Tartakov, 1997). There are many other images of Surya at several Early Chalukyan monuments. The image of Surya on the ceiling at the Virupaksha Temple mentioned earlier (Figure 26) shows how well versed Chalukyan artisans were with the iconography and depictions of the Sun-God. The knowledge about Surya as the healer of leprosy must have been quite familiar in Chalukyan times, contemporaneous with the composing of the *Suryasatakam*.

The area including the Bhutnath Temple and its surroundings (Figure 29) has been demonstrated to be a 'zone of commemoration', preserving the memory of deceased persons from the Chalukyan and later periods (Menon, 2017; Owen, 2021). The name of the Bhutnath Temple itself derives from the word 'Bhuteswara' (Lord of Souls) used in an inscription within the temple to refer to Shiva—the deity within. It is understandable that memorials to departed persons would be set up around this temple. The architectural vocabulary of these commemorative devices is large and varied, ranging from large and small temples and shrines, shrines so small that they cannot be entered, relief carvings of shrines mentioned earlier (Figure 12), hero stones, votive images etc. (Menon, 2017; 2018).

The sheer variety of commemorative devices employed by the Chalukyan artisans point to a propensity for experimentation, which is in agreement with the approach noted in experimenting with temple-form, too. One of the ingenious devices of commemoration is a laudatory verse inscribed on a rock (Figure 30) in praise of an Early Chalukyan hero known as Kappearabhatan (Menon 2017; 2018; Settar, 2012). Another image of a seated person, along with *padukas* or feet, carved on the wall and floor of a rock-shelter in the cliffs to the east

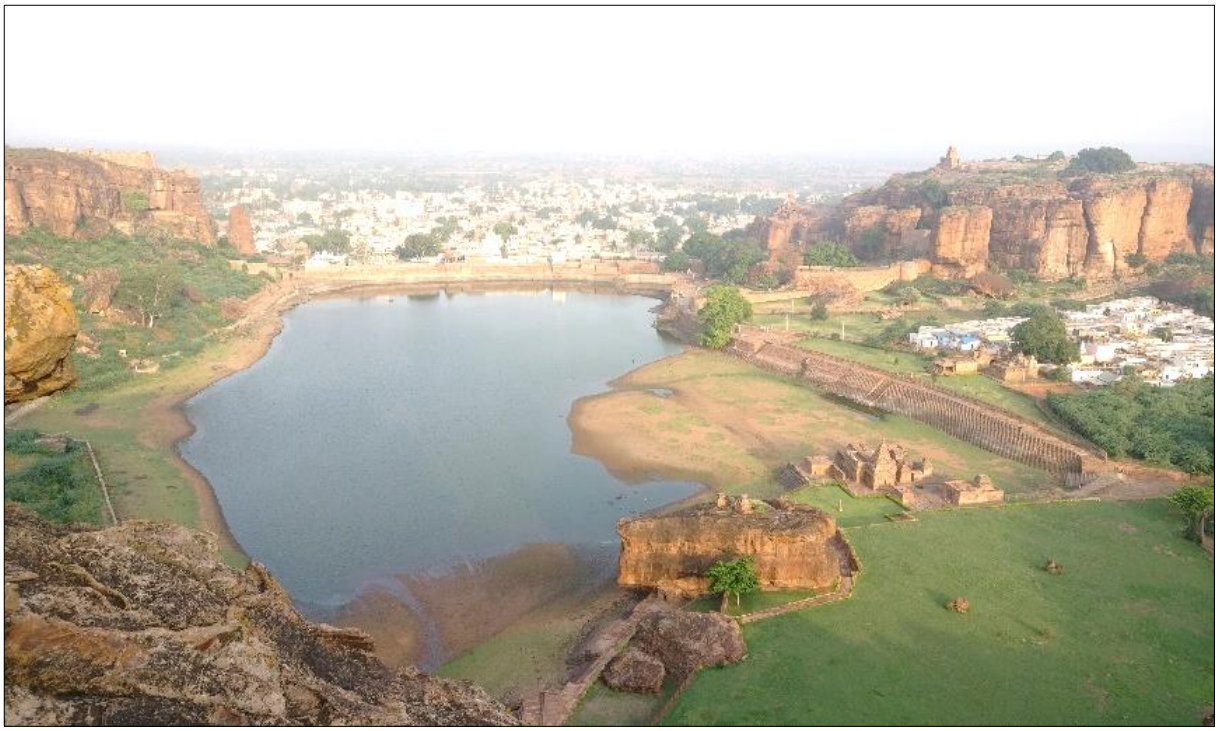


Figure 29: A view of the Badami from the cliffs in the east—the entire region near the Bhutnath Temple complex has been identified as a 'zone of commemoration' (photograph: Srikumar Menon).



Figure 30: The inscription of Kapperabhatan in the left background, with another memorial carving in the foreground, at right (photograph: Srikumar Menon).



Figure 31: The memorial to the Jain monk Vardhamanadeva (photograph: Srikumar Menon).

of Panchalinganaphadi (Figure 31) commemorates a Jain monk named Vardhamanadeva, which lived and died in that shelter in the sixteenth century CE.

From the weight of all these observations, it seems most likely that the image of Koshtaraya is a commemorative portrait of an Early Chalukyan King, possibly Kirtivarman I, who was afflicted with leprosy, and lived in the grotto, bathing in the Agastya Teertha and very likely praying to Surya to get cured of his affliction. The unfinished image of Surya near the Koshtaraya grotto must have been by way of tribute to the healing power of the Sun-God. Was the partly carved image of Surya abandoned when the artisan conceived of an excavation which receives the Sun's rays in the morning as a better, more innovative idea to pay homage to the Sun? Though we can never be certain about this, a rock-cut feature which pays homage to the Sun does seem to tie in neatly with the legend of Koshtaraya, the leper king who got healed by Surya's grace.

It is interesting how folklore and legends sometimes hold a kernel of truth, as illustrated by the account of how the alignment of the passage grave at Newgrange in Ireland was discovered by its chief excavator Michael O'Kelly (Marchant, 2020). Apparently, "… a belief existed in the neighbourhood that the rising sun, at some unspecified time, used to light up the three-spiral stone in the end recess." (O'Kelly, 1982: 123). Though he initially thought this might be a garbled association with the mid-summer sunrise alignment phenomenon at Stonehenge, O'Kelly, observing the orientation of the passage of the grave to the southeast, took a chance and tested it for a possible alignment to midwinter sunrise, thus discovering one of the most well-established alignments in archaeoastronomy (Marchant, 2020; O'Kelly, 1982).

Given that the Early Chalukyan monuments are the earliest ones in stone in Southern India, this is arguably the very first monument to be intentionally oriented to the Sun's rays. There are many examples in later times of Sun-facing temples. The Mahalakshmi Temple at Kolhapur in Maharashtra State celebrates *Kiranotsav* (Festival of Sun's Rays) during 31 January–02 February and 9–11 November every year, when the rays of the setting Sun fall on the idol of Mahalakshmi (Figure 32) in the sanctum of the temple (Bodhe, 2008). There is a closed pavilion and three open pavilions axially arranged in front of the sanctum. The azimuth of this axis being 256°, the setting Sun is axially aligned with the temple twice a year, when the festival of *Kiranotsav* is celebrated. Another example of the Sun's rays falling on the deity in a temple is seen in two temples of the Hoysala Dynasty



Figure 32: Rays of the setting Sun approaching the idol in the sanctum of the Mahalakshmi Temple at Kolhapur on 2 February 2013 (photograph: Srikumar Menon).

in Karnataka State. The Kedareshwara Temple at Nagalapura, dated to CE 1246 and the Moole Sankareshwara Temple at Turuvekere, also dated to the mid-thirteenth century CE, both have axes oriented east-west. However, in both cases the porch granting entry into the closed pavilion adjoining the sanctum is from the south. An aperture is provided in the thick east-ern wall of the closed pavilions of either temple, aligned accurately to the cardinal east to enable the rays of the rising Sun during equinox to fall directly on the deity (Figure 33). Singh (2009) discusses the orientations of various temples of Khajuraho, in Madhya Pradesh State, and the possibility that they were aligned to face sunrise on certain auspicious dates.

The simply conceived Empty Cave at Badami might have been the first ever shrine intentionally aligned to face the Sun in India, though it is possible that similar shrines built of perishable materials might have existed earlier.

4 CONCLUDING REMARKS

The barely noticed rock-cut feature dubbed as the Empty Cave, at Badami, is an important monument since it was intentionally aligned to face the rays of the rising Sun every day of the year. The intent behind this seems to be to pay homage to the Sun-God as healer of leprosy. An unfinished image of the Sun-God, as well as an enigmatic image that could be a portrait statue of the Early Chalukyan King who suffered from leprosy, in close proximity with the Empty Cave supports this hypothesis. Thus, this diminutive monument could be the first ever Sun-facing shrine executed in stone in India.



Figure 33: The rays of the rising Sun enter the sanctum of the Moole Sankareshwara at Turuvekere on equinox days, through the aperture in the middle of the eastern wall (photograph: Srikumar Menon).

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The first observation which led to this study was made on an early trip to Badami with Kailash Rao, in 2008. Subsequently, several people accompanied me on follow up trips over the years. I would like to thank Kailash, Sudhakara Giliyaru, Kadambari Komandur, Adrija Chowdhary, Meghana Kuppa, Apoorva G., Kuili Suganya, Sharbari Mukherjee and Kalakappa for their company during several visits to Badami. Kadambari helped document the small excavations of the Chalukyas, including the Empty Cave. Kadambari, Meghana and Sharbari helped document sunlight falling on the cave at sunrise during two visits. I am grateful to Naresh Keerthi and G. Lingaraj for stimulating discussions and constructive criticism. I am indebted to Shrinivas Padigar for his constant support and help in understanding Early Chalukyan and later temple architecture.

Professor S. Settar, who passed away in February 2020, was a giant in the field of Indian Art History, and my colleague at the National Institute of Advanced Studies. The research outlined in this paper drew inspiration from his celebrated identification of the only Buddhist monument at Aihole, as well as his work on the Jain monuments at Sravanabelagola. To his memory this work is fondly dedicated.

6 REFERENCES

Annigeri, A.M, 1958. Badamiya Silpakale (Kannada). Dharwad. Cited by Nagarajiah, H. in *Bahubali and Badami Chalukyas*. Hassan, SDJMI Managing Committee MMC 06 (2005).

Banerji, R.D., 1928. *Bas Reliefs of Badami*. New Delhi, Archaeological Survey of India.

Behera, K.S., 2005. *Konark: The Black Pagoda.* Delhi, Publications Division, Ministry of Information and Broadcasting, Government of India.

Bodhe, G., 2008. *Goddess Mahalakshmi Temple at Kolhapur: "Shakti Peeth."* Mumbai, Siddhishakti Publication.

Bolon, C.E. 1981. *Early Chalukyan Sculpture*. PhD Thesis, Department of Fine Arts, New York University, New York, USA.

Cousens, H., 1926. *The Chalukyan Architecture of the Kanarese Districts*. New Delhi, Archaeological Survey of India.

Donaldson, T., 2003. *Konark (Monumental Legacy)*. New Delhi, Oxford University Press.

Hardy, A., 1995. *Indian Temple Architecture: Form and Transformation. The Karnata Dravida Tradition, 7th to 13th Centuries*. New Delhi, Indira Gandhi National Centre for the Arts and Abhinav Publications.

Marchant, J., 2020. *The Human Cosmos: A Secret History of the Stars*. Edinburgh, Canongate Books Ltd.

Menon, S.M., 2017. Temples of memory: the Bhutnath Temple environs at Badami as a commemorative landscape. *Heritage: Journal of Multidisciplinary Studies in Archaeology*, 5, 576–605.

Menon, S.M., 2018. Megaliths: new perspectives for future studies. In Korisettar, R. (ed.), *Beyond Stones and More Stones, Volume II*. Bengaluru, Mythic Society. Pp. 208–256.

Menon, S.M., 2019. From megaliths to temples: astronomy in the lithic record of South India. In Orchiston, W., Sule, A. and Vahia, M. (eds.), *The Growth and Development of Astronomy and Astrophysics in India and the Asia-Pacific Region: ICOA-9, Pune, India, 15-18 November 2016.* New Delhi, Hindustan Book Agency and Springer Singapore. Pp. 433–461.

Michell, G., 2011. *Badami, Aihole, Pattadakal*. Mumbai, Pictor Publishing.

Michell, G., 2014. *Temple Architecture and Art of the Early Chalukyas: Badami, Mahakuta, Aihole, Pattadakal*. New Delhi, Niyogi Books.

Mishra, B., 1986. *The Sun Temple: Konark*. Bhubaneswar, Konark Prakashan.

Mitra, D. 1998. *Konarak*. New Delhi, Archaeological Survey of India.

Nagarajiah, H., 2005. *Bahubali and Badami Chalukyas*. Hassan, SDJMI Managing Committee MMC 06.

O'Kelly, M.J., 1982. *Newgrange: Archaeology, Art, Legend*. London, Thames and Hudson.

Owen, L.N., 2021. Neither cave nor temple: creating and commemorating 'Place' in the ritual landscapes at Badami. In Albery, H., Hartmann, J-U., and Ray, H.P. (eds.), *Power, Presence and Space: South Asian Rituals in Archaeological Context*. London, Routledge. Pp. 215–232.

Padigar S.V., 1977. The Durga Temple at Aihole: an Aditya Temple. *Archaeological Studies* (Mysore), 2, 59–64.

Padigar, S.V., 2012. *Badami (Heritage Series)*. Bangalore, Department of Archaeology, Museums and Heritage.

Quackenbos, G.P., 1917. *The Sanskrit Poems of Mayura: Edited with a Translation and Notes and an Introduction Together with the Text and Translation of Bana's Candisataka*. New York, Columbia University Press.

Rao, T.A.G., 1914. *Elements of Hindu Iconography*. Delhi, Motilal Banarsidass Publishers Private Limited.

Sastri, H.K., 1916 (Reprint 1986). *South-Indian Images of Gods and Goddesses*. New Delhi, Asian Educational Services.

Settar, S., 1969. A Buddhist vihara at Aihole. *East and West*, 19(1/2), 126–138.

Settar, S., 2012. *Aksarameru's Kaliyuga Viparitan: Earliest Tripadi Poetry in Indian Literature c. 740 A.D.* Bangalore, Ruvari.

Shetti, B.V., 1995. An image of Buddhavatara Visnu at Badami. Nirgrantha, I. Cited by Nagarajiah, H. in Bahubali and Badami Chalukyas. Hassan, SDJMI Managing Committee MMC 06 (2005).
Shrivastava, V.C., 1972. *Sun-Worship in Ancient India*. Delhi, Parimal Publications.
Singh, R.P.B., 2009. *Cosmic Order and Cultural Astronomy: Sacred Cities of India*. Cambridge, Cambridge Scholars Publishing.
Soundara Rajan, K.V., 1981. *Cave Temples of the Deccan*. New Delhi, Archaeological Survey of India.
Sundara, A., 1978. *A Sculpture of Kostharaya in Badami*. Archaeological Studies, VIII. Cited by H. Nagarajiah, H. in Bahubali and Badami Chalukyas. Hassan, SDJMI Managing Committee MMC 06 (2005).
Tarr, G., 1970. Chronology and development of the Chalukya Cave Temples. *Ars Orientalis*, 8, 155–184.
Tartakov, G.M., 1980. The beginning of Dravidian Temple architecture in stone. *Artibus Asiae*, 42(1), 39–99.
Tartakov, G.M., 1997. *The Durga Temple at Aihole: A Historiographical Study*. New Delhi, Oxford University Press.



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