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ESTIMATION OF THE ORIGINAL ERECTION SITE OF THE DELHI IRON PILLAR AT UDAYAGIRI

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The possible original erection site of the Delhi iron pillar at Udayagiri has been estimated based on a detailed analysis of the iconographical, archaeological, architectural and astronomical significance of Udayagiri site. Arguments have been provided to show that the iron pillar may have been originally located, facing east, in front of the specially cut passageway at the place where the northern hill meets the saddle. The relationship between the iron pillar and the Gupta-period architectural elements in and near the passageway has been described. The hierarchy of all the inscriptions at Udayagiri has been discussed with respect to the iron pillar's possible original location. The hierarchy of inscriptions is maintained for the proposed pillar location. Based on the astronomical significance of Udayagiri's location on the Tropic of Cancer, and earlier solar observations at Udayagiri, it is shown that the iron pillar was aligned with the cardinal directions such that, on summer solstice day, the early morning shadow of the pillar fell along the passageway in the direction of *anantaśāyin* Viṣṇu panel (in cave 15). The specific area for future archaeological excavations to identify the original erection site has also been discussed.

Key words: Astronomy, Erection site, Delhi iron pillar, Udayagiri, Inscription.

INTRODUCTION

The Delhi iron pillar has been a major attraction for academics in history, archaeology, metallurgy and science, apart from the general public due primarily to its antiquity, engineering and exceptional resistance to atmospheric corrosion. Its artistic design is also admirable. While the known facts about the Delhi iron pillar have been summarized in a monograph by Anantharaman[1], several new insights regarding its

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historical, technical and scientific aspects have been compiled in a recent book by Balasubramaniam[2].

The Delhi iron pillar is currently located in the courtyard of the Quwwat-ul-Islam mosque in New Delhi. However, this was not the original erection site of the pillar. The original location of the iron pillar has been described in the 6-line 3-stanza Gupta Brāhmī-Sanskrit inscription on the pillar, the oldest and largest of all the inscriptions on the pillar. This inscription records that the pillar was set up by Candra ("having in faith fixed his mind upon Viṣṇu") as a standard of Viṣṇu (*Viṣṇuordhvajaḥ*) at *Viṣṇupadagiri*. In the iron pillar inscription, the short version of *pada* (meaning footprint) is provided and not the long version *pāda* (meaning foot). Therefore, *Viṣṇupadagiri* translates as "hill of the footprint of Viṣṇu." The monarch's conquests have also been poetically described in the inscription. It must be noted that three directions are referred to in the inscription (i.e. east, south and west) and also Viṣṇu's name appears three times in the inscription, although in different contexts. The inscription has been analyzed in great detail elsewhere[2,3]. Candra has been identified unambiguously with Candragupta II Vikramāditya (375 AD-414 AD) based on a detailed analysis of the archer-type gold coins of the imperial Guptas (320 AD-600 AD)[2,3]. The original location of the pillar, *Viṣṇupadagiri*, has been identified as modern Udayagiri, in the close vicinity of Besnagar, Vidiśā and Sānci[2-4]. These towns are located about 50 km east of Bhopal, in central India, and the region is called Malwa. Literary, archaeological, numismatic and geographic evidences for the identification of modern Udayagiri as ancient *Viṣṇupadagiri* have been discussed in detail elsewhere[2-4]. If there was one location that Candragupta II Vikramāditya was personally associated with, it must have been Udayagiri because it is here that we find two datable inscriptions specifically mentioning Candragupta II, and, moreover, architectural evidences indicate that 19 of the 20 cave temples at this location may belong to his reign[4]. The antiquity of *pada* (i.e. footprint) worship is well established in the region near Udayagiri as indicated by several evidences[4]: worship of inscribed *Viṣṇupada* (footprint of Viṣṇu) at a place near Udayagiri foothill called *Caran Tīrth* situated at the confluence of rivers Bes and Betwa, the presence of Heliodorous pillar at Besnagar, worship of the tenth Jain *Thirthaṅkar* Śītalānāthijī's footmarks in Cave 20 in Udayagiri (dated by an inscription in this cave to 426 AD) and the discovery of a Kuṣhān-period brick with partial marking of a foot at Udayagiri[4]. A later-day inscription from 1036 AD in cave 19 specifically identifies Candragupta II having built the temple at Udayagiri[5]. In order to further emphasize Udayagiri's positive identification as *Viṣṇupadagiri*, and hence the original location of the iron pillar, Dass[4]

provided several evidences for iron-making tradition in the Udayagiri-Vidiśā-Besnagar-Sānci region (iron wedges from Sānci and Heliodorous pillars, iron slags from several sites near Vidiśā, remains of iron-making furnaces, names of nearby places like *Lohāṅgī* and *Lohāpūra*, etc.).

The word *Viṣṇupada* occurs in a royal seal (see Fig. 1), of Candragupta II Vikramāditya's period, discovered from Basarh, the supposed site of the ancient city of Vaiśālī . Bloch[6] discovered this seal amongst 720 pieces from what appeared to be a storehouse for records. Bloch described the seal as possessing an ornamental *triśūl* in the center, to the right a staff consisting of seven dots, conch and solar disc, to the left symbols of the moon and a wheel. The same seal has been interpreted by Raven[7] as "the symbols from left to right on the long horizontal line are a *śaṅkha* (probably), ornamental staff of some kind (compare banners of Gupta gold coins of

Fig. 1: A royal seal containing the term *Viṣṇupada* discovered in Basarh (ancient Vaiśālī)[6]. (Photograph courtesy: Archaeological Survey of India).

Kumaragupta I that have circular shaped poles), a *śrīvatsa* on a thin stand and a *cakra,* above sun and moon." The two line legend below reads as "*Śrī-Viṣṇupadasvāmī-Nārāyaṇa*" meaning "Nārāyaṇa, the lord of the illustrious Viṣṇupada." The particular *śrīvatsa* symbol seen on the seal also occurs prominently on the chest of Viṣṇu on the right of cave 6 at Udayagiri. Moreover, a similar *śrīvatsa* appears on the Durjanpura Jain image from the Vidiśā region. The image can be dated to 370-375 AD based on the inscription on the image[8]. Gupta-period seals, with comparable *śrīvatsa* symbol, have been discovered in Jhusi[9] and Rājghāt[10]. The provenance of the seal may not indicate the original manufacturing spot and may have traveled as tokens used to seal documents or may also have been produced as momentoes at religious sites. The above discussion suggests that the *Viṣṇupadasvāmī* seal mould was carved in the Vidiśā region and this link with the Vidiśā area is important to note.

The Delhi iron pillar was re-located to its current location in the courtyard of the Quwwat-ul-Islam mosque (near the Qutub Minar) in New Delhi by Iltutmish[4]. Interestingly, his name literally translates as "eclipse of the moon" because he was born on a night of moon eclipse[11-13]. The movement of the iron pillar occurred some time around 1233AD. The history of movement of the iron pillar from its original erection site at Udayagiri to its current location has been discussed in detail elsewhere[2,4]. In brief, Iltutmish succeeded Qutub-ud-din Aibak to the throne of the newly founded Sultanate in Delhi in early 13th Century AD. He extended and completed several structures at Delhi begun by Aibak, the most notable among them being the Qutub Minar. Iltutmish also extended the towering western arch and boundaries of the Quwwat-ul-Islam mosque, which is a historically significant construction because it is the first Indo-Islamic structure in the Indian sub-continent. Iltutmish undertook several military expeditions in his long reign of 26 years. He captured Ranthambor in 1226 AD, Gwalior in 1231 AD, Ujjain and Malwa in 1233 AD, and Bayana in 1235 AD. The details of his military expeditions have been recorded by several Muslim historians and graphic accounts of his expedition can be obtained from these valuable literary sources: *Tabākāt-I-Nasīri* by Minaj-us-Sirāj[11], *Tārikh-I-Mubārakshāhī* by Yahiya Bin Ahmad Bin Abdullāh Sirhindī[12] and *Muntakhabā-T-Tāwārikh* by Al-Badaoni[13]. Among these, the first document is of greater significance because Minaj-us-Sirāj, the author of the document, served in the court of Iltutmish. *Tabākāt-I-Nasīri*[11] mentions that "the Sultan led the hosts of Islam towards Malwah, and took the fortress and town of Bhilsan, and demolished the idol-temple which took three hundred years

in building, and which, in altitude, was about one hundred ells. From thence, he advanced to Ujjain-Nagarī, and destroyed the idol-temple of Mahā-kāl Dīv. The effigy of Bikramajit who was sovereign of Ujjain-Nagarī, and from whose reign to the present time one thousand, three hundred and sixteen years have elapsed, and from whose reign they date the Hindu-i era, together with other effigies besides his, which were formed of molten brass, together with stone [idol] of Mahā-kāl, were carried away to Dihli, the capital". The iron pillar must have been one of the "brass" objects carried away to Delhi because several earlier observers of the iron pillar have stated that it was made of brass. For example, a writer about 100 years from Jehāngir's time refers to the pillar as "an obelisk of brass of great antiquity"[2]. Several European travelers have also mentioned that the pillar was made of brass and all these accounts have been provided in detail, elsewhere[2,4]. As regards the great temple at Bhilsa, Willis proposed that the temple of Bhāillasvāmī stood atop the hill[5].

The aim of the present paper is to deduce the erection site of the iron pillar at Udayagiri. The astronomical and architectural significance of Udayagiri would be highlighted to assist the deduction.

Astronomical Significance of Location

The astronomical significance and importance of Udayagiri, i.e. *Viṣṇupadagiri* during the Gupta period, has been established, for the first time, from several archaeological evidences by Dass[4]. The location of Udayagiri is quite close to the important places of ancient central India, namely Vidiśā, Besnagar and Sānci. The importance of this region in the context of ancient Indian history, culture and trade has been well-documented[14]. The most significant aspect of the location of Udayagiri is that it is situated at 23°31′ latitude, almost on the Tropic of Cancer. The Tropic of Cancer is an important latitude in the northern hemisphere like the Tropic of Capricorn in the southern. It is generally considered to be located 23.5^0 north of the equator for the sake of simplicity. The Tropics are, however, not static but move due to natural oscillations of the angle of earth's tilt axis. The Tropic of Cancer was located at 23°42′ in 100 BC, 23°39′ in 400 AD and 23°26′ in 2001 AD[15].

The Tropics are related to the tilt of the earth's rotational axis by 66.5^0 from the horizontal. As the earth revolves around the sun, significant astronomical events occur repeatedly every year depending on the relative position of the earth with respect to the sun. These events will be considered by referring to the Udayagiri location, i.e. on

the Tropic of Cancer (known in Indian terminology as *karka rekhā*). The longest day in the year occurs on summer solstice day (21-22 June). On this day, the sun rises at 23.5° to the north of the east direction, and sets at 23.5° to the north of the west direction. Moreover, the sun traces a path in the sky on this day in such a manner that at noon, there would be no shadow cast on the ground for a vertically standing erect object like the iron pillar. The other complimentary astronomical event in the year in the northern hemisphere occurs on the winter solstice day (21-22 December). On this day, the sun rises exactly 23.5° to the south of east direction and sets at 23.5° to the south of the west direction for an observer located at the Tropic of Cancer, because the declination of the sun (i.e. angle of the sun with respect to the earth) is on the Tropic of Capricorn. The sun rays at noon on this day will cast a shadow, falling north, that makes and angle of 47° to a vertically erect object. The two other significant annual astronomical events are the spring (21-22 March) and autumn (21-22 September) equinoxes, the days of equal daytime and nighttime for all positions on the earth. These events occur between the summer and winter solstices. On both these days, for a location on the Tropic of Cancer, the sun rises exactly in the east direction and sets in the exact west direction. The angle that an erect object makes with its shadow (falling north) at noon on these days would be 23.5°. These astronomical aspects have been described here because they are very relevant in later discussions on deducing the probable erection site of the iron pillar at Udayagiri.

The ancient name of Udayagiri, i.e. *Viṣṇupadagiri*, has strong connections with astronomical observations. In the fourteenth chapter of *Sūrya Siddhānta*[16], one of the foremost astronomical treatises of ancient India, different methods of measurement of time have been listed. The third śloka of this chapter mentions "by solar (*saura*) time are determined the measure of the day and the night, the *ṣaḍacītimukhas,* the solstice (*ayana)*, the equinox (*viṣuvat)*, and the propitious period of the sun's entrance into a sign (*saṅkrānti*)". The seventh śloka provides that "in the midst of the zodiac (*bhacakra*) are the two equinoxes, situated upon the same diameter (*samsūtraga)*, and likewise the two solstices, these four are well known." The eight śloka is quite revealing in that "between these are, in each case, two entrances (*saṅkrānti*); from the immediateness of the entrance are to be known the two feet of Viṣṇu". Further, in the ninth śloka, it is mentioned that "from the sun's entrance (*saṅkrānti*) into Capricorn, six months are his northern progress (*uttarāyana*); so likewise, from the beginning of Cancer, six months are his southern progress (*dakṣiṇāyana)*." Verse eight has been interpreted by Burgess as follows[12]: "in each quadrant, the entrance immediately following the solstice or equinox is styled Viṣṇu's feet. In the earliest Hindu mythology,

Viṣṇu is the sun, especially considered as occupying successively the three stations of the orient horizon, the meridian, and the occident horizon; and the three steps by which he strides through the sky are his only distinctive characteristic. These three steps then appear under various forms in later Vaiṣṇava mythology, and there is plainly some reference to them in this designation of the sun's entrance into the signs. It seems easiest and most natural to recognize in the three signs intervening between the equinox and solstice Viṣṇu's three steps, and to regard the two intermediate entrances as the marks of his feet; this may possibly be the figure intended to be conveyed by the language of the text.".

It is important to note that Sun temples and associated observatories for astronomical observations were established along the Tropic of Cancer in ancient India, as provided by ancient Indian texts on astronomy[16]. The antiquity of Sun worship at Udayagiri has been recently elaborated in great detail[15]. Several evidences reveal that the site was important for Sun worship and astronomical studies were being conducted at this location, even in times prior to the Gupta period[15]. One evidence for this is the Suṅga lion capital discovered at this site[15]. The relationship between Sūrya and Viṣṇu was emphasized, especially at Udayagiri, during the Gupta period[4]. Moreover, the presence of a Gupta-period Sun temple at Udayagiri northern hilltop[5] was in keeping with the tradition of Sun worship that was associated with the hill.

During the reign of Candragupta II, this connection was symbolically extended to greater length by the invocation of Candragupta's epithet *Vikramāditya,* meaning "valorous sun"[17]. The adoption of the title *Vikramāditya* by Candragupta II appears to signify several different meanings. The complete decimation of *Śakas*, the foreign rulers of Gujarat, offers direct evidence of his valor[2]. There is another additional important aspect of his *Vikramāditya* title. The word is a combination of *Vikrama* and *Āditya.* The term *Vikrama* apart from signifying valor, has strong connections in Vaiṣṇava philosophy with the concept of *Trīvikrama,* who, it is important to note, is not an avatār of *Viṣṇu*. In the *Ṛgveda*, *Trīvikrama* is referred to as "Viṣṇu, the unconquerable preserver", who "strode over this universe and in three places planted his step." The early commentators understood the three places to be *pṛithvī*, the *vāyu* and *ākāśa*. One commentator Aurnavabha, took a more philosophical view of the matter, and interpreted the "three steps" as being the three positions of the sun at its rising, culmination and setting, thus linking *Vikrama* as *Āditya* or Viṣṇu as Sun God[4]. This aspect of Viṣṇu as the Sun god is closely associated with astronomical observations and at Udayagiri, it is this aspect of *(Trī) Vikrama-āditya* which Candragupta II sought to use for his own metaphorical representations. The epithet

Vikramaditya indicated that Candragupta was drawing an analogy between his own acts as king and Viṣṇu's *Trīvikrama*, the heroic three strides by which Viṣṇu redeemed the world. Conquering the worlds with good deeds are thoughts expressed in several inscriptions of Candragupta II, for example in his *Chattra*-type gold coins.

It is in this context that the Udayagiri site during the Gupta period must be viewed – a very important religious site, related to Viṣṇu and Sūrya worship, and which had strong connections with astronomical observations.

Relationship between Astronomical and Architectural Elements

After having understood the astronomical significance of the Udayagiri site, attention will be focused on the layout of Udayagiri and its associated architecture. Architectural evidences[4] indicate that Candragupta II Vikramāditya must have established nineteen of the twenty cave temples in this mountain. Some of these are not temples in the real sense of the word, but rather bas-reliefs carved on the rock face. The significance of these cave temples in the development of Hindu temple architecture has been well established[18]. The cave temples, particularly at Udayagiri, were the forerunners to later-day huge Hindu temple structures. The details of some of the cave temples at Udayagiri are available from several published references[19-22]. Moreover, the iconographic details of some of the images at Udayagiri have also been analyzed[19-24]. The iconography and cave temples at Udayagiri have been discussed previously[19-24] in a highly focussed manner, without considering the close inter-relationships between the images and the location of the cave temples. This is very much evident in the manner in which the cave temples have been numbered and also referred to by early archaeologists. For example, cave 7 occupies a central position in the scheme of the cave temples layout and neither its number nor its name (*Tava* cave, coined by Cunningham[23] because of the pan-like shape of the structure above this cave temple) provides any clue to its significance. Dass[4], for the first time, has established the significance of the location of the cave temples, in the overall context of the Udayagiri layout.

The location of some important bas-reliefs (and cave temples) in Udayagiri will be addressed, paying special attention to their relative location with respect to the cardinal directions. The complete layout of Udayagiri is provided in Fig. 2a. The first general observation of the overall hill site layout is that it is shaped like a foot. A saddle connects the northern and southern hills. A specially-aligned passageway is

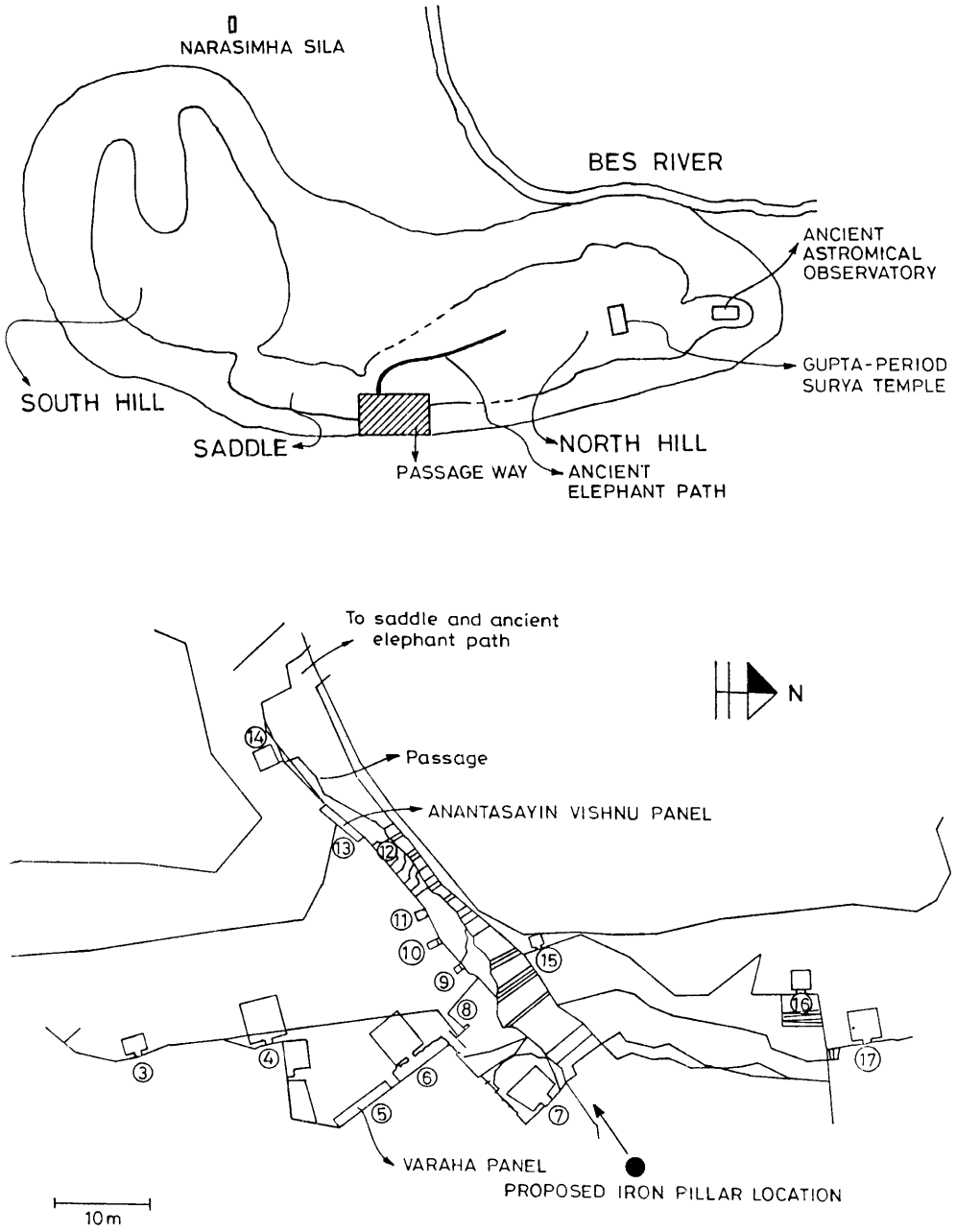

Fig. 2: The layout of (a) Udayagiri hill, and (b) of the important caves around the passageway

located at the place where the northern hill meets the saddle. The Gupta period embellishments, modifications and constructions at Udayagiri are concentrated around this passage (shown hatched in Fig. 2a). The passage is very important because it is the only path leading to the west of the hill and it is the main approach to the temple on the northern hilltop and remains en-route to it. The discovery of an ancient elephant path[4] (see Fig. 2a) further reinforces the importance of the passageway. Most of the cave temples are located around the passageway. The precise locations of the cave temples around the passageway are provided in Fig. 2b, which is the detailed map of the hatched region in Fig. 2a. All the carvings and the caves are cut into the south wall of this passage. The other important caves 4, 5, 6 and 7 are carved on the east face abutting it (Fig. 2b). In this figure, the cave temples have been numbered within circles as per the existing classification system, which the present study indicates may be inappropriate.

The iconography of the images at the Udayagiri site has been discussed in great detail by several authors[19-24]. However, the astronomical aspects of the iconography of images that appear at Udayagiri have never been addressed and this is analyzed here for the first time. The most important and architecturally significant bas-reliefs at Udayagiri are that of *Varāha* (in cave 5) and *anantaśāyin* Viṣṇu (in cave 13). The panel in cave 5, described in great detail elsewhere[24], depicts Viṣṇu in his *Varāha* avatar (Fig. 3), symbolically marking the beginning of the present *kalpa* (era). The panel is located at the left of the beginning of the passage and, moreover, faces the rising sun on *all* days in the year. The panel in cave 13 shows *anantaśāyin* Viṣṇu, in cosmic sleep on the coils of *Ananta* (Fig. 4). The *anantaśāyin* panel is aligned east-west with the feet of the god on the west. Myths associate *anantaśāyin* Viṣṇu with the end and the long night of each *kalpa*[4]. This panel is located at the west end of the passage, which is cut at a particular angle with respect to the cardinal directions, and faces north (Fig. 2b). The angle of cut of the passageway is an important consideration and this will be discussed in detail later. Next to the *anantaśāyin* panel, Viṣṇu is depicted in his *Narasiṃha* (half man-half lion) avatār (in cave 12), smaller in size than either *anantaśāyin* or *Varāha*. The *Narasiṃha* stands in an intermediary position between *Varāha* and *anantaśāyin*. The four-armed *Narasiṃha*, representing cosmic dusk that is neither day nor night, is appropriately located between the *Varāha* and the *anantaśāyin* panels. The Udayagiri reliefs, therefore, thus take one on a journey through cosmic time. Set in a deep cut running from the side of the setting sun, with the dissolution, night of the Brahmā and Viṣṇu's sleep, this is followed by the twilight time of *Narasiṃha* and, finally, the heroic creation of a new *kalpa* under *Varāha*,

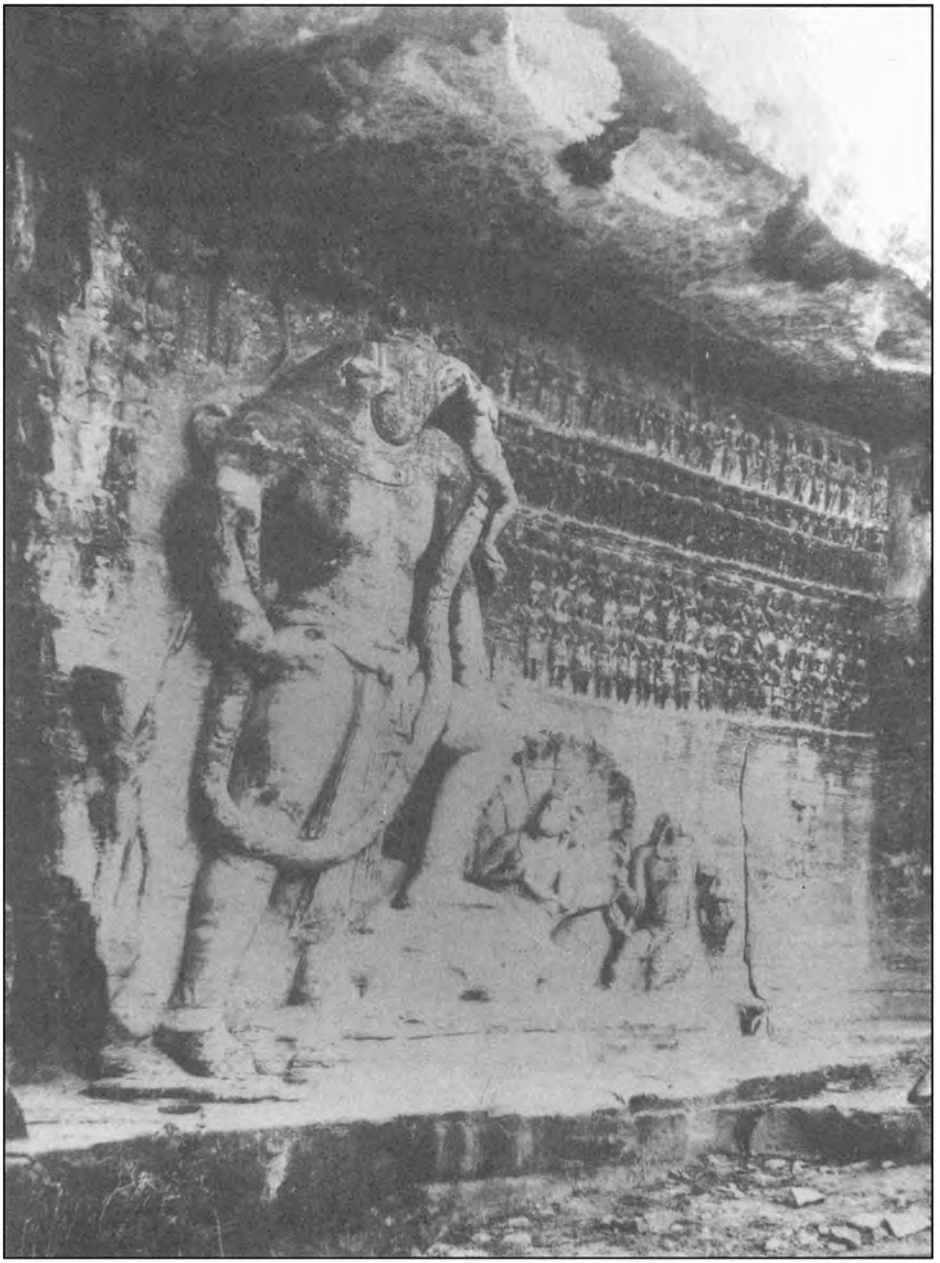

Fig. 3: Details of the *Varāha* panel photographed in 1914. (Photograph courtesy: Archaeological Survey of India).

who faces east toward the rising sun of a new day and epoch. This "journey through time" is located at the foot of the hill (Fig. 2a).

Interestingly, Candragupta II Vikramāditya is prominently present in both the *Varāha* and *anantaśāyin* bas reliefs in a kneeling posture with his face raised towards Viṣṇu in these reliefs[4,20]. The second person standing beside him, in both the panels, has been identified as Virasena Saba, the chief minister of Candragupta II[4]. The *Varāha* panel is remarkable in that it has no major precedent and the visual form seems to have been drawn not just on the myths of the god but also on the acts of the king Candragupta II. The fact that the king is depicted on these two large panels shows not just the importance of these images but also the personal involvement of the monarch with this site.

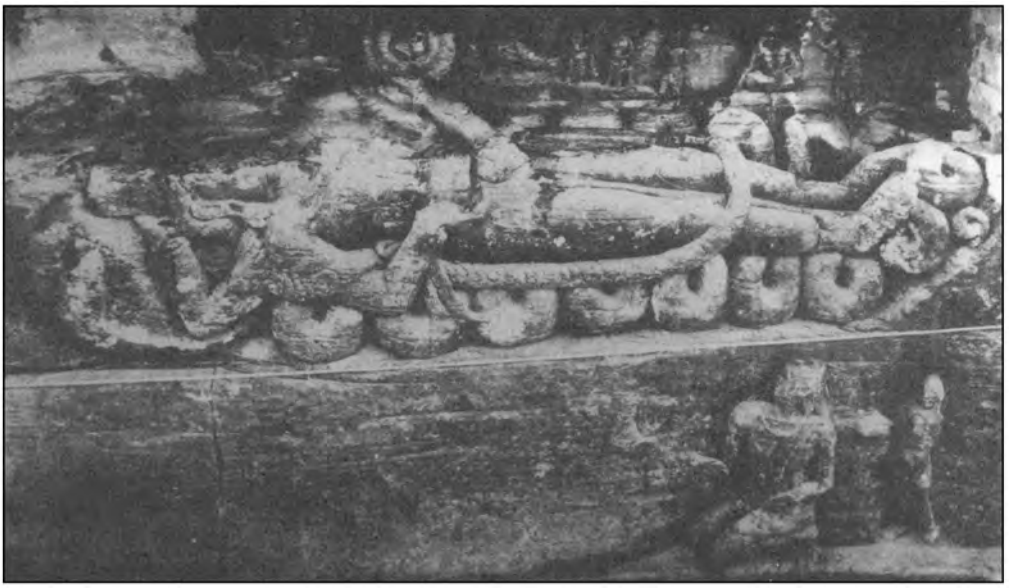

Fig. 4: Details of the *Anantaśāyin* panel photographed in 1914. (Photograph courtesy: Archaeological Survey of India).

The antiquity of Sun worship at Udayagiri has now been established[15]. In addition, the arrangement of the Viṣṇu images in *Anantaśāyin*, *Narasiṃha* and *Varāha* caves indicate the special role of the sun with respect to these images. For example, the early morning sun lights up the *Varāha* panel on *all* days in the year. However, it is only in the period preceding and following the summer solstice day that the alignment of sun with the site is such that the *anantaśāyin* panel is lit by the sun, particularly in the evening because of the unique alignment of this panel with respect to the cardinal directions. It must be noted that this is the time of the year when the sun rises and sets 23.5° north of the east and west directions, respectively, at Udayagiri and the sun is at its northernmost declination. This issue will be discussed in greater detail in the penultimate section. Therefore, clearly, the designers of the structures were well versed with astronomy and cleverly blended astronomical events with architectural imagery. It may be mentioned here that, apart from the astronomical significance of the iconography of the images and their relative positioning, the Udayagiri site also embodies concepts related to water bodies, and this has been described in great detail by Dass[25].

Balasubramaniam[3] originally proposed that the iron pillar was erected right in front of the *Varāha* image. The landscape of Udayagiri provides further insights on the possible erection site of the pillar. A modern road separates the *Varāha* panel on the hillside from a tank that is still filled with water. A careful study of the *Varāha* panel reveals traces of watermarks and severe erosion around the base of the *Varāha* panel (Fig. 3). This indicates that the feet of the god were once washed with water, creating a dramatic multi-media depiction of *Varāha's* cosmic act of rescuing *Bhūmādevī*, the earth goddess, from the depths of the sea. Dass[25] has identified the ancient water channels in Udayagiri and the relationship of the flowing water channels to the images in some of the cave temples. Water was collected in a tank located to the north of the saddle region and it was allowed to overflow over the northern wall of the passageway. The cascade was taken through several images in the caves below and finally the water was allowed to flow in to the tank. This allegorically represented descent of river *Gaṅgā* to the sea[25]. Old ASI photographs reveal that the tank in front of the *Varāha* panel was much larger in the near past than it is today (Fig. 5). Therefore, the iron pillar could not have been located in the tank but rather beside the tank such that it was in front of the *Varāha* panel. The nature of the surface of the iron pillar in the original buried regions[26] does not conclusively indicate that the pillar was

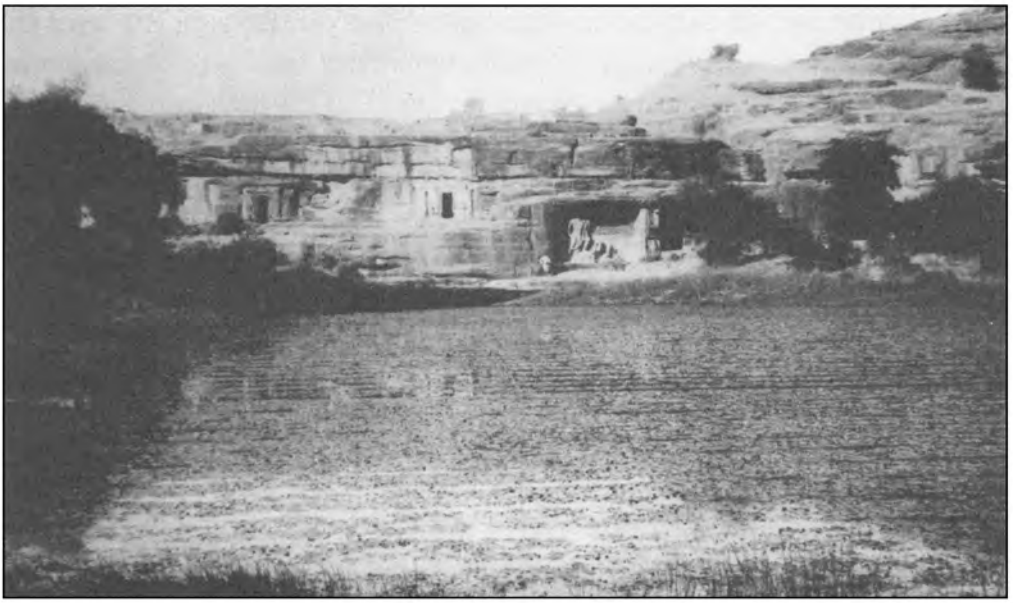

Fig. 5: The area in front of the *Varāha* panel was covered with a large tank in this photograph taken in 1914. (Photograph courtesy: Archaeological Survey of India).

immersed in water for fairly long periods of time (i.e. nearly 800 years from the time of its erection sometime in early 5th century AD to the time it was moved from Udayagiri, i.e. 1233 AD).

Heirarchy of Inscriptions

The layout of the caves adjoining the passageway, shown in Fig. 2b, is based on an initial survey of the topology of the area. It can readily be seen that cave 7, which is presently empty, occupies a significant location with respect to cave temples 5 and 13. The cave acts as the "reception center" to the complex. It is important to note the relative positions of cave 5, 7 and 13. Incidentally, cave 7 is now empty but contains an important inscription of Virasena Saba, the chief minister of Candragupta II

Fig. 6: Details of cave 6 photographed in 1914. (Photograph courtesy: Archaeological Survey of India).

Vikramāditya, who records that he had come here when Candragupta set out to conquer the earth[27]. The location of the original erection site of the Delhi iron pillar at Udayagiri can be forcefully argued based on the location of important epigraphic evidences (i.e. inscriptions) from the time of Candragupta II. These important material evidences have to be considered with respect to their relative location and positioning for an overall understanding of the site and for further deducing the probable original erection site of the Delhi iron pillar.

The first important inscription in Udayagiri is the 'Sanakānika' inscription in cave 6 (Fig. 6). This is a short epigraph inscribed on a specially prepared surface on the face of cave 6. The inscription is of two lines and conveys that on a particular day (i.e. eleventh lunar day of the bright fortnight of the month of *Āṣāḍa*) in the year

401AD, the local Sanakānika king presented this appropriate religious gift, meditating on the foot of Candragupta II, the *mahārājādhirāja* (king of kings)[27]. It is interesting to note that the local Sanakānika king is mentioned bowing to the foot of Candragupta II in this inscription in cave 6, while *Candra* is depicted bowing at the foot of *Viṣṇu* in the nearby cave 5 (i.e. the *Varāha* panel, see Fig. 3). Therefore, the political allegory used by Candragupta II was subtle and very much evident from the arrangement of elements at this site. While Candragupta II does not proclaim himself to be Viṣṇu, he, however, wants his subordinates to consider him like Viṣṇu, to Whom Candragupta is shown bowing in utter reverence. This is not the topic of discussion here, but it has, nevertheless, been provided to project the importance of *Viṣṇupadagiri* site for Candragupta II Vikramāditya's political as well as religious statements. It has suggested that the imagery of *Varāha* in cave 5 rescuing *Bhūmādevī* from the bottom of the ocean may allude to the deliverance of ancient India from the rule of the Śakas by Candragupta II Vikramāditya[20]. He eliminated the last traces of Śakas from India. His silver coins came into circulation in regions formally controlled by Śakas, breaking their long tradition of silver coinage that had been going on undisturbed for over two centuries[28].

The other important inscription appears in cave 7, which lies at the entrance to the passage (Fig. 7). The importance of this cave in the overall architectural scheme of Udayagiri is not immediately obvious because the ground levels have been modified by misguided restoration work, the building of a wall and the construction of a road. Discounting these changes and looking at the content of the cave's inscription, the importance of its location in ancient times may be understood. The epigraph is inscribed on the back wall (i.e. facing the entrance) inside the cave. Interestingly, the inscription is shifted towards the left side of the wall, which probably indicates that something important was meant to occupy the center-stage in this cave. The cave is currently empty, but for a beautiful lotus emblem carved on its inner roof. The relatively long-sized inscription on the back wall is written in Gupta-Brāhmī characters in five-lines. This Sanskrit epigraph is in poetic form with the verses numbered at the end. This again is a feature that appears in Gupta epigraphs for the first time[27]. Candragupta II is mentioned in line one. It is written by his minister Virasena Saba who describes himself as a poet who "knows the meanings of words, understands logic, and is familiar with the ways of mankind." He also records that he belongs to Pataliputra and had come here, accompanied by the king in person, who was seeking to conquer the whole world[27]. This cave, carved into an unusual conical rock formation with a disc like top (see Fig. 7), is like a reception kiosk to the complex. The inscription in

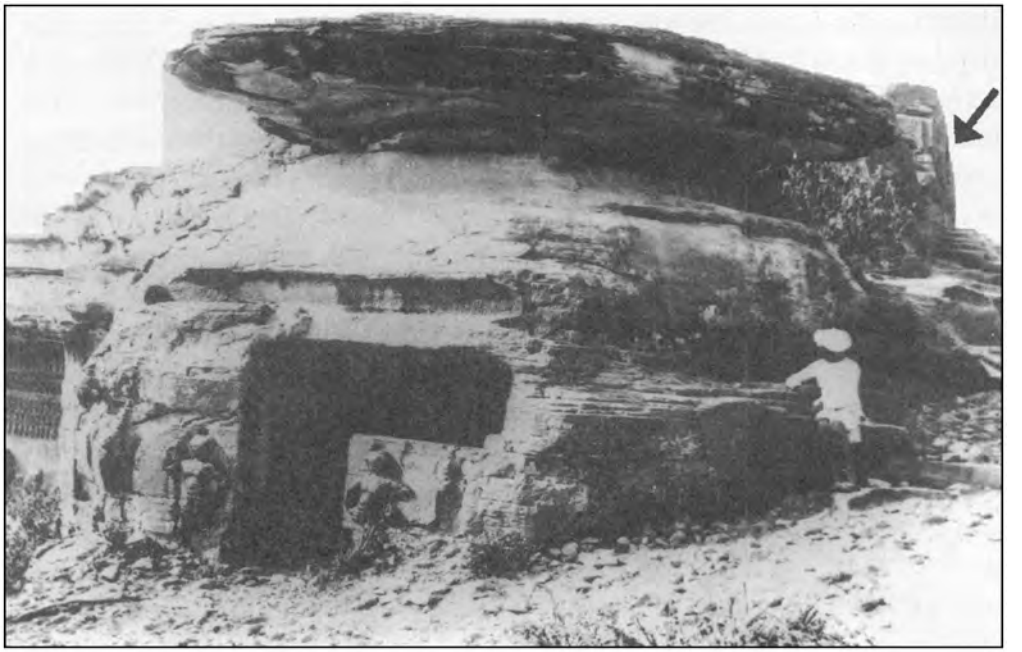

Fig. 7: Details of cave 7 and the passageway photographed in 1914. The *Varāha* panel is seen on the left of the photograph. The location of *Anantaśāyin* panel has been marked with an arrow. (Photograph courtesy: Archaeological Survey of India).

this cave is also introductory in character in that it introduces the key political players in the development of the complex in the early fifth century AD. As discussed earlier, the king and his minister appear in the iconography of the *Varāha* and *Anantaśāyin* panels. While the inscription on cave 7 mentions that Candragupta II set out to conquer the world from here, it is probable that he established an appropriate symbol of his conquests, most likely after accomplishing them, as vividly described in the iron pillar inscription[27]. The iron pillar may have served this purpose[2].

The actual erection site of the pillar should have been such that the hierarchy of inscriptions had to be maintained. The logical position for the iron pillar would thus have been outside cave 7 and in front of the passage (marked by a dot in Fig. 2b). If the above is accepted, then in the hierarchy of inscriptions, one would first encounter the *Candra* inscription on the iron pillar, second the Virasena inscription in cave 7 and then the Sanakānika inscription in cave 6. Moreover, the inscription on the upright iron pillar would have been located at a higher position compared to Virasena's inscription and both these would have been at a higher elevation compared to the Sanakānika inscription in cave 6. Although it is difficult to reconstruct ancient ritual movements around the site, a hierarchical positioning of inscriptions and monuments makes sense, because it is known that in nearby Buddhist sites (Śatdhara, Sānci, etc.), *stupas* and their inscriptions were located with respect to the seating arrangements of the disciples vis-à-vis the teacher[4]. The location of the iron pillar at the entrance of the complex can also be argued from Mauryan precedence. In the first instance, there is a formal similarity between the capital of the iron pillar and Mauryan inverted-lotus capitals at Sārnath, Sānci, etc. More importantly, Mauryan pillars were often erected in public spaces near the entrances of important Buddhist monuments. Although rooted deeply in Indian concepts of cosmology and universal order, these columns also lend themselves to the legitimization of political power. They acted as a threshold symbol demarcating the limits and centers of human order. The iron pillar at *Viṣṇupadagiri* must have similarly acted as both the standard of the deity Viṣṇu and a victory symbol of the king.

Astronomical Aspects of Erection Site

As the Udayagiri site was astronomically significant, it is reasonable to anticipate that the iron pillar must have been located at a calculated position with respect to the cardinal directions and important caves. Evidences have been presented to show that the decorative capital of the Delhi iron pillar may have been originally topped with a *cakra* image[29]. Agrawal[30] has elaborated the symbolism and meaning of various components of pillars topped with a *cakra* image (i.e. *cakra dhvaja*). The *cakra* symbolized the *cakravartin's* wheel and in the case of the iron pillar, the wheel may have symbolized the *cakravartin* powers of Viṣṇu. There is no need to relate the iron pillar as the weapons of Viṣṇu, namely the *gadā* (i.e. mace) and *cakra* (i.e. discus)[29] because the pillar by itself defined royal attributes of a *cakravartin*[30]. The iron pillar inscription mentions that the pillar was meant to be the standard of Viṣṇu (*Viṣṇuordhvajaḥ)* and does not state any other interpretation for the pillar's symbolism.

The astronomical aspect of the iron pillar's erection site will be addressed in detail here for the first time. If the pillar was located in front of the passage near cave 7, the *Varāha* and *Anantaśāyin* panels would have appeared further in the front in two different directions. From the location of the iron pillar, it must have been possible to view both the *Varāha* panel in cave 5 and the *Anantaśāyin* panel in cave 13. This can be understood from the photograph (Fig. 7) taken in 1914 from the front of cave 7. The position from where this photograph was photographed approximately provides the original erection site of the Delhi iron pillar. It must be carefully noted that from this location in front of the passageway, the *Anantaśāyin* panel (arrowed) is visible on the right while the *Varāha* panel is visible on the left side. (Two side walls and an overhanging roof have now been constructed by the ASI around the *Anantaśāyin* panel and therefore, this panel is no longer visible from the bottom of the passageway.) The original location of the pillar has been tentatively marked with a dot in Fig. 2b. The pillar must have been oriented such that the Sanskrit inscription faced east because this was the entrance direction to the complex in Udayagiri. Interestingly, the imagery provided in the iron pillar inscription ("*Candra* having in faith fixed his mind on Viṣṇu") is visually evident in Candragupta's images in both the *Varāha* (Fig. 3) and *Anantaśāyin* (Fig. 4) panels. Therefore, the visual effect of one of the statements of the iron pillar inscription must have been available right in front of the viewer as one entered the temple complex during the Gupta period.

If the iron pillar was located in front of cave 7, then several facts regarding the shadow of the pillar in early morning sunlight on significant astronomical periods in the year can be deduced based on detailed solar observations at Udayagiri[15]. Dass and Willis visited the site in different seasons and on equinox and solstice days. The summer solstice day was found to be significant because the sun rose in direct alignment with the passage. Moreover, the sunrays illuminated the north wall after dawn without shadows[15]. As Udayagiri is located on the Tropic of Cancer, the sun stands directly overhead on 90° on summer solstice day. Significantly, it was noted that there was virtually no shadow in the passage on the summer solstice day because the passage directly paralleled the sun's east-west axis[15]. Based on the estimated location of the Tropic of Cancer in 400AD at 23°49′, which is north with respect to Udayagiri location (i.e. 23°31′)[15], it can be reasonably concluded that the south wall of the passageway (containing the cave temples including the *Anantaśāyin* Viṣṇu panel) would have been lit by the sunrays as it progressed across the sky during summer solstice day, during the Gupta period.

Therefore, based on modern-day solar observations in Udayagiri site during summer solstice day[15] and based on the known location of the Tropic of Cancer in 400 AD, it is realized that, during the Gupta period, the sun rays must have struck the *Anantaśāyin* Viṣṇu panel in cave 13 only in the time preceding and following the summer solstice day. This must have been the intended effect of the architects of Udayagiri's cave temples cut-out along the passageway. The scientific proof for the same will be provided based on astronomical phenomenon. The summer solstice day will be considered in particular because of the observed[15] special alignment of Sun's movement with the passageway on this particular day. Interestingly, mythologies assign the summer solstice day with the beginning of Viṣṇu's cosmic sleep, when the sun completes its *uttarāyaṇa* ('northern progress'), and begins its *dakṣiṇāyaṇa* ('southern progress')[4].

The declination of the sun at significant annual solar days (like equinox and solstice days) was briefly addressed in the first paragraph of the second section. The

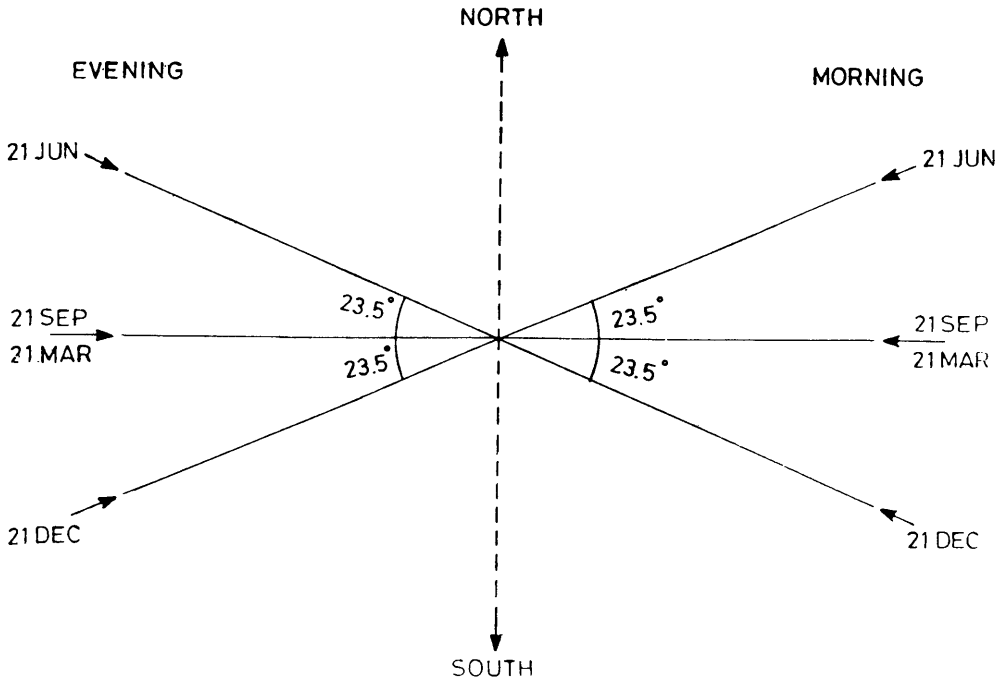

Fig. 8: The direction of the morning rising sunrays and evening setting sunrays on important solar (equinox and solstice) days in the year. This is valid for any location on the Tropic of Cancer, like Udayagiri.

direction of early morning and late evening sunray are depicted in Fig. 8. At any location on the Tropic of Cancer, the sun reaches its northernmost declination on summer solstice day and the southernmost declination on the winter solstice day. On the equinox days, the sun rises in the exact east direction and sets in the exact west direction. The passageway was cut out at a specific angle with respect to the cardinal direction as is evident from the following. On the summer solstice day, the sun rises at 23.5° to the north of the east direction. During this time, the shadow of an erect object located at the entrance of the passageway must fall in the direction of the *Anantaśāyin* panel because of the observed astronomical fact that the sun rose in direct alignment with the passage[15]. This direction has been arrowed in Fig. 2b. The astronomical aspect of the iron pillar erection site was therefore tied with the concept of time depicted in the iconography of the site, as discussed earlier. Another minor point of interest is that the Viṣṇu in the *Anantaśāyin* panel is shown lying with His head in the eastern side and foot in the western direction. Therefore, the alignment of the *Anantaśāyin* panel was such that the morning sun on summer solstice day would have lighted only Viṣṇu's feet.

The above discussion reveals the engineering and architectural genius of the creators of this site such that the allegorical representations of both Viṣṇu *pada* and Viṣṇu's cosmic sleep were successfully accomplished by careful blending of astronomical and architectural knowledge. The creation and development of Udayagiri site appears to have been clearly guided by a highly developed astronomical knowledge. The flowering of astronomical knowledge under prominent astronomers like Āryabhaṭa, Varāhamihira and Brahmagupta during the Gupta period has been well established[31]. The positioning of the iron pillar would have additionally served to highlight the astronomical intelligence, knowledge and advancements prevalent during Candragupta II Vikramāditya's time. Considering the astronomical significance of the Udayagiri site, it is interesting to note that there exists, on the northern hilltop, a flat platform commanding a majestic view of almost the entire skyline. Several astronomical marks have been identified at this platform[4], thereby suggesting that this must have been the site of an ancient astronomical observatory. This location has also been indicated in Fig. 2a.

Well-planned archaeological research needs to be taken for unraveling the hidden mysteries of Udayagiri. A detailed survey needs to be first undertaken to map out the precise positions of the passageway and cave temples and their alignment with respect to the cardinal directions. A complete pictorial documentation of the present state of

the complete Udayagiri site needs to be undertaken, utilizing the old ASI photographs of this location for reference and comparison purposes. The entire site needs to be carefully demarcated such that the tourists and casual visitors, generally ignorant of the site's importance, do not cause irreparable damage to several interesting and important archaeological information, like for example the large shell-characters inscribed in some sections of the floor of the passageway. It is also imperative that modern techniques and philosophies of archaeological research are employed while conducting future excavations at this site. As Dass and Willis have rightly pointed out[15] that no archaeologist ought "even to be allowed to excavate at all unless, when one is deciding to work on a certain site, one can answer the questions, what historical problems have lead one to the site, how can one go about solving these and how exactly does one intend to go about it."

Concluding Remarks

The possible original erection site of the Delhi iron pillar at Udayagiri (ancient *Viṣṇupadagiri*) has been deduced based on a detailed analysis of the iconographical, archaeological, architectural and astronomical significance of the site. The relative orientation of the important caves with respect to the cardinal directions and Udayagiri landscape have been discussed. The possible location of the iron pillar, at the entrance of the complex in front of the passage besides cave 7, has been deduced based on the hierarchy of inscriptions at this site. Based on the location of Udayagiri on the Tropic of Cancer and earlier observation of solar events at Udayagiri, it has been shown that the iron pillar was positioned such that, on summer solstice day, the early morning shadow from the pillar fell in the direction of *Anantaśāyin* Viṣṇu in cave 13. The present study provides valuable clues for the identification of specific area that needs to be addressed for future careful archaeological excavations at Udayagiri, to unravel the history of the Delhi iron pillar.

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