NOTES

1. Excerpts from the report of GSI: "The caves are excavated in a pahoehoe type of basaltic flow exposed in a 76m high semicircular scarp carved out by the Waghur River which descends beyond the last cave in a water fall with seven leaps known as the 'Sat Kund.' Three flows *are* exposed in the scarp where the caves are located. The lower flow is of AA type and is exposed in the riverbed. A prominent fragmentary zone marks the top of the flow. The middle flow contains the caves and is of pahoehoe type. It consists of 16-19 sub horizontal flow units. The basal parts of individual units are characterised by pipe amygdules, whereas the top parts exhibit vesicular zones with ropy surfaces. The upper flow is of AA type, the massive part of which forms a vertical scarp. The basalt in which these caves are excavated is medium to fine grained, moderately porphyritic, vesicular and is slightly weathered. The vesicles varying in size from 1 mm to 2 cm are mostly rounded and filled with silica, zeolites and green earth material." (Geological Survey of India)

2 In earlier articles, Spink specified different dates and duration for recession and hiatus. Recently he changed his views; in his latest time chart of 2012 he has ascribed 3 years for recession (c. 469-71 CE) and just 1 year for hiatus (c. 472 CE), which is closer to the results of my independent on-site research. Spink's latest time chart was first published in (Singh 2012, 254, fig. 283), which is reproduced here (Figure 225).

[3] This chapter is a slightly revised version of my published article (Singh 2009b).

[4] Archaeological Survey of India still regards Cave 8 as a 'Hīnayāna' edifice. For a discussion on its recent attribution to the fifth-century phase, see (Singh 2009a). For further revision and updates see Chapter 11 of this work.

[5] Khanḍālāvālā: (1990) and (1991).

[6] Deshpānḍe: (1992), (1996), (2002a) , (2002b), and (2002c).

[7] Cohen: (1995) and (2006).

[8] Bakker: (1989) and (1992).

[9] Some prominent articles by Spink: (The Vakataka's Flowering and Fall 1991a), (The Archaeology of Ajanta 1991b), (The Achievements of Ajanta 1992).

[10] Spink: (2005) and (2007).

[11] Williams: (1982) and (1983).

[12] Khanḍālāvālā: (1990) and (1991).

[13] Deshpānḍe: (1992), (2002b), and (2002c).

[14] About the rule of Hariṣeṇa during the fifth-century phase of Ajantā there are at least three epigraphic sources:

i. Cave 16, dedicatory inscription of Varahadeva, verse 17: *harirāmharasmrendukāntir-hariṣeṇoharivikkramapratāpah;* 'Then his son became king [. . .] Harisheṇa, who, in loveliness, resembled Indra, Rāma, Hara, Cupid, and the moon, and who was brave and spirited like a lion' (Mirashi 1963, 108-10).

ii. Ghatotkaca Cave, dedicatory inscription of Varahadeva, verse 13: *atha devarājasūnurhariseno [. . .] hastibhoja;* 'Then there is Harisheṇa, the son of Devarāja [...] Hastibhōja' (Mirashi 1963, 117, 119).

iii. Cave 17 inscription, verse 21, mentions: *vadanārvindacandre paripālayati kṣitīndracandre Hariṣeṇe hitakāriṇi prajānāṃ;* 'While that moon among the princes, Harisheṇa, whose face resembles a lotus and the moon, and who does what is beneficial for (his) subjects [. . .] is protecting the earth' (Mirashi 1963, 126, 129).

Burgess on this subject wrote: 'Pandit Bhagwanlal is probably right in assuming that the Harisheṇa mentioned in l. 21 is the Vākāṭaka prince whose name occurs in Ajantā No. 3 [inscription], and that the Vākāṭaka were the lords paramount whom these rulers obeyed' (Burgess 1883, 128).

[15] For a recent and comprehensive account of Vākāṭaka historiography, see (Goyal 1992).

[16] Walter M. Spink, 1991*a*, *op. cit.* pp. 71–92 [note in original].

[17] Although I owe much to Mirāshī's fundamental study (1945) my conclusions are based upon a significantly different chronology, resulting in a very different view of history… [note in original].

[18] Hans T. Bakker, 1997, *op. cit.*, p. 41 [note in original].

[19] Walter M. Spink, 1992, *op. cit.*, p. 2 [note in original].

[20] *A Comprehensive History of India,* Part III, vol. i, p. 146 [note in original].

[21] Spink, 1992, *op. cit.*, pp. 183–84 [note in original].

[22] Recently a new attempt has been made to prove the historicity of the tale of prince Viśruta. In an article with the somewhat awkward title… DeCaroli argues that Daṇḍīn's story was meant as a metaphor that should have served to caution the young Pallava king Narasimhavarman II. To make the metaphor effective, Daṇḍīn 'peppered' his text with accurate historical information.

Unfortunately, the author, who wholly relies on secondary literature, has not taken the trouble to investigate the historical sources that could corroborate or cast doubt on his contention. Actually, by viewing Daṇḍīn's story as a metaphor, DeCaroli generalizes the contents of the eighth *Uchvāsa* turning its characters into stereotypes that would fit many a king and many historical situations. In other words, contrary to the author's intention, his 'analysis' implies, if anything, that there is less historicity in Daṇḍīn's tale than he and some of his American colleagues might have hoped. [Note in original.]

[23] [Free transliteration by author]:

v. 8. – – – – – – – – – – [*a**]*rtthisthalodyo* (*ddyo*) *takarimvap* [|*]

Tasyam ca tasyāmburūhāyatākṣavuttaptacāmīkarakāntarūpau || [8||*]

v. 9. – ⏑⏑ – – – – – – – – – [*Pradyu**]*mnasāmbapratimau kumārau* [|*]

Dharādhipārakhyām prathamo babhāra dadhre dvitīyo [*Ra**]*visāmbasanjnām* || [9||*]

v. 10. – – – – – – – – – – – – ⏑⏑ – [*nīyochchhrita*]*maśmakādi*[*kam*] [|*]

[Kṛ]tārtthasatvā(ttvā) [va]bhibhūya bhūyasā rarājatuścandradivākarāviva || [10 ||*]

v. 25. – – – – – – – – – – – – – – – – – – *vipulām visṛjya* [|*]

acīkaradityam mānakalpamalpātmabhih kalpanayāpyaśakyam || [25||*

[24] Bhagwānlāl thought that the *gandhakuti* mentioned in v. 27 was the small Cave XVIII from which the image which was movable had been removed.

See *Inscriptions* etc., p. 76, n. 2 [(Burgess and Indraji, Inscriptions from the Cave Temples of Western India, Archaeological Survey of Western India series 1881)]. The description, however, clearly refers to the Chaitya Cave XIX which is actually situated to the west of Cave XVII [note in original].

[25] Bhau Daji read the name of the queen as *Āmachandrā,* and Buhler as *Suchandrā*, but neither of these readings is supported by the facsimile. The correct reading appears to be *Atichandrā* [note in original].

[26] This is the Chaitya Cave XIX, about the age of which there was much uncertainty [(Mirashi 1963, 123, n. 1); note in original].

[27] A blunder (typo?) is notable in Shāstri's study (Shastri 1997, 46-49). On one hand his chapter title reads 'Cave 17 inscription of Ravisāmba' (Shastri, Vakatakas: Sources and History, Great Ages of Indian History series 1997, 46) denoting that Ravisāmba, the younger brother, was the patron of Cave 17. On the other hand, the subjoined discussion (Shastri 1997, 46-49) ascribes the authorship of the cave to Dharādhipa, the elder brother, as can be seen, for example, in the following statement: 'Utterly grieved at the untimely decease of Ravisamba, his elder brother Dharadhipa developed an utter distaste for worldly pleasures and riches and pursued a pious life dedicated to Buddhism. He covered his kingdom with *stūpas* and *vihāras* and made charities to the suppliants (Shastri 1997, 48).'

[28] For some of the studies on Ṛishīka, Aśmaka, and Mulaka *janapadas* see ***1***. (Fergusson and Burgess 1880, 310, 343, 347); ***2***. (Burgess 1883, 40, 58, 108–09, 129, 131, 133–35); ***3***. (Altekar 1946, 96); ***4***. (Dikshit 1946); ***5***. Sircar (Eastern Deccan 1946, 88, n. 1) and (1971, 39; p. 40 n.1; 188–90; 193; p. 255 n. 1; 264; 272–73); ***6***. (Majumdar 1954, 187 f.); ***7***. (Raychaudhuri 1960); ***8***. (Rao 1960, 78, 97, 126); ***9***. Mirashi (1963, xviii, and map), and (1981, 11, 22, 32, 91, 92, 136 of Part I; 42–43, 46, 61 of Part II); ***10***. (Weiner 1977, 10 and map); ***11***. Shastri (1996, 67–68, 90) and (1997, 48, 49, and map).

[29] Although the ground plans of Burgess are very meticulous and precise, the present researcher noticed that the compass arrow placed in his General Plan has a grave error. The curvature of the scarp or the ravine is also not very precise. After careful study, the present researcher has placed a new compass arrow of his own in the Plan by Burgess that shows the true north. For this, the Plan by Burgess was rotated 92 degree counter-clockwise (Figure 12).

[30] To make matters worse, the Archaeological Survey of India (ASI) installed electric generators inside the hall of the cave; thus, forcing it to function as the site's electric supply chamber, and this is the role the cave carried out for several decades. Because of the misuse, the walls and ceiling of the cave are extensively smeared with carbon soot and deposits. Some years ago, sense prevailed to the ASI and the location of the power supply was shifted from here to a new site next to the ticket office. However, the generator machines are still enshrined in the cave, albeit no more in function. The cave was assigned another duty to function as a storeroom from which it has not still retired when I last checked in 2013. All kinds of things can be seen through the screen of the locked doors: bamboos, ladders, buckets, brooms, containers, rags, and other disposables (Figures 88-89).

[31] Spink goes further to say that Harişeṇa was directly involved being the patron of Ajantā Cave 1. For the latest summary of his ideas see: (W. M. Spink, Cave by Cave: Ajanta, History and Development series -- Handbuch der Orientalistik (HDO) series 2007, 17-40). There is no epigraphic proof of it, and I have not yet found a reason strong enough to accept this view out rightly.

[32] This chapter was published as an article (Singh 2012a).

[33] The word *śailagṛha* is extant in verse 6 of the inscription. Literally, it means stone or rock house, but more popularly and perhaps erroneously, it is called "cave" in studies on rock-cut architecture. Actually, the English rendering *cave* presents serious difficulties. For a discussion, see (Singh 2009).

[34] One of these two individuals has been called '*bhikṣu*' in the same inscription. Thus, doubtlessly they were from within the fraternity of monks. What the fact implies is that the order of the monks or the Buddhist Saṇgha as an organization had such monks who were specialist in such skills as the art or science of excavating residential or temple caves. Epigraphy here only supports the textual reference in *Culavagga* where the Buddha assigned six tasks to a monk, which included the task of building a *vihāra* or monastery.

[35] Karl Khandalavala advocated that Cave 26 belongs to sixth century CE (Khandalavala, The Chronology of Caves 16, 17, 19, 26, 1 and 2 at Ajanta and the Ghatotkacha Cave 1991, 105-29).

[36] I carried out a four-year study of Cave 26-complex, especially the developments of the first few years, and arrived at the conclusion that

the edifice was only second in chronology to be inaugurated on the site, cave 8 being the first of the Vākāṭaka period. See (Singh 2012b) and (Singh 2009a).

[37] *Text* broadly means any given writing, sign, symbol, gesture, picture, sound, or representation (the *signifier*) that is open to meaning or 'reading.'

[38] *Subtext* broadly means the latent meaning.

[39] See (Coomaraswamy 1944, 41-48). For a more popular and opposite view, see (Wimsatt, Jr. and Beardsley 1964).

[40] *Signifier* in semiotics means a sign, image, sound, or gesture that yields meaning.

[41] *Signified* is the meaning denoted by a signifier.

[42] *Referent* is a specific and particular entity among a class of signifieds.

[43] All transcripts and translations heretofore are from (Yazdani 1952, 115-17). Original parenthesis, italics, and punctuations have been retained. If any note from the original source is reproduced here, the same is marked 'note in original'.

[44] The word *kīrti* in the present context means 'temple,' 'monument,' or the like. See an essay entitled 'Kīrti: Its Connotation,' in the *Siddha-Bhāratī* (Dr. Siddheshwar Varma Presentation volume), Hoshiarpur, 1950, Pt. I, pp. 38-42. [Note 7 in original]

[45] This *āryā* is rather terse and may be elucidated further. In verse 6 we are informed that the venerable monk Achala caused a rock-temple to be excavated in honour of the Buddha, which evidently means that he provided the money needed for the work. This is a meritorious act which ordinarily a lay worshipper performs if he desires happiness in this world and liberation hereafter. Verse 7, the present *āryā*, justifies a monk's performing such an act. Achala is here alluded to as a Bodhisattva. The expression *prāg eva* is an idiom peculiar to Buddhist Sanskrit literature and answers to English 'far rather.' The implication of the statement in the verse seems to be that it is far more desirable that monks possessing wealth should spend if for charitable purposes than that even worldly wealthy people should do so. The adjuncts *bhāva-sukha-kāma* and *moksha-kāma* are common to Bodhisattvas and *saṁvidyamāna-vibhāvas* ('wealthy people'), but these are to be interpreted slightly differently in each case, as has been done in the translation. [Note 8 in original.]

[46] For the latest summary of Spink's very dependable research, see chapters on these caves in (W. M. Spink 2007).

[47] The significance of the word *kīrti* is further made clear here. By advising his readers to make temples out of the living rock, the author [Buddhabhadra] obviously alludes to the lasting nature of such monuments in contrast to those made of brick and mortar, which are less durable. [Note 1 in original]

[48] The name of the donor of Ajantā Cave No. 17 remains controversial. For Spink, his name was Upendragupta (W. M. Spink 2007, 203-30). Earlier, the name was regarded illegible in the inscription. Spinks' attribution rests mainly on Mirashi's edition (1963, 120-29), who abstained from assigning any authorship to Cave 17. However, within Spink's construction, there is an anomaly. The donor cannot be Upendragupta, but Upendragupta II, since a homonymous member of that name is mentioned earlier in the genealogy given in the same dedicatory inscription of Cave 17. New controversy has arisen after the recent edition of the inscription by Ajay Mitra Shastri (1997) who claims to have successfully read the name that was thought by Mirashi to be illegible. According to Shastri (1997, 47-48), it was Dharādhipa who sponsored Cave 17. He says that the name is not missing; only it was mistakenly regarded as an adjective rather than the proper name of the donor. For a discussion, see (Singh 2009b, 78-79).

[49] Spink's latest position on the subject of Dandin's *Daśakumāracarita* is contained in his volume I (W. M. Spink 2005, 119-62, 169-78, 179-80, 393-410).

[50] For a summary of various opinions on the issue, see (Singh 2009b, 72-76).

[51] This statement, in the first person, is supposed to be emanating from the monk Buddhabhadra, to whom the excavation of the cave-temple is due. [Note 5 in original.]

[52] For Spink's remarkable research on "intrusive" images and paintings, see his vol. II: (W. M. Spink 2006, 158-69, 204-44, 259-65).

[53] Buddhabhadra's Cave 26 stūpa-temple-complex started with a modest beginning following the plans of a typical Sātavāhana period *caityagṛha*. In the course of time various situations, setbacks, challenges, and ambitions emerged that led to the gradual expansion of the plan. Increasing number of architectural features, members, and units were added culminating ultimately into a grandiose *śailagṛha* project that was not only a 'cave-complex' with two pairs of wings (including Cave No. 25 and

27) but also had an 'annexe' (Cave No. 21, 23, and 24). Thus, Buddhabhadra's project is unique, innovative, and unprecedented in the history of rock-cut architecture.

[54] This chapter was published as an article (Singh 2012b).

[55] I am grateful to Professor Walter M. Spink, University of Michigan, USA, for helping in a number of ways; to my friend Sh. Devendra Ingle, Assistant Professor, M. J. College, Jalgaon, and his sister, Smt. Pratibha Ingle, Deputy Collector, Pune, for various help during my field trips; to Sh. Hemant S. Pagare, Superintending Engineer, Public Works Department, Aurangabad for facilitating my stays at the Circuit House, Fardapur; to Shovin Bhattacharjee for conjectural 3D reconstructions; and to Dr Ellen M. Raven of the University of Leiden for sparing her valuable time to go through the typescript and suggesting important changes.

[56] Spink has discussed this aspect frequently in many of his research papers and volumes. A summary can be found in (W. M. Spink 2009, 8–11).

[57] Jadhav regards Cave 8 as the first Mahāyāna edifice. However, he refrains from ascribing a specific date. Because he accepts Spink's chronology of Ajantā, he appears to support Spink's dating of c. 462 CE for the cave. Dhavalikar calls it a 'late Hīnayāna edifice'. Even he has not ascribed any specific date, but his dating of the cave may be inferred from his dating of the 'Late Hīnayāna' phase in general, which is from late fourth to early fifth century CE. In my view, work on the edifice may have started in an earlier decade but Phase I, comprising a simple, much smaller, and typical Sātavāhana period layout must have been completed by c. 461 CE. The edifice had multiple phases of development through which the layout was frequently modified, a portable shrine added, and attempts at plastering and painting undertaken. In May 2011, during my trip to a lesser-known Buddhist cave site on the Talaja hills in Bhavanagar district of Gujarat as well as at Banoti, I noticed that one of the leṇas has the same arranged monolithic pedestal at the rear of the shrine, on which a portable Buddha image must have been placed.

[58] For an example of the conventional view, vide (Mitra 1956, 5).

[59] In this essay, Indian architectural terms are derived from P. K. Acharya (1927) and (1946).

[60] The word Hīnayāna (Lesser Vehicle) is avoided in this article due to pejorative denotation. We cannot use Sthāviravāda, since it had many sects. A view is emerging in the favour of the Mulasarvāstivāda and Cetiya sects being involved at Ajantā besides the Mahāyānists. Until further

research, it is safe to use the terms 'Sātavāhana period caves' or the 'Vākāṭaka period caves', after the rulers of the region, whether or not they were directly involved. The word 'Mahayana,' however, is used in an inscription of Ajantā Cave 22, Line 1: *[siddham] [|*] deyadharmmo-yam s´ākyabhiksho[r*]-ma[hā] yāna - - - - [. . .]* ('Success! This is the meritorious gift of the Śākya monk, a follower of the Great Vehicle [. . .]') – (Yazdani 1952, 112).

[61] The plan referred to here is (Fergusson and Burgess 1880, plate XXXIV, fig. 4).

[62] For a discussion on the word *sthapati* (chief architect), see M. K. Dhavalikar (Dhavalikar 1969, 303-08). The word is used here in the plural because there were two *sthapatis*, as indicated by Buddhabhadra's inscription. Buddhabhadra was the patron of the caityagṛha, and he has thus recorded gratitude for the architects: 'Thanks to the monk Dharmadatta as well as to (my) good pupil Bhadrabandhu; for it is these two who have seen to the excavation and completion of this (cave) temple on my behalf'– (Chhabra 1952, 118). An earlier translation reads: 'When I had recourse to the monk Dharmadatta, and [my] good pupil Bhadrabandhu, those two constructed this temple for me'– (Burgess 1883, 135).

[63] The generator machines can still be seen inside the cave, although they are no longer functional. The edifice is now used as a storeroom (Figures 88-89).

[64] The patron of Cave 17 (and 18, 19, 20, and 29) was named either Upendragupta II or Dharadhipa (Singh 2009b, 78-79).

[65] Hariṣeṇa, the Emperor, was ruling over many *janapadas* while Varāhadeva (the patron of Cave 16) served him as a minister, and Upendragupta, the patron of Caves 17 to 20, was the feudatory king of the Ṛṣika *janapada* wherein Ajantā lay. For further details, see (W. M. Spink 2005, 7-21).

[66] Daṇḍin's Das´akumāracarita, a seventh century work in prose, seems to contain some reflections on the events leading up to the downfall of the Vākāṭaka house. Mirashi, Spink, DeCaroli, and Singh endorse the view first proposed by Mark Collins in 1907. See (Collins 1907, 60, table 2), (Mirashi 1945, 20-21 [repr. 165-77]), (Mirashi 1963, xxxii-xxxiii), (W. M. Spink 1991a, 75-88), (W. M. Spink 1992, 177-202), (W. M. Spink 2006, 6, 8, 112); (DeCaroli 1995, 675-77), (Singh 2009b, 75). Among those who oppose the view are Khandalavala, Shastri, Deshpande, and Bakker. See (Khandalavala 1990, 18-21 [repr. 117-24]), (Khandalavala 1991, 109-24),

(Shastri 1997, xii, 209), (Deshpande 1992, 8–14 [repr. 128–34]), (Deshpande 1996, 29–41), (H. T. Bakker 1992, 37–38). For an outline of the debate, see (Singh 2009b, 72–76).

[67] Mirashi has proposed that Khandesh, the region where Ajantā falls, was known as Ṛṣika janapada in ancient times. South of it lay the Aśmaka janapada. For a list of references on the two *janapadas*, see (Singh 2009b, 79–80, n. 71).

[68] For a discussion, see (Singh 2012a).

[69] Recent excavations have unearthed valuable material including a brick monastery that had a stūpa, a gold coin of the Byzantine King Theodosius, an image of Mahiṣāsuramardinī, implements, vessels, and other objects. For a full report, see 'Excavation at Ajantā: District Aurangabad' (Archaeological Survey of India 2006, 92–97).

[70] Whether the floor plan of Cave 25 by Burgess (Figure 30) is accurate needs to be examined.

[71] In Phase IV the workers did accidentally bump into the caityagṛha's vault while excavating the inner cells of the vestibule on the porch. It created an unwanted hole there (Figures 196-197), forcing all the work in Cave 25 to be abandoned permanently.

[72] See Spink's time chart (W. M. Spink 2009, fig. 39).

[73] Spink has analysed this crucial evidence in detail. See (W. M. Spink 2006, 21–53).

[74] Spink believes that the left, rear, and right walls had an equal number of cells (Figures 34-35). The ground plan by Suresh Vasant (Figure 32) is neither to scale indicates that a corner exceeds a 90-degree angle.

[75] The hall of Cave 27 would not have perished to the extent that it did, had there been pillars.

[76] Although Sātavāhana period leṇas were typically astylar, I have found at least one exception, namely Kondane Cave 2, which is a large leṇa of the second century BCE. It has as many as sixteen pillars, which display a refined understanding of symmetry and geometry. This precedent was not followed in any of the earliest started Mahāyāna leṇas of Ajantā, namely, the adjuncts of Cave 26 caityagṛha, Cave 15, and possibly Cave 20.

[77] Perhaps a structure with pillars was first tried out in Cave 11, then in Cave 6-Lower, then in Cave 16, and so on.

[78] In the course of time, some edifices received multiple cells inside the pillared vestibules at either end of the porch. In Cave 6-Upper, such modifications were done in a rampant manner, and even inside the hall, along all of the walls.

[79] See Spink's time chart (W. M. Spink 2009, fig. 39).

[80] Due to restrictions by site authorities, the author was not able to take exact measurements of the main gateway (*mūladvāra*).

[81] I am grateful to Prof. Walter M. Spink, University of Michigan, USA for sharing data on the subject; to the Archaeological Survey of India for granting special entry permission for Caves 8, 27 and 26 at 5 a.m. on June 21, 1998; to my friend Sh. Devendra Ingle, Assistant Professor, M. J. College, Jalgaon for many helps during the author's field trips; to Sh. Chandrashekhar Shikhare, Deputy Engineer, Public Works Department, Jalgaon for lending a prismatic compass; and to Dr Ellen M. Raven of University of Leiden for critical suggestions.

[82] These are the coordinates of the Ajanta hill. Erroneous coordinates are given in many other sources. For example, *Oxford School Atlas* (Oxford University Press 2005, 85) mentions '20.33N, 75.48E', which is incorrect. The compass given in the General Plan of Ajanta by Burgess (Burgess 1883, Pl. 14) is inaccurate, as can be found easily from, say, Google Earth. The error was first noticed and reported by the present author. He has accordingly placed an additional compass in the plan by Burgess pointing to the due north (Figure 12).

[83] My italics in the quotation.

[84] In the context of the fifth-century Hindu cave-shrines of Udaigiri, not far from Vidiśā in Central India, Willis writes, 'Udaigiri was a place where the summer solstice was observed and astronomical observation made. The summer solstice is naturally a hot time of year in north India […] the days round the solstice are very still and very hot, the heat being at last broken by the first monsoon rains. So a key reason for observing the solstice is that it can be used to anticipate the arrival of the rains […]. Scholars have tended to treat astronomical speculation about monuments with considerable scepticism. Archaeo-astronomy has been left to a small circle of specialists or entirely dismissed. Aside from the problem, that astronomical subjects tend to be mathematically complex and difficult to verify historically, the inability to engage constructively with these issues is embedded in the practice of art history, archaeology and, to a lesser extent, Indology […]. Of course,

in most cases it is impossible to know how people moved around a particular place or how they may have interacted with particular sculptures or physical features in the landscape […]. One constant, however, has been the sun, moon, and stars, things we know were observed and studied from early times for ritual purposes' (Willis 2004, 34-36).

[85] Uttarāyana is formed of two words: *uttara* (north) and *ayana* (the sun's road north and south of the equator; the half-year; the equinoctial and solstitial points). Uttarāyana thus means 'the progress (of the sun) to the north, or the period of the sun's progress to the north of the equator, or the summer solstice' (S. M. Williams 1899, 178). Another definition is 'the summer solstice; the sun's northward progress' (McGregor 1998, 121).

[86] Makara-Saṇkrānti literally means the entry of the sun from the zodiac Dhanu (Sagittarius) to Makara (Capricorn).

[87] *Dakṣiṇa* means south. Hence, Dakṣiṇāyana means 'southward way, way to Yama's quarter, sun's progress south of the equator, the winter half-year, situated in the sun's winter course' (S. M. Williams 1899, 465).

[88] Karkaṭa-Saṇkrānti denotes entry of the sun from Mithuna (Gemini) to Karka (Cancer) zodiac.

[89] The 12 *rāśis* correspond to the 12 zodiacs as well as to the 12 divisions of a year (excluding the 13th division being *malamāsa* (*mala* means inauspicious, and *māsa* means month)). Each of the 13 divisions are of 28 days, being shorter than a month.

The *rāśis* with *malamāsa* make the Indian calendar year (336 days of the *rāśis* + 28 days of Malamāsa = 364 days). It does not suffer with the odds and evens like the 28s and 29s, and 30s and 31s, of the European calendar. Among the thirty-something calendars used currently in India, those based on *Suryasiddhānta* is more popular. Two of the most popular eras are Vikram Samvat and Śaka Samvat.

[90] P. V. Kane writes [my translation from Hindi], 'About ninety years ago, according to the almanacs of those times, it [Makara-Saṇkrānti] used to take place on January 12 or 13, but now because of the forward shift of the equator it falls on January 13 or 14' (Kane 1973, 80).

[91] The Julian calendar also had errors. See, e.g. (Kane 1973, Part 1, p. 314); (Coyne 1983), and; (Meeus and Savoie 1992).

[92] My friend Devendra Ingle, Assistant Professor, M. J. College, Jalgaon went to the site on my behalf at the dawn of June 21, 2007 to measure the angle of the axis of Cave 26 and of sunrise on the site using

scientific prismatic compass. He reported, "Cave No. 26 is facing 63° on azimuth." The angle of sunrise on the site (N20°33'9"; E75°41'65") is measured 64.27° East-northeast at 05:43 AM on 21 June. This date would be called summer solstice as per the European calendar. In Indian calendars, the date of summer solstice is July 15 or 16 called Dakṣiṇāyana or *Karkaṭa-saṅkrānti*.

We also come to know that the compass placed in the General Plan of James Burgess (Burgess 1883, Plate XIV) has a grave error, which has seen perpetuation in Ajanta literature. The compass is *not* pointing to the north but some other direction. The error was first noticed and reported by the present author (Singh 2009a).

[93] I have used the following online calculators, software, and resources for solar and lunar calculations and for the conversion of epochs, eras, and calendars:

i. Software for the conversion of historical calendars, and solar and lunar calculator: *Suryasiddhanta (HIC)* computer application (Gislen and Eade 2007).

ii. Online solar and lunar calculator: (Time and Date.com, Solar calculator 2013)

iii. Online lunar calculator: 'Six Mellennium Catalog of Phases of the Moon' (NASA Eclipse Web Site n.d.).

iv. Online calculator for amant and Purnimant years in traditional Indian calendars and eras: (Yano and Fushimi 2004).

v. Online lunar calculator: 'Phases of the Moon: 401 to 500' (NASA Eclipse Web Site n.d.).

vi. Online solar calculator: (PSA Algorithm n.d.).

vii. Online solar calculator using SPA Algorithm: (NREL's Solar Position Algorithm (SPA) 2003).

[94] The measurement was taken by my friend, Sh. Devendra Ingle, Assistant Professor, M. J. College, Jalgaon on my behalf who used a scientific prismatic compass for reading the angle.

[95] The measurement of the sunrise angle pertains to the nearest city of Jalgaon, 60 km from the Ajanta caves. This is because the calculator of Timeanddate.com is based on city names. There is no provision to obtain the result based on longitude and latitude factors.

[96] Photographic and video documentation of the sunlight entering in the *caityagṛha* is needed for all days of June. That will provide the best data for such a study. The task can best done by the site authorities. For an individual it may be an uphill task due to the following reasons: (*a*) The cost of staying at the site for one month; (*b*) Permission from three different authorities to enter the cave site before twilight for all days of June: ASI, Maharashtra Tourism Development Corporation, and Department of Forests; (*c*) Biking to the cave-site from the tea-point (4 km) through the undulating terrain amid fear of the tigers recently introduced by Dept. of Forests. Biking is the only option since motorised vehicles, other than the diesel run buses of MTDC, are not permitted to ply between the Tea-point and the caves.

[97] For a discussion on this, see chapter 8.

[98] The Vākāṭakas did not initiate an era of their own. For an update on Vākāṭaka history, see (H. Bakker 2004).

[99] The word *vāstu* literally means 'a place of residence'. In Sanskrit lexicons, it denotes a house-site and a house proper. In the *Arthaśāstra*, it has a wider connotation covering a building-site, gardens, bridges, tanks, and a base: *gṛham kṣetramārāmāssetubandhstaṣṭākamādhāro vā vāstu*.

[100] For the use of gnomons for *diśā-vidhāna* see (Acharya 1927) and (Acharya 1946).

101. The cave was accessible when Burgess (Fergusson and Burgess 1880) and Dey (Dey 1925) visited it, as they found it 'the last accessible vihāra.' However, Gupte (Gupte and Mahajan 1962) and Mitra (Ajanta 1956) found it inaccessible, which condition persists even today. In late 2004, an official on duty helped me climb up through a bamboo ladder. However, in April 2005 my written requests for access to the cave was denied. In recent years, however, I have been fortunate to to be granted special permissions for studying the present and other caves on the site for which I am thankful to the Aurangabad Circle and New Delhi Headquarters of the ASI.

[102] The detailed analysis would be presented in a forthcoming research paper.

[103] A detailed discussion is included in Chapter 8.