

INDEPENDENT DETERMINATION OF THE BEGINNING OF THE GUPTA ERA USING ASTRONOMICAL METHOD AND RELIGIOUS BELIEF OF CHANDRAGUPTA II VIKRAMADITYA

BY

ANAND M. SHARAN
PROFESSOR, FACULTY OF ENGINEERING
MEMORIAL UNIVERSITY OF NEWFOUNDLAND,
ST JOHN'S , NEWFOUNDLAND, CANADA A1B 3X5
asharan@engr.mun.ca

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ABSTRACT

In this work, a review of the years of the beginning of the important Gupta era has been carried out. The correct year is arrived at by a study of the Gupta era inscriptions in cave 6 at Udayagiri, a place north east of Bhopal, in Madhya Pradesh. The inscriptions state that Chandragupta II was present in the caves on the day of the ekadashi (eleventh day) of the bright phase of the moon during the 82nd year of the Gupta era. The Julian calendar date of this event has been arrived at by performing astronomical calculations for the years 401, 402, and 403 AD, the possible years for Chandragupta II to have been there. The correct year was determined when the passage at Udayagiri on the above mentioned ekadashi day - was fully illuminated by the sun. The year so determined was 402 AD which results into 320 AD as the beginning year of the Gupta era.

In addition, the work also discusses briefly, the religious faith of Chandragupta II Vikramaditya .

INTRODUCTION

Although the Gupta era is considered as the golden age of India yet, the year of its beginning has not been ascertained clearly by historians. They have differed from each other, and have mentioned a range 319 AD to 321 AD.

The inscriptions by Fleet [1888] have been there for a long time but no one had thought that these inscriptions would one day lead to the determination of the beginning year of the Gupta era.

One could deduce the beginning year of the Gupta era from the work of Sharan, and Balasubramaniam [2004] but this fact was not stated explicitly amongst its objectives, and attempts were not made towards achieving this goal in that paper.

The objective of the present work is a step further in that direction, and which is needed, to complete the above mentioned work . In addition, this work also discusses briefly the religious beliefs of Chandragupta II Vikramaditya.

CHANDRAGUPTA I AND SAMUDRAGUPTA

The Gupta dynasty rose after the collapse of the Indo-Scythian or Kushan empire in India at some time in the third century . In the period just earlier (after Kushans) - many independent states must have been established when the control of a central authority ceased to exist .In the views of large number of historians [Cunningham, 1970; Wolpert, 1993 ; Tripathy, 1985 ; Smith , 1958 ; Jain, 1997 ; Sircar, 1969] , the Gupta era had its beginning somewhere around 320 AD when Chandragupta I ascended the throne of Magadha . Other possible years mentioned range from 319 to 321 AD.

The Lichchhavis of Vaisali, last heard of in the days of Lord Buddha, again emerged after 800 years of silence. The clan established themselves in Pataliputra, the ancient imperial capital, and perhaps they had ruled there as tributaries or feudatories of the Kushans, whose headquarter was at Peshawar. Early in the fourth century a Lichchhavi princess was married to a Raja of Magadha who bore the historic name of Chandragupta. The matrimonial alliance with the Lichchhavis enhanced his power so that he was able to extend his dominion over Oudh as well as Magadha, and along the Ganges as far as Prayaga or Allahabad. Chandragupta recognized the contribution of his wife by striking his gold coins in the joint names of himself, his queen (Kumara Devi), and the Lichchhavi .

Chandragupta I was succeeded by his son, Samudragupta who expanded his kingdom vastly. Samudragupta's son , Chandragupta ascended the throne after the death of his father, Samudragupta.

CHANDRAGUPTA II

About A.D. 380, or perhaps some five years earlier, he (Samudragupta) was succeeded by his son , Chandragupta II . Later in life, he took the additional title of Vikramaditya , which is associated by tradition with the Raja of Ujjain who is believed to have defeated the Sakas and established the Vikrama Era going back to 58-57 B.C [Sharan, 2004] . Chandragupta II, had his principal military achievement , the conquest of Malwa, Gujarat, and Saurashtra or Kathiawar countries which had been ruled for several centuries by Saka chiefs. Those chiefs, who had been tributary to the Kushans, called themselves Satraps or Great Satraps. The conquest was made between the years 388 and 402 A.D. The subjugation of the Malawas and certain other tribes which had remained outside the frontier of Samudragupta, although enjoying his protection , brought the Magadha rule in direct contact with the Arabian sea . This opened communication with Egypt , Arabia, and Europe and led to exchange of wealth and knowledge with the countries involved .

Udayagiri, is in Eastern Malwa near the ancient city of Vidisha. One can refer to the works of authors such as Balasubramaniam, or Dass, or Sharan as one of the authors in their various publications regarding the Udayagiri astronomical remains ; and some of these works are mentioned in the references here. There was an observatory set up at Udayagiri nearby on the hills [Sharan, and Dass, 2007] . This location has caves depicting the Gupta era fine arts (shown in Fig. 1) . The map shows the locations of caves 6 near the gate or entrance, and cave 13 in the passage where there is a statue of Lord Vishnu (shown as Fig. 2) . A view towards the gate or entrance , in the north - easterly direction, from the passage in front of cave 13 is shown in Figs. 3, and 4. The cave 13 is on the right hand side (south side) in Fig. 3.

GUPTA ERA ASTRONOMICAL REMAINS AT UDAYAGIRI

The original location of the Iron Pillar , Vishnupadagiri, has been identified as modern Udayagiri in the close vicinity of Eran, Vidisha and Sanchi [Balasubramaniam, 2002]. These towns are located about 50 km east of Bhopal, in central India, and the region is called Malwa. It is here that we find two datable inscriptions mentioning Chandragupta II. At this location, 19 of the 20 cave temples are from the time of Chandragupta II .

The Udayagiri location is on the Tropic of Cancer. The Tropic of Cancer has been mentioned as the ideal latitude for establishment of astronomical observatories in ancient India . There are several significant days in the year as regards to the position of the sun with respect to the earth. These are the summer and winter solstices and the equinoxes. It is important to understand - which event among these was the most important during the Gupta period. In this regard, there is specific mention of a particular day, in addition to the mention of the name Chandragupta, in an important Gupta-period inscription in Udayagiri in cave 6 [Fleet, 1888] .

THE DETERMINATION OF THE YEAR OF PRESENCE OF CHANDRAGUPTA II USING THE INSCRIPTION IN CAVE 6

The inscription is read as :

" Perfection has been attained! In the year 80 (and) 2, on the eleventh lunar day of the bright fortnight of the month Âshâdha,— this (is) the appropriate religious gift of the Sanakânika, the Mahârâja . . dhala (?),— the son's son of the Mahârâja Chhagalaga; (and) the son of the Mahârâja Vishnudâsa,— who meditates on the feet of the Paramabhattachâraka and Mahârâjâdhirâja, the glorious Chandragupta (II.) "

So, the problem remains, as a first step, is to establish the calendar date of the 82nd year of the Gupta Era where Chandragupta mentioned in the last line is obviously not Chandragupta I . The day mentioned is the eleventh lunar day of the bright fortnight of the month of Asadha .

As the Sanakanika inscription refers to the 82nd year of the Gupta Era, calculations were performed for the years 401 AD to 403 AD (shown in Tables 1 to 3) to determine - which year and which particular date mentioned in the inscription was close to a major event for the Vaishnavites where it has been established that the Guptas were Vaishnavites . The reason is that in cave 13 , the statues show Lord Vishnu laying in Kshirsagar (Figs. 2, and 5) . On the ekadashi day, Lord Vishnu goes to sleep in Kshirsagar , and this day is considered to be the beginning of the Chaturmasa (four months) of the rainy season which is full of festivals. Therefore, the descriptions in the inscriptions agree with the scene depicted in cave 13. Even to-day, this ekadashi day is celebrated with a lot of festivities at Puri in Orissa, Pandarpur in Maharashtra, and Ahmedabad in Gujarat.

The orientation of cave 13 is along the north – easterly direction in the passage (refer to Figs. 1, and 3, and 4). On the summer solstice day, the morning rays of the sun at Udayagiri shine from the north-east. Therefore, this cave is aligned along the morning sunrise direction.

Only on certain days (during a week before and after the summer solstice) , the passage is fully illuminated

by the sun as mentioned in the work of [Sharan, and Subramaniam, 2004]. Other researchers such as Dass, and Willis [2002], also mention this fact.

Tables 1, 2, and 3 show the variation of the angles per day for the moon and this is 13.333 degrees when measured with respect to the stars (sidereal) in the sky. The moon traverses one nakshatra in one day (tithi). Therefore, in 27 tithis (27 x 13.333) one would have 360 degrees . For the Purnima of the Asadha month, the moon's angle should differ from the sun's by 180 degrees. In these tables, the positions of the sun and the moon are calculated using the astronomical software. In these positions, a correction is applied due to the precession of the earth's axis [Devi, 1995]. The corrected values of the sun, and the moon are shown as SUNC, and MOONC respectively in these tables. Finally, to determine the Purnima (the full moon day) , the absolute difference between the positions of the sun and the moon is calculated and the values thus calculated are shown in a separate column in these tables.

The results of the calculations presented in Tables 1,2, and 3 show that only in Table 2 , the Purnima of the Asadha month occurred on the 30th of June – close to the summer solstice day. Therefore, it is concluded that the ekadashi mentioned in the Sanakanika inscription in cave 6 was on the 26th of June, 402 AD. The ekadashi day (eleventh day) is known from the Purnima day. The Purnima occurred far from the summer solstice day in the years 401 and 403 AD. So, in those years, the passage containing cave 13 would not have been illuminated.

Referring to Table 2 , the Purnima would have been on June 30, when the absolute difference in angle between the sun and the moon approaches 180 degrees from the lower side.

If we subtract 82 years from the year 402 AD, we get 320 AD as the beginning year of the Gupta era.

RELIGIOUS OCCASION FOR THE VISIT OF CHANDRAGUPTA II

As established above , the date on the inscriptions in cave 6 was June 26, 402 AD, one wonders why did the Vikramaditya visited this site on this day. The answer comes from the Bhavishya-Uttara Purana [<http://www.acbspn.com/ekadashis/sayana.htm>] where this particular day is called the Sayana EkAdasii or the Deva-sayana - Padma Ekadasi. It is a very auspicious day for the Vaishnavites and when Vishnu goes to sleep in Kshirasagara and this day marks the beginning of the Chaturmasa (four months) starting from the month of Asadha to Kartika. During these months people are advised to keep fasts as water in the wells becomes impure due to flood or rain. The inscription does use the word religious in ‘ religious gift of the Sanakanika ‘ above. Obviously, it was an important day for Chandragupta II Vikramaditya.

Fig 2 shows Lord Vishnu sleeping in the ocean whereas in Fig. 5, one can see Sheshnag (left top corner) covering Lord Vishnu's head. Such scenes are displayed in other temples in India also.

Vikramaditya is famous for Betaal stories whereas here, we have confirmation of his deep religious (Vaishnavite) beliefs in Vaishnavism.

For the first time in history , this cave shows any evidence of lifestyle of Vikramaditya It shows the

magnificence of the Gupta era's reaching the peak of Indian Civilization where one can see a combination of art, religion, and science (astronomy) existing in unison.

CONCLUSIONS

In this work, there was a brief review carried out of the historical dates of the beginning of the Gupta . From these reviews it was determined that the beginning years ranged from 319 AD to 321 AD.

The date mentioned in the inscriptions in cave 6 of the Udayagiri hills show that Chandragupta II in the 82nd year of the Gupta era was there on the ekadashi day. This was ascertained from the astronomical calculations made for this ekadashi day in the year 402 AD and not in either 401 AD.or 403 AD.

This work also sheds light on the lifestyle of Chandragupta II Vikramaditya having deep religious faith in Vaishnavism just like his father Samudragupta.

Here, we also see Chandragupta II having taste for art just like his father Samudragupta who used to play Veena, an instrument.

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TABLE 1: POSITIONS OF SUN AND MOON IN THE YEAR 401 AD

YEAR	MONTH	DATE	SUN	MOON	AYANAMSHA	SUNC	MOONC	ABS(MOONC-SUNC)	TITHI
401	6	27	93.4	93.7	1.955	91.445	91.745	0.3	1
401	6	28	94.4	106.5	1.955	92.445	104.545	12.1	2
401	6	29	95.3	119.3	1.955	93.345	117.345	24	3
401	6	30	96.3	132.3	1.955	94.345	130.345	36	4
401	7	1	97.2	145.4	1.955	95.245	143.445	48.2	5
401	7	2	98.2	158.6	1.955	96.245	156.645	60.4	6
401	7	3	99.2	172	1.955	97.245	170.045	72.8	7
401	7	4	100.1	185.5	1.955	98.145	183.545	85.4	8
401	7	5	101.1	199.1	1.955	99.145	197.145	98	9
401	7	6	102	212.6	1.955	100.045	210.645	110.6	10
401	7	7	103	226	1.955	101.05	223.95	122.9	11
401	7	8	103.9	239.2	1.955	101.945	237.245	135.3	12
401	7	9	104.9	252.2	1.955	102.945	250.245	147.3	13
401	7	10	105.9	265.2	1.955	103.945	263.245	159.3	14
401	7	11	106.8	278	1.955	104.845	276.045	171.2	15

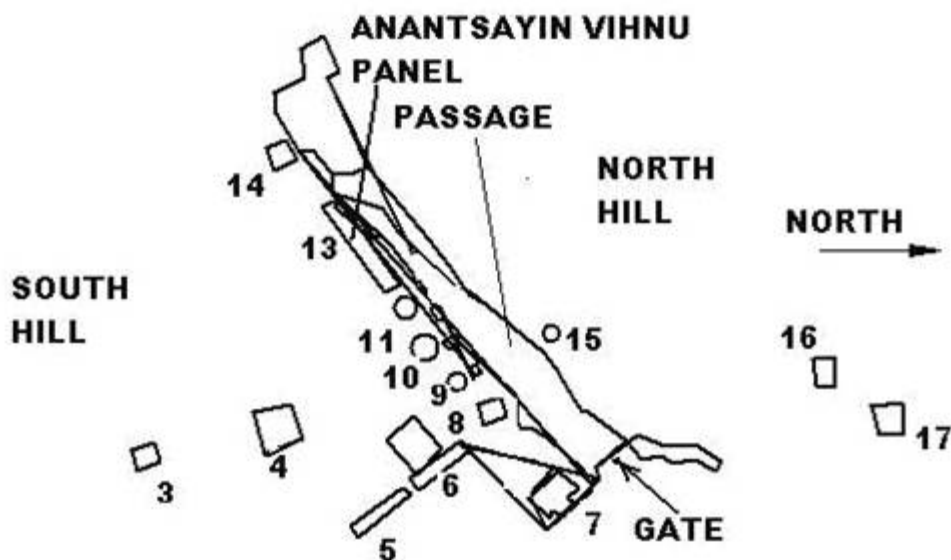
TABLE 2: POSITIONS OF SUN AND MOON IN THE YEAR 402 AD

YEAR	MONTH	DATE	SUN	MOON	AYANAMSHA	SUNC	MOONC	ABS(MOONC-SUNC)	TITHI
402	6	16	85.355	89.46	1.955	83.4	87.5	4.1	1
402	6	17	86.255	102.3	1.955	84.3	100.3	16	2
402	6	18	87.255	115.1	1.955	85.3	113.1	27.8	3
402	6	19	88.155	128.1	1.955	86.2	126.1	39.9	4
402	6	20	89.155	141.2	1.955	87.2	139.2	52	5
402	6	21	90.155	154.5	1.955	88.2	152.5	64.3	6
402	6	22	91.055	167.9	1.955	89.1	165.9	76.8	7
402	6	23	92.055	181.4	1.955	90.1	179.4	89.3	8
402	6	24	92.955	194.9	1.955	91	192.9	101.9	9

402	6	25	93.955	208.4	1.955	92	206.4	114.4	10
402	6	26	94.855	221.8	1.955	92.9	219.8	126.9	11
402	6	27	95.855	235.1	1.955	93.9	233.1	139.2	12
402	6	28	96.755	248.2	1.955	94.8	246.2	151.4	13
402	6	29	97.755	261.1	1.955	95.8	259.1	163.3	14
402	6	30	98.655	274	1.955	96.7	272	175.3	15

TABLE 3: POSITIONS OF SUN AND MOON IN THE YEAR 403 AD

YEAR	MONTH	DATE	SUN	MOON	AYANAMSHA	SUNC	MOONC	ABS (MOONC-SUNC)	TITHI
403	7	6	101.3	107.6	1.955	99.345	105.645	6.3	1
403	7	7	102.3	120.3	1.955	100.345	118.345	18	2
403	7	8	103.2	133.2	1.955	101.245	131.245	30	3
403	7	9	104.2	146.2	1.955	102.245	144.245	42	4
403	7	10	105.1	159.4	1.955	103.145	157.445	54.3	5
403	7	11	106.1	172.7	1.955	104.145	170.745	66.6	6
403	7	12	107.1	186.1	1.955	105.145	184.145	79	7
403	7	13	108	199.7	1.955	106.045	197.745	91.7	8
403	7	14	109	213.2	1.955	107.045	211.245	104.2	9
403	7	15	109.9	226.7	1.955	107.945	224.745	116.8	10
403	7	16	111	240	1.955	108.95	238.15	129.2	11
403	7	17	111.8	253.4	1.955	109.845	251.445	141.6	12
403	7	18	112.8	266.5	1.955	110.845	264.545	153.7	13
403	7	19	113.8	279.4	1.955	111.845	277.445	165.6	14
403	7	20	114.7	292.3	1.955	112.745	290.345	177.6	15

**FIG. 1 PLAN VIEW SHOWING LOCATIONS OF CAVES AND PASSAGE**

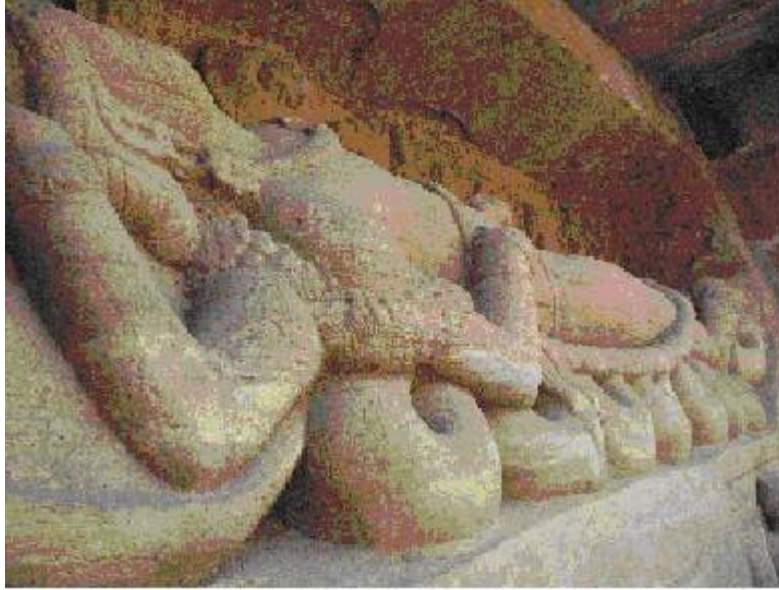


FIG. 2 ANANTASAYIN VISHNU IN CAVE 13

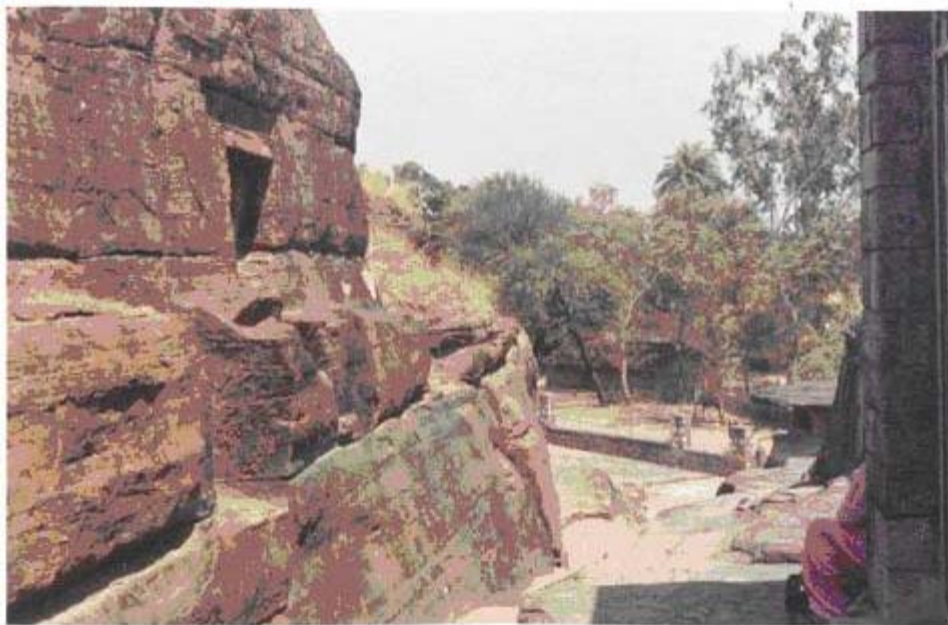


FIG. 3 A VIEW OF PASSAGE FROM CAVE 13

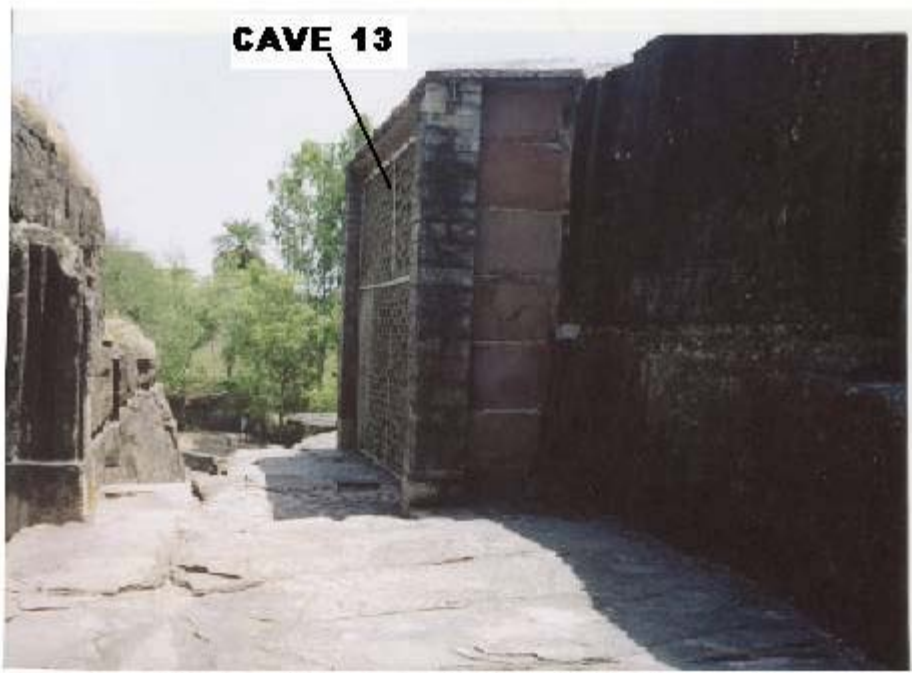


FIG. 4 A VIEW OF THE PASSAGE WITH CAVE 13 ON THE RIGHT (SOUTH WALL)

SHESHNAG

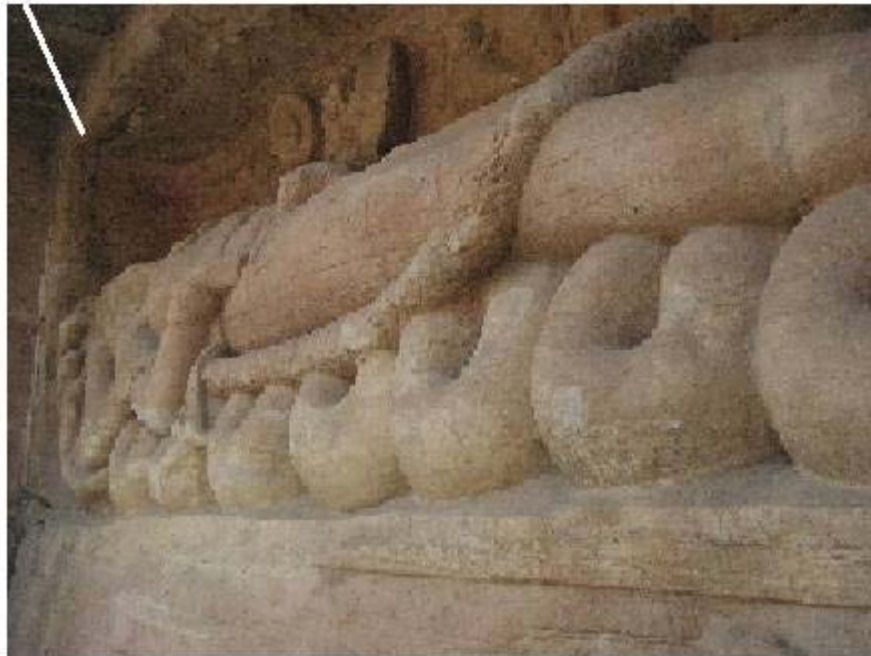


FIG. 5 LORD VISHNU SLEEPING IN KSHIRSAGAR

SHESHNAG



FIG. 5B VISHNU'S HEAD COVERED BY SHESHNAG