the "Mosque of Mansa Musa" and providing a four-man guard to watch over the site. Funds are also being sought to provide similar measures at Saney. This, however, is not a viable option for every archaeological site in the Gao region, let alone the whole of Mali, as obviously the costs of such action would be crippling. Similarly, it is difficult to blame the robbers themselves who are supplementing their very meager incomes dangerously to supply eager, distant (often very distant) markets (lnsoll 1993a:631).

Even though in this case the prime market is not a Western one, some of these beads are bought by tourists from North America and from Europe. Educating people not to buy beads from these sources could well slow down the rate of destruction of important archaeological sites. It is the responsibility of archaeologists, bead researchers, collectors, and all those who study and write about beads and other such material to set an example to the general public by, as far as possible, checking the provenience of the material they deal with and by not purchasing or handling materials of dubious origin. It is worth remembering that a bead without context is not much more than a pretty object.

Acknowledgements

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35. SACRED PALM-LEAF BEADS, by Alok Kumar Kanungo (2000, 37:9-15)

This paper discusses palm-leaf beads, each comprised of 31 overlying discs. Being of a religious nature, their production and usage are intimately related to a particular cultural context in which the right to wear such beads is restricted to a person's status (religious hierarchy). Their manufacture is done solely by hand, entailing a high level of dexterity, sophistication, and exquisite craftsmanship.

Introduction

The palm-leaf bead is a type of sacred bead composed of 31 disc-shaped, centrally punched palm leaflets, of which 29 are inscribed with religious texts on both sides. The remaining two leaves, which are placed at the two ends of the bead, are uninscribed. These leaflets are sized and strung in a manner imparting a spherical shape. The largest disc fits in the middle position, i.e., the 16th position, and the size of the remaining leaflets reduces towards both the ends. Once strung, each bead begins and ends in a knot which keeps it, segregated from others, thereby rendering the string infallible. The diameter of leaflets ranges from 0.5 cm to 2.5 cm. The number of characters on each disc varies from 4 to 20 in accordance with their respective size.

The author came across four such palm-leaf bead strings and one pendant, located in different parts of India. These are as follows:

1. A string made of 58 beads and one pendant with *Srimad Bhagvat Gita* part I, inscribed on it, at the Berhampur University Manuscript Library, Berhampur, Orissa.

2. *Srimad Bhagvat Gita* part II, consisting again of 58 beads and one pendant, at the Orissa State Museum, Bhubaneswar, Orissa (Fig. 1).

3. A string containing 27 beads and one pendant with

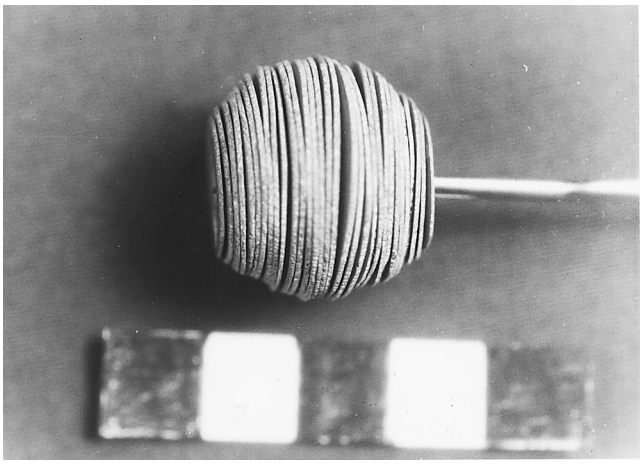

Figure 1. The case-study bead having 31 discs (the scale is 5 cm long).

the *Gitagovinda* inscribed on it, at Orissa State Museum, Bhubaneswar, Orissa.

4. "Written palm leaf pieces tied in the form of beads and strung into a rosary (Kerala University Oriental Manuscripts Library, Tiruvanantapuram)" (Murty 1996:31).

5. One pendant (single bead on a string) made of 31 inscribed palm leaflets with *Saptashloki Gita* (Gita in seven verses) and *Chaturshloki Bhagavata* (Bhagavata in four verses) inscribed on it, in the private possession of Niranjan Paatjoshi, Lathi village of Berhampur, Ganjam, Orissa.

The poor preservation, combined with the rules of Berhampur University and the Orissa State Museum, did not allow for an in-depth study of the beads. Repeated attempts by the author to communicate with the authorities at the Kerala University Oriental Library have been in vain. In 1999 the author located a pendant in the possession of Niranjan Paatojoshi and a case study was carried out, which is the basis of this work.

Brief Outline of the Religious Texts found on the Beads

The *Srimad Bhagavad Gita* (1st-2nd centuries A.D.), often known simply as the *Gita* (song) is a material interpretation of the instructions of the *Upanishads*[1] and their bearing on social life. It highlights and rewards nothing but *karma* (duty). It is considered one of the most sacred works for the Hindus and consists of 700 verses divided into 18 chapters. Most of these are dialogues between Krishna and Arjuna on the battlefield of *Kurusshetra*.[2]

The *Srimad Bhagvat Purana* deals with the life and adventures of Krishna, an incarnation of Vishnu. It is probably the most popular of the Puranas and the story of Krishna has had a great influence on both north Indian folk and classical music as well as on literature. The ecstatic devotion of the *gopis* (milkmaids), especially that of Radha for Krishna, and their yearning for him, occur over and over again. It is believed that the *Srimad Bhagvat Purana* was composed by Maharshi Vyasa (the author of the *Mahabharata*).

The *Gitagovinda* relates the love story of Krishna and Radha. The medieval devotional acts that developed in Bengal largely dwelt upon the Gitagovinda (12th century A.D.). These songs are still sung during the Vaishnava festivals in Bengal and Orissa. The spread of Vaishnavism in the East was largely due to this poem.

The Beads

The *Gitagovinda* string consists of 28 (27 beads + 1 pendant) beads and each volume of the *Srimad Bhagvat Gita* strings contain 59 (58 beads + 1 pendant) beads. The exterior of the *Gitagovinda* string has been painted in green pigments to protect it from insects and other detrimental agents. Due to the inadvertent care of the other string it is not possible to verify the same. The pendants (basically a bead strung from the apex of the chain) carry information about the author's name, date, year of completion of the work, and the introductory inscriptions. The remaining beads consist of verses from the *Gita/Gitagovinda*. From the inscription engraved on the pendant of both *Gita* part I and II, it was found that both strings are two parts of the same and were engraved by a person named Raghu Paika Mahadeba Panda in Sakabda 1838, i.e., A.D. 1916, at Kunikhanda village of the Ganjam district in the state of Orissa. The *Gitagovinda* string was engraved in 1971 at Athagada, Ganjam district (the name of the author was not readable).

Antiquity

"The manuscripts now available are not generally older than about 600 years (only in a few cases, it may be 1000 years or more) because of the fragile nature of the material used for writing" (Murty 1996:31). However, palm leaf usage has been in vogue since the 5th century B.C. *"Panna"* of the *jatakas* is presumably palm leaf. Palm leaves as a medium for writing have been referred to by Husen-Tsang (7th century A.D.). There is evidence as early as the 15th century A.D., when copper plates used for charters were fashioned after palm leaf; i.e., oblong and narrow. The earliest copper plate of this sort is the Taxila plate of Patika dated to A.D. 21 (Buehler 1897:54). Palm leaves were being used as late as the middle of the 20th century. Today, palm-leaf writing might not be a frequent event but the art is still practiced in Kerala and Orissa for writing horoscopes, initial lessons of students, etc. However, the incision of palm leaves

to manufacture such beads are not a common phenomena today.

The oldest inscribed palm leaf bead available today is that of the *Gita* dated to A.D. 1916 It is a formidable task to trace the origins of such beadmaking traditions in Orissa on the basis of the currently existing bead-strings, but their historical origin cannot be questioned, particularly as when Vaishnavism was at its peak in this region, and printing on paper was not in abundance. People, keen to possess a replica of sacred works like the *Gita*, copied such material on palm leaves, as they were easily and readily available.

Vaishnavism witnessed its rise in the Classical age of Indian history, and marked the era of cultural efflorescence in India. Under the patronage of the Mathuras (5th century A.D.) and Nalas, it flourished in Kalinga and Kosala. Under the Imperial Gangas[3] (about A.D. 1110), it spread throughout the length and breadth of Orissa from the Ganga to the Gautama Ganga. Ramanuja[4] (A.D. 1107-1117), Jayadava[5] (12th century A.D.), and Narahari Tirtha[6] (A.D. 1264-1278) upheld its cause and enriched it with their ideologies. Under the *Suryavamsi Gajapatis*, the worship of Vishnu was identified with that of *Jagannatha*. In this new consciousness that marked the climax of Vaishnavism in Orissa, the contribution of Rai Ramananda, Sri Chaitanya[7] (A.D. 1510), and five of his associates shall remain imperishable in the history of Vaishnavism (Behera 1977:376). With the influence of Vaishnavism it became more or less a prerequisite for most of the inhabitants of Orissa either to recite the name of Krishna, through the *Bhagavat* or to hear the same from the *Bhagavat Tungi* (a house in each village for reciting the *Bhagavat*) everyday, to help them identity with main stream Hinduism. Some people considered having the *Bhagavat* with them all the time a sign of great devotion. This clearly indicates that beads like those discussed here probably played a role in the process of keeping the devout and their devotion together.

Manuscripts

Tsai Lun of China is credited with the invention of paper in A.D. 105. Paper was introduced to India by the Mughals. Prior to this all texts were written by hand on various materials including stone, copper, birch bark, and palm leaves. However palm leaves dominated all the other materials. These books are today referred to as palm-leaf manuscripts.

Preparation of the Leaves

There are a number of procedures by which palm leaves are prepared for writing or incision. In north India, the leaves are exposed for a few days during the day and night. The heat of the sun dries the leaves and the dew in the night makes the color of the leaves white. When the preference is for writing and not for incision, the surface needs more softening. For this purpose the leaves are soaked in water for some days and then left to dry without direct exposure to the sun. Later, with a smooth and soft stone, the sides of the leaves are polished till all the pores are flat. In some places the leaves were kept underneath a heap of mud and water of the required quantity was poured upon them daily. Then they were removed and the treatment of polishing was undertaken to smooth the sides (Sampath 1975:264).

De Silva (1938:xiv) describes the preparation of palm leaves, as in vogue, in Sri Lanka. Leaf buds were collected and immersed in cold water and heated over a slow fire. As the water began to boil, the heat was reduced gradually and the leaves were allowed to simmer in the water for three to four hours. Thereafter, the leaves were dried in the shade for three days and nights. The leaves were smoothed by pulling them up and down against a smooth cylindrical wood surface, mostly of the Areca palm. Then they were cut to the required size. The leaves were lightly pressed at the ends and sides and then singed with a hot iron. This ensured preservation from the damp and mold.

Murty (1996:27) states that mature leaves are first dried and then boiled in water and again dried in the shade. The surface of the leaves is made smooth by rubbing them with a burnishing stone. They are then cut to the required size. He mentions two traditional verses pertaining to the features of the leaf that is fit for writing:

Tada patram drdham saumyam riju sagram dvidha-krtam; mrdulam yat prasastam tan matam lekha-vilekhane. Karkasam klmasam vakram hinagram sphutitam yugam; talapatram na tat s'restham matam lekha-vilekhane. Meaning: Palm leaf which is not cleft, is clean (or smooth) and straight, having ends (not broken), separated from the rib, sort, is best for writing. Palm leaf that is hard, unclean (or rough), not straight, without ends (i.e., broken), cleft not separated from rib, is unfit for writing (Murty 1996:27).

After sizing the palm leaves, punching is required to string them all, before the incision starts. De Silva quotes a verse that gives directions for punching holes:

Ayamena catur bhagam tribhagam punar eva caj ubhayah sutra-madhyena tatha kuryat chidralaksanam. Meaning: The leaf is folded in three and unfolded, again folded in four and unfolded. The leaf is punched between the creases (De Silva 1938:xiv).

Case Study

The bead chosen for this case study has the compressed version of two sacred texts of the Hindus; viz., *Chatursloki Bhagavata* (the whole Bhagavata compressed into four verses) and *Saptasloki Gita* (the whole *Gita* compressed into seven verses). They are incised in the Oriya script and in the Sanskrit language, on both sides of the leaves excluding the first and the last leaflets of each bead (Fig. 2).

The following is a discussion of the palm-leaf bead production technique and the role of beads as noted by 70-year-old Niranjan Paatojoshi. He inherited this bead from his father Dasarathi Purohita Rajaguru Sharma. Dasarathi produced such palm-leaf beads, the skill having been inherited from his mother. He was the royal preceptor to the feudal king of Mahuri and made such beads for the King and for himself exclusively. He wore such a palm-leaf bead on his wrist (produced in 1944-1945) and a bead string around his neck with the *Gita* inscribed on it. At the occasion of his death in 1947, hounded by the fear of blasphemy, the palm-leaf beads were removed from his body before the funeral. The full string consisting of approximately a hundred plus beads with the entire *Gita* inscribed on it is supposedly in the possession of one of his cousin's sons (who is reluctant to supply any information about the same). The case study was thus carried out on the bead bound to his wrist.

Manufacturing Technique

The technique followed for producing beads of inscribed palm leaves is in some stages similar and in other stages in contrast to that generally prevalent for the manufacture of palm-leaf manuscripts.

Of the three widely available species of palm tree (*Corypha umbraculifera*, *Corypha faliera*, and *Borassus flabellifera*), only the first was used for the manufacture of palm-leaf beads. The leaves were collected and soaked in the water for one or two days. They were taken out and kept under the sun for one or two more days and then pressed with a flat piece of wood on which some stones were placed so as to exert additional weight, thus making the writing area flat and straight. The leaves were cut into rectangular sizes, from which a number of required circular leaves could be later worked. Thereafter circular marks in required sizes were impressed on the leaves with the help of a compass. The center of the circles was punched with the help of a hot iron nail with a circular interior depression. The *tantras* enjoin that the holes should always be punched–never cut with a knife or produced by burning.

The inscriber sat, keeping this palm-leaf square on a flat piece of wood on one knee, and holding a *lekhani* (stylus) in his hand. The latter is a rod of iron about 10-30 cm in length with the thickness of a pencil and tapering towards one end which is used as a writing instrument for palm-leaf manuscripts. Then, with the help of the *lekhani*, the inscriber started the inscription from the center outwards on both sides. The inscription area was restricted to the space in-between the punched areas and the circular marks incised upon the squares.

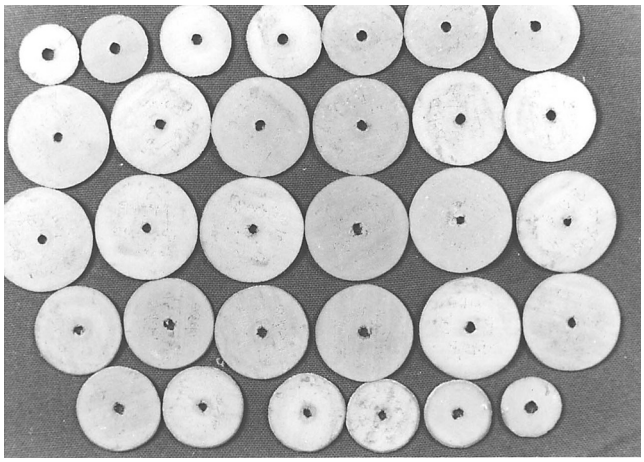

Figure 2. The 31 palm-leaf discs analyzed for this study.

The length and the compactness of the writing were followed from top to bottom. A rectangular space was left blank around the string holes. However, in the case of beads, the writing is circular and is centered around the perforation.

In order to ensure the clarity of incised characters on the palm leaf, *masi* (dye/ink) was applied. There were various recipes for preparing this ink. The ordinary variety of ink was prepared by mixing powdered charcoal with locally collected tree gum and some other glutinous substance, like sugar. After incising the leaves, the paste was completely smeared over the leaf and then wiped off. The paste settled into the grooves and the letters appeared clearly (Fig. 3).

Then the required circular inscribed palm leaf plates were detached from the parent leaf with the help of a sharp knife. The leaflets were strung in ascending and descending orders, and knots are tied at the beginning and the end of each bead, so that leaves of adjoining beads did not intermingle. The shape of the beads was judged and the peripheries of the leaves were rubbed with slag collected from the nearby brick kilns (the informer used to collect the slag for his father) to attain a circular shape and to not allow cracks to develop on the leaflets.

Role of the Bead

The *Gita* bead string was used as a rosary for morning and evening prayers and was worn around the neck during

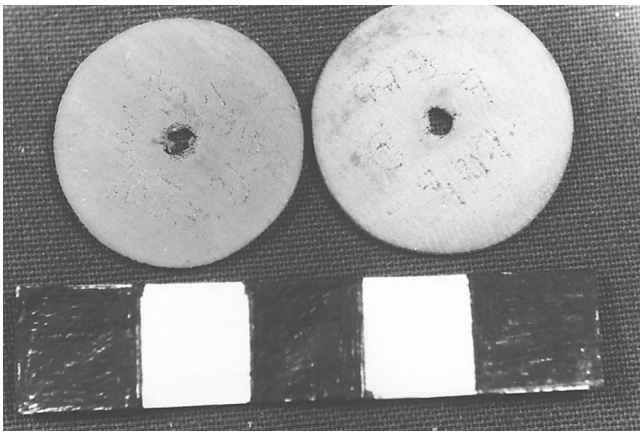

Figure 3. Close up of the two inscribed palm discs.

the rest of the day; the single piece was worn on the wrist. According to the informer, the local inhabitants hold his family in respect on account of their discordance to the feudal king of Mahuri as well as their scholarship. Besides, every individual had a high respect for his father due to his possession of the rosary containing the most respected religious text of the Hindus, i.e., the *Gita*. According to Niranjan Paatojoshi only the king, an erudite individual like his father, or the high priest of the kingdom, could use such beads.

Books, Manuscripts, and the Bead

Referring to the *Rayapaseniya-sutta*, a Jain work, Murty (1996:24) identified seven of the ten parts of the palm-leaf book. They are: *patra, dora, granthi, chadana, masi, lekhani,* and *aksara;* in order: the leaves (the writing surface), the cord (binding the manuscripts), the knot (at one end of the cord), the covering (of cloth), the ink, the pen, and the characters (written). The identity of the other three (*kambi*, *lipyasana*, and *srnkhala*) need further discussion. As far as the bead is concerned, it has all the seven previously mentioned parts.

Paper and palm leaf, the two chief materials for writing books, are prone to destruction in due course of time. Their durability depends largely on their material quality and patterns of usage. Generally speaking, time, fire, water, heat, dust, humidity, atmosphere, fungi, ants, rats, and humans threaten their survival.

Conclusion

This work is an addition to the research on beads. Perhaps done in time, as the specimens are limited in number and very fragile in nature.

Acknowledgements

The author came across these beads in the museums mentioned above while doing archival research on the beads of the Juang and Bondo,[8] financially supported by the Horace C. Beck Fund, UK, and the Chicago Midwest Bead Society, U.S.A. Thus, he is grateful to these organizations for financial support and to Peter Francis, Jr., Kurush Dalal, and Shahida Ansari for their comments and suggestion on the earlier draft of this paper. He is also thankful to Mr. Dave Hemant and Ms. Anupama for their help and assistance in the preparation of this paper.

Endnotes

1. *Upanishads* are the ancient philosophical texts of the Hindus.

2. *Kuruskhetra* is the battlefield of the Mahabharata, where the royal cousins, the Pandavas and the Kauravas, fought with each other.

3. Chologanga is one of the famous kings who conquered Utkala, alias Orissa in A.D. 1110 and ruled over a vast empire from the Ganga to the Godavari.

4. Ramanuja visited Orissa and stayed at Puri, in the course of his journey from Melukote to Delhi, between A.D. 1107 and 1117.

5. Jayadeva visited Orissa in the mid-12th century and authored the immortal *Gitagovinda*.

6. Narahari Tirtha came to Orissa during the reign of Bhanu I, A.D. 1264-1278 and initially acted as the spiritual guardian of the young prince Narshima. He later became the governor of Kalinga.

7. Chaitanya came to Orissa in A.D. 1510 and stayed for 18 years at Purl. He identified Krishna with Jagannatha and consequently Krishna consciousness and Jagannatha consciousness were merged into one.

8. The Juang and the Bondo are two major primitive communities inhabiting the forested regions of the state of Orissa.

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36. BEADS FROM IRON AGE HOARDS IN LATVIA, by Karlis Karklins (1985, 6:9-11)

Since 1790, approximately 108 hoards and votive offerings buried during the Bronze and Iron ages (1300 B.C.-A.D. 1200) have been uncovered within the borders of Latvia, a [former] Soviet Socialist Republic situated between Estonia and Lithuania on the east side of the Baltic Sea. Five of the Iron Age finds contained beads.

Burned fragments of **bone beads** or discs about 20 mm in diameter (Fig. 1:1) were among some 130 broken or burned objects found in the Kokumuiža (Līgotnes) II offering (Fig. 1, map, no. 1) which was buried in a marsh in apparent votive thanks for good fortune in battle or for the aversion of death or misfortune. It is uncertain whether the discs, some of which have conical perforations, served as beads or fulfilled some other function. Based on the associated artifacts, the discs are attributed to the end of the 5th century A.D.

An **amber bead** was found in the Celmiņi hoard (Fig. 1, map, no. 2) which was buried in the 11th century A.D. Irregular in outline, the bead is in the form of a short circular barrel (Beck type I.B.l.b.) with a slightly sloped "upper surface" (Fig. 1:2). Its irregularity and small size (16.5-19.0 mm diameter; 11.0 mm length) preclude its having been used as a spindle whorl and suggest that it most likely served as a bead or pendant. The specimen was imported from the territory of the western Balts, probably the coast of Lithuania or Poland.

Bronze beads of indigenous manufacture formed part of a woman's breast ornament in a hoard at Reznes (Fig. 1, map, no. 3). Two pins of tinned bronze with cross-shaped heads were connected in two places by two barrel-shaped beads of cast bronze. Similar beads have also been unearthed in 11th- and 12th-century graves and habitation areas of the Livs, a Finno-Ugrian people who inhabited the region to the east and southeast of the Gulf of Riga.

The Reznes hoard also contained a double strand of bronze-wire spiral beads strung on linen thread. Such neck ornaments have frequently been encountered in the graves of 11th-12th century Liv women.

Silver beads, eleven in all, formed part of the rich Ipšas hoard (Fig. 1, map, no. 4). Oblong and globular in shape, these hollow beads were produced using the "filigree and granulation" technique (Fig. 1:4). The specimens measure 12-14 mm in diameter and 11-20 mm in length. Their combined weight is 15.65 grams. Associated coinage, the most recent of which is that of the Hungarian ruler Salomon (A.D. 1063-1074), suggests that the beads date to the second half of the 11th century. They were imported from Russia.

Similar beads of various styles have been found at the Salaspils Laukskola settlement near Riga, as well as in Gotland, Sweden, Old Prussia, Kievan Russia, and the territory of the western Slavs, primarily in 11th- and 12th-century contexts.

Glass beads were encountered in the Koknese I (Fig. 1, map, no. 5) and Reznes hoards. The former produced three whole beads, two bead halves, and several fragments. Round originally, the specimens were all burned and deformed to some degree (Fig. 1:3). Beads of this type are common finds at 12th-century hill-forts in Latvia and adjacent countries.

The Reznes hoard produced half of a round gilded bead as well as several decomposed fragments. The beads, together with six perforated silver coin pendants of 10th-11th-century West European origin, undoubtedly comprised a Liv woman's necklace, such as have been found at Lehavere, Estonia, and Mārtiņsala near Riga.

Associated artifacts reveal that both hoards date to the 12th century. The beads are believed to have been imported from "somewhere to the east."

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