
Archaeology of Early Historic Site of Radhanagar, Jajpur District, Odisha: A Fresh Appraisal

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Abstract: Radhanagar, an Early Historic fortified settlement in Odisha, was subjected to archaeological excavation for three consecutive seasons from 2010 to 2013. The preliminary excavation report was published in 2015. Further, prolonged investigations in the context of other contemporary sites in southeastern India provided fresh insights into the growth of Buddhism, trade, and urbanism. A major contribution of this study is the identification of a provincial headquarters of Ashoka and the Eastern Indian coastal trade route, with evidence of a series of Buddhist settlement sites along the East Coast, from Tamralipti to Bhattiprolu. The interconnected network of Buddhist centers and port sites—including Radhanagar, Langudi, Dhauli, Aragarh, Jaugarh, Salihundam, Dantapura, Kalingapatna, Thotlakonda, Lingalakonda, Kottur, Dhulikota, Phanigiri, Guntupalli, Nagarjunakonda, Vaddamanu, Dhyankataka, and Amaravati—demonstrates cultural interactions in the post-Mauryan period across ancient Kalinga and Andhra Desha. This is further evidenced by the discovery of coins of Srisada, the Maharaja of the Kalinga-Mahisasaka country, from Dharanikota and Vaddamanu. An up-to-date analytical study has thus been conducted, considering the archaeological findings from the Radhanagar settlement.

Keywords: Buddhist Settlement, Archaeology, Trade Route, Urbanization, Radhanagar, Kalinga, Andhra Desha

Introduction

Recent archaeological excavations in the coastal region of southeastern India demonstrate the distinctive growth of urbanism through the emergence of fortified settlements, structural developments in brick and stone, the use of iron technology, the arrival of new and advanced pottery techniques, and the introduction of coinage. A settlement, as defined, may be a site or any location on the landscape with datable traces of human activity. These may include occupation sites of various kinds or a conglomeration of occupation sites forming societies or archaeological cultures, which can be well understood from the present site of Radhanagar. The process of urban growth, or the 'Second Urbanization,' in its early phase, encompassed the Ganga Valley, the Indo-Gangetic Divide, northwest India, Bihar, central India, Odisha, Andhra Pradesh, and Tamil Nadu—covering almost the entire Indian subcontinent.

New evidence from the Keeladi excavations, datable to the 6th century BCE, further supports this phenomenon.

Excavations at several Buddhist sites in southeastern India, spanning the Brahmani-Mahanadi, Vamsadhara-Nagavali, and Godavari-Krishna River valleys along the coastal region, have expanded our understanding of the spread of Buddhist settlements. Additionally, port sites such as Palur, Kalingapatnam, Visakhapatnam, Arikamedu, Machilipatnam, and Bhattiprolu have provided new insights into the growth of trade, religion, and urbanization. Although the spread of Buddhism in southeastern India began during the Mauryan period, its expansion—from Odisha to Karnataka, including Andhra Pradesh and Telangana—has significantly enhanced our understanding of various aspects of historical development in the post-Mauryan period, at least up to the 3rd century CE.

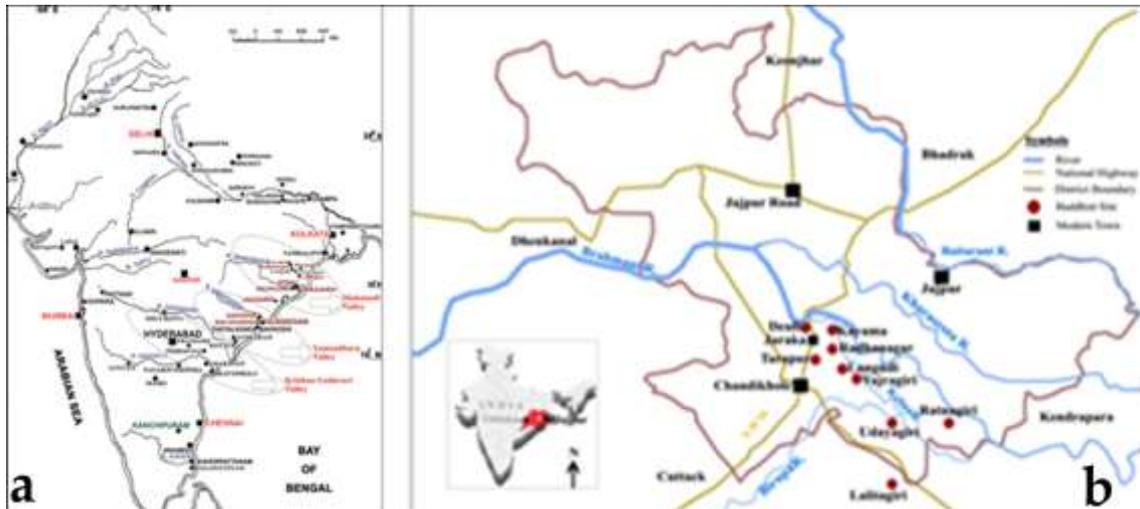


Figure 1: (a) South East Indian Buddhist Settlements and (b) Radhanagar Site

Incidentally, a significant number of Buddhist settlements in these areas indicate continuous interactions among communities, reflected in religion, art, architecture, trade, and social development. For example, major Buddhist settlements excavated and explored in Odisha—such as Radhanagar, Langudi, Lalitgiri, and Udayagiri—had close interactions with major South Indian sites like Salihundam, Thotlakonda, Dhulikota, Phanigiri, Kotalingala, and Nagarjunakonda, among others (Figure 1).

Some of these sites are located away from the eastern littoral and river basins, suggesting that they developed along caravan routes. One such arterial route passed through Jaggayyapetta, Gajulabanda, Phanigiri, and Kondapur, extending to Tagara (Ter) and beyond. Another caravan path connected Dhulikota, Pashigam, and Boddhan to Vidisha or Ujjain. Even the coastal sites may have formed a route linking the interior of Kalinga to the Nellore region, as suggested earlier by H. Sarkar (1987) and A. Ray (1983). This hypothesis was further substantiated by the excavation of Radhanagar in Odisha. The most significant outcome of this study is the identification of cultural complexes interconnected through trade routes.

In this context, the prolonged archaeological investigations at Radhanagar (Kankia) in Odisha have opened new avenues for early historical research. A critical study of the Radhanagar excavations is discussed here to understand early historic trade and urbanization in southeastern India. Among the less-studied ancient cities of the Indian subcontinent, Radhanagar in eastern India stands out. The site was first reported by K. S. Behera in 1996 and later explored by several scholars, including Yule (2006:18-19) and Mishra (2000:507-550). A trial excavation was conducted in 2007-08, followed by a renewed program of surface surveys, mapping, excavations, and geophysical studies from 2010 to 2013 (Patnaik 2015). Further investigations of the excavated material remains were undertaken to date the site scientifically (C14) and analyze its physical remains. Traces of human occupation at Radhanagar have been documented by multiple scholars (Patnaik 2016). Additionally, Paleolithic, Mesolithic, and Neolithic-Chalcolithic habitation has been reported from various sites in the Brahmani Valley (IAR 2012-13:115-116).

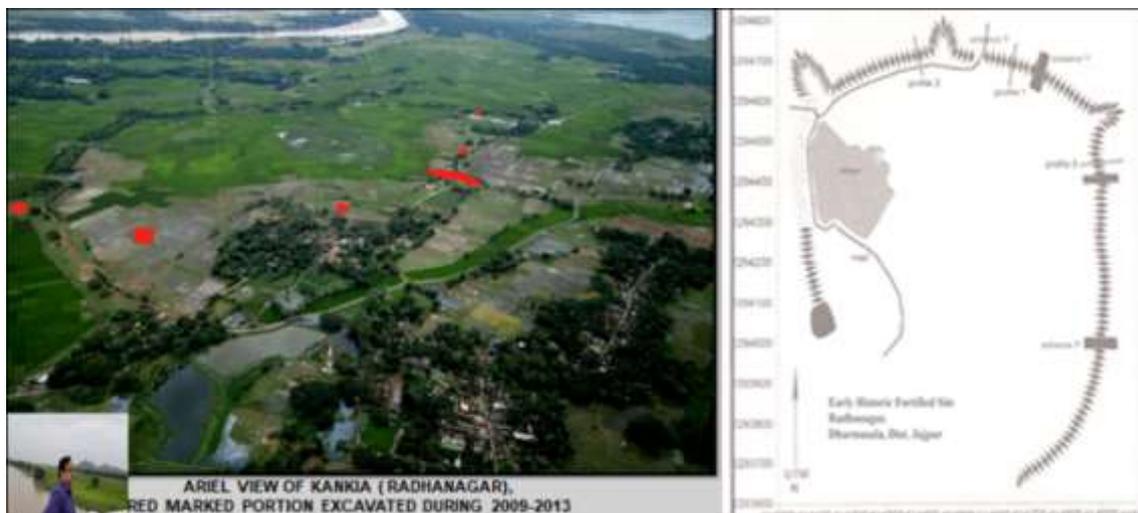


Figure 2: Radhanagar site and fortification (after Yule)

The Site

Radhanagar (20°44'50.4" N; 86°10'39.4" E) is situated amidst a cluster of densely populated villages on the right bank of the Kelua (Kimiria) River, a distributary of the major Brahmani River. The site is approximately 90 km north of Bhubaneswar and 30 km from the present shoreline. Although partially recorded as Kankia, it is widely known as Radhanagar and is connected to National Highway 16 in the Dharmasala area of Jajpur district. The Dharmasala region is dotted with numerous Buddhist sites and several hillocks, including Langudi, Kayama, Tarapur, Deuli, Neulapur, and Vajragiri, all of which were excavated between 1997 and 2007 by OIMSEAS (Patnaik, 2014). Radhanagar is located between the Langudi and Kayama hillocks and is enclosed by an earthen fortification (Figure 1b). The region's landscape encompasses both deltaic plains and hilly zones. The district is rich in agriculture, and its two important hill ranges contain mineral deposits and alluvial soil, supporting surplus agricultural production. The site is located in the deltaic plains in close proximity to the

Bay of Bengal. The geological formation of the region includes granite, charnockite, sandstone, and other sedimentary and metamorphic rock types. The area is rich in alluvial deposits, making it highly fertile. As a result, agriculture has been a major occupation of the local inhabitants since the early historic period, as revealed through excavations. The landscape is predominantly covered with paddy fields and agricultural lands.

The Radhanagar site is fed by a water channel from the Kelua River to its north and by the backwaters of the Birupa River to the south, connected through the Sagadia Nulla. This continuous water supply has contributed to the fertility of the land, which may have played a crucial role in population growth in the past. Archaeological remains have also been identified in the surrounding villages of Bamphu, Mangalpur, Uttarasasan, Derabar, Gopalpur, and Naupala. Radhanagar provides significant insights into the region, as evidence of regular habitation has been confirmed. The site covers an area of 902,500 square meters (223 acres or 9.25 hectares) and is enclosed by an earthen fortification occasionally mixed with bricks, earth, stone, and sand (Figure 2). The site features a distinctive oval-shaped rampart with gateways and projections surrounding an urban core of approximately one square kilometer. In addition to the rampart, the site contains monumental architecture, including brick structures and massive laterite blocks. Geophysical surveys and excavations confirm that the site was fully occupied, with remains of artifacts and architecture present both within the rampart walls and in the adjacent exterior.

Although the fortification is cut through on the northern side to provide a passage, it remains largely intact on the northern and eastern sides. The western defensive wall has been heavily disturbed due to modern habitation. Three projections are visible on the northern side of the fortification. The middle of the eastern fortification is locally known as 'Singhadwar,' while the north-western corner projection is called 'Hatidiha,' and the middle projection of the northern fortification is known as 'Uttaradwara.' Although the fortification wall generally follows an oval shape, the western side projections have suffered significant damage. A 50-meter-wide opening in the northern fortification faces directly toward the Kayama hill rock-cut caves. A water body (pond) is ideally situated just opposite this opening at the southern end of the site, near the fortification. A modern temple, housing ancient sculptures mostly belonging to Buddhist pantheons, is located to the south of the pond. In the recent past, some people from nearby areas have migrated to the village, although the dominant caste remains the potter community, with approximately 250 families residing there.

The site of Radhanagar can be better understood in the context of the two adjoining early historic excavated sites of Langudi and Kayama. As B.D. Chattopadhyaya (2003:68) outlines, a complex of mounds forming a single site can be considered a 'settlement locality' when it comprises multiple sites within a micro-region. Such a cluster of settlements, exhibiting evidence of homogeneity, constituted a habitat sphere larger than a single urban center. Early historic urban centers typically emerged from

commercial prosperity and extensive trade networks (Ray, 1980), a characteristic reflected in Radhanagar's material culture. The three major sites—Radhanagar, Langudi, and Kayama—are closely associated, forming a linear alignment within a four-kilometer radius. Radhanagar, the main settlement site, is centrally located in the plains, while Langudi lies to the south and Kayama to the north.

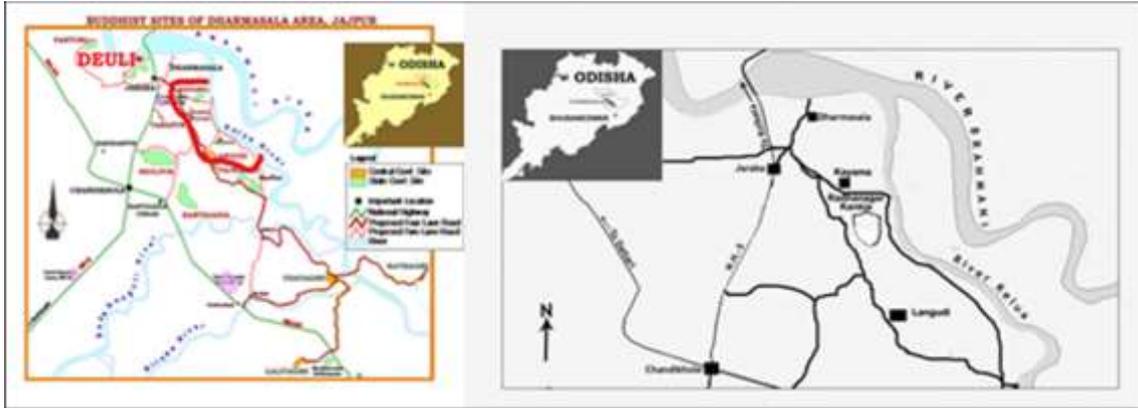


Figure 3: Kayma-Radhanagar-Langudi culture complex

The cultural landscape of the Radhanagar settlement includes two adjacent early historic Buddhist sites, which are essential to understanding its historical significance. The sites of Langudi and Kayama (Figure 3) have yielded antiquities and structural remains from the early historic period, dating from the 3rd century BCE to the 6th century CE. Kayama is a hillock overlooking the Kelua River to the north, with the Radhanagar site located approximately 600 meters to the south. The site has yielded a brick stupa and monastic remains, though these have been extensively robbed, leaving only their lowest levels. Several caves are located along the edges, facing the Radhanagar settlement. Two significant historical artifacts from the site include a 3-meter-tall standing elephant sculpture (Figure 4) and a 4th–5th century CE inscription in Śāṅkha Lipi of the Kutila script, engraved on a boulder. The inscription reads "Gugularaba, Sri Sri Buddh." Additionally, earlier punch-marked coins have been reported from the site. Based on the findings, the site is dated from the 3rd century BCE to the 6th century CE.

Another important site, located south of the Radhanagar settlement, is Langudi. Among the significant discoveries from Langudi are images believed to represent Ashoka (or other royal figures) (Figure 4). During the 2000–2001 excavation season at Langudi, an inscribed bust was discovered at the entrance of an early stupa. B.N. Mukherjee of Calcutta University deciphered the inscription as "Chhikarena ranj Ashokena" in Prakrit, written in the Brahmi script. This was later Sanskritized as "Sri Karena ranja Ashokena" and dated to the 2nd century BCE (Mukherjee 1997). Another sculptural representation from the same stupa area, made of Khondalite, measures 52 cm × 50 cm × 12 cm. The principal male figure is depicted in a crowned posture, or 'rajalila asana,' in the center, flanked by two female attendants, likely queens, shown in a gracious stance. The central figure, unmistakably a royal personage, is adorned with

a turban, chhannavira (a cross-belt), a patta-uttariya draped from the neck through the shoulders and across the chest, a crown, and earrings (kundals). The female attendants are similarly adorned with elaborate ornaments. Based on stylistic elements and body adornments, the sculpture is dated to the 2nd–1st century BCE, possibly from the Sunga period (Pradhan 2000, 2001).

These two images, initially under the custody of OIMSEAS, have since been transferred to the Odisha State Museum for display. The reference to Ashoka in these inscriptions and sculptures is comparable to similar evidence from Sannati and Salihundam. This further highlights the extensive and continuous growth of Buddhist sites, linking Odisha's mainland to Andhra Pradesh and Karnataka. Recent discoveries of Buddhist monastic sites across the Brahmani, Mahanadi, and Vamsadhara river basins, extending to the Godavari and Krishna-Cauvery River valleys, reinforce this historical connection.



Figure 4: a - Elephant Figure, Kayama, b and c. Images of Ashoka ? (Royal Figure)

Excavations

The archaeological excavation was carried out in a manner that ensured maximum results, with four selected areas designated as KNK-I to IV. We have deliberately referred to the excavation site as Kankia, as recorded in the revenue records, although the entire mound is locally well known as Radhanagar (Figure 2).

The mound was divided into four parts, and excavations were conducted over three field seasons (2010–2013). The rampart was constructed using mud, kankar, earth, and occasional bricks (measuring 46 × 30.5 × 9 cm), along with large and medium-sized dressed laterite blocks. Similar materials were also used in the projections. The average height of the ramparts is 4 to 5 meters, with a width of 40 meters at the projections. Each side of the fortification consists of three projections—two at the corners and one in the center.

The settlement has two gateways: one on the northern side, located to the east of the central projection, measuring 20 meters in width, and another, popularly known as Naharaduara, facing Kayama Hill. The northern corner projection stands 8 meters high. The area west of the inner fortification shows traces of significant activity, suggesting that it functioned as the nucleus or citadel of the settlement.

Fortification

The fortification area was designated as KNK-1, referring to the rampart area, specifically the northern bastion, which measures 40 × 40 meters on the projected side. A cross-sectional excavation was conducted on the western arm of the bastion, where a deep trench measuring six meters was excavated. The excavation revealed three distinct phases of fortification construction. The lowest layer consisted of yellowish kankar, followed by a layer of mud and sandy soil, with occasional use of laterite in the upper portion. In this area, adjacent to the bastion, a deep cut approximately 40 meters wide was made in recent times to create a thoroughfare, exposing a clear section of the stratigraphy. A circular structure with two courses of laterite stone, measuring 20 meters in radius, was discovered (Figure 5). This structure could be the remnant of a stupa, similar to the one at Udayagiri-2 in front of Monastery-2, as well as those found outside the fortification area of Sisupalgarh.



Figure 5: Excavations at the core area with structures of 3rd-2nd century BCE

Further excavation was carried out in the extreme western corner of the fortification, where modern habitation is present. Excavation up to a depth of 2.5 meters revealed a massive structure running north-south, constructed with burnt bricks and laterite blocks. A total of 22 courses were traced, and the exposed portion of the structure measures 35 meters in length. A significant number of terracotta tiles and tile keys were retrieved. This structure appears to be a part of the fortification, strategically located at one of the corners, and belongs to the early phase, i.e., the Mauryan period. It is likely that this structure served as an entrance to the site.

During the excavation of KNK-2/3, the southern foundation wall was completely exposed. However, the eastern arm of the structure extended towards the north and was only partially exposed. To determine the full extent and nature of the structure, further excavation was carried out in this area. Although the left arm of the structure had been heavily robbed, it was completely traced in the plan. The wall measures 39 meters in length and 1.3 meters in width. The passage between the two arms is 4.5 meters wide. Laterite, bricks, and large boulders were used in this portion of the wall, with mud mixed with kankar serving as mortar. Perforated terracotta tiles with fingertip markings, along with large terracotta tile keys, were also unearthed in this area. These findings suggest that the structure was part of the southern entrance to the site. The tiles and keys point to the earliest phase, dating to the 3rd century BCE, as observed at many early historic sites (IAR 1963-64). The rampart may have had a

symbolic function, delineating the city as an island of order within a chaotic landscape. Similar to Sisupalgarh, this fortification was carefully planned, with projected bastions indicative of a Janapada-type fort. A comparable fortification is observed at the Dantapuram site (now in Srikakulam District, Andhra Pradesh) on the right bank of the Vamsadhara River. One notable historical aspect is that these fortified cities did not rely on centralized administration but grew spontaneously due to the interaction of various socio-religious and economic factors, facilitated by favorable geographical conditions. Another gateway was exposed on the southwestern side of the fortification. Excavation at the gateway revealed a long brick wall, 22 meters in length, constructed with laterite and burnt bricks, demarcating the habitation inside. On the left side, a 3 x 3-meter room was uncovered, which appears to be associated with the gateway. Additionally, another brick structure was exposed at the same site, though its function could not be ascertained at present.

The next phase of excavation focused on KNK-IA, located 200 meters towards the core area of the settlement. Notable findings from this area include a variety of bowls from the Maurya, Sunga, and Kushan periods. In one trench, more than 40 intact bowls were discovered, stacked one above the other. These bowls exhibit different shapes, including fine straight, inward-curved, outward-curved, and knife-edged varieties. Four trenches were laid out in the extreme southwestern corner of the site, revealing a small brick structure consisting of two courses of bricks. This structure may have been a subsidiary habitation area adjacent to the massive Mauryan-period brick structure. The high concentration of potsherds and antiquities suggests that this portion might have been occupied by a community of craftsmen. The most significant finding from this area is an inscribed stone pendant. Initially, it was presumed that this area served as a water outlet, as a water body is present nearby. However, a wide opening was noticed on the northern side of the fortification, which is paralleled by a similar disturbed opening on the western side. Excavation of three trenches in this portion yielded a few potsherds and brick fragments. This suggests that the extreme southwestern corner of the site was not a natural opening. Instead, the opening dividing the site into two parts might have functioned as a roadway, facilitating movement for both the inhabitants of Radhanagar and outsiders.

Cultural Sequence

After a careful examination of the stratigraphy, material remains, and inscriptional finds, including pottery, the following periodization has been established to understand the phases of development of the site.

Period I (c. 4th Century BCE – 1st Century BCE): During this phase, the settlement entered a stage of urbanization, evident from the brick structures discovered in the Kankia III (KNK III) location. The brick sizes from this period measure 39 × 24 × 8 cm and 34 × 24 × 8 cm. In the early phase of this period, morrum-rammed floor levels were noticed adjacent to the massive brick structures. This cultural phase of Radhanagar is marked by the introduction of well-known ceramics from early historic India,

including Northern Black Polished Ware (NBP Ware), Black and Red Ware, and Black Slipped Ware. Other pottery types from this period include Red Ware, Grey Ware, and Red Slipped Ware. Terracotta objects such as beads, skin rubbers, figurines, ornaments, and hopscotch pieces were unearthed in this phase. Additionally, finds include bone points, semi-precious stone beads, highly eroded silver punch-marked coins, and an antler piece. Notably, a seal inscribed in Brahmi with the name *Sadbhu Tissa*, dating to the 2nd century BCE, was discovered. Another significant find is a pendant with a conch symbol and Brahmi inscriptions reading *V(b)ijaya*. A few terracotta tablets and inscribed potsherds, paleographically dated to the 1st century BCE, were also recovered from this phase.

Period II (1st Century BCE – 3rd Century CE): This was the most prosperous phase of the site. Although excavations were mainly conducted in the structural area, the highest number of antiquities—compared to Periods I and III—were found in this phase. A key feature of this period was significant progress in clay modeling, as seen in the discovery of clay molds and terracotta figurines from the KNK III area. Prominent pottery types from this phase include Rouletted Ware, Knobbed Ware, appliqué-incised-basket-impressed Red Ware, Black Slipped Ware, Red Slipped Ware, and Grey Ware. This period also yielded a large number of fine terracotta ornaments, including *Triratna* symbols. Numerous terracotta beads with flat bases were also unearthed. Notable finds include a terracotta Buddha head (8.4 × 4.6 cm) with a turban featuring an alien hairstyle and a squatting lion figurine. A significant change in pottery usage was observed, as the people abandoned Black and Red Ware from the preceding period in favor of Red and Grey Wares. Additionally, a substantial number of Kushana copper coins were found in this phase.

Period III (c. 3rd Century CE – c. 5th Century CE): This phase is characterized by a decline in material culture, with fewer antiquities found compared to earlier periods. The people of this phase primarily used coarse Grey Ware pottery. Construction activity was significantly reduced, and the structural remains encountered in the excavated area indicate a degenerative phase. This period marks a gradual decline in both architectural developments and cultural material.

Ceramic Assemblage and Antiquities

The pottery unearthed from the excavated area comprises a wide range of forms, types, wares, and shapes. The study of pottery is an important source for reconstructing ancient lifestyles (Dhavalikar, 1999:121). Based on this, the pottery assemblage is summarized as follows. A few sherds of Northern Black Polished Ware (NBP Ware), including bowls and dishes, were unearthed in the KNK III area. These sherds are made of fine fabric and exhibit both silver and golden glazing. NBP Ware was found at a depth of 1.8 meters in the KNK III area, where a significant number of highly eroded silver coins were also discovered. This diagnostic pottery type characterizes the earliest phase of Buddhist centers such as Rajagriha, Sravasti, Vaishali, Ujjain, and Vidisha (Sanchi). Evidence from the Andhra region, specifically Amaravati-Vaddamanu,

suggests that NBP Ware (Figure 6a) arrived there during the early Mauryan period, brought by Buddhist missionaries from the Magadha region (Sarma, 1991). This pattern is also observed in Odisha, as evidenced by finds from Radhanagar (Kankia).

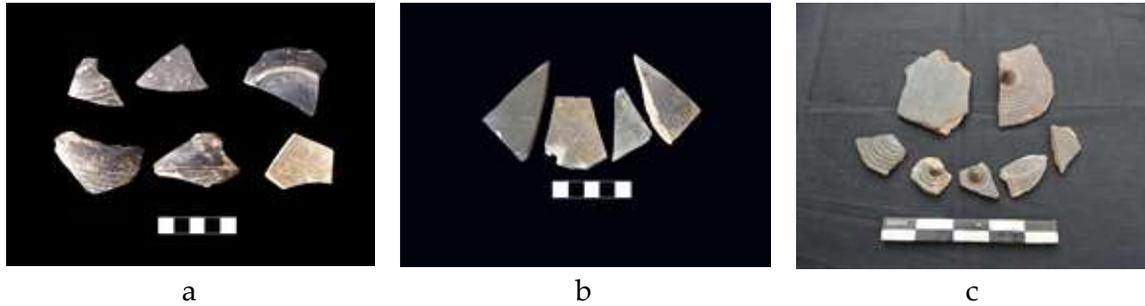


Figure 6: a - NBPW, b - Rouletted and c - Knobbed Ware

A few sherds of Rouletted Ware (Figure 6b) were found in the KNK III structural area from Phase II. Some sherds are treated with a fine glazed slip, whereas others lack slip and exhibit a gray surface. This ware is made of extremely fine, well-levigated clay and is gray or grayish-pink in color, with a thin slip coating. Previously, this type of pottery was reported from the excavations at Manikapatna (Pradhan, 2000). Scientific analysis of Rouletted Ware from Sembiran (Bali), Arikamedu (India), and Tissamaharama (Sri Lanka) has revealed striking similarities. Rouletted Ware has also been reported from various sites along the East Coast, including Chandraketugarh, Tamralipti (Ghogte, 1996: 69-85), and Sisupalgarh, as well as sites in South India. Heidrun Schenk's extensive studies on Rouletted Ware provide a comprehensive understanding of its origin and distribution (Schenk, 2014: 95-115). This ware is now dated from the 3rd century BCE to the 1st century BCE, indicating that Radhanagar was engaged in trade with contemporary settlements in both the north and south.

A significant number of Knobbed Ware sherds (Figure 6c) were unearthed from Phase II of the site, with nearly all trenches yielding this pottery. The discovery of Knobbed Ware is particularly important, as it is symbolically linked to the spread and development of early Buddhism (Tripathi et al., 2019: 82-89). The central knob has been interpreted as representing Mount Meru, while the surrounding circles symbolize the ocean. This ware is made of well-levigated clay and is typically found on the base portion of the interior surface of bowls. The rim is featureless and has a carinated shoulder. Knobbed Ware is commonly found at sites associated with Buddhism in Odisha, as well as other parts of India and Southeast Asia. It has also been reported from sites such as Ban Don Ta Phet in Thailand and Tra Que in Vietnam (Ray, 1996). Excavations at early historic urban sites in Odisha and southeastern India have consistently yielded Knobbed Ware, indicating trade and religious connections with Southeast Asia and Buddhist centers across India.

Sherds of Black and Red Ware, including bowls, saucers, platters, dishes-on-stand, and small cups, were retrieved from the earliest level of Phase I. This ware is made from well-levigated clay, shaped on a fast wheel, and exhibits fine fabric. Some sherds bear

graffiti marks on the exterior surface. This distinctive ceramic type was discovered in the KNK III brick structure area at a depth of 3.2 meters from the lowest level, dating back to the 4th–3rd century BCE. Associated antiquities include crucibles, iron nails and objects, as well as terracotta artifacts such as beads, spindle whorls, and hopscotch pieces.

Several early historic sites in Odisha, including Sisupalgarh and Manmunda-Asuragarh, have yielded Black Slipped Ware in significant quantities, as has Radhanagar. The primary shapes found in this ware include convex-sided bowls, cups, plates, saucers, and small utensils. The fabric and luster suggest that these vessels were produced on a fast wheel, then burnished and glazed. Many bear graffiti marks, including zigzag patterns, oblique strokes, straight lines, and triangles.

Dull Red Ware, as found at Radhanagar, is primarily characterized by storage jars with flaring rims, inverted rims, and straight-cut rims. This coarse pottery is made from impure, unlevigated clay. Some examples are treated with a red slip on the exterior surface, and graffiti marks are found on both interior and exterior surfaces. Given their shape and size, these vessels were likely used for cooking and storage.

Grey Ware, in both fine and coarse varieties, has also been encountered. Some sherds exhibit a gray core, possibly due to uneven firing. The main forms include storage jars and globular pots with flaring or straight-cut rims. Graffiti patterns, including straight oblique bands arranged in crisscross patterns and overlapping designs, have been observed on some sherds.

Red Slipped Ware primarily represents household pottery, tableware, and cooking vessels. The primary shapes include dishes, dishes-on-stand, cups, plates, and carinated bowls. This pottery is made of well-levigated clay, shaped on a fast wheel, and fired at high temperatures. Graffiti marks appear on both the interior and exterior surfaces.

Antiquities

The excavations at Radhanagar yielded a large number of antiquities made from various materials, including iron, gold, terracotta figurines, crucibles, inscriptions, and coins. These antiquities represent a wide range of objects used for household, decorative, ritualistic, and ornamental purposes. A high concentration of antiquities was observed in the KNK III area.

Inscriptions

A pendant measuring 1.9 × 0.9 cm, inscribed in early Brahmi script with the name *Saddabhu Tissa* and a swastika symbol, has been dated to approximately the 3rd–2nd century BCE (Figure 7). This inscription provides significant insight into the site and suggests that it belonged to a person of high esteem. The epithet *Sadabhu*, which appears frequently, may indicate a resident monk of Radhanagar. It is worth noting

that Buddhist literature mentions Tissa, possibly the brother of Ashoka (?), who chose Kalinga as the place of his retirement. The emperor is said to have built a monastery named *Bhojakagiri Vihara* for him, which later became a major center of Buddhist activities. Dharmarakshita, Tissa's preceptor and a prominent propagator of Buddhism in western India, is believed to have spent his final days at *Bhojakagiri Vihara* alongside Tissa and other monks (Malalasekera 1960: 585). This discovery provides important evidence shedding new light on this urban settlement, suggesting that the pendant may have functioned as a seal of the Buddhist community, though the identification of *Sadabhu Tissa* remains uncertain. Another circular stone pendant (Figure 7), measuring 0.5 cm in radius, bears a conch symbol along with the Brahmi inscription *B(V)ijaya*. It was found in a stratified context dating to approximately the 2nd–1st century BCE. The name *B(V)ijaya* is significant in the Odishan context and its connections to Sri Lankan Buddhism. Notably, Vijaya and his entourage are regarded as the first humans to settle in Sri Lanka, with their ancestry traced to eastern India (Thapar 2013: 143). Additionally, an oval-shaped sealing measuring 0.2 cm, inscribed with the Brahmi letters *Devaya Uttara*, was recovered from a stratified context dating to approximately the 2nd century CE. This inscription is particularly significant, as the Buddha is sometimes addressed as *Deva* on seals and sealings, while references to *Nagara* suggest an urban character for the site.



Figure 7: Inscribed Objects

Coins

Coins play a crucial role in determining the chronology of an excavated site. A significant number of both silver and copper coins have been recovered from the excavation. These include highly eroded silver coins, uninscribed copper cast coins, and Kushan copper coins (Figure 8). Nearly 50 coins from different periods have been retrieved. Among them are nine rectangular or oblong silver punch-marked coins featuring sun, moon, and wheel designs; nineteen highly abraded rectangular silver coins; uninscribed copper cast coins with standing human figures; Kushan copper coins; and Puri-Kushan coins. Additionally, thirteen Kushan coins were previously recovered from the adjoining Kayama area of this complex, as reported by Tripathy (1986: 45). More recently, in August 2020, a Kushan gold coin was discovered at the Radhanagar site by a local farmer. A preliminary examination identified it as belonging to the Kushan period, issued by King Huviska. The coin is part of the *Nana* series, with an obverse inscription in Greek script and the ancient Bactrian language, reading ‘...shaon anoshao...oeshkikoshano...,’ which refers to *Nana*, the goddess venerated by

the Kushans (Patnaik 2021: 198). This coin serves as remarkable evidence of the site's connections with distant regions, including the Kushan Empire. It also provides strong proof of trade activity associated with this settlement.



Figure 8: Punch Mark Coins and Kushana Gold Coin

Terracotta Figurines

Terracotta ornaments are distinctly prevalent at Radhanagar compared to other sites in the region and are found in the form of bangles, earrings, finger rings, and pendants (Figure 9). These items have been recovered from all excavated areas. With the exception of the simplest forms, such as ear studs, beads, and bangles, all terracotta ornaments from Radhanagar were made using molds, in which decorative patterns were embossed during the molding process. More than 500 complete and fragmentary artifacts were collected from the excavations. Additionally, some local people have collected similar artifacts and keep them in their personal collections. One such individual, N. Sahu from Kayama village, has amassed a significant number of terracotta objects as chance findings from the area, which I had the opportunity to examine.



Figure 9: Terracotta Objects

Terracotta pendants from Radhanagar exhibit a wide variety of styles and decorations, many of which are Buddhist in nature. Some bear impressions of the Bodhi tree, triratna, lotus, and other symbols. The molded pendants often feature decorative motifs ranging from embossed concentric circles to floral and geometric designs. Among the terracotta ornaments from Radhanagar, pendants display the greatest diversity in size, shape, and decoration. Notably, all terracotta pendants were made exclusively using molds, resulting in embossed designs—no plain pendants have been found. A total of four terracotta Roman bullae have been discovered. These circular pendants, featuring a human head in profile, are widely distributed across various

sites, including Sisupalgarh, and date to the 1st–2nd century CE. A significant number of terracotta snake figurines have also been retrieved, indicating that the site preserves an ancient tradition of snake worship in Buddhism. This is further supported by the large number of Mucalinda Buddha images found at the nearby Lalitgiri Buddhist site. Terracotta figurines, both human and animal, were primarily unearthed from the core area (KNK III). Among the most significant finds are a squatting lion, the head portion of a Buddha image, human heads, a round terracotta plaque depicting three elephant heads, a bull, and three snake figurines.

The lion figurine, found in the Sunga-Kushana level, closely resembles Sunga terracotta figurines (Mathur 1996). The turban on the Buddha head suggests artistic influences from regions outside Odisha, possibly from the Gandhara School of Art. Additionally, a terracotta mold depicting a Buddha figure was retrieved from the site. The diverse range of terracotta figurines from Radhanagar provides valuable insights into the evolution of Indian terracotta art during the Maurya and Sunga-Kushana periods. These findings also highlight the site's extensive cultural interactions and prosperity.



Figure 10: Beads of various size

Beads

Excavations at Radhanagar have yielded 59 beads made of both stone and terracotta (Figure 10). A few semiprecious stone beads, including carnelian, banded agate, jasper, crystal, and quartz, have also been recovered. The surface luster of the terracotta beads suggests they were made from well-levigated, superfine clay of a light brownish color. The perforations were executed from both sides and are extremely fine. These beads were likely used as necklaces strung together. They come in various shapes, including small oval, flat-based, one-sided flat-based, and globular forms. The presence of stone beads suggests distant trade contacts with neighboring regions. Additionally, the variety of shapes and sizes indicates that they were worn by individuals of different age groups.

Bangles

Excavations at the Early Historic site of Radhanagar have yielded several glass bangles (Figure 11), all of which are broken and fragmentary. Based on their texture and surface quality, it appears that these bangles were manufactured using traditional techniques, as they lack purity in texture. The bangles range in color from light brownish to fine grey-white and are translucent. They were smelted in earthen crucibles, which resulted in slightly rough surfaces. The recovered specimens vary in size, with both large and small fragments, suggesting that they were worn by individuals of different age groups. In total, seven bangle fragments have been recovered from the excavation.



Figure 11: Bangles

Biological Remains

The faunal remains from the site include fragments of *Bos indicus* Linn. (Bull or Ox), undetermined species (*Undent*) (Goat/Deer), *Bubalus bubalis* (Buffalo), *Bubalus arnee* (a deer-like species), *Equus* sp. (Equidae - Horse), *Capra hircus* Linn. (Domesticated Goat), *Ovis* sp. (Ram), *Lissemys punctata/Lacapede* (Tortoise or Turtle), *Axis axis* Erxleben (Chital), *Canis familiaris* Linn. (Dog), *Rattus* sp. (Rodent or Rat-like species), *Chitra/Trionyx* (Soft-shell Tortoise), and undetermined fish remains. Among these, *Bos indicus* Linn. (Bull or Ox) and *Undent* (Goat/Deer) are the dominant species. The biological remains were examined by Supriya Nandi of the Zoological Survey of India (ZSI), Kolkata. The evidence of charred horse remains and other domesticated animals suggests a rich biodiversity in the region during the 4th–3rd century BCE. Additionally, an antler piece from the lowest level was submitted to BETA Laboratory, yielding a date of approximately 1350 BCE, indicating the presence of wild habitation in the area.

Other Objects

Other antiquities unearthed from the site include hopscotches, throwing disks, finger rings, toe rings, terracotta wheels, and various iron and bronze objects. Notable finds include gaming pieces, ear ornaments, rings, crucibles, and additional gaming artifacts.

The discovery of crucibles of different sizes suggests that the people of Radhanagar (Kankia) were well-versed in metal smelting technology. Similar to other early historical sites, Radhanagar has yielded a significant number of round-shaped hoppers. A few terracotta animal and human figurines were also discovered. The antiquities, including coins and inscriptions, indicate the prosperity of the site from the 4th–3rd century BCE to the 3rd–4th century CE, with its peak period occurring between the 3rd century BCE and the 3rd century CE.

Date of the Site

A charcoal sample from stratified Layer Five at a depth of 3.65 meters was submitted to BETA Laboratory for AMS dating. The result places the site in the pre-Mauryan era, dating between 412 and 354 BCE (Sample No. 627793-1). The AMS-standard delivery process (charred material) using the acid/alkali/acid method yielded a date of 2310 ± 30 BP (78.1% probability: 412–354 cal BCE or 2361–2303 cal BP). This confirms that early urbanism at Radhanagar began around the 4th century BCE and continued to flourish until the 3rd–4th century CE. Radhanagar (Kankia), like Ujjaini and Bhita, was a city center with strong defensive structures, including moats. Megasthenes provided a detailed description of the defensive measures of capital cities (McCrinkle, 1979 rpt). Monumental architecture first appeared in North and Central India during the 6th–5th century BCE, while in Western India and the Deccan, it emerged later, around the 3rd–2nd century BCE. Pliny recorded the existence of thirty fortified towns in the Satavahana kingdom, with excavations revealing sites such as Sannathi and Satanikota (Dhavalikar 1999:82).

In Eastern India, several fortified settlements have been excavated, including Sisupalgarh, Radhanagar, Jaugarh, Budhigarh, Manmunda-Asurgarh, Kharligarh (Odisha), Chandraketugarh, and Tamluk (*Tamralipti*, West Bengal). Other significant sites include Dantapura in Andhra Pradesh. These sites are regionally clustered. Seneviratne (1983) previously studied these settlements, highlighting aspects of secondary state formation. More recently, Sahu (2020) noted that early historic Odisha lacks direct evidence of trade contact. In this context, the Radhanagar settlement provides valuable evidence of fortified settlement formation from the pre-Mauryan to the pre-Gupta period. It also illustrates thriving trade and commerce along the coastal route, where Buddhist monks and merchants played a crucial role in establishing a series of Buddhist monastic and stupa sites.

Observation

Radhanagar (Kankia), excavated between 2010 and 2013, provides valuable archaeological evidence that helps reconstruct the expansion of Buddhism, trade, and urbanization in southeastern India. This is reflected in the cultural complexes of the early historical period across at least three major river valleys: the Brahmani-Mahanadi, the Vamsadhara-Nagavali, and the Krishna-Godavari. In this context, urban centers developed in Andhra Pradesh, Telangana, and Odisha, as evidenced by settlement sites such as Kotalingala, Dhulikota, Peddabankur, and Kondapur in

Andhra Pradesh, and Sisupalgarh, Radhanagar, and Narla-Asurgarh in Odisha. A detailed examination of the fortifications, structures, and antiquities excavated from these sites provides further insights into their historical significance. It is important to note that Kalinga and Andhradesh were part of a single cultural circuit, as evidenced by references to Sri Sada in Kharavela's Hatigumpha inscription and the Guntupalli Pillar inscription.

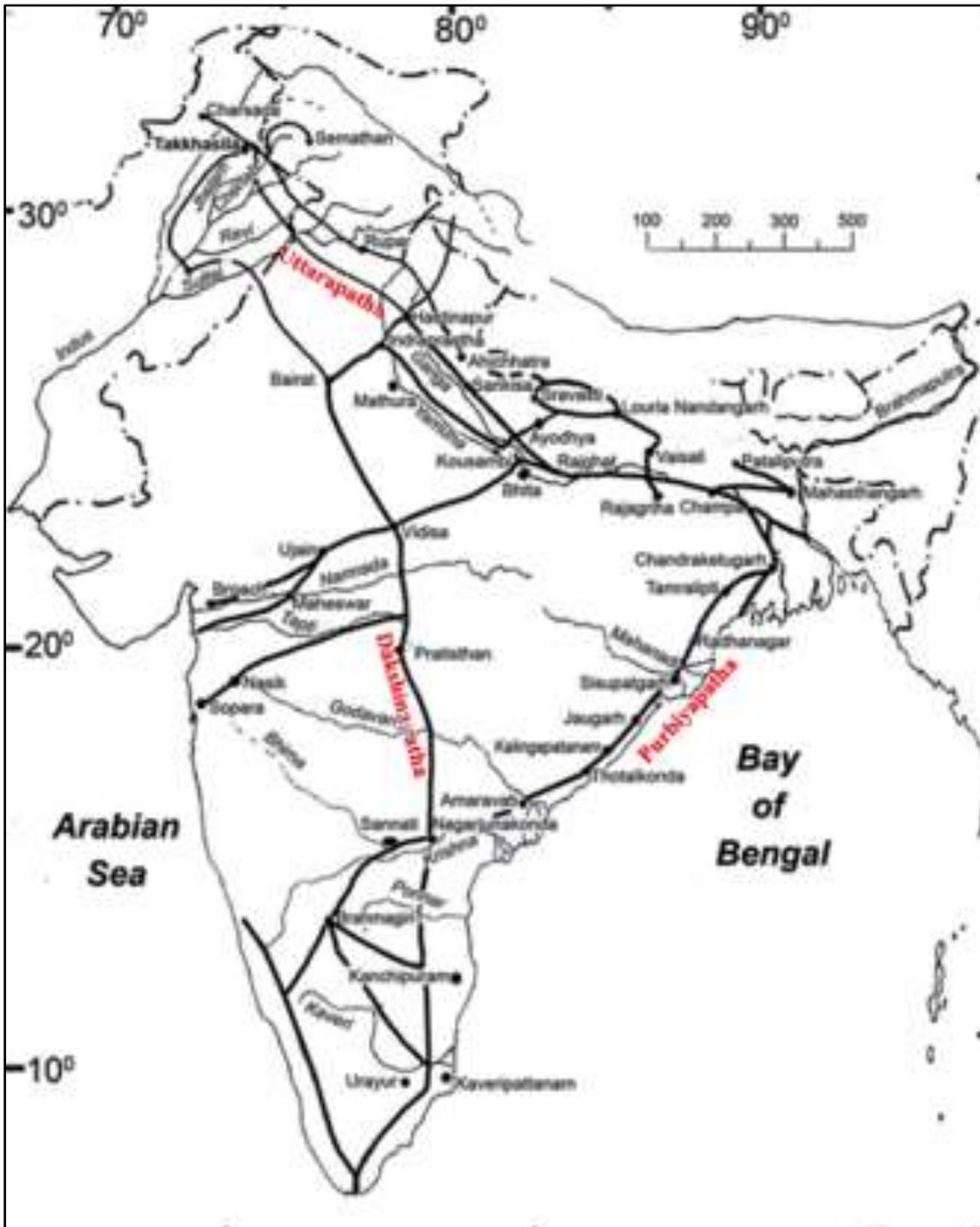


Figure 12: The Eastern Trade Route (*Purbiyapatha*)

A large number of Sada coins have been found in Amaravati and its surrounding areas, including Dharanikota and Vadamanu (Parasarasen, 2021: 95-97). Sri Sada, as referred to in inscriptions, was the successor of Emperor Kharavela of Kalinga and ruled as Maharaja of the Kalinga-Mahisasaka region under the Mahameghavahana dynasty during the first century BCE/CE (c. 40 BCE to c. 100 CE) (Prasad, 1993: 53-62). This reference, along with archaeological findings, helps us understand that the cultural efflorescence in the Mahanadi and Godavari-Krishna deltas was interconnected from the 3rd century BCE to the 3rd century CE. Furthermore, a detailed discussion of the excavations at Radhanagar (Kankia) suggests that the site had close links with South Indian sites through both inland and oceanic trade, facilitated by the spread of Buddhism. The growth of urbanization in southeastern India was a widespread phenomenon, encompassing both land-based and maritime trade routes.

Inscriptions provide significant geographical references indicating that Pataliputra was the capital during the reign of Ashoka's grandfather, Chandragupta Maurya. Other important centers of provincial administration mentioned in inscriptions include Kosambi, Ujjain, Takshashila (Taxila), Suvarnagiri (Karnataka), Toshali, and Samapa (Odisha) in Kalinga. The viceroys of Toshali and Ujjain were referred to as *Kumara* in the Kalinga edicts, while the viceroy of Suvarnagiri was designated as *Aryaputra* in the Mysore (Brahmagiri-Siddhapura) edicts. The *Mahamatras* who served as *Nagara-Vyavaharakas* (city administrators) in Toshali and Samapa likely held the same role as the *Paurayavaharikas* mentioned in Kautilya's *Arthashastra*. These officials administered justice in urban areas, while the *Rajukas* fulfilled a similar role in rural regions (Sastri, 1967 [1988]: 224-226).

During the 3rd century BCE, Mauryan Emperor Ashoka declared pilgrimage as *Dharmayatra* or "Tours of Piety." Ashoka (c. 269-232 BCE) is said to have built 84,000 Buddhist monuments across his empire, including stupas, pillars, chaityas, monasteries, and rock-cut caves, dedicated to preserving and disseminating Buddhist teachings. The Second Buddhist Council, held at Vaishali, led to the emergence of two distinct Buddhist schools: Hinayana and Mahayana (or Mahasanghika). The Mahasanghikas later evolved into the Mahayana school, while the Hinayanists referred to themselves as Theravadins. Theravada monks traveled to Kalinga to propagate Buddhism and educate local monks (Patnaik, 2021).

Ashoka is also known to have built a monastery for the Theravada monk Tissa at Bhojakagiri (Sahu, 1958). Notably, an inscription bearing the name *Sadabhu Tissa* in Brahmi script (dated to the 3rd-2nd century BCE) has been discovered at Radhanagar. It is widely recognized that Ashoka constructed several Buddhist stupas in Kalinga, three of which—Lalitgiri, Langudi, and Tarapur (Dharmasala)—have been confirmed, with a recently discovered stupa at Aragarh (Patnaik, 2020). The excavated stupa remains on a hilltop in Godiput Panchayat, Puri District, represent an important discovery, shedding light on early Buddhist architecture and the origins of Theravada

Buddhism in Odisha. Buddhist settlements in Odisha—such as Radhanagar, Langudi, Lalitgiri, Dhauri, Aragarh, and Jaugada—were part of a vast pilgrimage network connected through trade routes that extended from Taxila (present-day Afghanistan) in the north to Suvarnagiri (Karnataka) in the south. Recent research suggests that in his 13th regnal year, Emperor Ashoka undertook a *Dharmayatra* to the south. The Minor Rock Edicts indicate that he spent 256 days on this tour before reaching Suvarnagiri, from where he issued orders to the governor at Isila (Thapar, 2013: 50-51).

Evidence from excavated sites—such as Radhanagar, Dhauri, Aragarh, and Jaugada (Odisha), as well as Salihundam, Ramatirtham, Thotlakonda, Kottur, Vengi, Bhattiprolu, Chandavaram, and Dhanyakataka (Andhra Pradesh)—suggests that Ashoka may have followed an eastward coastal route, possibly termed *Purbiyapatha*. The duration of his journey implies that it was not a mere whirlwind tour but rather a deliberate pilgrimage in which he supervised construction activities at various locations. He is known to have erected a Pillar Edict at Dhanyakataka, a Minor Edict at Rajulamandagiri (Kurnool), and four Rock Edicts at Erragudi, in addition to Rock Edicts at Dhauri and Jaugada (JAHRS, 1995: 69). These sites, all located along the eastern coast and well-connected, played a crucial role in the dissemination of *Dhamma*, trade, and pilgrimage, making Kalinga and Andhra strongholds of Buddhism between the 3rd and 2nd centuries BCE.

The prosperity of Buddhist sites such as Lalitgiri, Langudi, Radhanagar, and Aragarh, alongside urban centers like Sisupalgarh, Jaugada, and Lathi, and the references to port sites such as Palur and Kalingapatnam from the 3rd-2nd century BCE to the early medieval period, highlight the significance of coastal trade routes in sustaining commercial enterprises. Radhanagar was an important urban center, with a predominantly Buddhist population, as evidenced by the discovery of artifacts such as *triratna* symbols, sprinklers, pendants, and terracotta Buddha images. This suggests that Radhanagar was an ancient, prosperous palace city with adjacent mountain settlements. Some scholars identify this settlement with the earliest city of Dantapura mentioned in Pali literature (Prusti, Mohanty & Mishra, 2000), while others associate it with *Toshali Nagar*. The XIII Rock Edict of Ashoka records that orders were issued directly to the *Nagara Vyavaharikas* and other officials of Toshali, bypassing the *Kumara* who was in charge of the province. This indicates a well-organized administrative structure, which is corroborated by archaeological remains at Radhanagar.

Previously, Toshali, the provincial headquarters of Ashoka and a significant urban center in the 3rd century BCE, was identified with Sisupalgarh-Dhauri (Sahu, 1964; Brandtner, 1988-89). However, recent excavations at Radhanagar have provided new insights, challenging this identification. Radiocarbon dating of Radhanagar's urban settlement suggests an early historical phase beginning in the 4th century BCE (BETA Lab Sample No. 62779). The site's well-planned fortifications, similar to those found at Dhulikota and Dantapura, indicate that it was a significant royal settlement from the 4th-3rd century BCE, continuing to flourish until the 3rd-4th century CE. These

findings strongly suggest that Radhanagar was a major Mauryan-period urban center, likely corresponding to *Toshali Nagar*, the provincial headquarters of Emperor Ashoka (Chakrabarti, 2011: 67-71; Lahiri, 2016: 220-21).

Sisupalgarh was previously identified as *Toshalinagara* of the Mauryas (Sahu, 1964). However, while the settlement at Sisupalgarh dates back to the 7th century BCE, its urban characteristics emerged only after the 2nd century BCE, and no Buddhist antiquities have been recovered from excavations there (Mohanty & Smith, 2008). In contrast, Dhauli, located near Sisupalgarh, was likely a pilgrimage center along a trade route, similar to Langudi. Therefore, Sisupalgarh is more appropriately identified as *Kalinganagari*, the capital city of Emperor Kharavela. The excavations at Radhanagar have significantly contributed to the socio-economic history of southeastern India. They have reshaped perspectives on early historical archaeology in Odisha, particularly in the areas of Buddhism, trade, and urbanization. Furthermore, they have provided new insights into the socio-economic history of early Odisha.

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References

- Brandtner, M. 1988–1989. Archaeological explorations around Bhubaneswar. *Manav*, 3.
- Chakrabarti, D. K. 2010. *The ancient routes of the Deccan and the southern peninsula*. New Delhi: Aryan International.
- Chakrabarti, D. K. 2011. *Historical geography of the Ashokan edicts*. New Delhi: Aryan International.
- Chattopadhyaya, B. D. (Ed.). 2003. *Studying early India*. New Delhi: Permanent Black.
- Dhavalikar, M. K. 1999. *Early historical archaeology*. New Delhi: Books and Books.
- Gogte, V. T. 1997. The Chandraketugarh–Tamluk region of Bengal: Source of early historic rouletted ware from India and Southeast Asia. *Man and Environment*, 22(1).
- IAR. 2012–2013. Excavations at Kankia (Radhanagar). *Indian Archaeology – A Review* 2012 -13. Archaeological Survey of India. New Delhi.
- Journal of Andhra Historical Research Society* 39. 1995. Government of Andhra Pradesh. Hyderabad.
- Lahiri, N. 2016. *Ashoka in ancient India*. Ranikhet: Permanent Black.
- Malalasekera, G. P. 1960. *Dictionary of Pali proper names* (Vols. 1–2). London: Pali Text Society.
- Mathur, V. K. 1996. *Art and culture under the Sungas*. New Delhi: Bharatiya Kala Prakasan.
- McCrinkle, J. W. 1979. *Ancient India as described by Ptolemy* (Book VII). New Delhi: Munshiram Manoharlal.

- Mishra, J. 2005. Radhanagar and beyond: Pattern, process and structure of early urbanisation in south eastern India. In K. K. Chakravarti and G. L. Badam (Eds.), *River valley cultures of India* (pp. 138–148). Bhopal: IGRMS and New Delhi: Aryan Books International.
- Mukherjee, B. N. 1997. A fragmentary inscription referring to Ashoka. *Journal of the Epigraphical Society of India*, 24.
- Mukherjee, B. N. 1997. *Utkala Pradipa* (Vols. 1–2). Bhubaneswar: Utkal University.
- Patnaik, S. K. 2015. *Excavations at Radhanagar*. Bhubaneswar: Odisha Institute of Maritime and South East Asian Studies.
- Patnaik, S. K. 2021. *Buddhist heritage of Odisha*. Bhubaneswar: Mayur Publications.
- Patnaik, S. K., and G. C. Pradhan. 2015. Contextualizing Buddhist settlements: A study of epigraphical remains in Dharmasala area, Jajpur, Odisha. In S. K. Acharya (Ed), *Studies on Odishan epigraphy*. New Delhi: Pratibha Prakashan.
- Patnaik, S. K., and S. Nayak. 2020. Buddhist settlements in South East India. *Arnava*, 9(2). Varanasi.
- Patnaik, S. K., P. Upadhyay and P. Pradhan. 2014–2015. Iron objects from the excavations at Kankia (Radhanagar), Jajpur, Odisha. *Bharati: Bulletin of the Department of AIHC and A, BHU*, 39, 138–148.
- Pradhan, D. 2000. Stupa discovered in Orissa, India. *Circle of Inner Asian Art, SOAS Newsletter*, (11).
- Pradhan, D. 2001, June. Two rare statues of Ashoka discovered at Langudi Hill, Orissa, India. *Circle of Inner Asian Art, SOAS Newsletter*, (13).
- Prasad, P. R. K. 1993. Sada coins in coastal Andhra. In A. V. Narasimha Murty (Ed.), *Studies in South Indian coins* Vol. 3. Madras: New Era Publications.
- Prusti, H., P. Mohanty and J. Mishra. 2000. Dantapura, the capital of ancient Kalinga. In K. K. Basa & P. Mohanty (Eds.), *Archaeology of Orissa* (Vol. 11). New Delhi: Pratibha Prakashan.
- Ray, A. 1983. *Life and art of early Andhradesa*. New Delhi: B. R. Publishing Corporation.
- Ray, A. 2001. Beginning of urbanisation in Andhradesa. I. K. Sharma & B. Vidyadhara (Eds.), *Sri Subrahmanya Smriti*. pp. 287–297. New Delhi: Sandeep Prakashan.
- Ray, N. R. 1980. *Bangalir Itihasa, Adi Parva* (3rd ed.). Kolkata.
- Sahu, B. P. 2020. *The making of regions in Indian history*. New Delhi: Primus Books.
- Sahu, N. K. 1958. *Buddhism in Orissa*. Bhubaneswar: Utkal University.
- Sarkar, H. 1987. Emergence of urban centres in early historical Andhradesa. In B. N. Pande and B. D. Chattopadhyaya (Eds.), *Archaeology and history*. New Delhi: Agam Kala Prakashan.
- Sastri, K. A. N. (Ed.). 1967. *Age of the Nandas and Mauryas*. Delhi: Motilal Banarsidass.
- Schenk, H. 2014. Tissamaharama pottery sequence and early historic maritime silk route across the Indian Ocean. *Zeitschrift für Archäologie Außereuropäischer Kulturen*, 6. Wiesbaden: Reichert Verlag.
- Senaviratne, S. 1980–1981. Kalinga and Andhra: The process of secondary state formation in early India. *The Indian Historical Review*, 7(1–2). New Delhi: Indian Council of Historical Research (ICHR).

- Senparasher, A. 2021. *Settlement and local histories of the early Deccan*. New Delhi: Manohar Publishers.
- Thapar, R. 2012. *Ashoka and the decline of the Mauryas* (3rd ed.). New Delhi: Oxford University Press.
- Tripathy, S. 1986. *Early and medieval coins and currency system of Orissa, circa 300 BCE to 1568 CE*. Kolkata: Punthi Pustak.
- Tripathi, S., G. Prabhu, S. K. Patnaik, S. K. Acharya, U. K. Mishra, P. P. Behera, G. C. Pradhan, D. Garnayak, S. R. Sahoo and S. J. Joshi. 2019. A preliminary study of Knobbed Ware from Odisha. *Man and Environment*, 44(1), 82–91.
- Yule, P. 2006. *Early historic sites in Orissa*. New Delhi: Pragun Publications.