

## **Iron anchors of Northern Odisha, east coast India: Maritime contacts with European countries**

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### **Abstract**

The maritime trade between the ports of northern Odisha namely Balasore, Pipli, Dhamra and Chandbali and the European countries during the 16th to 19th centuries is well documented. Among other European countries, the Portuguese were the first to setup their trade centre at Odisha. Subsequently, the Dutch, French and English came to Odisha for maritime trade. During the end of the 19th century ports of northern Odisha were declined. In order to study the remains of maritime activities of northern Orissa, the Odishan Institute of Maritime and Southeast Asian Studies and Odisha State Museum jointly carried out explorations and recorded the finds. In the course of explorations four iron anchors were found at Balaramgadi and Chandabali and those were brought to the Odisha Museum and displayed. A wooden boat was recorded in the rivulet of the River Burabalanga. In this article, an effort has been made to describe the anchors, their probable dates and in relation to the maritime history of Odisha.

**Key words:** Iron anchors, Boat, Maritime trade, ports, Odisha

## Introduction

Maritime archaeological studies confirm that stone weight anchors were the earliest device to hold watercraft in place. Different shapes and sizes of stone weight anchors were developed and used during different periods by various cultures (Curryer 1999; Frost 1973; Hadas *et al.* 2005; Kapitän 1984; Nibbi 1984; Whitehouse 1970). Some varieties of stone anchors have been reported along with lead-filled or lead stock wooden hook anchors from shipwrecks, harbours and trade routes around the world (Green 1971; Wachsmann 1998; Agius 2002). The development from stone weight anchors led to wooden hook anchors (Haldane 1986; Haldane 1990; van Duivenvoorde 2012), lead-stock anchors and iron anchors. Maritime archaeological explorations along the east and west coasts of India have yielded stone anchors (single hole, composite, Indo-Arabian, and ring stone [mushroom]), which were used until the middle of the 20th century. However, no lead-core or all lead stock wooden hook anchors have ever been reported in Indian waters. In Indian context of the various anchor typologies from the historical period onwards, the latest introduction was the iron anchors.

The Europeans introduced the iron anchors in India in the 16th and 17th centuries (Qaisar 1982: 27–28). Despite the introduction of iron anchors in Indian waters, stone anchors were still in use alongside the iron anchors for centuries. Archaeological explorations have recorded iron anchors on many sites, both underwater and onshore. These include the Sunchi Reef, Sail Rock, and Aguada waters off Goa (Tripathi *et al.* 2003), Dabhol (Gaur *et al.* 2009) and Vijaydurg in Maharashtra, Tuticorin in Tamil Nadu and Puducherry (Pondicherry). Similarly, iron anchors have been observed and reported in other sites around India, which have yet to be archaeologically recorded, studied, and published.

During coastal explorations along the northern coast of Odisha in 1988–89, four iron anchors were found on the bank of the River Burabalanga in the coastal regions of Balaramgadi in Balasore district and on the bank of River Baitarani at Chandabali in Bhadrak district. All four anchors were recently raised and accessioned into the collection of the Odisha State Museum, Bhubaneswar, and displayed along the museum corridor. In the later years the Odisha State Museum carried out further explorations along the Burabalanga River to record evidence related to these iron anchors. A survey conducted, however, found no clues related to these anchors. On the other hand, explorations of the rivulet of the Burabalanga River, locally known as '*Olandaz Nala*', which was used as a harbour, revealed the remains of a wooden boat measuring 10 m in length and 4 m in width. Test excavations were carried out in 1990 to study its construction technique, vessel type and nationality. Finds included a Dutch coin, a drinking water jar and rolled potsherds. Due to water seepage and problems created by the water table the excavation was not completed and the study of the vessel's origin and construction were abandoned (Das 1991). In this paper the iron anchors,

their probable date, condition and origin are discussed along with their relevance and importance to the maritime archaeology of Odisha.

### **Association of iron anchors with maritime history of Northern Odisha**

The ports of Northern Odisha such as Balasore, Chandabali, Chhauna, Churamani, Dhamra, False point, Harishpur, Laichanpur, Pipli (Fig. 1) and Saratha, had trade contacts with the English, Danes, Dutch, French and the Portuguese. Ships of these countries visited these ports. Some of which had shipbuilding centres. The Portuguese were the first to establish a trade centre at Pipli in 1514 and were the sole traders here for more than a century; subsequently, the Dutch, French and the English came to Pipli for trading. The English set up the first trade centre at Pipli that continued until 1723 (Maddox 1910). The Dutch arrived in Pipli around 1625–27 (Mukherjee 1964) and eventually shifted their trading volume from Hugli to Pipli because of Muslim hostility. The Pipli factory was stable and profitable for the Dutch. In the middle of the 17th century, Hamilton (1930) describes that Pipli was a major centre of European trade from where the Dutch alone shipped 2,000 tons of salt annually (Hunter 1877). When other European nations commenced their trading efforts with Pipli in the early 17th century, the Portuguese repositioned their trading settlement and efforts from San Thomé near Chennai to Balasore. They were also in conflict with the local people. They established a second trade centre at Balasore on the mouth of the Burabalanga River in 1625 (Campos 1919). The English had established a factory on the banks of Burabalanga (Barabati) in 1633 (O'Malley 1907). Subsequently, the Danes established their factory in 1636, followed by the Dutch, and the French in 1673–94 (Raut 1988).

Fakir Mohan Senapati (1843–1918) outlines the maritime activity of Odisha during the 19th century in his autobiography (Senapati 1963; Senapati 1991). Balasore port (*Bandara Balasore*) on the tributary of River Burabalanga is known as the '*Olanda Nala*', because the '*Olandaz*' (Dutch) anchored their ships in the tributary. '*Dinamar Dinga*' or '*Dingomar Dinga*' village, which is on the west of '*Olanda Sahi*', was the centre of the Danish traders while '*Farashi Dinga*' on the east of Balasore was a centre of the French traders (Senapati 1991). The Marathas plundered Balasore in 1794 and, subsequently, the English set up their new factory at Balaramgadi (Raut 1988).

Balaramgadi was one of the important textile production centres along the Balasore coast and the English factory records frequently mention the textile production of Balaramgadi (Sethi 2008). Dhamra was declared a port in 1858 and is situated on the banks of estuaries of the Baitarani and the Brahmani rivers. The English were attracted to Dhamra because of its better facilities. Hunter also describes "Dhamra, as a suitable port for native shippers ranking next to Balasore in importance" (Hamilton 1828). Chandbali port on the bank of Baitarani River began in 1872 and was known as Ravenshaw port (Das 1997). Throughout the 19th century, salt was exported from Chandbali. Almost 60% of the total trade and commerce between Odisha and Calcutta was carried out from Chandbali port. Until 1885 consumer goods and cotton were

sent to Calcutta from Dhamra and Chandbali port and in return forest products, oil seeds and rice came from Calcutta (Toynbee 1873; Bhatta 1998).

After the decline of Chandbali port due to a devastating cyclone and the increasing shallowness of the area, the False Point, a low headland in the Bay of Bengal, was declared a port in 1860. False Point is located in the Kendrapada district of Odisha, India, and got its name from the mistaken belief of seafaring merchants who frequently mistook it for Point Palmyras, less than a degree farther north (Murray *et al.* 1832). Its anchorage was safe and completely landlocked and the port was recognised as the best harbour on the whole of the Indian coast between Calcutta and Bombay (Hunter 1872). The port at False Point had trade contacts with Madras and Bombay as well as with Ceylon, Burma, Maldives Island, Mauritius and London (Banerjee 1898). Regular shipping between these ports and False Point contributed significantly to the maritime trade of Odisha.

In terms of export and import, the ports of Odisha played a significant role. The cotton and textile products of Odisha had a wide market in Europe. The Portuguese imported spices, woollen cloth, tin, lead and vermilion to Odisha and exported cotton, muslin, butter, rice, and gingelly seed from Pipli port (Campos 1919). The Dutch exported textile goods, silk, saltpetre, wax, rice, sugar and butter from Odisha to countries in Asia and Europe (Raut 1988). In the mid 17th century, the Dutch shipped 2,000 tons of refined saltpetre annually from Pipli port. They invested £2,000,000 sterling yearly and, in 1654, purchased goods for seven to eight ships (Foster 1915). The main exports of the English were cotton, silk products, rice, sugar, butter, iron, pepper, salt, saltpetre and items such as broadcloth of various colours, quicksilver, lead, vermilion and other luxury items were imported (Foster 1906–27; Raut 1988).

Thomas Bowery (1905) referred to the different types of vessels, namely *Budgaroo* (pleasure boat), *Boora* (large Indian boat), *Olooko* (riverine), *Patellas* (large flat-bottomed vessel) and *Purgoo* (sailing boat), which ply the Odisha coast during the 17th century. The paintings of *Patella* and *Purgoo* boats depict two armed iron anchors, which are similar to the European type (Hill 1958), emphasising the fact that iron anchors were used along the Odisha coast during this period.

### **Description of iron anchors**

Four iron anchors were found during investigations along the northern coast of Odisha, of which three are from Balaramgadi and one is from Chandabali. These are described and discussed below.

*Anchor No. 1:* This anchor was found in poor condition at Balaramgadi on the east of Balasore. Its maximum length is 180 cm. The flexible iron sliding stock of the anchor is 220 cm long, which is similar to Cotsell's (1856) iron stock. The iron chain measures 5.40 m long and is attached to the ring. One fluke is missing while the other is present but corroded. The shank of the anchor is squarish at the bottom, tapers upwards and is roundish at the upper end (Figs. 2 & 2a).

*Anchor No. 2:* This anchor was found in a well-preserved condition at Chandabali on the mouth of the River Baitarani with one of the flukes buried (Fig. 3). Its maximum length is 200 cm. Its shank is roundish. The anchor ring to which the chain was attached is present but the anchor chain is missing. A hole below the ring was meant for the stock but the iron stock is missing. Only one of the flukes is still intact (Figs. 4 & 4a).

*Anchor No. 3:* This anchor was also found at Balaramgadi. Its maximum length is 245 cm. One of the flukes is missing while half of the other fluke arm is lost. Only half of the anchor ring has survived but is highly corroded (Fig. 5 & 5a). The condition of the anchor therefore is poor. The stock key or lug is present below the hole on the shank for the ring probably meant for fixing the stock.

*Anchor No. 4:* This anchor was also found at Balaramgadi. Its maximum length is 227 cm. One of the flukes is eroded while half of the other fluke is missing. The ring hole is highly eroded and closed with oxidation (Figs. 6 & 6a). In comparison with the other three anchors, the state of this anchor is very poor. In order to protect the anchors from further corrosion, a thick layer of enamel paint has recently been applied on them. No marks or stamps are visible on their surfaces.

All four are wrought iron anchors. Of the four anchors, anchors 1 and 2 are similar in shape but differ in size and the stock of anchor 2 is missing. However, these two anchors (2 & 3) belong to the Admiralty Pattern anchors with Admiralty pattern stock and ring to take the chain. Anchors 3 and 4 are identical and are longer than anchors 1 and 2. The surfaces of anchors 3 and 4 are very rough and their stocks are missing. Both are also highly corroded making it difficult to determine the original circumference of the shanks. In comparing the length of shank and fluke of anchors 3 and 4, the shank is longer than the fluke. As these anchors are corroded, calculating their estimated weight may not prove accurate. All these four anchors are forged and Curryer (1999) describes in detail the fabrication and methodology of these types of anchors.

Anchors 1 and 2 are Admiralty pattern anchors, developed under the guidance of Admiral Sir William Parker in 1841, and datable to the 18th–19th centuries. These anchors were elliptical in shape and their arms were curved. Anchors 3 and 4 belong to typical Admiralty Old Plan Long Shank anchors datable to the 17th–18th centuries. These anchors are similar with those found at the *Sirius* (1786) and *Bounty* (1790) shipwreck sites as well other shipwrecks dated to the 18th century. The shank of these anchors is of the same length as the stock, and the diameter of anchor rings is smaller than the fluke (Upham 1983; Curryer 1999). Iron stocks were introduced in small anchors in the late 18th century and for larger anchors, the beginning in the 19th century (Upham 1983).

Balaramgadi and Chandabali were ports and trade centres under British control with plenty of natural resources such as diamonds, iron, timber, forest and agricultural products (Habib 1982: 49–

52). As iron was in abundance in the Nilgiri hills region, the area may have been the source for the raw materials in the manufacture of these anchors. Ascertaining the owners of these anchors is difficult because the ports of northern Odisha were under the sway of European powers. However, the size and type of the anchors do not suggest that they were made in Northern Odisha. Rather, these anchors are likely of European origin used by European vessels, which left them in India for unknown reasons.

### **History of iron anchors of India with reference to Odisha**

The Europeans introduced iron anchors to India and it is believed that iron anchors were first used in Indian waters between the years 1550 and 1600 (Qaisar 1982; Mookerji 1912; Bowery 1905). A recorded example from 1615 includes Shahbandar of Surat where mention is made of purchases of English anchors (Strachan & Peurose 1971). The *Farhang-i-Jahangiri*, the lexicon written during the reign of Jahangir (1605–1627), which is the earliest reference, refers to a *langar* made of “iron used for securing the vessel” (Qaisar 1982: 27). Similarly, the Mir’ at-ulhaqaiq, a diary written in 1720, also describes *langar-iahni*, which are anchors of iron; and the 18th century lexicon, *Bahar-i Ajam*, describes a *langar* made of iron used to stop vessels from moving away (Qaisar 1982: 27).

In the second half of the 17th century, attempts were made to manufacture iron anchors in India and a breakthrough was achieved. With reference to Odisha, Hamilton (1930: 217) mentioned that iron anchors were cast in moulds for ships because plenty of iron was available in the region. However, he further opined that Indian made iron anchors were of inferior quality compared to European anchors. Moreover, Qaisar (1982) stated that in the 1660s, Aurangzeb (1658–1707) purchased 10 to 15 iron anchors, each weighing 110 *maunds* at 8 rupees per *maund*, from England because good quality anchors were not available in India. Even in the 1670s English anchors were brought to Surat by traders (Qaisar 1982: 28). Although there is no direct reference to iron anchor manufacturing industries at Odisha by the Europeans, Senapati (1963: 715) mentions that iron anchors of 14 to 15 quintals were manufactured locally at Balasore but the process remained unknown. Thomas Bowery (1905: 102) stated that iron anchors, bolts and spikes were manufactured at Madapallam (Madapollum) and Narsapur of Andhra Pradesh, on the east coast of India. The British and other merchants built their vessels at these places because of the availability of timber, iron and craftsmanship (Mookerji 1912: 232–33).

### **Discussion and Conclusions**

In recent years a significant degree of new evidence about the maritime archaeology of India has been collected from onshore and offshore investigations. Among the discoveries, stone and iron anchors contribute to an understanding of the history of maritime trade and commerce including overseas contacts. Once a tool or a technology is invented, its improvement continues and shapes and sizes are altered as required. In the case of stone and iron anchors, the same phenomena was

observed such as the development from a single hole to composite, as well as in Indo-Arabian types used for smaller watercraft and iron anchors for ships. After the introduction of iron anchors, stone anchors were not totally discarded but were still used in the coastal waters by the maritime communities. Although the development of iron anchors has reached its apex, fisher folks of many parts of the world including India continue to use primitive types of stone anchors in coastal or back waters (Tripathi *et al.* 2014). In comparison with iron anchors, stone anchors have a relatively small variety. However, iron anchors of different types were invented, introduced and developed and then subsequently discontinued. Both stone and iron anchors have been reported from many parts of India but comparatively more stone anchors have been discovered compared to iron anchors.

Anchors were not only used for anchoring and mooring. Evidence suggests that anchors were reused, worshipped and had alternative uses in many parts of the world (Vosmer 1999; Tripathi & Gaur 1997; Tripathi *et al.* 1998; Gaur *et al.* 2009; van Duivenvoorde *et al.* 2013). Reuse and alternative use of stone anchors are recorded from the Indian subcontinent; however, worship of stone anchors is not documented in India. Recently, worship of iron anchors has come to light at the Loyaleshwar temple near Dabhol jetty, Maharashtra, on the west coast of India (Gaur *et al.* 2009: 299), the first recorded example in India. An iron anchor was buried in the sanctum of the temple and worshipped as Lord Shiva. Local stories revealed that this temple is at least 200 years old and fishermen offered worship prior to their sea voyages (A. Shirgaonkar 2007, pers. comm., 17 March).

Further evidence suggests that iron was used for making anchors in the 1st century BC and AD. The iron anchor came to replace the wooden anchor during the course of the Roman Imperial Period, but the earliest reference we have to the iron anchor can be found in Herodotus' History of the Persians. He mentions that one of the Greek heroes in the Battle of Plataea (479 BC) fixed himself on the battlefield with an iron anchor tied to his waist (Haldane 1984).

The earliest known iron anchor (dated to 40 AD) with wooden sheathing was recorded in Lake Nemi in Italy (Speziale 1931; Muckelroy 1978: 149) while another early example was recorded in the eruption deposit at Pompeii (Frost 1963: 59–60). A seal dated to the 13th century, found in the coastal town of Portsmouth, United Kingdom, illustrates a boat with anchor. Similarly, the seal of Winchelsea, East Sussex, datable to the 14th century, depicts an anchor along with two seamen working at the windlass (Upham 1983). Later period shipwrecks from around the world have yielded different shapes and sizes of iron anchors datable to the 15th century onwards, after which other types of iron anchors were invented, used and modified and developed as and when required.

The maritime contacts of the east coast of India are datable to the early historical period but very limited numbers of stone and iron anchors have been recorded. Literary sources suggest that the wooden sailing ships of Northern Odisha used iron anchors both in the bow and stern for anchoring, and the anchors at the stern were known as '*latadi*' (Dash 1996).

This is the first attempt to study iron anchors from the east coast of India. As none of the iron anchors in this study were found in context with diagnostic artefacts that could help in further dating them more precisely, the proposed dates have had to be based on anchor shape, form, typology and material. During investigations, Odisha Museum authorities found these isolated anchors that were lying neglected and transferred them to the museum for display.

By the end of the 19th century the Danes, Dutch, French and Portuguese left Odisha subsequently decreasing the importance of these ports however the British held sway all over India. Balaramgadi and Chandabali were under British control for a long time and maritime trade along the east coast of India was carried out through Chandabali, therefore it is possible that these anchors belong to the British during to the 17th–19th centuries.

The marine records of the archives of New Delhi, Bhubaneswar, Madras, provide information about the ships that sank on the Odisha coast (Tripathi *et al.* 1994), but no shipwrecks are mentioned off Balaramgadi and Chandabali and other parts of the northern Odisha coast. However, the India Meteorological Department (IMD) sources suggest that between May 1823 and 1900, many cyclones occurred along the northern Odisha coast and a large number of ships were destroyed and capsized (Tripathi & Unnikrishnan 2011); whether these anchors belong to any of those ships or not is difficult to ascertain. Another possibility that cannot be ruled out is that the anchor were used by ships that regularly visited Odisha ports but once the ports declined the anchors may have been abandoned.

Like stone anchors, iron anchors also provide evidence of maritime trade contacts between countries and show the advancement of technology in navigation. Further explorations at the European trade centres of India may bring to light more iron anchors that may help shed further light in relation to typology, period and origin. The findings of these iron anchors add new information in the maritime history of Odisha.

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Figure 3. Iron anchor found at Chandabali on the mouth of the River Baitarani (OMISEAS, Bhubaneswar).

Figure 4. Iron anchor found at Chandabali on the mouth of the River Baitarani

(Photo: Sila Tripati).

Figure 4a. Iron anchor found at Chandabali on the mouth of the River Baitarani

(S.B. Chitari & Rudra Behera).

Figure 5. Iron anchor found at Balaramgadi, Northern Odisha (Photo: Sila Tripati)

Figure 5a. Iron anchor found at Balaramgadi, Northern Odisha (S.B. Chitari & Rudra Behera).

Figure 6. Iron anchor found at Balaramgadi, Northern Odisha (Photo: Sila Tripati)

Figure 6a. Iron anchor found at Balaramgadi, Northern Odisha (S.B. Chitari & Rudra Behera).

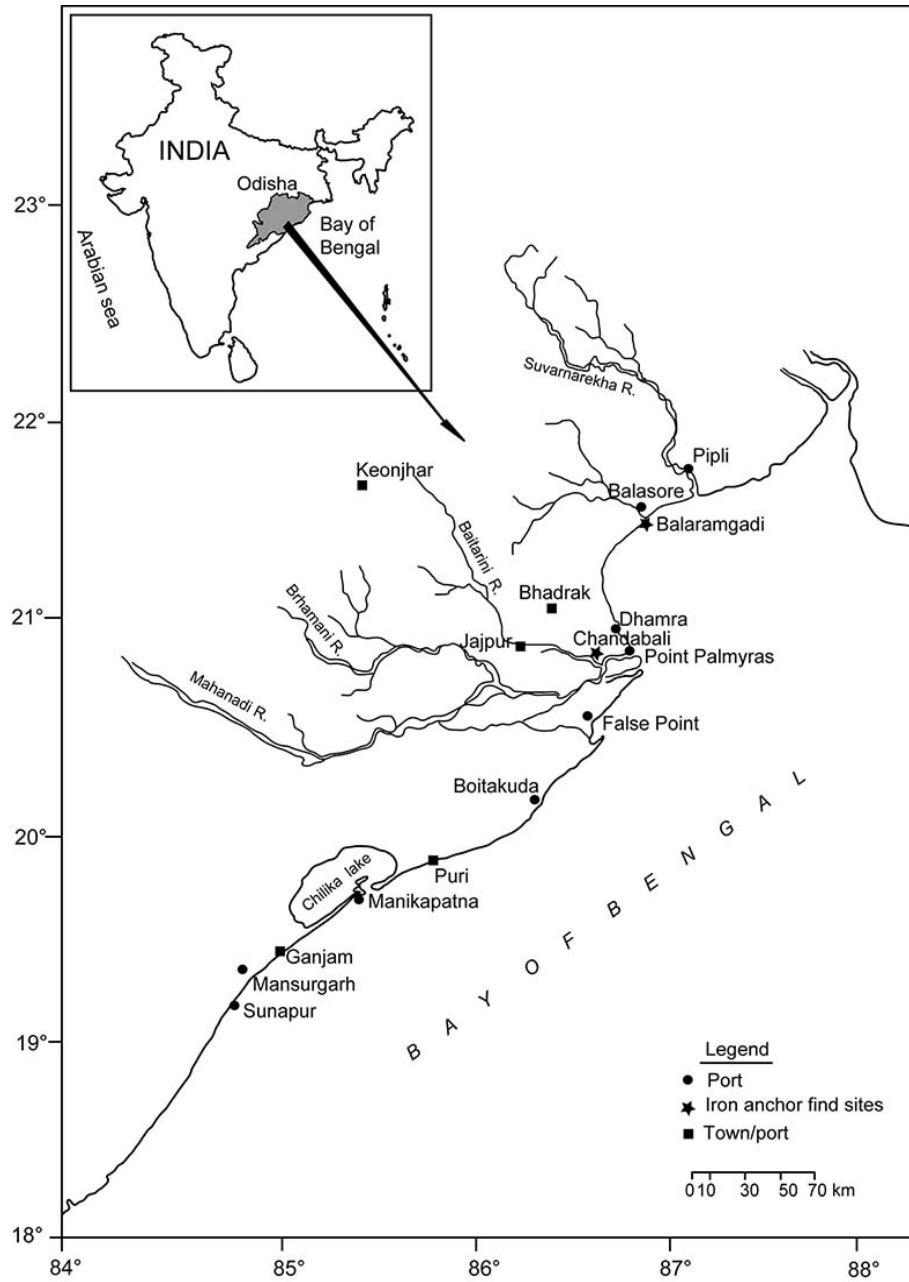


Fig. 1 Iron anchor find sites, ports and trade centres of Odisha

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Fig. 2

Iron anchor found at Balaramgadi, Northern Odisha.

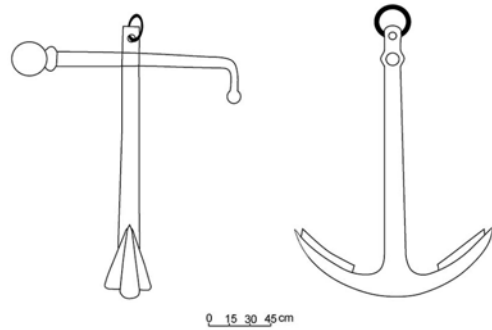


Fig. 2a



Fig. 3

Iron anchor found at Chandabali on the mouth of the River Baitarani (OIMSEAS).



Fig. 4

Iron anchor found at Chandabali on the mouth of the River Baitarani.

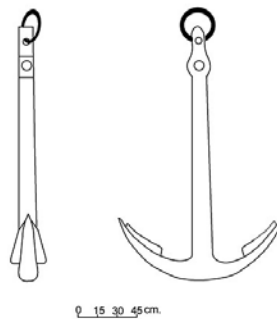


Fig. 4a



Fig. 5

Iron anchor found at Balaramgadi, Northern Odisha.

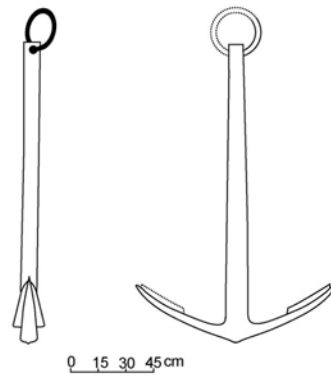


Fig. 5a



Fig. 6

Iron anchor found at Balaramgadi, Northern Odisha.

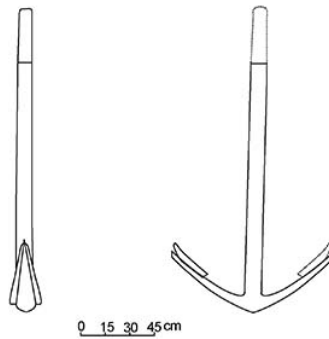


Fig. 6a