

# Ecotheological Dimensions of Termite Hill

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ECOLOGY is most fundamental to the survival of human cultures and populations. Ecological resources are exploited by humans for creation of an artificial hierarchy of eco-systems. Technologies are evolved for efficient transfer of ecological resources. During this course of material and technological evolution symbols, motifs are absorbed; rituals are formulated, cults emerge through common symbols and rituals; gods and goddesses; demons and devils; spirits and angels assume forms and shapes and religious systems befitting the levels of technology get rooted.

Magic is related to technology. Primitive agricultural and fertility magic could be considered as monopolised knowledge of stagnated, unevolved or dynamic technology depending upon the ecological specificity of each culture.

The common determinants of ecological specificity of any region are soil and climate.<sup>1</sup> The ecological dimensions of historical theology have to be examined from these common determinants.

In this regard, the cults of earth-mother worship as found in South Konkan and Goa, could be test cases. Scientific elucidation of these cults and demystification of various beliefs, legends and rituals associated with them is necessary to find the true meaning of several historical phenomena. As A.C. Spawlding says, "*historians depend on a type of explanation that they claim is different from scientific explanation. While in fact, no separate form of historical explanation exists.*"<sup>2</sup>

Many quasi and pseudo-historical forms of explanations<sup>3</sup> exist for the cult of Santeri, Ravalnatha, Skanda-Kartikeya,

Subhramanya and Muruga, Renuka, Parashurama and Yellamma, Jyotiba, Khandoba and Durga<sup>4</sup>. Mostly these are propagated through brahminic literature and sometimes through the folklore. In the ultimate analysis, every explanation is reduced to the two basic principles - the male and the female. Cults related to the worship of 'Roan' or termite hill embodied both these principles symbolically. The 'Roan', known as 'Santara' (with perforations or 'Valmika' in Sanskrit, 'Pottu' in Tamil, 'Varul' in Marathi, 'Bhom' or 'Bhombada' in Malvani or Kudali thus became the focal point of origin of cults such as Santeri-Ravalnath, Jyotiba-Yamai, Renuka-Kedarnath, Yellama-Adimailar and inspired amalgamation of many Saivite cults.<sup>5</sup>

### **The Ecological Magic of *Roan***

Absorbed by Konkani, *Roan* is originally a mundari word according to Anand Dhume, denoting the natural form of the ant or termite-hill.<sup>6-7</sup> From the paleolithic period cave art, the use of natural symbols and forms by primitive man could be pinpointed. Forms matching the termite-hill have not been reported from the wall painting of caves of Bhimbetka Complex of Madhya-Pradesh<sup>8</sup>, a region closer to the original home of the primitive settlers of Goa - the Kols. The cave complex which is dated from 30,000 B.P. - 4000 B.P. indicates that the magico-religious aspects of the termite-hill did not so much impress the hunter food-gatherers of pre-historic ages. The magico-religious aspects of termite-hill are manifested not only through the pyramidal, conical, triangular form of its architecture but also through its origin from soil. To the hunter food-gatherer tribes origin of termite-hill, their expansion, multiplication without any visible external interference or agency, their property to withstand sun, wind and rain, their seemingly ageless nature was a supreme ecological magic. However, it found expression only after formation of some stable societies in region dominated by the termite-hills. Geographically, this region is mostly the sub-Himalayan region of India. Within this region, the mound-building termites are dominant only in South India<sup>9</sup> - a characteristic of the ecological determinants - soil and climate.

## Termite-hill Association with Fertility Cult

The primitive fertility cult was based on the fertility of the soil. Since agriculture was a discovery of women, food gathering and cultivation was done by them. They wielded immense power as tillers of the earth and came to be regarded as depositories of agricultural magic. The essence of this magic consisted in linking up their fertility with that of the earth.<sup>10</sup> This could be accomplished through selection of a natural form like termite-hill. The termite-hill, the Roen, thus became the divine cult symbol of earth-mother goddess. This association must have occurred during the pre-agricultural period. The cult of Santeri in Goa thus dates back to the neolithic period. It is pertinent to record here the ritual of '*Mage Parab*' festival of mundaris. After lighting the fire during '*holi*', the chiefs and other important clan members visit a termite hill and cover it with tree branches. According to Anant Dhume, this ritual was retained by Kols of Goa. The Kol tribe introduced the worship of *Santer* in Goa and the worshippers were known to be called as *Santerkars* or *Satarkars*.<sup>11</sup>

The Goan landscape is saturated with termite-hills. Their density was more during ancient times. Termite-hills, specially the largest and oldest near a settlement or village thus became the centre of ritualistic worship. A survey of the Santeri temples or centres of Santeri worship of pre-Portuguese period<sup>12</sup> shows that the cult of Santeri is most dominant cult of Goa. Interestingly it has many similarities with termite-hill associated cults of neighbouring states. The major centres of these cults are Alampur and Nagarjunkonda in Andhra Pradesh; Siddankotte, Sangameshwar, Vyaghreshwari in Karnataka and Ter, Mahurzari and Bhokardan in Maharashtra.<sup>13</sup>

## The Sanctity of the Termite-hill Soil

The termite-hill soil is identified as one of the five holy soils used for *yadnas*. In *Shatapatha Brahmanas* (1.1.1.17), the earth gifts the termite-hill soil to the sky as the female ovum, while the sky gifts salt to the earth as semen.<sup>14</sup> The termite-hill is believed to contain the seed of protector gods as per another legend. In the South newly married women worship the termite-hill and the

soil is brought as *prasada*<sup>15</sup>. There is a belief that termite-hill soil has conception powers. At the Subhramanya temple in South Kanara, the main priest on the day of *Skandashasti* or *Nagashashti* wears a leather glove and removes the termite soil which is distributed as *prasada*. The soil is known as '*Mool-Mrootika*'.<sup>16</sup>

These beliefs have originated from the fertility cult which considered the termite-hill as vagina or womb of the earth-goddess. Naturally, the complimentary male principle of the inseminating god co-evolved in the form of snake or serpent and came to be associated with the cults of termite-hill worship.

### Termite-hill Cults and Naga Worship

Contrary to popular beliefs only discarded or destroyed termite hills occasionally shelter snakes. No snake can enter an intact, unperforated, live termite mound, protected by thousands of soldier termites with paralysing stings.<sup>17</sup> Still snakes or nagas have come to be associated with termite-hills and related cults. The anthropomorphic forms of snakes have come to be worshipped in Goa. The snake-symbols have evolved as iconic protector gods or '*Kshetra patis*' in South India.<sup>18</sup> In Goa they assume the form of Ravalnatha or Bhairava. In Maharashtra, Jyotiba or Khandoba. In Karnataka they are worshipped as Subhramanya. In Tamil Nadu Murugan is their representation. In Bellari, Karnataka, it is '*Manmaillar*' or '*Mannu-Mailar*' still in the form of termite-hill. Similarly, at Jejuri in Maharashtra, the '*Adimailar*' shows the association of sacred serpent or the male-principle in the form of termite-hill.

The association is further symbolized through ceremonious marriage. In Vengurla, Santeri weds Ravalnatha. At Chandagadh near Belgaum, Ravalnatha weds Pavanai. Such ritualistic and symbolic marriages are known to signify an important historical phase in evolution of cults.<sup>19</sup>

## Evolution and Sanskritisation of the Termite-hill Cults

The ritualistic worship of the *Roen* in Goa as fertility symbol continued in its natural form till the advent of powerful Aryan influence in the South. The process of Sanskritization must have been accelerated with the development of trade routes and expansion of coastal navigation. Intensive interaction with the neighbouring regions resulted in import and assimilation of many ideas.<sup>20</sup> The incorporation of the name 'Santeri' derived from the Sanskrit word "Santara" was one such for termite-hill or *Roen*.<sup>21</sup> The popularity of termite-hill cults led to composition of many myths and legends in Sanskrit literature. The folk-deities found their way in Ramayana and Mahabharata. The earth-goddess, Renuka, became the mother of Parashurama and wife of Jamadagni. It is interesting to see that on Jamadagni's orders obedient Parashurama decapitated Renuka.<sup>22</sup> A symbolic representation of subjugation of ethnic earth-goddess worshippers. Her original form is still found intact as Yellamma. The Madiga caste is traditional worshipper of Yellamma. The Madigas and their folk-singers Bavnids sing glories of Parashurama, Yellamma and Renuka in Karnataka.<sup>23</sup> In Goa, the only true folk-art form related to the fertility cult, similar to 'Gondhal' in Maharashtra and 'Bhootnriya' in coastal Karnataka seems to be "Perni Jagor", now almost extinct.<sup>24</sup>

A chronological sequence of transition of termite-hill related folk-deities into brahminic forms may be difficult to construct. However, this transition could be shown to have occurred after the Satvahanas rule. The popularity of Skanda Kartikeya cult during 4th-5th century A.D. is related to this transition. The cult of *Durga* and her representation as *Mahishasurmardini* was a natural outcome of the interaction with the Gupta empire. The Bhojas and the Chalukyas accelerated the process and during the Kadamba rule tantric influences held their sway resulting in forms like Kali and Chamunda. The original form of Santeri differentiated in various goddesses of the Saivite and Natha sects. The strong brahminic influence, the tradition of royal land grants to priest-class as agrahars further consolidated their position dominant over the traditional village communities or

'Gramasaunsthās'. With the advent of Saraswat clans during the Shilahar and Kadamba regimes, the fold-deities were relegated to a minor position. The major centres of Santeri worship were assimilated by the new settlers. Santeri thus assumed the new form of Shantadurga. Myths and legends were created to glorify her theogony.<sup>25</sup>

The Naga or serpent worship in Goa was similarly influenced. Anthropomorphic sculptures were probably worshipped by the Sendrakas of nearby Banavasi region who traced their origin to 'Phanindra' or 'five-hooded serpent'<sup>26</sup>. The sculptures of Talavali and Cudnem show Gupta-Kushana influence stylistically. Women desiring child used to offer Nagar carved on stone - or *Nagakalas*.<sup>27</sup> Such *Nagakalas* are prominently found in many temples in Goa. The Tambdi Surla temple, a pre-historic and megalithic site contains two *Nagakalas* carried in basaltic slabs signifying 'Subramanya' and the importance of 13th century fertility cult.<sup>28</sup>

The male principle, worshipped as phallic form or *linga*, found popular representation in Goa. Saptakotishwara, Nagnatha, Manganatha, Mallikarjuna were derivations of the cult of Naga worship, related to the earth-mother goddess - Santeri, but later influenced by the brahminic and puranic modes dominant under various dynasties.

Despite powerful vedic, brahminic and puranic influences, the folk-deity Santeri has retained its original aniconic form at many places of worship in Goa. The goddess is represented in mask form fixed on a vessel of copper and brass. At Dhargal and Keri-Ponda, two metre high live termite-hills are still worshipped as Santeri. One of the largest temples of Santeri existed at Sancoale, which was destroyed in 1567. A similar temple at a place called Sandelva or Sandival in Curtorim was burnt<sup>29</sup> down in 1560. Since Santeri is an aniconic deity the destruction of temples did not break the tradition. New large termite hills immediately became the abode of Santeri.

### **The Hidden Aspect of Ecological Magic**

There is a scientific explanation of the fertility aspect of the termite hills.<sup>30</sup> The termite hills are built by termites over a period of 2-3 years. Termites are social insects having different classes

and a system of division of labour. Only the termites of Macrotermitinae sub-family build massive overground mounds/hills. Each hill has many compartments where the termites store their food. This food is composed of plant matter. The termites grow a type of fungus called Termitomyces over this food-pile. The fungus grows on the pile and makes its digestion easier for the termites. After rains the fungus grows very fast. The walnut shaped mass inside each compartment shows growth of small needles. The needles grow further through the soil. they look like small serpents, with bulbous hoods. After penetrating the roof, the snake-like objects grow further through the soil. After penetrating the roof the snake-like objects grow further. At this stage they look like erect phalluses or hooded snakes. After a few days the growth is complete. A beautiful umbrella like object with a cylindrical support and a ring is seen. It gives a fruity smell. This is the well known 'Termitomyces' mushroom.

It could be shown that at hunting-food gathering stage the food-value of these mushrooms had been discovered.<sup>31</sup> The food-generating capacity of the termite-hill, after insemination by rains, was considered as fertility magic by the women-Shamans. Further, the food-piles, if a termite hill is excavated or destroyed, look like animal-brains. For a hunting community, the association was not difficult. Termite-hill thus became a cult-symbol and the snake-like forms, white at the top and black underneath, the immature or pseudo rhizal stage of Termitomyces mushrooms were transformed into Kshetrapala gods - the consorts of Santeri, Renuka and Yellamma.

The origin of all phallic shaped forms associated with the cults of termite-hill worship thus have to be related to specific stages of Termitomyces mushroom-life cycle.<sup>32</sup> This explains the origin of '*lingadevas*' and '*stambhadevas*' devoid of *yonis/pithas* or *shalunkas* found in South Konkan, Goa and Canara. These forms do not follow the stylistic features suggested by Varahamihira or the Puranas.<sup>33</sup>

The '*Nagakashtha*' is one of the chief emblems of cult of Santeri, Renuka and Yellamma. It is carried by the Matangis in Karnataka and by the Gauravas in Goa. The '*tarangas*' are '*Nagakashthas*' of Santeri and Ravalnatha, which are taken in a procession<sup>34</sup>. The origin of '*Nagakashtha*' could be traced to the

snake-like objects emerging from the womb of the earth-goddess the *Roen/Santeri*.

The five-hooded serpent could be just a bunch of immature *Termitomyces* mushrooms emerging from the surface of the termite hill. This is a commonplace observation<sup>35</sup> exploited religiously by the priest-class in South Canara and other places. In the Subhramanya temple the main priest has to wear a leather glove to remove '*Moolmrutika*' which is nothing but part of fungal-comb inside the hill. The leather glove gives protection from stinging bites of soldier termites.

The legend of discovery of Umbrella<sup>36</sup> by Jamdagni is also related to copying of the umbrella form of a mature *Termitomyces* mushroom. The largest *Termitomyces* mushroom has a diameter of one metre, larger than modern umbrella. There is no similar form in nature which may inspire discovery of an umbrella. In this regard, it is pertinent to record the experience of the Bengalese tribes. They named the mushrooms growing on Termite-hills as *Durga-chhata* or the Umbrella of Durga. This name signifies the importance of th termite hill as an iconic goddess Durga and the *Termitomyces* mushroom as her umbrella.<sup>37</sup>

The most common words for mushroom<sup>38</sup> in Maharashtra and Goa are Alambi (Marathi), Alami (Konkani) and in Karnataka 'Anabi'. These names are related to Ela or Yellamma, the termite-hill goddess. Elam-beej or the 'Seed of Elam' became corrupted as Elambij - Alambij - Alambi - Alami - Anabe (Kannada). Compared to any other species of wild edible mushrooms, discovery of mushrooms on termie hills is more ancient. So, the original names could have been derived only from *Termitomyces* spp. of mushrooms.

This hidden entomo-mycological dimension<sup>39</sup> of the cult of earth-mother goddess parallels several prominent cults of mushrooms in the world.<sup>40</sup> The closest, related to phallic or anthropomorphic cult is the Mexican or Aztec cult of Tenonanactal. This cult practised ritualistic consumption of hallucinogenic mushrooms. No such consumption occurs in India.<sup>41</sup>

The worship of Gajlaxmi is popular in Goa. R. C. Dhere has shown that this worship was originally related to the cult of earth-mother goddess.<sup>42</sup> In Goa, it could be a symbolic worship of



monsoonal showers. The elephant represents monsoonal cloud. Through the Gajalaxmi worship a link between the sky and the earth is established. The monsoonal rains invigorate the earth. The earth-goddess becomes "*Shakhambhari*" or creator of vegetation. And from the termite-hills, the rains give rise to *Durga-chhatas* or *Alambeejas*. The best crop in Goa emerges at *Nagpanchami*. This crop is known as the "*Crop of Panchami - Panchamechi Alami*". Year after year this tradition is maintained. The cult of Santeri also provides a means of subsistence to the followers. The people who collect and market termite-hill mushrooms are all followers of Santeri, Ravalnath, Khetoba and similar folk-deities. The food-gathering, non-discriminative habit has continued through the ages without imposition of a taboo.

### Natha Sect and Termite-hill Worship

*Kaulamata*, the tantric ritual system of Natha sect has originated from the termite-hill worship. From the studies of Dr. Mitterwalner<sup>43</sup> on the Pilar Cave site, it could be established that it was a principal site or a combined worship centre of Natha sect and Saivites.

### Termite-hill in Goan Folklore

There are no direct references in folk-art forms of Goa related to the cult of termite-hill worship. The folk-deities of Dhangaras of Goa, Khandoba and Mhasoba, are associated with the termite hill worship cult.<sup>44</sup> In their talo folksongs<sup>45</sup> the Dhangar folk-dancers and singers refer to the termite hill by its original mundari name *Roen* as in the following couplet:

"*Katyo Roeni Jagani...*"

An analysis of dialogues of '*Perni Jagar*' could perhaps shed more light on the original form of the cult of termite-hill worship. There is a Dhangar legend in Goa associating five-hooded serpent with the termite-hill.

## Other Legends and Rituals related to Termite-hill

1. As per the Alampur legend, after decapitation by Parashurama, the head was destined to be worshipped as *Yellamma* and the torso as *earth-goddess*.<sup>46</sup>
2. Earth-goddess Renuka rejected Ratnagiri as residence and went back to Mahur.<sup>47</sup>
3. In Matangi initiation ceremony (*Diksha*), a termite hill is excavated. The virgin girl is seated in the pit and a basket covers her head. The girl goes in a trance. The medium 'springs' up from the excavated pit on the background of beat of drums and *bavanida* songs. After confirming the initiation the girl is presented with Matangi's (equivalent of Santeri) insignia.<sup>48</sup>
4. The Adishakti emerged from termite hill and grew up as a princess.<sup>49</sup>
5. Mahabharata and Brahmanda Purana do not mention Renuka-Termite hill association.<sup>50</sup>
6. Tondamana, a king, sees Renuka as termite hill.<sup>51</sup>
7. One Durgamma of Bellari (Karnataka) dreamt of a goddess inside an expanding termite hill. A temple was built in her honour. A snake used to come out from the hill every day during ancient time to consume a feast of eggs, milk etc.<sup>52</sup>
8. On Chaitra Shudda Nawami, the Renuka in termite-hill form is offered meat and hundred casks of liquor.<sup>53</sup>

## Iconography and the Cult of Termite-hill Worship

The termite-hill, due to its complex elastic form, is not worshipped as a sculptural image. According to R C Dhere, the aniconic termite-hill evolved into the '*Lajjagauri*' or 'nude goddess' motif.

In Goa, the Curdi mother-goddess is the best local representation of the evolutionary form. This goddess carved in supine form in porous laterite dates back to 1000-600 BC or megalithic period.<sup>54</sup>

Another highly evolved form of *Lajjagauri*, carved in bas relief was found by the author at Cudnem among many Chalukyan images.

The unique lion-linga, from Narva Cave I, placed in the 4th-5th century AD is considered as symbol of Durga.<sup>55</sup>

The '*Bhairava*' and '*Kali*' images found at Pilar depicting the 'Bhootnriya' is an interesting example of iconographic evolution.<sup>56</sup>

Among the several *Mahishasurmardini* images of Goa, those reported from Guleli by V R Mitragotri, showing the seated goddess in a boat are most interesting.<sup>57</sup> These may symbolize the popularity of the cult among the traders involved in intracoastal trade, through merchant ships.

The iconographic evolution of Santeri shows the dynamics of cultural amalgamation through external stylistic features.<sup>58</sup>

### **The Importance of Ecological Dimensions in Theogony**

The emergence of the cults associated with the worship of termite hill would not have been possible without the mound-building termites. The termites evolved, over 180 million years, have occupied a specific ecological niche. Human interaction within this niche has givenrise to a galaxy of gods and goddesses over a period of 5000 years. The best example is '*Shantadurga*' of Goa or '*Shantala*' of North Kanara which combine the folk beliefs and brahminic rituals.

Without termites and termite hills which are specific to typical tropical soil and humid climate theogony of these goddesses and gods would not have been possible. Like Asia Minor, where termite hills are not found, a cult of mother goddess with votive clay figurines<sup>59</sup> would have dominated this region.

The new trends in archaeology have been influenced by an ecosystem view of the culture. This view considers human populations as part of larger ecological systems and poses multiple reciprocal exchanges between as cultural system and environment. It offers unlimited possibilities for studying the processes involved in the evolution of ecosystems with the focus on human population.

Similarly, dealing with the evolution of political and religious

systems Flannery (1972) and Flannery & Marcus (1976) have mentioned that the entire culture could be profitably analysed from an ecological perspective.<sup>60</sup>

Perhaps, this effort is consistent with the new trends in archaeology, and many lead to a meaningful scientific explanation of several folk deities, cults, folk beliefs of Goa as also the culturally cohesive region of Santeri-Yellamma-Renuka.

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11. See reference 6 & 7.

12. Pereira, Rui Gomes, 'Goa, Hindu Temples and Deities', Vol. I, Panaji, 1978. pp. 240. The date on the ancient (pre-Portuguese) temples have been compiled from various sources by the author, as listed in refer. 62 in the book.
13. See, Dhere, Lajjagauri.
14. *Ibid.*, p. 195.
15. *Ibid.*, p. 150.
16. *Ibid.*, p. 155
17. Rajgopal, Termites: The author has surveyed hundreds of termite hills in Goa. No proof has been found of snakes sheltering in the hills. This seemed to be a myth to keep away unwanted people.
18. Dhere, Lajjagauri, pp. 132, pp. 150-151.
19. *Ibid.*, pp. 185; the primitive rites of fertility magic have usually become adapted by cultural transformation to the social and moral demands of advanced culture - Briffault, quoted by Arundhati Banerjee in 'Terracotta Zhob mother goddess - a study, archaeology and history, pp. 117-134.
20. See. Ref. 1
21. Dhere, Lajjagauri, has different explanation. He believes Renuka is derived from Renu + Ka (made of Renu or soil grains). More plausible explanation seems to be from Mundari word - R - o - o - no - Roenuka - Renuka.
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24. Khedekar, Vinayak, 'Gomantakiya Lokakala' (Marathi), Kala Academy, Goa, pp. 36-39; only two families of Perni performers are left.
25. Dhume, Vinayak Shenvi, 'Devbhumi Gomantak' (Marathi) - All India Saraswat Foundation, Bombay, p. 82-88. The author has translated valuable Portuguese documents.
26. Dhere, Lajjagauri, p. 149. Robert Sewell, list of inscriptions and sketches of the dynasties of South India. ASI, Vol. 2, p. 235; Panchmukhi R.S., Karnataka inscriptions Vol. I, p. 5.
27. Dhere, Lajjagauri, p. 150.
28. Author's studies of Nagakalas and the temple site.

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34. Dhere, Lajjagauri, p. 65, p. 185.
35. Based on field studies of the termite hills producing abundant mushrooms.
36. See ref. 22.
37. In South Canara, during the 'Bhoota-aradhana' ritual related to worship of Subramanya, a priest carries replica of mushroom. Unlike ordinary umbrella this form has numerous radial spokes showing its similarity with mushroom. (Oral communication by Dr D J Bhat).
38. Purkayastha R.P. & Chandra Aindrila, *Manual of Indian edible mushrooms*: Jagminder Book Agency, New Delhi 1955, pp. 224-225; Pandey Gnyanendra & Singh V.K. 'A note on the concept of mushrooms in ancient India. In *Indian Mushroom Science*, I. Atal, Kaul (ed.) 1978, pp. 383-387; the first reference lists about hundred local names of edible mushrooms, the second lists names found in Sanskrit texts.
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41. See ref. 38; Few species used for medicinal purpose may have hallucinogenic effect; the Vedic 'Soma' plant is shown by R Gordon Wasson to be the hallucinogenic mushroom '*Amanita Muscaria*'. (See Ref. 40).

42. Dhere, Lajjagauri, p. 66
43. See ref. 33.
44. Dhere, Lajjagauri, p. 188.
45. See Ref. 24, page 52.
46. Dhere, Lajjagauri, p. 40.
47. Ibid, p. 46.
48. Ibid, p. 64.
49. Ibid, p. 65.
50. See Ref. 22, p. 15.
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55. Anonymous, 'Goa: Birthplace of Hindu Cave Temples?' The Navhind Times, Panaji, Sunday, 22-7-1979. The crowning portion of the linga is cut into a sejant lion. It is about 15 inches in height. Carving is singularly simple, somewhat stylized. Absence of mane, presence of a small round bell-band around neck and unusually thick moustache are its notable features.
56. See Ref. 33. The author has inspected the images mentioned, at Pilar Seminary Museum.
57. Mitragotri, V.T. 'Mahishasurmardini in boat - a rare Guleli motif.' Purabhilekhratatva, Vol., VI, No. 2, July-Dec. 88 pp. 69-78.
58. See Ref. 1.
59. See Ref. 10, Ref. 31 & Banerjee in Ref. 19.
60. See Ref. 2, p. 27-31.