A. INTRODUCTION

Right from the dawn of civilization human being had a feeling for the need of protection from the natural calamities, wild animals and other rival human agencies. Obviously, this feeling initiated the need of shelters by raising barriers around human dwellings. This might have been the earliest creation of human mind to construct the ramparts and fortifications (fort) around residence. The recent researches and archaeological excavations have yielded ample evidence to prove the existence of forts and fortifications around the villages, towns of pre and proto-historic periods, which is further substantiated by literature. Thus gradually science of town planning and fortification developed and had its own trend with various orientations.

Rgveda mentions the fort made of Asmamayi (Stone) the siliceous type and also the Ayasi (Iron) or metallic type. Further it informs us of the Satabuji fort-with hundred wells. The Yajur-veda and Samhita make mention of the word “Mahapura”. Obviously the word means a great fortress. The Atharva Veda too refers to the Vapra-ramparts. The later Brahmanic texts like Upanishads also refer to the word ‘Pura’ and ‘Mahapura’ Pura and Nagara may be taken as synonyms. Nagara is surely a fortified town as its etymology signifies immovable, implying permanence and strength with reference to stone walls. The Vedic pruas were mere forts, while pura as in Tripura and Mahapura was much bigger. The foreign records of Meghasthanese and also the Pali texts focus light on the use of wooden sleepers in the walls of the town of Pataliputra. Apart from these texts the Manusamhita, Brahmanda Purana, and the epics like the Ramayana and Mahabharata focus ample light on

2 Rgveda., IV 30, 20 and Rgveda, II 35-36
3 Rgveda., I, 38. 8, II 20. 8, IV 27. 1, VII 3.7, 15.4, 95. 1, X 101. 8
4 Ibid, I, 156. 8, VII 15.14
the forts and fortification along with its different essential parts. Panini refers to the \textit{Prakara} ramparts, \textit{parikha}, and moat and \textit{dwara} (gate) as important parts of the city built for defense. Kautilya in his \textit{Arthasasthra} has described a number of forts to be raised on certain places in different localities namely \textit{Sthaniya}, \textit{Dronamukha}, \textit{Kharvatika}, \textit{Sangarahana} etc\textsuperscript{6}. We find details about the forts in the chapter dealing with \textit{Durgavidhana}. On all the four cardinal directions of the boundaries of the kingdom, defensive fortifications against an enemy in war shall be constructed on grounds naturally best suited for the purpose; a water fortification (\textit{audaka}) such as an island in the midst of a river, or a plain surrounded by low ground, a mountainous fortification (\textit{parvata}) such as a rocky tract or a cave; a desert (\textit{dhanavana}) such as a wild tract devoid of water and overgrown with thicket growing in barren soil; or a forest fortification (\textit{vanadurga}) full of wagtail (\textit{khajana}) water and thickets. These water and mountain fortifications are best suited to defend populous centers; and desert and forest fortifications are habitations in wilderness (\textit{atavisthanam})\textsuperscript{7}.

The development in planning of fort became most essential parts of military engineering and hence the early medieval writers put more stress on the engineering of forts in the \textit{Silpasasthras}. It is noteworthy to mention that the villages and towns were fortified following certain prescriptions and in due course even the towns derived their names from the types of fort, viz., Kataka, Siyalkota, Surkotada, Kotada (Dholavira), Quail, Nagarkota, Mangal-kota, which speaks of their genesis in as much as Kataka, or kot, means a fort. Thus a king without a fort is compared in the \textit{Sivatattavartnakara} to a snake without poison and an elephant can fight against a hundred and a hundred can fight against ten thousand.

Again \textit{RgVeda} discussing the art of fortification focuses light on the builders of the fort, namely the ancient people of India known as “\textit{Dasyus}” who possessed the forts and strongholds. The same text mentions that the Sambaras had hundreds of forts to protect

\textsuperscript{6} \textit{Ibid}, p.62.
\textsuperscript{7} R.Shamasastri., \textit{Kautilya Arthasastra}. Mysore, 1967, Book II Chapter III, p.50.
themselves from their enemies. The Vedic texts provide us more details about the Aryan and Non-Aryan wars and types of forts and fortifications existed during that period when they entered into India. There are specific instructions for different types of residential areas in the fort, for instance the residence of Samantas, Brahmins, Kshatriyas and Vaisyas, along with appropriate places of residence for artisans. Besides these, marketplaces should also be provided with the fort, which must be protected by two or more defensive ramparts encircling it. Manu also states that the fort should be equipped with stores and provisions including an arsenal and other secret establishments. He further adds that the king resides in a palace situated in the center of the fort.

In *Mahabharata* the Nrdurga has been accepted as the strongest fort among the six types of forts that are expounded in the *Sasthras*. However, it is also enumerated that the fortification walls must be equipped with loopholes to attack the enemy with bows, arrows and other missiles. Secret passages provided within the fort were only known to the king and his trustworthy men.

It is noteworthy that the fort planning played a significant role in the military engineering of Indo-Aryans right from the ancient times to the medieval period. The *Silpasasthras* have greatly stressed upon the importance of forts. Thus the construction of ramparts encircling a city was considered to be one of the important branches of the science of town planning in ancient India. Ancient literary works prescribed the rules for laying foundations of the forts and their different essential components and planning. Architecturally, the fortifications consist of five components as propounded by the *Silpasasthras* viz.,

1. The *Vapra*, the built up artificial mound
2. The *Parika* or a moat with glacis

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8 Rajadharma, ch. 8, p. 5-15
9 B.B. Datta, *Town planning in Ancient India*, Delhi, 1977, see chapter on “City”
3. The Prakara or Sala or the fortification wall which is encircled by a Parika

4. The Attalakas (the bastions) provided along the Prakaras.

5. The entrance gates, the Gopura or Pratoli.

The planning and architecture of the entire settlement of the royal capital along with the citadel are given in ancient texts like Mayamata and Manasara etc., According to Sukracharya the royal citadel must have a Sabha or council hall in the center. It must be surrounded by a number of secondary fortification walls and moats. The military should be stationed within the fortress and outside the town in case of a land fort as a precaution against any invasion within the fortification. Residential quarters should be located while the royal army and military should occupy the east and south sides. The Silpasasthas refer to four distinct categories of habitational settlements within the forts and fortified cities as explained below\(^\text{10}\).

1. The houses for common mass generally known as Janabhavanas

2. The palaces and gorgeous mansions for ruling class named the Rajbhavanas.

3. The religious shrines better known as Devabhavanas

4. The public buildings such as public rest house, public gardens, public libraries, public tents, reservoirs, and wells.

The earlier Silpasasthas do not put more emphasis upon the secular architecture i.e., the Janabhavanas. However, the ancient treatises like the Manasara, Mayamata and Visvakarma Prakara lay great emphasis on the planning and architecture of the houses of common people during the early medieval period simply because of the increasing necessity of the people. This had the natural impact on the planning.

The Samaranganasutrathara of king Bhoja speaks of the details of residential architecture. The term ‘Sala houses’ meant dwellings for ordinary use namely Agnisala,

\(^{10}\) P.V. Begde, *Ancient and Medieval Town Planning in Ancient India*, Delhi, 1978, p. 83.
Gosala, Gajasala and Pathasala. The words Harmyas, Vimanas and prasada denoted the houses of higher people like princes and nobles\textsuperscript{11}.

The palace complex is an assembly of other ancillary buildings such as council building, stables, like Gajasala, Aswasala, Gosala, Nyayasala, and Margasala. Other large artificial tanks are also located in all directions. Some times the step wells are provided in alignment with the fortification walls inside the Burjas. The palaces were provided with guard rooms at various strategic points for guards, equipped with arms, weapons, and well–defended by machinery.

The Samaranganasutradhara has given a list of 50 establishments including administrative and domestic structures\textsuperscript{12}. The Ramayana of Valmiki describes the palace complex of the king. Palace–complexes are based on chatus-sala planning having one or more courts because of their large number of establishments and were entered through principal entrances known as Rajadwara. In Samaranganasutradhara out of 83 chapters there are about a dozen chapters exclusively devoted to architecture for houses. It also devotes two separate chapters to the exposition of palace architecture, the multy storied mansions and large edifices without storeys serving needs of every kind of a ruling monarch, the residential quarters (Nivasa-bhavanani) together with a vast paraphernalia of establishment- the court, the coronation hall, the abodes of ministers, commanders, queens, princes, and pleasure- gardens, orchards, etc.,\textsuperscript{13} Other buildings not falling in these three broad divisions of houses are the assembly halls, the shed, stables, for elephant, and horses are also separately dealt with in other chapters. Thus the picture of the several houses dealt within this treatise emerges in the following tentative classification; common residential houses- Sala houses, uncommon houses-the houses of Kings, special houses- assembly halls

\textsuperscript{12} D.N. Shukla., Samaranganasutradhara- Delhi, 1964, p.116.  
\textsuperscript{13} Vide ch. 15.
and council chambers, animal-sheds and stables, for cows, horses, and elephants. *Prasadas* or temples may be classed as extra-ordinary houses as residences for Gods together with their accessory building for worship, ritual, shelter, and the ceremonies of a religious nature- the *mandapas*, and *Jagatis*. All these five types of building may, however, are reduced to only three broad classifications as treated ahead. *Samaranganasutradhara*; literally means an “architect of human dwellings”.14

*Antha sala* (interior palaces with courts) and *Vahis sala* exterior palaces and courts are two types of palace complexes, which are described in the *manasara*.15 The *Antha sala* was meant for the royal residences of king and his family while the *Vahis sala* was meant for the royal establishments like Sabha halls.

Later on during the period of the Mughals the same concept of apartments in the fort was known as *Dianie khans* (the hall of Private Audience) and *Dianie Am* (the hall of public Audience). Besides, there were:

1. *Gṛhodyana* (the garden of the palace) was also known as *Bhavanodyana*, artificially raised mound for the pleasure resorts of the kings and the Queens.
2. *Grihadirghika*, the artificially made flowering canal for discharging fountains and water ponds.
3. *Vya-Yamabhumi*-the gymnasium.
4. *Snanagrha or Dharagrha* – the Hammam or the bathing pavilion
5. *Devagrha* the palaces of *Kuladevatha* of the king
6. *Toyakarmanta*, water storage for drinking purpose
7. *Mahanasa*, Royal kitchen

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14 Pushpendra Kumar, Bhoja’s *Samarangana Sutradhara*, Delhi, 1998, p. IXXiX.
B. Etymology

**Fortification**: The military science of strengthening positions against attack is termed fortification. Since the word is taken from the Latin *fortis* or *forte* meaning strong and *facere*, to make, its literal meaning is defensive works.

In Portuguese language a fort is called *Fortaleza*. Permanent fortifications have been important in the history of warfare since the times of the Romans. These fortifications followed a pattern, which essentially included the use of walls and the ring fortresses of early modern period or concrete battleships of the early 20th century\(^\text{16}\).

In the early Sanskrit literature the term ‘Durga’ has been often used while discussing the importance of a particular *Janapada* during the period of its political upheaval. Another Sanskrit word *Pur* cannot be overlooked which was equally prevalent to denote the invincible forts. The *pura* might have been *Nagara*, the full-fledged capital city. The dimension and other layouts with regard to gates, towers, building, markets, temples, military defense etc, may be previewed in the *Vastulakshana*. Apart from these terms the Sanskrit texts also mention different types of *Durga* viz., *Giridurga, Parvatadurga* (Mountain fort), *Jaladurga* (Water fort), *Dhanavadurga* (Marudurga) Dhanur Durga (Desert fort) etc. Vedic literature may however be accepted as the earliest literary records which focus light on the constructions of stone and Iron forts. The later *Silpasasthas* also refer to these forts. Earth, bricks and stone masonry in square, rectangular, hexagonal, octagonal, polygonal, and circular -and in irregular shapes are used to build forts. It is noteworthy that the number of *Durgas* mentioned in the *Rgvedic* literature has been increased during the period of *Smritisasthas*. So was the case during the Mouryan period and later on the Kautilya’s *Arthasastra* and many other *Silpasasthas* mention even more varieties of forts and

\(^{16}\) *Encyclopaedia Britannica*, 1768, Vol. 9, London, pp. 530-537.
fortifications. These fortresses indicate their specific nature of planning and geographical situation Viz, natural and artificial\textsuperscript{17}. Kautilya has divided these forts (\textit{Durga vidhana}) into various categories\textsuperscript{18}. He further adds names of \textit{Audak}. (Waterfort) in island-\textit{Antardwipa} a fort in a place surrounded by low ground in which water is stagnated by a rocky tract (\textit{Prastana}) or a fort in a valley in the midst of a range of hillocks, a \textit{Dhanavana}- a desert fort-a fort in wild country devoid of water and even thicket of soil in a stride desert, \textit{Vanadurga} – forest fort.

\textbf{C. Classification of fortresses based on location}

Manu has enumerated only six types of forts and their merits and demerits based on their constructions, which have further been described, by Yagna Valkya and Chausnesa. They are\textsuperscript{19}.

\textbf{i. Dhanu durga:}

The Dhanu durga is situated in the midst of a desert devoid of any water resources, upto a limit of approximately 20 kros; hence it is called a desert forts, some times called as \textit{Dhanurveda, Dhanavan durga, Marudurga, Nirudaka or Airina} (the desert fort). Animals like dears should frequent such forts; Rats and other earth scouring animals and ultimately making the foundation weak should also infest Mahidurga. Desert fort can again be divided into two- \textit{Marudurga} and \textit{Airina}.

\textbf{a) Marudurga:}

\textsuperscript{17} A.P. Singh, \textit{Forts and Fortifications in India.}, New Delhi, 1987, p.164.
\textsuperscript{19} \textit{op.cit.}, pp. 163-175.
Fort surrounded by a desert-spread up to five “Yojanas” is also called ‘Marudurga’ or Nirudaka (waterless). The Nirudaka is a type of desert fort which must be encompassed by barren tract and which must be free from water, trees, and even grasses.

b) Airina durga:

Airina fort is one which is situated in the midst of saline soil of barren tract. Occasionally, this type of tract is enveloped by fens, full of saline water with thorny woods. Jaisalmer fort in Rajasthan is a notable example of it.

ii. Abdurga or Jaladurga (water fort)

Abdurga is a fort which must be situated within water body, and its access is rendered difficult on account of the typical tract. It is divided into two categories, viz., the Anterdvipa (Island fort) and the sthala durga (Land fort). The former type of fort is named as Nadidurga by Sukracharya because such type of fort must be situated within the water of the sea or flanked by rivers. Abdurga or Jaladurga at Srirangam and Kaveripattinam, Tamil Nadu are rare examples.

iii. Sthaladurga (Land fort)

It is situated on high land and it should girt up sound by stagnant water or a fort in the midst of a lake or a vast tank. When these water bodies are artificial, the moats must surround the parikha, and the position of such a fort must be artificial.

iv. Vrkshya durga

Vrkshyadurga must be situated in the midst of a dense forest or such other nature camouflage up to atleast four kors in all directions.
v. Giridurga-parvatdurga (Hill fort)

*Giridurga* or *parvatdurga* must be situated in mountainous terrain, mostly on the top of a hill. It must have ample supply of water through the natural subterranean streams, or fountains and artificial sources like deep wells, bastions, tanks and reservoirs etc. A zigzag narrow entrance leads to the fort and it is arduous to ascend. Further it must be endowed with fertile fields yielding abundant crops and plenty of fruit trees. According to Manu, *Giridurga* may be regarded as the best of the entire fort and hence they are accepted as most suitable fort for security.

vi. Giriparsva durga:

*Giriparsva* durga is situated on the slope of a mountain.

vii. Guha durga:

Guha fort is situated in a valley secluded and made of inapproachable encircling range of mountain with natural passes or defiles.

viii. Divisions based on the shape of the entrance

Based on the shape of the entrance, forts can be divided into *Ekamukhadurga*, *Dwimukha durga* and *Chaturmukha durga*, which were built on the banks of river or at the seacoast and were provided with one, two or four gates respectively. The *Kurmadurga* (tortoise fort) probably was designed to trap the enemy. It is situated in the middle of the forest or the foot of the hill and the *Parvatha-durga*-is for the use of protection in a fierce battle.

ix. Divisions based on defensive techniques

In view of the defensive mechanism, forts may be divided into *Prabha-durga* and *Ayutdadurga*. *Prabha-durga* had strong defence mechanism with several *Prakaras*, watchtowers, guards, etc., while *Ayudha* fort, which is well equipped with all structures and
weapons necessary for both defence and offence purpose. The *Nrdurga* or *Baladurga* (Manfort) was protected by *Chaturangini vahini*, a four-fold army consisting of elephants, horses, chariots and infantry. It has two more categories of *Samya-durga* and *Sahaya-durga*. The paramara king Bhoja in his *Yuktikalpataru* divides the fort into two categories- *Akritrim* (natural) and *Kritrim* (artificial). The natural fort had natural defences and the artificial fort had rampart and parapets built by human agencies.

x. **Divisions based on materials used**

Based on the material used for the construction of fortress it may be called *Mahidurga* (Earth fort). It is subdivided into three categories, *parigha*, *panka*, and *mrd-durga*. The fort embattled by the mud-rocks, stones, and bricks, was known as *parigha*, whereas the fort with a tract full of saline mire, or quicks is known as *panka-durga* and *mrd durga*, (mud fort) might be having mud walls.

**D. Historical Development of Fortress**

i. **Pre-Historic period**

Since time immemorial human being started living in selected places, where they could have day today needs like water, food, and shelter. In course of time they started covering their dwelling with series of boulders protecting them from natural and human calamites. The rock shelters found at Bimbetka, Hoshangabad, in Madhya Pradesh have circle like granite boulders. Scholars believe that they could be the protective walls around their settlements.

ii. **Proto historic period**

During Proto historic period the dawn of Civilization made man to realize the importance of the Fort and the Fortification walls around the city. Excavations at Mohenjodaro and Harappa, in Pakistan, Kalibangan in Rajasthan, Dholavira in Gujarat, Rakhigarhi
and Banawali in Haryana and several other places revealed the existence of marvelous fortresses built of mud and burnt bricks by the people of Indus valley civilization. It has been observed that in the beginning generally the construction would have been in the form of earthen bunds and battered wall, built of mud-bricks raised, internally and externally in a basal width of 40’- 0’ (12 meters) and 35’ – 0’ (10.5 meters) in height. Rectangular towers indicating an elaborate system of enfilade battered this particular wall. These were co-eval platforms of mud rising to a height of 33’-0” (10.9 meters). This evidence is supported by the construction of the fort during the pre-Vedic age. Undoubtedly Harappans were much advanced to adopt the defensive measures. The size of bricks 40x20x10 cm and 30x15x7cm represents two principal structural phases in the masonry wall. (Pl: I)

iii. Chalcolithic Period:

The fortification found during Chalcolithic period such as Eran, Maheshwar, Navadatoli, Ujjain, in Madya Pradesh, and Gangetic valley at Allahabad, sites like Kausambi, Ahichchathra, in Bariely district (UP) etc., yielded remnants of fortification. Piprakwa, Ganwaria (Basti district UP), and Sravasti (Sahet Mahet district Bahraich) have also revealed the nature of fortifications with mud ramparts dating back to 7th century B.C. In the 3rd to 4th centuries A.D. we find the construction of fortified walls in Sisupalgarh district Orissa, where laterite rocks and backed bricks were used as building material.

iv. Historical Period

The sculptural reliefs of Bharhut stupa No. 1(2nd and 1st century B.C.) have a scene of soldiers attacking the enemy down with armors and stones. This helps us have an idea of the fortifications around the city and the forts. Similarly, in the south and west gateways of

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20 See plate no. I
21 R.S.Bisht, S. Asthana, “Recently Excavated Harappan Site, South Asian Archaeology, Naples, 1979, p.227
22 A.P.Singh., Forts and Fortification in India, New Delhi, 1987, pp.54-60.
Sanchi stupa the scene of the ancient city with lofty gate towers and ramparts can be seen. It is interesting to note that a relief on the southern gate-way of Sanchi stupa No.I, a scene of the seize of fort of Kushinagara is shown. This substantiates the theory developed by Kautilya, i.e., it has shooting posts for arrows and bows built in the walls, technically known as Indrakosha. The town planning and fortification at Nagarjunakonda cannot be overlooked. It was raised under the supervision of Ikshwaku king during 3rd century A.D. A number of the Buddhist texts like the Jataka texts inform us about the fort and fortification, viz., the Udai- Jataka, mentions the fortified city of Vaisali, Mithila, etc., similarly the Maha-Ummagga Jataka gives the details of a fortified city along with its gates and several towers23. Besides these the Mahajanaka and Tendulanali Jataka also refer to the fortified city of Champa and Varanasi respectively. In Tamil Nadu large number of fortifications of historical period have come to light during excavation in places like Uraiyur, Kaveripooppattinam, Kanchipuram, Madurai, Thanjavur, and other places.

Similarly the mighty kingdoms and empires which ruled over the Deccan and western coast like Sathavahanas, Vakatakas, Rashtrakutas, Kadambas, and Yadavas in the Deccan and the coast and the three south Indian kingdoms of the Cheras, Pandyas, and the Cholas that furthered commerce and trade built their own fortresses around their city. In Indian tradition the king was as high as God or for that matter of any other ancient country the king had very high privileges and positions, in accordance with which their abodes could never be conceived to be simple structures. The citadels, the castle, the gorgeous mansions and the fortified huge establishments comprised the making of a king’s palace. Later on when times were more peaceful and prosperous, these palaces further ramified into two distinct establishments, the residential cum administrative set-ups, the Nivasa – bhavanani and the pleasure places, the vilasa bhavanani. The palace planning is composite one which consists

23 Ibid. p.61.
not only of the residential quarters of the king and his retinue but also vast paraphernalia of huge establishments where the council-chambers, the sabha, the stables, for having the elephants, and other royal animals along with the pleasure gardens, etc., are also given proper attention.

v. Medieval Period:

The importance of forts and fortifications was greatly realized by the rulers of medieval India. Many of the forts were raised around the important cities and the capitals under the special patronage of the contemporary kings. These rulers occupied most of the forts and they extended them with certain essential additions as necessitated for the strategic and defensive purposes. The forts of Kerala such as Cannanore, Bekal, Tellicherry, Anjengo, Palakkad, Thangassery, and Vattakkottai in Kanyakumari district in Tamil Nadu, bear testimony to the fortifications of medieval period. (fig I)

Fortresses built during the pre-industrial period of Indian history especially by the Europeans have some special features.

vi. Evolution of Factory and fortresses

As a result of the trade contact Europeans built a number of fortresses in India in different periods. Vasco da Gama anchored near Calicut in 1498 to get major concession from the Zamorin in the sphere of trade. Again when Vasco da Gama came to Malabar Coast for the second time in 1502, he met the king of Cannanore with a letter he took from Dom Manuel, the king of Portugal addressed to the king of Cannanore with a request to establish peace and friendship to conduct commercial activities. Dom Francisco de Almeida was appointed as viceroy of Portuguese India with specific instruction to erect fortresses at strategic places. Accordingly on 24.10.1505, Almeida, and Goncalo Gil Barbosa, the Factor
at Cannanore laid the foundation of the factory (fortress) in a place called Moppila bay ceded by the local ruler. Gradually, they fortified the factory to protect the factors and the goods stored. The construction was quick with active support of the Kolathiri Raja and the walls and towers reached sufficient height for being equipped with artillery. In the beginning it was a wooden fort, which was named after St. Angelo, the fort had a long trench. Again in 1507 the Viceroy began construction of a stone fort inside its walls. It was in the beginning, a square fort with four round towers on the cardinal directions. By the side of the bay there was a two-storied tower. The door of the fort was by the seaside. This was one of first mainland forts built on the western coast and it had a trench of 3 fathoms deep and two and a half fathoms broad. Its circuit was 255 fathoms. Linschoten described this fort as “the best fortress that the Portuguese have in Malabar”. In course of time the fortified factory grew into a fort as the need for local show of force became more and more important and often necessary. Side by side with this change came also the acquisition of extra territorial jurisdiction. Dom Francisco de Almeida himself ordered the construction of a chapel dedicated to St. James between the walls surrounding the habitation and the portals of the fortress. A Franciscan convent was also built as desired by the Portuguese king. This was known as the convent of Sao Antonio.

At present it is a massive triangular structure built with laterite stones. It had facilities to keep arms and ammunitions besides a warehouse. It is surrounded by sea on three sides. The deep moat protected it from the landside and strong flanking bastions.

Similarly, the Bekal fortress built by Sivappanayaka during 1645-1660 AD is the only indigenous surviving and intact Malabar coastal fortresses covering a vast area on the Arabian Sea Coast. Forts built by the Keladi Nayaka played an important part in the military organization. There were three kinds of forts in the Keladi state, viz., the land forts, such as Keladi and Ikkeri, the hill forts such as Bidnur and Kavaledurga, and forts on coastland such as Bekal, and Honnavar. Most of them were renovated or fortified during their rules. The
Nayakas of Keladi took great care to maintain the forts in good condition because they realized, like Shivaji in Maharashtra, the importance of the forts very well. Every fort was generally self-sufficient. It was usually surrounded by a moat filled with water. Inside the fort there used to be a moat filled with water, granaries for storing food grains, temples, palaces, mansions of different sizes for ministers, dwelling places for other inhabitants of the fort, elephant stalls, horse stables, powder magazines, guns, and other necessary things. Bekal fort was on the southern boundary of the Keladi kingdom. It had great importance, since it was from this fort that the Keladi rulers had to defend themselves against the Kolattiris of Malabar and the Portuguese. It was entered through the main gateway facing the north, and was surrounded by sea on the east, west and south.

E. Previous works:

No scientific studies relating to the fortresses of St. Angelo at Cannanore and Bekal located in Kasaragod district on the western coast of India have not been done so far. A.P.Singh in his ‘Forts and Fortifications in India’ has not covered the fortresses mentioned above; hence I have taken up research on these two fortresses. Further Cannanore St. Angelo is the only fortress of the Portuguese, which still survives. The Bekal fortress at Kasaragod at the northern end of Malabar Coast is having some similarity as well as dissimilarity. Since Archaeological Survey of India, Thrissur Circle recently conducted small scale excavation and scientific debris clearance on these two fortresses and I myself was associated with various types of works on these fortresses, I am well aware of the archaeological material sources such as ceramics, coins, copper objects, stone objects, beads, drainage systems, and other monumental discoveries.

Survey of Sources:

The primary source used in this research is archaeological materials supported by secondary sources.
Methodology:

The methodology used in the research includes the collection of various details regarding materials found inside these two fortresses, and architecture along with the structural details through field studies. The methodology also includes collection, and tabulation of the data regarding the comparative studies of the fortresses. Personal field studies verifying the data collected and discussions with the Portuguese Archaeologists, and historians who are competent authorities on these subjects like Vitor Luis Gasper Rodrigues, Adel Yusef Sidarus, Timothy Walker, and Paulo Lopes Matos were done. Similarly, comparative studies of the various fortresses located on the western coast like Anjengo, Thangassery, Tellicherry, Madayi, Housdurg, and mount Eli, were also conducted.

The work consists of seven chapters. Chapter one starts with Introduction, Etymology, Classification of fortresses based on location and material used, and historical development of fortresses. Chapter two deals with settings of the fortresses like physiography, geology, locations, rivers and backwaters and historical background of the Portuguese and Keladi fortresses. Chapter Three deals with the defensive mechanism of the fortresses, Chapter Four deals with Residential and Service sectors of the fortresses, Chapter Five describes the Maritime trade and the fortresses, Chapter six speaks about the present condition of the fortresses and its impact on social, political, economical and religious changes, and finally Chapter Seven summarises the similarity and dissimilarity and the merits and demerits on the architectural features, and their international contact during the hey day of the fortresses.

CHAPTER II

SETTINGS OF THE FORTRESSES