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A New Outlook Towards The Forts, After The Introduction Of Gunpowder Technology In Late Medieval Period-A Case Study Of Daulatabad Fort

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Abstract
The paper discusses the changes in the design of forts after the evolution of Gunpowder technology. In the earlier period, towns needed fortified walls for protection, fortified walls were required to defend territories during Wars. Considering the invasions and conquests, towns have been fortified since very early times. In the Indus Valley Civilization, towns and forts were walled in. The forts are alive and reverberating; they were witnesses to the great dynasties, bearing witness to brutal succession struggles and regicides, and containing unparalleled glitz and grandeur within their fortifications.(Deloche, 2009)
The introduction of cannons in the fourteenth century made most forts constructed in the medieval design obsolete. The study of forts and the addition of structural elements as per the changes in warfare techniques has not been well documented and studied by researchers in India. The research paper aims to study how Gunpowder technology evolved globally, how the fort pattern changed, and the adaptation of these innovations to secure the lives of the citizens. In addition to the existing research, case study techniques have been used to examine the fort. The study of Daulatabad fort has been carried out to conclude. The study will be helpful to provide great opportunities for scholars, historians to explore and understand the knowledge of the forts, and will create awareness amongst the citizens.

Keywords- *Deccan, Gun powder technology, Bahamani, Daulatabad, Forts, Late Medieval period*

INTRODUCTION

Defence typology, Fort is seen from the B.C. period. The first example of a fort from the Neolithic period was the Jericho fort. This was a widely used technique for city fortification. (Martin Brice, Forts and Fortresses, 2005). The fortified towns, along with the forts, were constructed to strengthen the human settlements to protect against wild animals, floods, and wars. Records show that in response to military developments, fort designs in European nations changed. Documentation of fortifications and defence strategies is very well done in Europe, after the introduction of the Military Revolution. (Alexey Sokirko, 2005).

A king's strength was measured by the forts he had. In most of the forts, exquisite palaces were located, which were the structures utilised for military purposes. The forts have had a major impact on the medieval history of the Deccan. (Tejas Garge, 2014).
After the invention of Gunpowder, the forts were much smaller and made more use of ditches and glacis to absorb and distribute the energy of fire through cannons. To strengthen protection, the walls of the fort sank into ditches with a slope on the front part because they were in danger from direct cannon fire attacks. War history cannot be merely a history of events; it would be impossible to write about war without taking into account political, economic, social, and technological factors. These factors are responsible for the outcome of the war. (Frank Jacob and Gilmar Vision-Alonzo). As per the records, human developers have always been in search of various ways of killing enemies. After the invention of gunpowder, killing became a more distant act in which machine guns, artillery, and tanks played a decisive role. The study and research in this domain are important to enhance the importance of forts, change the pattern of forts, and adaptation of this innovation to secure the life of the citizens. For this research, Daulatabad fort, located in Maharashtra, Deccan region, has been studied in detail, and the changes after the invention of gunpowder technology have been examined.

Global Scenario

The late medieval period in Europe was unique because of Military development, which explained the continuous western supremacy in the age of colonization. The Cannoni, a new type of artillery, was cast in bronze and used iron balls as ammunition. The heavy cannons were transported from one place to another on go-karts and sometimes pulled by horses. According to Parker, this display of firepower during the Italian Wars became the impulse for constructing ever more complex fortifications. There were additions of Bastions to the medieval walls, which finally led to the design and construction of more redoubtable and complex fortifications.
The angular bastion became the symbolic element in a formulation of the stronghold that included polygonal layouts, low-level structures, thick walls, sloped visibilities, earthworks, moats, scarps, counterscarps, ravelins, and crown works (free-standing artillery platforms that covered the approaches to the main structure). The bastions are the remnants of a slow process of growth. As per the present topic, one can think of Leon Battista Alberti who, around 1440, wrote De Re Aedificatoria, a treatise on architecture where it is advised for the first time that fortifications should be built with angular points matching "the temper". (Geoffrey, 1996)

There was a creation of several bastioned fortresses by Giuliano and his brother in around 16th century, which shows their developing notions of Military architecture. Most of the fortresses or defensive structures had bastions and polygonal towers. Giuliano was aware of the importance of artillery, and his advice on how to build forts included some modern elements such as integrated defences, deep embankments, flanking recesses, and casemates at the bottom of the moat. The development of the lower wall, which is concentric envelopments separated by a ditch, the towers built along the curtain walls at intervals of 400 feet, and the thick merlons along the walls were common. The early style of warfare had changed as a result of the use of artillery and early modern guns.

Indian Scenario

Gunpowder technology came to India from West Asia; Gunpowder was first used in the South Asian subcontinent. Aladdin Khilji used Gunpowder in 1300 AD in the siege of Ranthambore, and Mahmud Gawan used Gunpowder in 1472 AD in the siege of Belgaum. The changing patterns of the forts after the 15th century introduced new structural elements, fort walls, bastions, Gun ports, magazines, tanks, watchtowers, guardrooms, sculpture, and the materials used during various periods can be analysed to understand the changing needs of defence from time to time. (Major T. W. Haig, 1907). In the second half of the 15th century, gunpowder artillery was common in different parts of India. The gunpowder artillery was more powerful than that of other devices in the earlier period. Considering the same reasons, most of the forts, known for their strength, had to be redesigned in the 15th century. (Iqtidar Alam Khan, 2005). The Bahmani rebuilt many forts and modified them for their suitability in case of military requirements, including the covered passages and bastions as an addition. (Major T. W. Haig, 1907)

First Phase- The first phase of the introduction of Gunpowder technology, as per records, came into being in the Bahamani period, in the 15th century.

Second Phase- The second phase was influenced by Ottoman experts, technology, and methods brought into India in the 16th century by the Mughals.

Third Phase- The third phase spanned the crisis and decline of the Mughal Empire after the battle of Plassey, firearms stagnated for almost 150 years. (Iqtidar Alam Khan, 2005).

Research Methods or Methodology

For this research, the literature review is carried out to understand the context of Deccan, the late medieval period, rulers in that period, changes in warfare technology, sociocultural context, and economic and political context with the same, site visit is carried out to Daulatabad fort located in Chatrapati Sambhajinagar district, detail observations are marked, and analysis is carried out. In this research, both primary and secondary data have been considered. Primary data was gathered through onsite observation, and photographs were taken of

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various parts of the forts, also structural elements, and cross-checked with the data available from the secondary sources.

Deccan:

The "Deccan" is also known as the Dakshin Path or "Great Southern Highway" and was the entranceway from the north that passed through this region, serving as India's main north-south throughfare. There was trade, and movements of people across the regions. (Dr. G. Yazdani, 2007).

The Location of Deccan in Peninsular India, with the main rivers Narmada, Tapi, Godavari, and Krishna. The soil of the Deccan region is extremely fertile and productive. The Western Ghats in the region acted as a natural barrier. After the Western Ghats, the plateau is flat. Because of the location of the Deccan region, there were connections to the world with maritime connections through the Sea. There are many ports on the West and East coasts of Peninsular India. By considering all these regions, there was a continuous flow of foreigners from Persia and other parts of the world. The Deccan region was one of the Cultural centres, also famous for textiles, Salt Peter, and Diamond mining. The famous crop of the region was cotton, and the products from cotton were exported to Persia, Turkey, and Arabia. All these reasons are responsible for attracting various rulers, new Military strategies, and activities. (Sherwani, Haroon Khan, 1954)

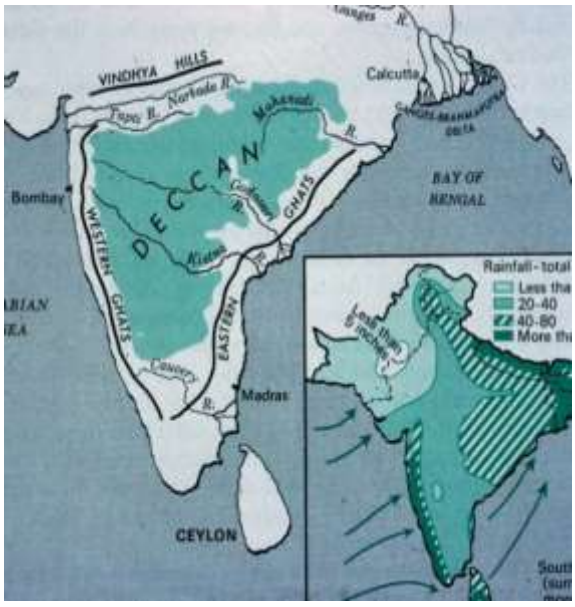

Fig. no.-1 Map of Deccan (Source-Internet) Fig.No.2- Deccan Map,17th century(Source- Book Sultans of South)

Late medieval period

The term medieval Deccan is one of the convenient labels; it has more political and cultural importance than socio-economic factors—the term medieval period, which mainly depicts the rule of Islamic dynasties. The first Islamic dynasty was the Bahamani period, which ruled over the Deccan from 1347 AD, the Bahamani period. There was a sultanate period. The history of the Deccan throughout the Middle Ages mainly spans the years 1317 to 1687 AD. The Mughals attacked Bijapur and conquered it, as well as the Golconda Sultanate and other parts of medieval Maharashtra. (MATE, 1997). The Delhi Sultanates were, for a short time, the Bahamanis kingdom founded in 1347 AD. It was disintegrated in 1482, after the death of Mahmud Gavan. After the Bahamani period, there was a Sultnate period in Deccan, with five successor states, Ahmednagar, Bijapur, Berar, Golconda and Bidar, were in charge of the Deccan. The Mughals conquered the Deccan at the end of the 16th century. (MEDIAEVAL ADMINISTRATION AND SOCIAL ORGANISATION, p. 65)

3.3 Development of Ammunition and Warfare on Deccan plateau, 1450-1520 AD

The Gunpowder technology was introduced to the Deccan by the Portuguese, also bringing Political influence to the Deccan. The Indians used brass or bronze cannons and handguns in the second part of the 15th century. Also, as per the literary and archaeological evidence, according to Gommans, there is evidence that firearms were employed in Peninsular India before the establishment of Portuguese power in the region. Cannon ports and bastions were erected in the Bahamani period, into the walls of the three main forts such as Bidar (1463-1482), Kalyana(1461-1463 AD), and Raichur (1468-1470). (Iqtidar Alam Khan, 2005)

The Bahamani rulers were known for the offensive and defensive usage of cannon in the Deccan region from 1460. This was the period when the arrival of Gunpowder technology in the region appeared. The Bahamani rulers added Bastions and Curtain walls around the fort in 1468- 1469 AD, that incorporated state-of-the-art military engineering from the contemporary Middle East. They also installed gun apertures in their curtain walls to accept the most recent weapon: the cannon (WAGONER, March 2014)

3.4 Gunpowder technology and Changes in the design of forts

In Deccan, the fortifications built in the pre-gunpowder era were reconstructed to accommodate to the new style in mid mid-sixteenth century, to accommodate cannons. In Deccan, the soldiers from at least 1460 AD were acquainted with gunpowder and firearms. At the end of the first decade of the sixteenth century, the 'Adil Shahi rulers of Bijapur had attained an advanced level of cannons and matchlock manufacture at their armory in Goa. At the end of the 16th century, the Adilshahi rulers of Bijapur started manufacturing an advanced level of cannons at their armory in Goa. For the stronger fort construction, Basalt stone was used for the construction of the fort along with lime mortar.

The development of the parapet shows the same trend, from a row of **Merlons**, each formed of a single block of stone. This provides safety and efficiency for the soldiers' .Use of lime mortar for masonry, the thickness of the Merlons reached about 28 inches, the thickness depended on the area in front of the wall. Merlons on the parapet walls were designed to protect the fighter behind them and to allow him to attack enemies, whatever their position. Brattices, a small stone gallery, was another achievement in the battlement, permitting the fighter to discharge front, oblique, and flanking fire at different angles. In the second half of the 15th century, after the introduction of heavy guns, forts in the Deccan were reconstructed for the installation of heavy cannons. Massive bastions were built along the fortified walls, and cavaliers were built in the middle on the highest points. The cannons placed on the cavaliers fired only stone balls; they aimed to act as a repellent, to keep enemies at a distance. (Haidar, N. N., & Sardar, M. 2015).

The perimeter of Deccani forts was increased during this period, between 1450 and 1500 AD. A barbican and a fauss braye were generally added in front of the gates. Ahmednagar Fort is different and marks the beginning of a new era. The involvement of the Portuguese in construction activity was another important fact. The masonry defence walls and the moat were completely concealed from the attackers by huge earthen glacis.

3.5 Case study of Daulatabad Fort

Daulatabad Fort is situated near Chhatrapati Sambhaji Nagar in Maharashtra and is one of the finest examples of Medieval Military land forts. In the earlier period, under Yadava rule, the fort's name was "Deogiri", (Dr. Dulari Qureshi, 2004). The Yadavas previously occupied the fort, Alauddin Khilji launched the initial assault on the city in 1269 AD. After that, around 1327 AD, Muhammad Bin Tughluq decided to make Daulatabad a capital and forced people to shift from Delhi. It was also the capital of the Bahmanis and Nizamshahis in the later days of the dynasty, and an important military and administrative centre throughout the period.

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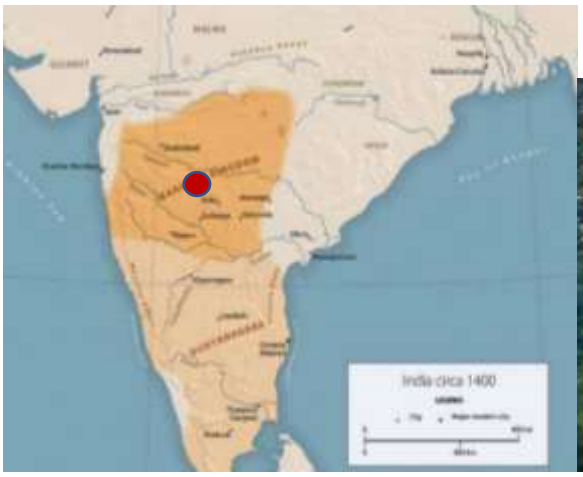

Fig. No.3 Map of Deccan Region (Source- Internet) Fig.no.-4 Aerial view of Daulatabad Fort (Source-Google)

The central location of the Devgiri fort was the reason the sultan chose it as his capital, which was equidistant from Delhi, Gujarat, Lakanati, Telangana, Malabar, Dwara Samudra, and other important places. (Source: Shodhganga, Thesis on Daulatabad.) In the fort precinct, there were several Jain temples. When it was under Aladdin Khilji, the name was changed to Daulatabad. In the Bahamani period, there were additions of ditches and the development of a water supply. In the Nizamsahi period, there were constructions of palaces in the fort precinct, which was a neatly planned town with various religious and commercial activities.

In various dynasties, the design of Daulatabad left an impression. The design was complicated with secret passages, thick fortified walls, bastions, and cavaliers. The Daulatabad fort is a mixed fort, which is a type of hill fort and a land fort. The fortified wall of the fort was built in different periods under the rulers like Yadavs, Khilji, Tughlaq, Bahamani, Nizam Shahi, and Malik Amber.

The Bahamanis were responsible for the Military engineering and changes in fort Architecture, and their successive rulers were responsible for changes in fort Architecture. The exterior wall, Ambar Kot, was built by Malik Ambar in the 17th century AD., is the outermost wall of the fort, consisting of 45 Bastions, built with their connecting curtain walls and nine principal gates with bastions and towers. The Mahakot is the outermost wall that encircles the entire city and was built around the base of the fortress; still, the ruins of the walls can be visible, and there is growth of custard apple trees and jungles. Moats and bridges are constructed to enter the main citadel. The construction of round-shaped bastions was the technique adopted at Daulatabad fort, which was an advanced technique that originated in Baghdad.

In the Bahamani period (1347-1527 AD), Daulatabad was more formidable. In this period, there was an addition of ramparts, a steeper scarp, and a massive ditch about 15 meters deep and nine meters wide. Flanking towers have been modified according to the different principles of fortifications. Most of them are massive, made of stones laid with lime mortar, circular in shape, topped by battlements of parapet (merlons are 2.20 m high, 1.40 m wide, and 1.10 m thick), adapted for defense by musketry and guns. (Jean Deloche, 2009) Other structures in the fort are the stepped well, Kacheri(Court building)Jama mosque (Bharat Mata temple and Hathi Tank (Stephen Markel,1994)

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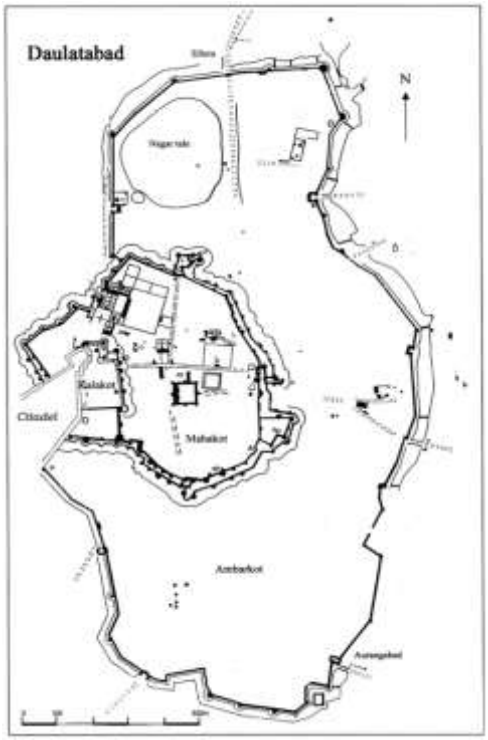

Fig. 5. Plan of Daulatabad Fort (Source-Book-Studies of Fortifications in India, Jean Deloche,K. Rötzer).

Development of Daulatabad Fort under various phases

As per the literature and historical records, the earlier name of the fort was Deogiri, which was built upon a conical rock, at a height of 159 ft. from the base. The hill fort was the most impenetrable fort. The architecture of the fort was devised by Yadavas, and the extension of the fort was carried out by the Bahamanies and their successors. The perimeter of the fortified outer wall was around 2 miles. Thevenot writes that this town was the capital of the Balaghat before it was captured by the Mughals, and it was a great place of Trade.

The Daulatabad fort consists of three layers of fortified walls, with bastions, culminating in the citadel. The wall stands on the inner side of the rock-cut ditch. (M.S. Mate 1988). According to records, Daulatabad Fort was one of the great Military land forts. It functioned for a year as a Political and administrative hub and a cultural centre (Stephan Markal, 1994)

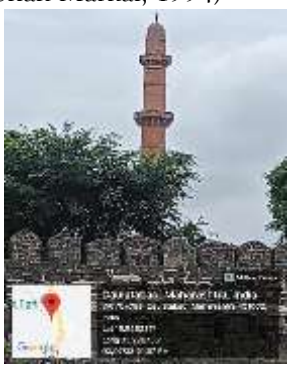

Fig no.6- Chand Minar (Source-Author)

Fig no.7- Aerial View of the Fort (Source-Google)

International Journal of Environmental Sciences
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Fig.no.8 Entrance to Balakot, Fig.No.9 Entrance to the Mahakot, Daulatabad, 15th century

Military Advancements at Daulatabad Fort

After the introduction of Military technology in the 14th century, there was a revolution in military architecture in the Islamic world. The changes are seen after the Military Revolution at Daulatabad Fort. (City of Fortunes).

During the Tughlaq period, in 1326/27 CE, a revolution in military architecture occurred in the Islamic world, prompted by new technologies of siege brought were seen (City of Fortunes). Ibn Battuta visited Daulatabad in 1342 CE., As per his observations, the fort was impregnable with round bastions, a deeper and wider moat, combined with counterscarp and glacis. The fort had three layers: Kalakot, the uppermost citadel, the middle is Mahakot, and the lower city, which is Ambarkot. (Deepanjan Mujumdar, 2014).

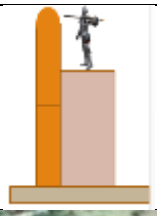
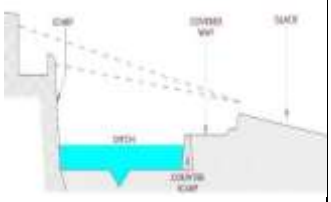


Fig. No.10 Storage for ammunition Fig.No. 11 View of Mendha canon Fig.no 12 Duraga Tope(Source - Author)

Military advancements and changes in fort Architecture (Period 1347-1527 CE)

A case study of the fort, observations, and study of historical records, the following structural components are observed after the introduction of Military Revolution. Daulatabad fort represented one of the most striking fortifications of the medieval period. From the Tughalqs to the Mughals, reconstructions and adaptations of the fortifications to the new poliorcetics have multiplied. The following are the structural elements added.

Sr.no.	Name of the Structural components	Photo	Definition
1.	Ditch (1400 AD)		The ditch, cut in the living rock around the cylindrical wall of the hill, is in no way altered, about fifteen meters deep and ten meters wide, which collects rainwater and prohibits the approach to the mound.

2	Parapet wall (Chemin couvert) 1400 AD		It indicates the walkway that is on one side/inner side of the outer walls. It protects the soldiers from enemy fire. It gives protection to the soldiers.
3	Fauss Braye (1450 AD)		Fausse-braie, a low enclosure with a parapet, built to establish grazing firing batteries. In many places, especially in the southern part, this wall is chipped or largely demolished.
4	Merlons (1400 AD)		Merlons are provided to cover the defenders shooting from the top of the fortification
5	Cavaliers (1570 AD)		Cavaliers are Strategically located at important places are large and great in height with provision for mounting big guns which cover not only Mahakot but also Ambarkot and the area much beyond.
6	Bastions (1565 AD)		Construction of special towers on the fortified walls having openings towards enemy lines, Bastions are placed at a distance of 50' to 100'.
7	Barbicans (1500 AD)		The Barbicans, entranceway to the forts are designed strategically and it difficult for the enemy to enter inside of the fort. The gateways are zigzag manner within a short distance with recesses for ammunition storage, making access to this area quite difficult.
8	Glacis (1580 AD)		Glacies, which is outside the fortified wall of the fort, is an artificial slope along the boundary of the ditch. Glacies provides a direct line of sight for defenders of the fort and also safeguards the wall of the fort from cannon attacks. It was observed in the Daulatabad fort.

CONCLUSION

The transformation of forts after the introduction of Gunpowder technology was Global, with numerous Military Revolutions, which, however, would still be part of a larger process of research and development, adaptation, and evaluation. As we come to the end of this remarkable history of forts and their transformation over a period of time under various rulers after the introduction of gunpowder technology, it is important to study that these forts are much more than just strongholds. The evolution of forts and changes in design and planning because of military technology were not considered by the researchers; research in this domain will

provide opportunities for the researcher to explore the research on other forts in the various regions. Forts are always great tourist attractions. People from other fields, like historians, Military students, and scholars from respected fields, visit the forts and understand the evolution of the forts, associate history, and phase-wise analysis of forts in detail. Daulatabad Fort is rich in medieval architectural structures, a towering Minar commanding attention, and fortification walls surrounding the comprehensive area, elevating its towering presence. The forts constructed before and after the invention of Military technology on the Deccan plateau required an unexplored domain. In this 21st century, preserving such important monuments is an absolute necessity; we have to be especially conscious of this issue because the transformation process is very fast. Its illustrious and rich past is reflected in these heritage sites and cultural relics from various eras. Forts are invaluable treasures of the nation and need to be preserved and protected for future generations.

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