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Study of Sense of place in Grotto architecture of Central Kerala Churches Teena Levi and Athira P

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Abstract

This paper examines how the grotto architecture of central kerala's churches shapes a distinct sense of place through spatial design, spiritual ambience and human experience. Focusing on thirteen case studies from the districts of kottayam, ernakulam and thrissur, the research adopts a mixed-method approach that combines architectural analysis, ethnographic observation, field documentation and community surveys. Rooted in marian devotion, these grottoes function not only as sacred spaces for personal prayer but also as vibrant social settings for festivals, processions and communal gatherings. The study explores both their physical dimensions such as form, materials and spatial layout and their cultural and spiritual layers expressed through rituals, symbols and collective memory. Findings reveal that grottoes strengthen the emotional and spiritual connection between individuals and their communities. Their design, material choices and accessibility play a vital role in fostering participation and a sense of belonging. Grottoes with inclusive spatial design, such as comfortable seating and easy access encourage deeper community engagement and shared spiritual experiences. Overall, the study highlights how these modest sacred structures weave together devotion, design and community life. It offers insights valuable to architects, church authorities and heritage practitioners seeking to design or preserve spaces that nurture spiritual continuity and collective identity.

Keywords: central kerala, church, grotto, sacred space, sense of place, spatial integration

1. Introduction

Grottoes are small, cave-like structures dedicated to Saints, mainly St. Mary. The term comes from the Italian 'grotta', which means cave (Episcopal Church, n.d.). It became central to Christian devotion after the 1858 vision of St. Bernadette at Lourdes. Inspired by this moment, which was originally natural and later built, churches around the world started adding grottoes as intimate prayer spaces where people can reflect and find comfort. In Kerala, these grottoes combine local craftsmanship, such as carved stones, integration of wood with Christian symbols like statues of the Virgin Mary or other saints. Located at church premises, or along processional paths, as they guide worshipers through a series of sacred spaces. Their smaller structure allows for focused spiritual encounters, while it also integrates strong social interactions among the community and devotees.

Sense of place describes the emotional and psychological connections of people with the specific locations, shaped by their experiences, memories and the meanings they assign to those places (Relph,

1976). It includes how spaces can create feelings of attachment, identity and belonging, going beyond just their visual or functional qualities. In studies, sense of place combines sensory experiences, culture and community practices to show how spaces gain significance (Beamish, 2002). In sacred spaces such as grottoes, the sense of place is particularly profound, as it is intimately connected to spiritual experiences, rituals and devotions, thereby exerting a significant impact on individuals and communities.

Nearly 60% of Kerala's Christians reside in central Kerala, particularly in districts such as Kottayam, Ernakulam and Thrissur (Religious Denominations of Kerala, n.d.). The area has a historical background, as St. Thomas, the Apostle arrived and landed in Kodungallur, Thrissur, in 52 AD, where it became home to ancient Syrian Christian communities. Since the grottoes in these places are architecturally and culturally important, the study of sense of place in Grotto Architecture contributes a better understanding and findings to this research. Most of the studies include Church architecture and its components. Even though there are extensive studies on shrines and their associated components, there are limited studies on Grottoes and their spiritual meaning. This research could bridge the gap in understanding how grottoes evoke a sense of place through their spatial form, spiritual atmosphere and human experience.

1.1. Aim and Objectives

This study aims to understand how grottoes in Central Kerala churches create a sense of place through their spatial form, spiritual atmosphere and human experience. The research uses an exploratory method focused on interpretation rather than predictions. The objectives of the study are:

1. to identify and analyse the architectural elements and spatial features of grottoes
2. to explore and document human experiences and meanings linked to grottoes
3. to interpret how architectural qualities connect to spiritual meanings in creating a sense of place.

The mixed-methods approach includes architectural drawings, interviews, observations and sensory maps, which leads us to the conclusions by matching physical details with personal feelings. The scope covers documentation of architectural and spatial elements of grottoes. Various stakeholder groups, including clergies, religious communities, heritage experts and local artisans are included and their insights are taken in the research. The main limitation of the research is that the study focuses only on central Kerala Church grottoes. Ongoing church renovations and community changes may affect current findings.

2. Literature Review

2.1 Marian Devotion and Grotto Traditions in Kerala

In Kurukkoor (2024), we could understand the importance of Marian grottoes, and could study about Virgin Mary and the traditions of Marian devotion. It explains that grottoes are sacred spaces, built to honour Mary. They serve as spaces for personal prayers and group worship.

2.2 Grotto Architecture - Typology, Design, and Cultural Significance

In the study of Benes (2024), it tells us how grotto design has evolved, from both historical and experiential perspectives. The study traces how different cultures have reinterpreted grottoes to create a spiritual environment. According to Benes (2024), grottoes often share key design features such as enclosed spaces, defined entrances, landscaping, sculptural details and ambient lighting. All together, making grottoes a unique, sacred space that creates both sensory and spiritual reflection. The research also shows that the best grotto designs find a balance between the natural feel of real caves and the comfort and accessibility of built environments, making them spaces that still resonate in modern contexts.

2.3 Understanding Sense of Place - Concepts and Frameworks

The sense of place refers to the emotional and personal connection that people develop with specific

environments. It goes beyond the physical appearance of a location, which includes the feelings, memories and meanings of people through their experiences, culture and community life. This idea shows how people's connections to their surroundings foster a feeling of belonging and identity. A sense of place grows over time, not just from the way a space is built or designed, but from how people inhabit it, recall it and share experiences in it.

2.4 Integrating Phenomenology, Sense of Place, and Sacred Architecture

Combining phenomenology with the sense of place helps us understand how grotto architecture creates spiritual and meaningful spaces. It recognizes that sacred spaces engage people through all the senses, movement, emotion and how individual spirituality connects with the shared community practices. According to Benes (2024) and Kurukkoor (2024), Grotto architecture can be felt on multiple levels. It serves as a physical structure, a cultural symbol and a spiritual experience. The perspective on how people feel and experience a grotto through sight, sound, texture and emotion is essential for grasping its true significance, beyond its design or religious role.

3. Methodology

The study uses the framework of mixed methods. Architectural analysis, ethnography and perceptual mapping are all integrated into the study to understand how grotto architecture creates a sense of place. The operationalization takes place through a progressive sequence of documentation, fieldwork, comparison and synthesis.

3.1 Architectural documentation and analysis

A systematic photographic survey along with sketches, material inventories, and spatial metrics (size, type of enclosures, orientation with respect to church precincts, accessibility) of selected grottoes in the districts of Kottayam, Ernakulam and Thrissur was conducted. The reports assessed physical condition as well as weathering, maintenance and integration with landscapes. With the implementation of this method, we have identified and analysed the architecture and spatial characteristics of grottoes.

3.2 Ethnographic observation and community engagement

Community engagement and ethnographic observation recorded the contexts of grotto use, such as their locations within churches, personal prayers, processions, feasts of saints and community events. A survey was conducted with a sample size of 150 persons. The perspectives of people regarding the grottoes were documented, and suggestions for improvements were gathered to help preserve these sacred spaces. The narratives about spiritual significance, community, emotional connection and rituals were obtained through semi-structured interviews with priests, leaders, and worshippers. The mind mapping sessions demonstrated the sensory associations of visual, touch, sound and smell. Through this approach, we have investigated and recorded the human experiences and meanings of grottoes.

3.3 Comparative analysis and sensory mapping

A cross-case analysis combined variations in design (open versus semi-enclosed) with experiential outcomes for identifying patterns in size, orientation and levels of participation. Sensory mapping links aspects of architecture to spiritual responses or emotions to see how architecture brings a sense of place. A combination of mind maps and spatial diagrams helps us establish connections between architectural attributes like material texture, enhancing tactility and responses like tranquility and belonging.

4. Data Analysis and Findings

Analysis of thirteen case studies in Kottayam, Ernakulam and Thrissur is used to understand the

architectural elements, spatial configuration, spatial quality, communal interaction and approach to sense of place.

4.1 Architectural elements

From the case studies, I have identified the architectural elements that make grottoes feel natural and spiritual, thereby helping build a sense of place in grottoes. Sculptures of St. Mary or other saints sit right at eye level in carved niches as the heartfelt focal point. Figures of Mary Magdalene, saints and angels add familiar biblical stories. Elements such as candle boxes and collection boxes blend into the design to support rituals. Writings or plaques with prayers and donor names weave personal and community stories into the structure. Landscape features include railings, plants and stone paths. Together, these features turn simple structures into meaningful spiritual places that people remember and return to.

4.2 Typology

Based on the case studies and observation, I have identified 3 main typologies of grottoes based on their material and structure.

1. Natural rock-cut grottoes - Semi-enclosed caves that use natural rocks for construction, usually seen in earlier churches. These arched-shaped grottoes, dedicated mainly to St. Mary, resemble the original grottoes at Lourdes.
2. Concrete-molded grottoes - Open, free-standing concrete structures that have a rock-faced finish or tiled interiors to enhance durability. It may be free-standing or integrated into precinct walls. They standardize accessibility by including steps and railings, accommodating larger gatherings. This evolution prioritizes ease of maintenance over material authenticity, resulting in smoother surfaces. Common in urbanizing parishes, they strike a balance between devotional practice and practicality.
3. Hybrid grottoes – Artificial rock-like structures mostly made of concrete, that mimic the grotto at Lourdes. Modern grottoes are built using this method, combining concrete bases with open gardens, ponds and shaded seating. Enhanced by water features and floral arrangements, these grottoes heighten multisensory engagement.

Figure 1: Natural rock-cut grotto, Major Archiepiscopal Marth Mariam Archdeacon Pilgrim Church, Kuravilangad, Kottayam.Source: Author



Figure 2: Concrete-molded grotto, St. Mary's Syro Malabar Cathedral Basilica, Broadway, Ernakulam .Source: Author



Figure 3: Hybrid grotto, St. Antony's Syro-Malabar Catholic Forane Church, Ollur, Thrissur. Source: Author



4.4 Sensory experiences

Sense of place in a grotto is characterized by a threshold effect, in which a transition from a lush landscape to a semi-subterranean space promotes a psychological shedding of distractions. The feeling of spirituality is stronger with the use of raw, unpolished stones. These materials create a link between the visitor and these womb-like spaces. The candlelight is a very strong symbol in this dark space. It acts as a prayer in the form of a living thing, contrasting with the darkness and highlighting the nature of faith. The seating and the kneelers have been created in such a way that a person can sit or kneel at a very humble level, which also helps the spirituality of the place.

4.4 Comparative analysis

From the thirteen case studies of grottoes, data was collected on the basis of architectural features, spatial components, festivals and gatherings held and the spatial positioning of grottoes.

each case's significance was evaluated across historical, aesthetic, spiritual and social dimensions. This could provide more insights on variations of architectural features, spatial quality, communal events and overall significance that could vary from place to place. Notably, grottoes dedicated to distinct Marian advocations or saints evoked differentiated spiritual atmospheres.

Table 1: Comparative analysis Source: Author

Case study	Year Built	Dedicated to	Materials used	Activities	Festivals held	Orientation with the church
St. Mary's Syro Malabar Cathedral Basilica, Broadway, Ernakulam	29-12-2012	St. Mary	Stones, Concrete, Tiles	Pray, Offer flowers, Ask for help, Give thanks	Annual feast of St. Mary, Annual blessing, Christmas	Towards the left of the church
St. Antony's Cof Padua Roman Catholic Church, Kaloor, Ernakulam	1975	St. Antony	Stones, Concrete, Tiles, Glass	Pray, Offer flowers, Ask for help, Give thanks, light candles, Rossary	Annual feast of St.Antony, Annual blessing, Pilgrimage prayers and rossary	Towards the frontyard of the church
Our Lady of Immaculate Conception Church, Manjummel, Ernakulam	2014	St. Mary, Jesus Christ	Rocks, Wood	Pray, Offer flowers, Ask for help, Meditation	Pilgrimage prayers	Towards the left of the church
Our Lady of Immaculate Conception Church, Manjummel, Ernakulam	11-02-1959 (renovated 26-06-2016)	St.Mary	Rocks, Concrete	Pray, Offer flowers, Ask for help, Give thanks, light candles	Annual feast of St.Mary, Annual blessing	Towards the left of the church
St.Mary's Major Archiepiscopal Pilgrim Church, Kudamaloor, Kottayam	1988 (later renovated)	St.Mary	Wood, Concrete	Pray, light candles Ask for help, Give thanks, Seating	Annual feast of St.Mary, Annual blessing, Christmas	Towards the frontyard of the old church (Towards the left of the new church)
St.Mary's Major Archiepiscopal Pilgrim Church, Kudamaloor, Kottayam	2011	St.Mary, St. Kuriakose Chavara, St. Alphonsa	Concrete, Tiles, Roof tile, glass	Pray, light candles Ask for help, Give thanks	Annual feast of St.Mary, Annual blessing	Towards the right of the church

Table 2: Significance analysis Source: Author

Case study	Year Built	Dedicated to	Material used	Activities	Festivals held	Orientation with the church
St. Marys Church, Lalam, Pala, Kottayam	05-03-1940 (renovated 08-04-2018)	St.Mary, Jesus christ	Rocks, Concrete	Pray, Offer flowers, Ask for help, Give thanks	Annual feast of St.Mary, Annual blessing, Christmas, Easter	Towards the left of the church
St. Alphonsa's tomb, Bharananganam, Kottayam	2008	St.Mary, Jesus christ	Rocks, Wood, Concrete	Pray, Offer flowers, Ask for help, Give thanks	Annual feast of St.Mary, Annual blessing, Annual feast of St.Alphonsa	Towards the left of the church
St. Mary's Syro Malabar Church, Bharananganam, Kottayam	17-08-1952	St.Mary	Rocks, Wood, Tile	Pray, Offer flowers, Ask for help, Give thanks, light candles	Annual feast of St.Mary, Annual blessing, Christmas, local festival of St.Mary in may	Towards the left of the church
Major Archiepiscopal Marth Mariam Archdeacon Pilgrim Church, Kuravilangad, Kottayam	1963	St.Mary	Rocks	Pray, Ask for help, Give thanks,	Annual feast of St.Mary, Annual blessing, Christmas, feast of other saints	Towards the left of the church
St. Antony's Syro-Malabar Catholic Forane Church, Ollur, Thrissur	15-08-2006	St.Mary	Rocks, Wood, Concrete	Pray,Ask for help, Give thanks, light candles	Annual feast of St.Mary, Annual blessing, Christmas	Towards the right of the church
St. Joseph's Church, Kuriachira, Thrissur	08-02-2020	St.Mary	Rocks	Pray, Offer flowers, Ask for help, Give thanks, light candles, Meditation	Annual feast of St.Mary, Annual blessing	Towards the right of the church
St. Euphrasia tomb, Ollur, Thrissur	18-03-1929 (renovated 11-02-1959)	St.Mary	Rocks, Wood, Tile, Concrete	Pray, Offer flowers, Ask for help, Give thanks, light candles	Annual feast of St.Mary, Annual blessing, Feast of St. Euphrasia	Towards the left of the church

Case study	Historic Signifiicance	Aesthetic Significance	Spritual Significance	Social Significance	
St. Mary's Syro Malabar Cathedral Basilica, Broadway, Ernakulam	Modern foundation reflecting post-millennium church expansion-	Polished stone, tile finishes with angel sculptures and lotus pond	Devoted to Marian prayers and annual feast of St. Mary	Hosts large Christmas and blessing gatherings, focal point for city congregation	
St. Antony's Cof Padua Roman Catholic Church, Kaloor, Ernakulam	1975-built example of late 20th-century parish development	Mixed materials, such as stone, glass, and tile, create a bright grotto interior.	Dedicated to St. Antony, pilgrimage prayers, and rosary processionstraditional marian activities.	Pilgrims and locals gather for devotion, candle-lighting rituals enhance fellowship	
Our Lady of Immaculate Conception Church, Manjummel, Ernakulam	Mid-20th-century site renovated to accommodate growing congregation	Rustic rock and timber combination with simple seating	Marian devotion site for pilgrimage prayers	Regular meditation and small-group prayer sessions foster close community bonds	
Our Lady of Immaculate Conception Church, Manjummel, Ernakulam	Established to complement first grotto with more accessible structure	Simpler design with concrete and tile, enhanced lighting	Dedicated to Marian prayers, often used during large feast days	Serves as active gathering spot during feast days, encourages youth participation	
St.Mary's Major Archiepiscopal Pilgrim Church, Kudamaloor, Kottayam	Represents late-modern architectural intervention in traditional church contexts	Wood-concrete mix with sculptural scene backdrops	Shrine for St. Mary and local saints, central to annual pilgrim events	Adapted seating area used for Christmas enactments, communal storytelling	
St.Mary's Major Archiepiscopal Pilgrim Church, Kudamaloor, Kottayam	Reflects 21st-century reinvention of pilgrim shrine to include multiple saints	Contemporary tile roofing and glass elements	Multi-saint devotional site supporting Marian, Alphonsa, and Kuriakose Chavara feasts	Frequent candlelit gatherings and blessing ceremonies attract multigenerational participation	

Case study	Historic Signifiicance	Aesthetic Significance	Spritual Significance	Social Significance	
St. Marys Church, Lalam, Pala, Kottayam	Originally built 1940, renovated 2018, illustrating continuity of local church heritage	Octagonal grotto form with sculpted sheep and Mary Magdalene figure	Dedicated to St. Mary and Jesus Christ, used daily for individual prayer	Easter and Christmas events draw families, courtyard seating encourages casual interaction	
St. Alphonsa's tomb, Bharananganam, Kottayam	2008 tomb-shrine marking modern canonization of local saint	Natural rock textures with angelic sculptures and holy-water font	Shrine of St. Alphonsa, pilgrimage destination during her feast	Annual feast of Alphonsa prompts community volunteerism and youth-led events	
St. Mary's Syro Malabar Church, Bharananganam, Kottayam	1952 establishment reflecting post-colonial church growth	Carved wood and tile mosaic, floral ornamentation	Marian devotion with local May festival of St. Mary	Local festival gatherings reinforce neighborhood identity and inter-parish visits	
Major Archiepiscopal Marth Mariam Archdeacon Pilgrim Church, Kuravilangad, Kottayam	1963 construction tied to expanding pilgrimage routes	Unadorned rock façade with crane-bird motifs	Dedicated to St. Mary and other saints, hosting multi-feast celebrations	Serves as rest stop for pilgrims, informal meeting point for neighboring villages	
St. Antony's Syro-Malabar Catholic Forane Church, Ollur, Thrissur	2006-built reflection of suburban church expansion	Wood and concrete blend with flowering plant features	Marian and Antony devotional site for weekly prayer groups	Weekly candlelight prayers and seasonal fairs strengthen communal ties	
St. Joseph's Church, Kuriachira, Thrissur	2020 contemporary structure illustrating recent church planning	Minimalist rock grotto with seating and holy-water jars	Dedicated to St. Mary, site for meditation and sacramental offerings	Meditation sessions and small retreats support mental health and community support networks	
St. Euphrasia tomb, Ollur, Thrissur	1929 origin with 1959 renovation, marking early local saint veneration	Rich tile, wood, and concrete interplay with sculpted relief panels	Shrine for St. Euphrasia and Marian blessings	Feast of Euphrasia mobilizes parish volunteers and intergenerational storytelling	

5. Results and Discussion

5.1 Architectural characteristics

From the literature reviews and case studies, I have identified that the following are the elements that contribute to the sense of place: Sculptures of Saints (mainly St. Mary), Sculpture of Mary Magdalene, Sculptures of Other Saints and angels, Candle boxes, Collection Boxes, Inscriptions or writings and the landscape features.

5.2 Material evolution

Originally, the concept of a grotto was akin to that of a rock cave. To preserve this idea, many grottoes have been designed to resemble caves. Initially, people used natural rocks arranged to mimic a cave. However, for easier construction, they later transitioned to using concrete structures. These include both free-standing concrete forms and those with a concrete mold cave. The materials used in a grotto can significantly enhance its quality. Rock-based grottoes, leveraging locally available rocks from the region, maintain their historical significance, resemble the cave at Lourdes, and promote sustainability through low embodied energy and minimal transportation. Yet, for improved maintenance, concrete became a preferred building material. Additionally, incorporating tiles facilitates easier cleaning and use.

5.3 Spatial configuration

Generally, the orientation of the grotto plays an important role. Grotto's positioning with respect to the church's altar orientation. As the information collected from the expert clergy, the position of the grotto is generally to the left of the entry of the church. Generally, the left side of the altar is for saints and the right side is for the holy family. Since the grottoes are dedicated to the saints, it should be positioned to the left of the entry. Even though, its position could vary due to the availability of land and also due to renovation works.

5.4 Spatial quality

Integration of spatial quality could differ from one grotto to another. Earlier, grottoes were just a place to pray, but now they are a place to sit and relax, a meditation place and a meeting place during processions and festivals. Spatial quality enhancing elements include seating, pond, gardens etc. Additionally, visual sequences and interactions of the Holy Family, Christmas etc., are created in the form of sculptures, which help to create more interaction among community members during festive seasons. 20.60% people visit the grotto daily, and 38.10% prefers visiting the grotto weekly. People consider these sacred spaces as a space for social bonding. It is noticed that, more interactions occur in grottoes that have comfortable and shaded seating spaces.

5.5 Communal interaction

Activities like lighting candles, offering flowers, praying and reciting rosary, creates a strong communal interaction among the devotees. The devotees consider it an important communal gathering during the festival season and major prayers. From the survey conducted, 31.51% people visit the grotto to pray and light candles, 29.52% people prefer to attend masses and prayers held at grottoes during feasts and other occasions. 22.05% people are involved in activities like offering flowers. The grotto itself acts as a focal point during festivals as it becomes the starting or ending point of the events in many churches. 48.99% of people suggested better maintenance and improving the condition of grottoes in order to preserve them in the future. 28.28% people wanted to bring more programs and activities, which could eventually enhance the youth involvement (22.73%). Considering these insights and suggestions, we could create a strong communal interaction, thereby creating a sense of place.

6. Conclusions and Recommendations

Hence, this paper can be concluded as follows:

- Grottoes are structures that show how sacred spaces can preserve culture even during modern changes.
- The sense of place in grottoes is not only created through its architectural components, but also through its spatial quality, its communal interactions and through its spiritual meaning.
- Enhancement of spatial quality evokes a sense of devotion and spirituality in the overall spaces. These could be elements like landscape features that contribute to overall comfort and accessibility
- The use of materials can enhance spirituality. The use of natural rocks or rock-like structures creates more spiritual meanings as it resembles the original grottoes.

Since the study is limited to Grottoes in central Kerala, the regional context may differ from the overall sense of place in grottoes. Understanding the grotto positioning and the spiritual meaning of grottoes across Kerala could give a larger insight into the topic. This would help to develop a better understanding of this type of sacred architecture. Future research might include considerations for preserving grottoes to protect the heritage significance of sacred architecture.

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