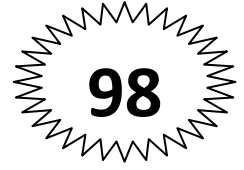


Mammallapuram Shore Temple, Stone Temple

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Abstract

Mammallapuram, near Chennai, Tamil Nadu, is noted for its UNESCO-certified rock-cut temples and monoliths. Pallavas constructed these unique monuments during the 7thCE without wood, brick, mortar, and metal. It is interesting to see the architecture transition from excavated cave temples to structural temples during the Pallava period. The temples and caves in and around the Mamallapuram are attributed to the Pallava reign. This article will analyze the architectural marvels and techniques of Mamallapuram shore and stone temples to benefit the architectural fraternity.

Keywords: Pallavas, Monoliths, Rock cut temples, Structural Temples, Sculptures, Bas reliefs

Introduction

Architecture and buildings reflect the culture and technologies of different eras. The history of building in southern India can be traced back to the Sangam age. The Sangam age structures were ruined after a certain period due to weather, erosion, and other natural disasters, as they were built with wood, bricks, mortar, and metal. The Pallava dynasty, which has existed since 275CE, rose to power with their ruler Simhavishnu Pallava in the 6th century following the fall of Kalabras. His successor, Mahendravarma I, introduced the excavation of cave temples. The granite rocks, which had better longevity than the Sangam age building materials, were chosen as the building material. He was referred to as Lakshita (idealist) and Vichitra Chitta for his innovative ideas. His descendants followed this concept of excavating the rocks to build cave temples which further developed into Rock-cut and Structural temples during the Rajasimha Pallava period.

History of Mamallapuram

Mamallapuram, called Mahabalipuram today, is one of the oldest seaports in southern India. The findings of the 1CE Neolithic burial urn, cairn circles, and jars in this area mark the antiquity of this place. There is a reference to the port Nirppeyyaru(Mamallapuram) during the reign of King Thondaiman Illam Thirayar in the Sangam literature Perupanattrupadai. The recent discovery of Roman, Chinese, and Pallava coins from the 4th CE proves that Mahabalipuram was an important trading port. Nirppeyyaru was named Mamallapuram after Pallava king Narasimhavarman II (630CE – 668CE), also called "Mamalla ." A group of monuments was built in the 7th and 8th CE bringing more traction to Mamallapuram. This period can be considered the Golden Age of Art and Architecture of Southern India. Mamallapuram is also the birthplace of Boothathaalwar. The town was further planned and developed during British rule in 1827. Today Mahabalipuram is an important tourist center UNESCO certified and conserved.

Pallava Temple Architecture

Mahendravarma I introduced cave temples in the 6th century. These cave temples were architected with entrance space or verandahs supported by pillars with a carved-out shrine in the interior wall of the cave. If the cave faces south or north, the shrines were cut out facing east or west of the interior wall. If the cave was facing east or west, the shrine was carved on the back side of the cave. These cave temples were referred to as mandapas. The mandapas are divided into proximal and distal sections with pillars equal to

the pillars
at the
entrance.



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The inner part is called Maha mandapa, and the outer part is called the Ardha mandapa. Some elevated cave temples have steps cut out of the rock to climb up. The earlier cave temples' pillars and walls were mostly empty. This model of construction has extended for almost three generations.

Mahendravarma I's descendant Narasimhavarma II also called Rajasimha, enhanced cave temples with more ornated pillars which were divided into sections with carvings on each section and embellishments. The entrance between the pillars was arched out. There are more pillars and shrines in Rajasimha-style cave temples. There were Dwarapalas statues sculpted outside the cave temples. The inner walls had sculptures depicting Hindu myths, epics, and history. Some cave temples had shrines with Shiva, Vishnu, and Korraivai sculptures. These are also referred to as the "Mamalla style" of construction.

The Monolithic construction marvel implemented by Mamalla was the cut-out Vimanas or Rathas from a single rock. The Vimanas were cut out from top to bottom. There are nine Rathas in the Mamallapuram built with this technique. They are the Dharmaraja Ratha, Nakula Ratha, Sakadeva Ratha, Draupadi Ratha, and Bhima Ratha, collectively called the Pancha Ratha. There is no evidence or relationship to Mahabharata. It's still an unsolved question among researchers on the given name of these Rathas. The remaining four Rathas are Ganesha Ratha, South Pidari Ratha, Valaiyankuttai Ratha, and North Pidari Ratha.

Pancha Rathas Architecture

Rajasimha Pallava built this Pancha Ratha in the 7th century. These Pancha Rathas are monolithic, each designed uniquely with pink granite stone. It's believed their original design is based on the wooden temple chariots. Dharmaraja, Arjuna, and Draupadi Rathas are square. Sahadeva Nakulan Rathas is apsidal, and Bhima Ratha is rectangular.

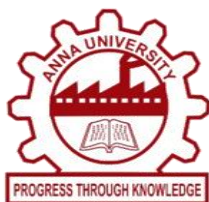
Dharmaraja Ratha is the tallest Ratha among the five Rathas. It's about 42 feet tall west, facing, and has a square layout. It's a Tritala Vimana, or three levels of smaller shrines and Kudus as embellishments with octagonal shikhara. This is Dravidian-style temple architecture. The top level is completed, but the middle and lower level is incomplete. This again proves the construction was done from top to bottom.

There are a total of 48 sculptures on this Ratha.

The ground level, or level 1, is the tallest design, with a central shrine surrounded by an outer wall with large sculptures on the outer corners. There are two pillars with a lion/Simha base and two pilasters near the corner walls. The entrance is designed to be on the west side. The Adisthana, or the bottom of the structure, has a platform on the top with Pratibandha, or a repeated pattern of elephant and lion. There is a beam on top of the pillars with kudas with human faces. This is topped with sculptures of various animals and humans in salutation pose with a hole behind as a water outlet. On top of this, three oblong Salas are in the center and a square Kuta at the ends. These mini shrines are connected by a pathway running around in all four directions. The west side of the main entrance has two additional mini structures between sides to mark the Mukha mandapa. The outer corners of the lower level are sculpted with images identified by the researchers as below Bhairavamurthy, Chandrasekara, Harihara (inscription above says Narasimha), Brahma, Ardhanadhieswara (inscription Bhuvanabajana), Narasimhavarma I (Sri Mega Tirlokyavardhana Vidhi), Skanda (inscription as Prithivisara Sri Bara), and Siva (inscription Atyantakama Anekopaya)

The second level or mid-level doesn't have access; only authorization from ASI access can be obtained. There are four niches on the north and south sides and seven on the East and West sides. Pillars separate these niches. There is one niche on the west side with no sculpture. The west side is the small projection for the Mukha mandapa, with two Simha base pillars to mark the main shrine on this level. The sculptures in this level are Siva in the form of Kankalamurthi (inscription Satyaparakkrama and Paravara), Dwarapala (one found other Dwarapala unfinished), Sculpture of a woman (Celestial dancers Rambha, Urvashi or a devotee), Shiva as Vrshabhantika (inscription Sthira bhakti Madanabhirama Vidhi), Siva as

Kalarimurthi he is in a dancing pose,



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Vishnu with Garuda Garudantikamurthi (inscription Sri Narasimha, Bhuvanabajana, Srimegha Apratihatasasana) Gangadaramurthi in tribhanga pose, Siva in the form of Chandesa Anugrahamurti (inscription Kamala Lalita, Ameyamaya Sakala Kalyana), Siva as Tandu Anugraha, Siva as Vinadhara (inscription Nayanamanohara, Vama and Adimana), Priest holding a vessel, devotee holding a bell and a chef

On the third level, we have Nayanmar singing, Shivain Tribangha pose (inscription Lalita), Kaliyamardana Krishna, Shiva linga Nandi (inscription Nayanamanohara Sarvatobhadra), Vishnu, Veenadhara dakshinamurti (inscription Srinidhi Niruttara), Andhakantaka Murti, Shiva (Vidhi Vibarantha). In the upper shrine, there is a sculpture of Somaskanda; outside, we have sculptures of Devas or Devotees or Gandharvas male dancers holding flowers, Dwarapalas on each side of the entrance to the shrine, Chandra, Surya, and Dakshinamurthi

On the top is the Shikara, octagon-shaped with carved kudus. There are sculptures of Buthaganas below it. The researchers say the stupa installed on the top is missing. The recently excavated Ganesha bas relief in the vicinity didn't fit this Ratha.

Draupadi Ratha Is the smallest square Ratha. The roof is like a hut, as described in Silapadikaram "Kuchchara Kudikai" temples, according to researcher Gopu Rangarathanam. At the bottom of Adhistana, there are sculptures of lions and elephants. The stupa excavated is placed on the side. There are sculptures of two Dwarapalikas at the entrance to the shrine. There are sculptures of Kotravai on the three outer walls. The north and south sides of Kotravai sculptures are incomplete. There is a small fleet of stairs to enter the shrine. Inside the shrine is the sculpture of Korravai standing on a lotus. With Boothaganas on top corners. On either side are sculptures of soldiers, one of them sacrificing himself by cutting his throat, called Navakandam. As embellishments, a Makara tooran pattern is found on the roof and outer walls. There is a massive single lion sculpture outside in front of this Ratha.

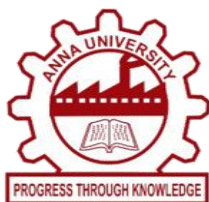
Arjuna Ratha shares the same platform as the Draupadi Ratha and is about 20 feet high. The base Adhistana is the same continuous pattern of elephant and lion alternating as the Draupadi Ratha. The entrance to the shrine has a small fleet of stairs with two pillars and two pilasters with a Simha base.

On the upper beams, there are kudus with human faces. This Ratha has two levels above and is hence called Dvitala vimana. The upper level has one Sala in the middle with two Kutas in each corner with kudu embellishments. The lower levels of this ratha are designed in Dravidian style. The Shikra is Vesara style, so this ratha is called Dvitala Mishra Vimana. The first level has nine niches, three on each side. The center one is not completed; the remaining eight have bas reliefs of couples. This is being interpreted either as Ashta dikpalakas or royal couples by some scholars. The shikhara on the top is octagonal; the stupa is kept on the floor of this Ratha on the side. In the north external wall, we have four sculptures separated by pilasters. Vishnu as Garudantaka Murti, royal couple and two dwarapalas on each side. On the east outer wall, we have Lord Indra in the middle, with Ramba and Urvasi on one side, Jambu Maharishi on the other, and the dwarapalas at the ends. This is debated by some scholars as Skanda in the middle, Devayanai and Valli on one side, with Anthanar on the other side. The south-facing outer wall has Lord Siva with his bull Vrushabhantaka murti, royal couples, and dwarapalas on either side. There is a giant Nandi outside the Arjuna Ratha.

Bhima Ratha is an oblong-shaped Dvi tala Salakaara Vimana. This is believed to be built for Mahavishnu or Sapta mar tikas due to its elongated shape. There is a small fleet of stairs to enter the Ratha. There are four rounded Simha base pillars and two pilasters at the entrance. There is a second set of posts dividing it has Mahamandapa and Ardhamandapa, as discussed above in the cave temples of Mahendravarma I. The outer top beam has embellishments of kudus with human faces. Above are the five

mini shrines,

Sala, and two shrines,



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Kutas, on the longer sides. On the other two sides, we have three Salas and two Kutas at the ends. The floor on top is a single oblong shrine with a vaulted roof with a path connecting around it. There are five niches with pilasters with Kudu on top of each. Three of them have sculptures of royals. On the shorter sides of the Ratha, the roof on the north and south sides has an in-built vimana octagon shaped with rounded shikhara and mini pillars with a simha base enclosed in a decorative arch with Makara designs.

Nakulan Sahadevan ratha is apsidal architecture. The entrance is north facing with two pillars with a Simha base supporting the porch-like design. The two pilasters behind have an elephant base. There is a slight slope to climb to the Ratha. The main entrance takes to a shrine that is empty or incomplete. The outer wall of the Ratha has pilasters at equal distances running around. On the front porch, or Mandapa, is a beam with six kudus with human faces. Above which, there is a Sala in the middle with Kutas in each corner. Above the shrine, there are Kutas in the corner, with six Salas going around. These mini shrines have embellishments with kudu with figurines inside (incomplete) and pilasters. The floor above has a row of mini pilasters above which the beam sits with Kudus embellishments without the human faces. The second floor has two Salas in the middle and two Kutas at the corners, with 5 Salas around the structure. Above is a vaulted roof with one large Kudu and two small kudus on either side on the east and west sides. There is one large Kudu on the south side of the roof. On the front side of the top, we have shikhara enclosed within an arch. This is similar to Bhima Ratha. Outside this Ratha is a monolithic elephant sculpture.

Shore Temple is called the Kadarkarai Koil in Tamizh, built by Rajasimha Narasimha II in the 8th century. This landmark for trading ships reached the Seven Pagodas. It is believed that there were six other similar structures lost in Tsunami. The merchant of 13thCE Marco Polo has documented the previous existence of the Seven Pagodas. There were three temple towers in the existing complex. Only two have survived, according to the archaeologists. This is pyramid shaped monolithic with octagonal shikaras with stupas on top with one tall and other smaller tower. The compound wall is embellished with Nandis in a row with sculptures of Boothaganas at the entrance. There are also sculptures of Vishnu and Brahma on either side of the entrance. The taller tower is east-facing, and the smaller building is west facing. The taller tower is called Kshathriyasimha Pallaveshwara Griham; the shorter tower is called Rajasimha Pallaveshwara Griham with tritala, and Pallikondaruliya Devar is a middle temple with no tower in an oblong shape.

Rajasimha Pallaveshwara Griham is the smaller tower dedicated to Shiva. It has pilasters with a Simha base and a Nandi near the entrance. The Shikara has 4 Bhothaganas blowing the conch. In the shrine of this temple, there is a bas-relief of Somaskanda with Brahma and Vishnu behind, showering their blessings. There is a small kalasam sculpted near the foot of the goddess Parvathi. The external wall of the shrine has sculptures of Tirumurti in Ekapada posture and Nagaraja under the five-headed snake. Outside this temple is a monolithic Kotravai seated on the leg of the lion. This looks like she is climbing up or down. There is a square socket on the chest of the lion with the sculpture of the goddess Kotravai. Next to this is an animal with its head slayed lying down, or it was broken. It may be the buffalo demon Kota slayed by the goddess.

Kshathriyasimha Pallaveshwara Griham is the taller temple with five stories dedicated to Shiva. This temple has a broken 16-faced lingam with the sculpture of Somaskanda behind Brahma and Vishnu on either side. The outer walls have sculptures of Tirupuranataka and Kotravai.

Pallikondaruliya Devar is between both the towers is the Vishnu temple in the form of Ananthasayana. The external walls of this shrine have sculptures of Kalinganardhana, Gajendr moksha, and Keshi vadam. The inscription says it's Jalasayana temple.

Varaha Temple was excavated after the Tsunami in 2004 in the Shore Temple vicinity. This is like a temple tank with stairs going down with the center miniature structure with mini Simha base pilasters.

Inside this structure is a shrine with Lord



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Shiva and his bull. There is also a hole next to this structure which is connected to the groundwater. It is believed by the locals when the groundwater level increase and the level is near the neck of the deity in the structure; it is a flood warning. Inside the tank, there is also a boar (Varaha) monolith.

Balipeddam in the shore temple complex is where the animal sacrifice for God happened. This has a Granth inscription praising the Rajasimha Pallava.

Pidari Rathas are two incomplete two-storied Rathas with Shikara facing east and north located on the border of Mamallapurma town. This has the same architecture as the Pancha Rathas with Salas Kutas and Kudus with human faces. One is square-shaped, and the other is octagonal. There are supporting pillars and pilasters around the Ratha, but it doesn't have a lion base. There is a sculpture of Ganesha on the path to Pidari Rathas.

Ganesha Ratha is behind the Arjuna Penance. This resembles the Bhima Ratha, with a two-story and vaulted roof. It has miniature shrines, kudus, and pilasters around the temple. There are two lion-based pillars and two pilasters at the entrance. There are sculptures of two dwarapalas. This west-facing temple was dedicated to Shiva; this has been evident after the excavation of the Siva sculpture. However, locals installed the Ganesha idol in the shrine before the finding, hence the name Ganesha Ratha. On top of the vimana is a Tirusula sculpture with a face on one end; nine rounded kalasams are in a row on the top of the roof.

Mukunda Nayanar Temple was excavated a few decades ago. This is two storied with ardhmandapa supported by two rounded pillars and two pilasters with steps to enter. It has Sala and Kuta above. The temple's central sanctum has a sculpture of Somaskanda, similar to other Rajasimha-style temples.

Adi Varaha Temple is a cave temple with six pillars, like the porch at the entrance. The temple shrine is Adi Varaha (Boar) carrying the Bhoodevi. This temple has a secret tunnel leading to Varahaswami temple in Thiruvadanthai. The north side wall has a sculpture of Shiva in the form of Gangadhara, Gajalaskmi. The south wall has sculptures of Adhi Seshan and Lord Vishnu in the standing pose. Next to it are the Hariharan, Brahma, and Kotravai. There are bas reliefs of Simhavishnu with his two queens standing on either side of him. There is also a sculpture of Mahendravarma I with his two queens.

Mahishasura Mardini Cave is east facing with four rounded pillars and two pilasters. The two pillars are either incomplete or were designed differently. The top has an outline of miniature shrines, which have been designed but not started. Inside are two pillars and two pilasters with a lion base, marking the entrance to the main shrine with Dwarapalas on each side. There is a sculpture of Somaskanda inside the main shrine. Nandi is at the foot of Shiva, and Chandikeswara is on the other side. There is Vishnu, Surya, and Brahma on the left side of Shiva. Outside the shrine, there are two beautiful bas-reliefs on either side. Mahishasura Mardini is sitting on the lion on one side and slaying the Keshi, the buffalo-headed demon. On the other side is the bas-relief of Ananthasayana. The demons Madhu and Kaitabha are at the feet of Vishnu. The Vishnu's Ayuda pursha's are depicted as the male and female forms above and below Mahavishnu. Also, there is Bhudevi below the Ananthasayana.

Ramanujan Mandapam is a cave temple with six pillars supporting the porch at the entrance. There is a set of two pillars and two pilasters with a lion base with Dwarapalas sculpted on top (missing) to enter the cave shrine. Two small shrines are on either side of the pilasters carved on the wall. Somaskada, Vishnu, and Brahma were at bas reliefs in the inner shrine, which is now missing.



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Koneri Mandapam is west facing and has two sections. The first section has four pillared entrances, a cornice with nine kudas above, and five Salas. Above which, there are mini pillars that are incomplete. Five cells inside, with Dwarapalas outside, were dedicated to Lord Shiva. There are no sculptures found. The second section of the cave has a flight of rock-cut stairs leading to four pillars and two pilasters at the entrance. Both areas have been excavated in the same rock.

Kotikal Mandapam This west-facing cave temple has two pillars and two pilasters at the entrance. There are a few socket holes over this pillar on the rock. The shrine is empty, with two Dwarapalikas at the entrance to the shrine holding the sword and bow. This shows this was dedicated to Kotravai, the war goddess. The thick pillars and designs on it suggest they belong to the Mahendravarman period.

Tirumurthi cave temple is dedicated to Tirumurthi. This beautiful cave temple has three entrances with no pillars, with kudas and mini shrines above. It has two dwarapalas at each entrance. The central shrine has a bas-relief of Lord Shiva with devotees and Boothaganas with a Siva linga in the front. To the right is the Vishnu in standing pose with devotees, and the left shrine is dedicated to Karthikeya with devotees. Just outside on the left side is goddess Kotravai standing on the buffalo.

Varaha Mandapam is a cave temple with two pillars and two pilasters with a lion base at the entrance. Above these pillars are six Kudus and three Salas. The main sanctum idol is missing. This is dedicated to Lord Vishnu. Outside the sanctum, we have bas reliefs of Varaha carrying Bhumadevi, and the right leg is placed on the Adhishesha. There are bas-reliefs of Brahma, Narada, Surya, Chandra, and devotees found on this bas-relief. The second bas-relief is the Gajalaksmi, with devotees with waterpots and flowers. The elephants pour the water on the goddess on either side. One of the elephants is taking the pot from the devotee. There is also Goddess Kotravai bas relief standing on a lotus. One of the soldiers on either side is cutting his throat as a sacrifice. Boothaganas are around the goddess, and an antelope and a lion are behind the goddess. There is the fourth bas-relief of Trivikrama; Brahma is near his right foot, Jambavan the bear is playing the drums, Shiva on the top corner, Surya and Chandra, King Bali, Guru Sukracharyar and other associates of the king is found in this bas relief.

Pancha Pandaya mandapam is east facing cave monument with six pillars and two pilasters with a lion base at the entrance. There are some mini shrines found on the top of these pillars. There is a set of 6 pillars behind it. Inside the shrine and the walls are empty.

Dharmaraja Mandapam is an east-facing cave monument. It has two massive pillars and pilasters at the entrance. There is a second set of two pillars inside. It has three empty cells. The middle cell has outlined marks of Dwarapala but not the bas-relief at the entrance. This is called the Atyantakama Palleswara Griham, dedicated to Lord Shiva. This is about 50 feet tall.

Atiranachanda Mandapam is a cave temple facing east and about 6.5 feet tall. The cave's entrance is supported by two broad pillars and two pilasters with a square base at the top and bottom with an octagonal shaft in the middle. The inside has three cells. The center has a 16-faced shiva linga with Somaskanda bas relief behind the wall. There are two dwarapalas at the entrance. The other two cells have the bas relief of Somaskand on the wall. Outside the cave is a Shiva linga and a Nandi sculpture. There is a rock with the bas relief of Kotravai killing the buffalo demon Keshi. Some inscriptions are found on the walls of this cave temple in Pallava Granth.

Valaiyankuttai Ratha is a two-story square Ratha with the shikhara. This unfinished Ratha has two pillars and two pilasters at the entrance. The tower has the usual Kudus and mini shrines at each level. The shrine and walls are all empty.

Krishna Mandapam is east facing, with a cave temple with six lion base pillars and two pilasters at the entrance. There are mini shrines over these pillars at the entrance. There is a second set of pillars inside the cave with carveouts of Kalinganardhana and Alwars at the base. The bas-relief is the Govardana giri. Lord Krishna lifted the mountain. Their sculptures of ladies, kids, and villagers with cows in the background are depicted. As part of the same panel, there is Balaraman standing; behind is a sculpture of

a man
playing the
flute and
the lady



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with the kid turning and watching him; then we have the cowherd and cow being milked. Villagers carrying their pots, mats, children, etc., are found. There is a sculpture of a man and woman dancing the Kuravai or Thunangai, where men and women join and perform together. There are sculptures of lions on the side; some are human faces with lion bodies. On the north side is a sculpture of a cow with a namam on the forehead, emphasizing it's a Vaishnavite temple.

Olakkanneshvara structure built over the Mahisashura Mardini cave. The structure is built on a boulder with a stone base. There is a flight of stairs to climb to the top of the building. The inside cell of the temple, which is gated, has a pillar with a set of stairs leading to the roof and a secret chamber on the other side of the pillar. The dwarapalas at the entrance are facing toward the cell. The outer wall of the temple has a pilaster with a lion base. Boothaganas are blowing the conch and images of dwarapalas. There are bas-reliefs of Ravana lifting the Kailasha with Shiva and Parvathi on the north side, Dakshinamurthy facing the south, and Kalanthaka and Lord Shiva in a dancing pose. The recent discovery has shown evidence that this was used as a watch tower/lighthouse for the ships. It had three torches with fire to guide the vessel. One on the top of the tower and two on either side, hence the name Olakkanneshvara. This was replaced by a dome with directional arrows the British that was later removed. This has served as a lighthouse about 1000 years ago or even earlier.

Rayar Gopuram is an incomplete tower. There are four tall pillars, two with a carved out of lady over a yali at the entrance, and the other tower with Dasavatharam carved on it. There are four pilasters with mini pillar-like structures, and it's different from the other Rajasimha style temples. This must be a later construction.

Tiger's cave facing southeast has an entrance carved with a garland of Yalis at the entrance; there are also carveouts of elephants and horses on one side of the front wall. The center cell has pillars with ladies riding the lion on either side. The inside of the cell is empty but may be dedicated to Kothravai. There are two empty cells on either side.

Arjuna Penance is the most significant bas-relief 90' by 30'. This bas-relief has carveouts of Arjuna in penance standing in tree pose, Lord Shiva with Tirusulam and boothaganas. A hunter is holding his animal and a lion behind. There are various animals, devas or Gandharvas. There is a small shrine with Vishnu. Ascetics are worshipping. There is a cat in penance in tree pose and an elephant with three calves. There are lions, birds, and monkeys. There are divine couples, Kinnara couples, Surya and Chandra. Lion with the tail curved like the number 8. A gap in the middle of this bas-relief with Nagaraja and Naga Kanya looks like a waterfall.

Conclusion:

We have inferred the following architectural facts from this research article.

Pallava architecture included Cave temples, Monolithics, Bas reliefs, and Structural.

The design and style are classified as Mahendravarma Style temples and Rajasimha-style temples. Evidence of later style has been found, as seen in Rayar Gopuram.

Mahendravarma style were cave temples with massive pillars with square bases on top, bottom, and octagonal center. The structure was excavated from rock caves, mostly empty.

Rajasimha Style cave temples included rock-cut caves, structural temples, monolithic, and bas reliefs. The pillars had a Simha base. The kudus were embellishments, and miniature temples called Salas and Kutas were carved out on the towers and Ardhamandapa of the temples. Bas reliefs model have

been the standard sculpture form in all



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these temples. The main deities found on these bas-reliefs can be narrowed down to Shiva and Vishnu, Kotravai, and Karthikeya. Monoliths like Nandi, Lingam, Lion, and Elephant are found. Somaskanda bas relief is found in most of these temples.

All structural and monolithic monuments in Mamallapuram were built from top to bottom. The bottom of the unfinished Rathas serves as proof.

The following rock-cutting technologies were used.

A row of square-shaped holes was cut in the rock with a chisel; a wooden piece was inserted and filled with hot water daily to help dissolve and split the rock. This is a slow process that takes many years to dissolve and break. This square pattern is found on the rocks in Mamallapuram.

The other method used is the drilling method found on some rocks. Drill marks are found on the stones proving this method was implemented.

The Olakknesvara structure provides an understanding of the ancient methods of building and maintaining the lighthouses. Even though it's referred to as a temple, it was never a place of worship.

The Varaha temple near the shore temple was built for flood alerts for the locals to evacuate.

The technology and science behind the construction of Mamallapuram monuments are beyond one's imagination. Mamallapuram monuments are an amalgamation of art, culture, science, and technology that showcases the best rendering of Tamizh architecture.

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