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SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT – I – History of Architecture I -SAR1201

NEOLITHIC ARCHITECTURE

Paleolithic & Neolithic - Elements and types of settlements, Nucleus and growth of settlements, Culture, Evolution of shelter, Factors influencing Architecture- Khirokitia, Catal Huyuk, Early Indus settlements, Harappa and Mohenjodaro, Stonehenge, Architectural character - Ziggurat of Ur; Palace of Sargon, Khorsabad.

Earth's beginnings can be traced back 4.5 billion years, but human evolution only counts for a tiny speck of its history. The Prehistoric Period—or when there was human life before records documented human activity—roughly dates from 2.5 million years ago to 1,200 B.C. It is generally categorized in three archaeological periods: the Stone Age, Bronze Age and Iron Age.

From the invention of tools made for hunting to advances in food production and agriculture to early examples of art and religion, this enormous time span—ending roughly 3,200 years ago (dates vary upon region)—was a period of great transformation.

The Stone Age

Divided into three periods: Paleolithic (or Old Stone Age), Mesolithic (or Middle Stone Age), and Neolithic (or New Stone Age), this era is marked by the use of tools by our early human ancestors (who evolved around 300,000 B.C.) and the eventual transformation from a culture of hunting and gathering to farming and food production. During this era, early humans shared the planet with a number of now-extinct hominin relatives, including Neanderthals and Denisovans.In the Paleolithic period (roughly 2.5 million years ago to 10,000 B.C.), early humans lived in caves or simple huts or tepees and were hunters and gatherers. They used basic stone and bone tools, as well as crude stone axes, for hunting birds and wild animals. They cooked their prey, including woolly mammoths, deer and bison, using controlled fire. They also fished and collected berries, fruit and nut

Ancient humans in the Paleolithic period were also the first to leave behind art. They used combinations of minerals, ochres, burnt bone meal and charcoal mixed into water, blood, animal fats and tree saps to etch humans, animals and signs. They also carved small figurines from stones, clay, bones and antlers.The end of this period marked the end of the last Ice Age, which resulted in the extinction of many large mammals and rising sea levels and climate change that eventually caused man to migrate.

During the Mesolithic period (about 10,000 B.C. to 8,000 B.C.), humans used small stone tools, now also polished and sometimes crafted with points and attached to antlers, bone or wood to serve as spears and arrows. They often lived nomadically in camps near rivers and other bodies of water. Agriculture was introduced during this time, which led to more permanent settlements in villages.

Finally, during the Neolithic period (roughly 8,000 B.C. to 3,000 B.C.), ancient humans switched from hunter/gatherer mode to agriculture and food production. They domesticated animals and cultivated cereal grains. They used polished hand axes, adzes for ploughing and tilling the land and started to settle in the plains. Advancements were made not only in tools but also in farming, home construction and art, including pottery, sewing and weaving.

The Bronze Age

During the Bronze Age (about 3,000 B.C. to 1,300 B.C.), metalworking advances were made, as bronze, a copper and tin alloy, was discovered. Now used for weapons and tools, the harder metal replaced its stone predecessors, and helped spark innovations including the ox-drawn plow and the wheel.

This time period also brought advances in architecture and art, including the invention of the potter's wheel, and textiles—clothing consisted of mostly wool items such as skirts, kilts, tunics and cloaks. Home dwellings morphed to so-called roundhouses, consisting of a circular stone wall with a thatched or turf roof, complete with a fireplace or hearth, and more villages and cities began to form.

Organized government, law and warfare, as well as beginnings of religion, also came into play during the Bronze Age, perhaps most notably relating to the ancient Egyptians who built the pyramids during this time. The earliest written accounts, including Egyptian hieroglyphs and petroglyphs (rock engravings), are also dated to this era.

The Iron Age

The discovery of ways to heat and forge iron kicked off the Iron Age (roughly 1,300 B.C. to 900 B.C.). At the time, the metal was seen as more precious than gold, and wrought iron (which would be replaced by steel with the advent of smelting iron) was easier to manufacture than bronze.

Along with mass production of steel tools and weapons, the age saw even further advances in architecture, with four-room homes, some complete with stables for animals, joining more rudimentary hill forts, as well as royal palaces, temples and other religious structures. Early city planning also took place, with blocks of homes being erected along paved or cobblestone streets and water systems put into place.

Agriculture, art and religion all became more sophisticated, and writing systems and written documentation, including alphabets, began to emerge.

PALEOLITHIC ERA

The Paleolithic Era is the name historians give to the time period between 2.6 million years ago, and approximately 12,000 years ago.

Historians categorize the Paleolithic Era as prehistory because there was as yet no written language to record events, names, dates or places.

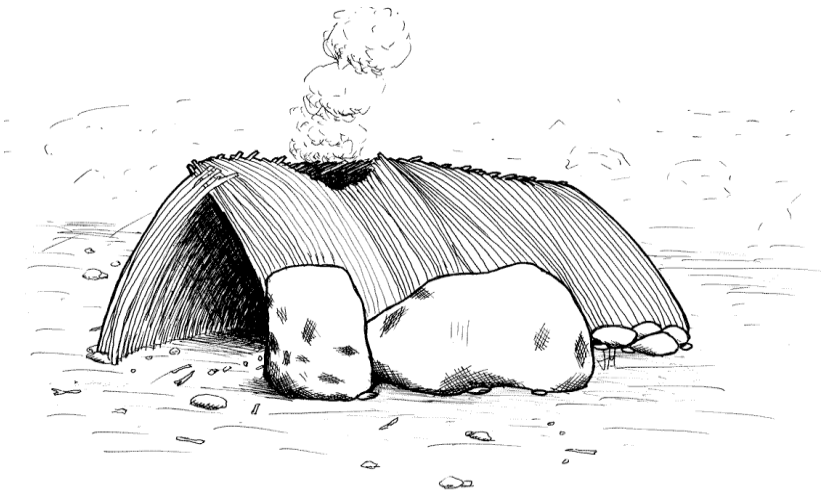
Everything we know today about prehistory, including the Paleolithic age, is as a result of the investigations of paleoanthropologists, archaeologists, physical and cultural anthropologists, zoologists, chemists, botanists, physicists, historians and dedicated amateurs.

It is difficult and under-appreciated work, but it is necessary if our understanding of the past is to advance.

This first primitive era saw few changes in how humans lived. Four great developments did occur which represent some of the most momentous changes in human lifestyles.

These four changes may be summarized:

the idea of a tool, a range of tools, fire, and shelter.



Most early hominids probably lived in the open air, near to sources of food and water.

They chose locations that could be defended against predators and rivals and that were shielded from the worst weather.

Many such locations could be found near rivers, lakes and streams, perhaps with low hilltops nearby that could serve as refuges in troubled times.

These "houses" are more frequently campsites within caves or in the open air, with little in the way of formal structures for living in.

However, as the Paleolithic era progressed, dwellings became more sophisticated, more elaborate, and more house-like.

The oldest examples are shelters within caves, followed by houses of wood, straw and rock; a few examples exist of houses built out of bones.

It seems that there was a gradual changeover to the Neolithic era, with new settlers arriving in and bringing new farming techniques.

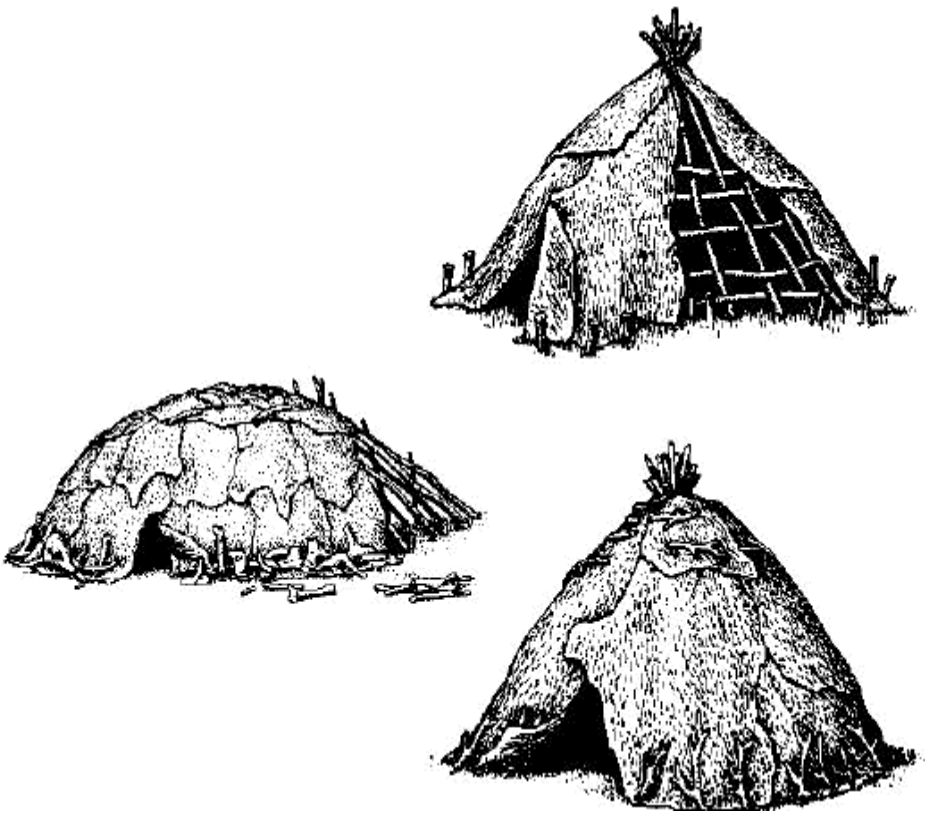
This was the era of more settled peoples who grew their own crops and laid by stores of grains to tide them over the winter.

They still hunted and gathered in berries and nuts but now their diet was supplemented on a regular basis by the produce of their crops, and by the domesticated animals they now kept such as pigs, sheep, cattle and hunting dogs who kept predators at bay and warned of intruders.

The houses built at this time are much more permanent than those of earlier times.

The Neolithic house builders chose the site of their homes very well; they needed to be close to water, good arable land, land for animals to graze on, with building materials such as wood nearby also.

The remains of the house provided enough evidence for archaeologists to extrapolate what the whole house would have looked like.



EVOLUTION OF SHELTER

Structures of the prehistoric period, although interesting for archaeological reasons have little or no architectural value and will only be lightly touched upon.

i) Monoliths, or single upright stones, also known as menhirs, a well-known example 63' high, 14' in dia and weighing 260 tons, being at carnac, Brittany.

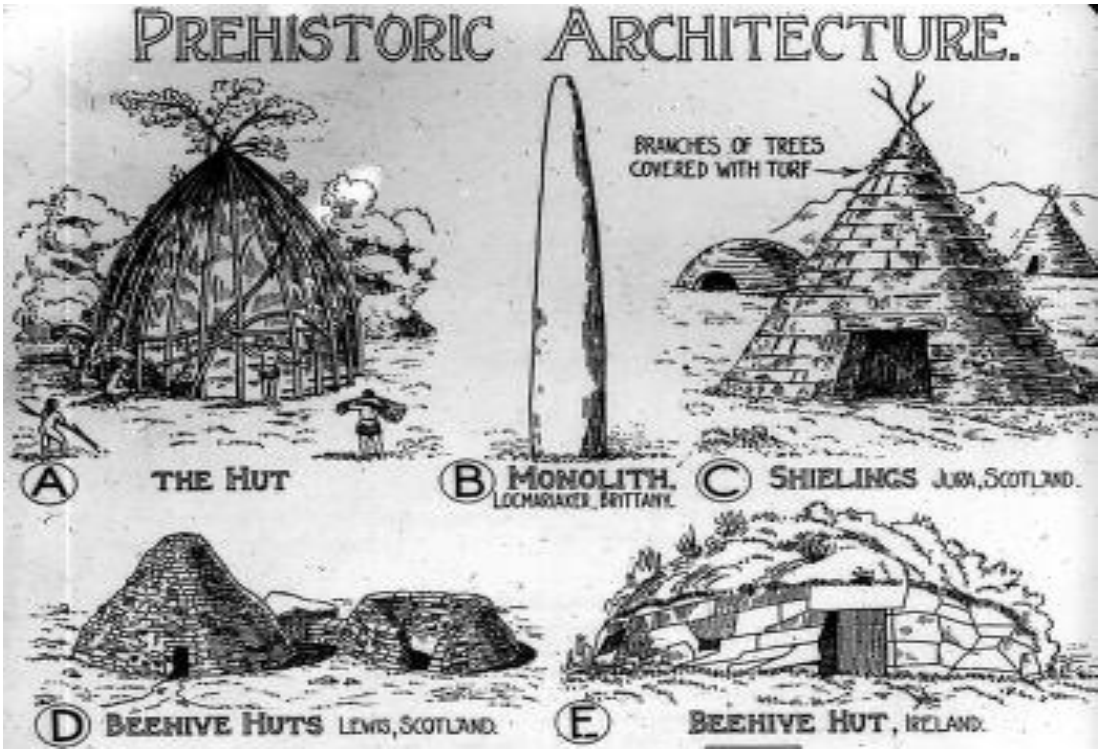
ii) Dolmens (Daul, a table, and maen, a stone), consisting of one large flat stone supported by upright stones. Examples are found in Ireland, Northern France, the channel Islands, Italy and India.

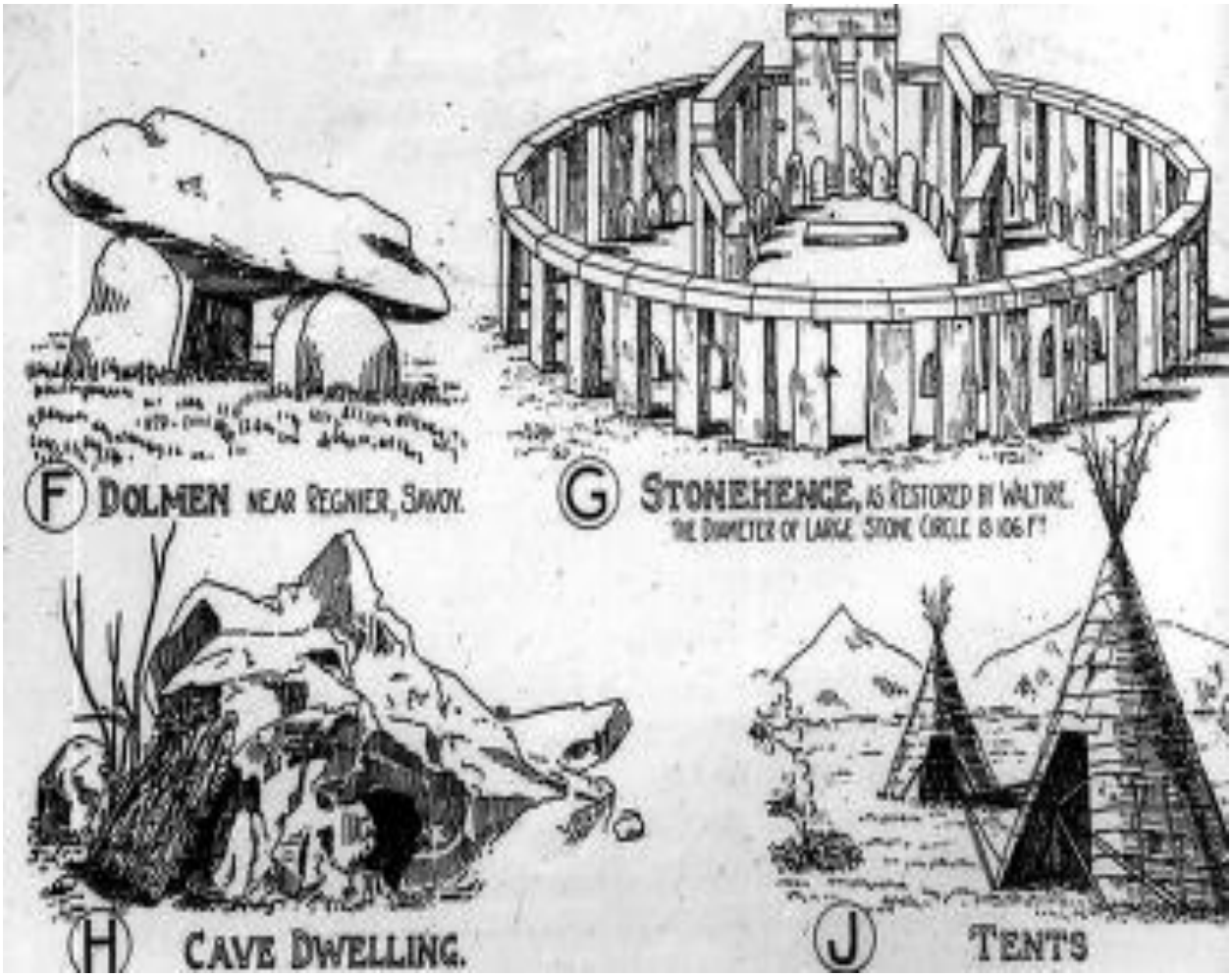
iii) Cromlechs, or circles of stone, as at Stonehenge, Avebury and elsewhere, consisting of a series of upright stones arranged in a circle and supporting horizontal slabs.

iv) Tumuli, or burial mounds, were probably prototypes of the Pyramids of Egypt and the beehive huts found in Wales, Cornwall, Ireland and elsewhere.

v) Lake Dwellings, as discovered in the lakes of Switzerland, Italy and Ireland consisted of wooden huts supported on piles, and were so placed for protection against hostile attacks of all kinds.

PREHISTORIC ARCHITECTURE.





Khirokitia is an archaeological site on the island of Cyprus dating from the Neolithic age.

The settlement of Khirokitia is situated on the slope of a hill in the valley of the Maroni River, towards the southern coast of the island about 6 km from the sea. Subsistence methods practiced by its Neolithic inhabitants included farming crops, herding sheep and goats, and raising pigs. It is a closed village, cut off from the outside world, apart from by the river, by a strong wall of stones 2.5 m thick and 3 m at its highest preserved level. Access into the village was probably via several entry points through the wall. The buildings within this wall consist of round structures huddled close together. The lower parts of these buildings are often of stone and attain massive proportions by constant additions of further skins of stones. Their external diameter varies between 2.3 m and 9.20 m while the internal diameter is only between 1.4 m and 4.80 m. A collapsed flat roof of one building found recently indicates that not all roofs were dome shaped as was originally believed.

The internal divisions of each hut were according to the purpose of its usage. Low walls, platforms designated work, rest or storage areas. They had hearths presumably used for cooking and heating, benches and windows and in many cases there is evidence of piers to support an upper floor. It is believed that the huts were like rooms several of which were grouped around an open courtyard and together formed the home. The population of the village at any one time is thought not to have exceeded 300 to 600 inhabitants. The people were rather short – the men about 5' 3" on average and the women about 4' 11". Infant mortality was very high. On average adult men reached 35 years of age and women 33. The dead were buried in crouched positions just under the floors of the houses. In some instances provision was made for offerings, possibly indicating a form of Ancestor cult within the households. This, the earliest known culture in Cyprus, consisted of a well-organised, developed society mainly engaged in farming, hunting and herding. Farming was mainly of cereal crops. They also picked the fruit of trees growing wild in the surrounding area such as pistachio nuts, figs, olives and prunes. The four main species of animals whose remains were found on the site were deer, sheep, goats and pigs.

The village of Choirokoitia was suddenly abandoned for reasons unknown at around 6000 BC and it seems that the island remained uninhabited for about 1500 years until the next recorded entity, the Sotira group. More recent discoveries, however, including several sites in the vicinity of the ancient acropolis of Amathus on the eastern edge of modern Limassol, have filled this chronological gap considerably, revealing that the island was probably occupied continuously at least from the ninth millennium BC. Early communities were small and widely dispersed, so not every region would have been as heavily exploited as later in prehistory.

Çatalhöyük was a very large Neolithic and Chalcolithic proto-city settlement in southern Anatolia, which existed from approximately 7100 BC to 5700 BC, and flourished around 7000 BC.[2] In July 2012, it was inscribed as a UNESCO World Heritage Site.

Çatalhöyük is located overlooking the Konya Plain, southeast of the present-day city of Konya (ancient Iconium) in Turkey, approximately 140 km (87 mi) from the twin-coned volcano of Mount Hasan. The eastern settlement forms a mound which would have risen about 20 m (66 ft) above the plain at the time of the latest Neolithic occupation. There is also a smaller settlement mound to the west and a Byzantine settlement a few hundred meters to the east. The prehistoric mound settlements were abandoned before the Bronze Age. A channel of the Çarşamba River once flowed between the two mounds, and the settlement was built on alluvial clay which may have been favorable for early agriculture.

Regional Setting – Indus Valley Civilization

The Indus Valley Civilization (IVC) was a Bronze Age civilization (3300–1300 BCE; mature period 2600–1900 BCE) that was located in the northwestern region of the Indian Subcontinent.

Geography - Indus Valley Civilization

The geography of the Indus Valley put the civilizations that arose there in a highly similar situation to those in Egypt and Peru with rich agricultural lands being surrounded by highlands, desert, and ocean.

Recently, Indus sites have been discovered in Pakistan's northwestern Frontier Province as well.

Other IVC colonies can be found in Afghanistan while smaller isolated colonies can be found as far away as Turkmenistan and in Gujarat.

Coastal settlements extended from Sutkagan Dor in Western Baluchistan to Lothal in Gujarat.

An Indus Valley site has been found on the Oxus River at Shortughai in northern Afghanistan,[in the Gomal River valley in northwestern Pakistan,[at Manda on the Beas River near Jammu, India, and at Alamgirpur on the Hindon River, only 28 km from Delhi.

Indus Valley sites have been found most often on rivers, but also on the ancient seacoast, for example, Balakot, and on islands, for example, Dholavira.

Culture – Indus Valley Civilization

The Indus Valley people had an advanced civilization with large cities, running water and sewer systems.

They built large cities with ordered streets and bricks made all the same size.They built walls around their cities which indicated that they might have had to defend themselves against other people. The people of the Indus Valley were mostly peaceful farmers. We do not know a lot about them because we cannot yet read their writing.

Linguists are still trying to decipher the language.

They traded with the people of Mesopotamia and Egypt so perhaps those people knew how to read and speak this language.It covered a larger area than modern Pakistan. The two important cities, **Harappa and Mohenjo-Daro** each held perhaps 35,000 people at their height. Other cities excavated included Kalibangan; on the west coast bordering Pakistan was almost as large as Harappa or Mohenjo-Daro.

Trade & Commerce – Indus Valley Civilization

The people of Indus civilization traded with Sumer and sent merchant ships to the island of Tilmun in the Persian Gulf.

The main items of exports included pottery, inlays, and wood. Sumerian merchants referred to the Indus Valley as Meluhha. They also traded with Mesopotamia and Egypt.

Harrappan civilization was the first to turn cotton into yarn and weaving the yarn into cloth. Cotton was first developed around 2000 B.C.The people used to export surplus grain, pottery vases, ivory combs, pearls, precious woods, and semi-precious stones. Indus Valley farmers grew wheat, barley, field-peas, melons, sesame, and dates.

Economy – Indus Valley Civilization

Economy likely based on agriculture, trade Most probably farmed, herded livestock In cities, many specialized in crafts like pottery, metalwork, jewelry

Indus traded goods with people nearby, distant civilizations Traders from Indus Valley brought goods to locations as distant as Central Asia, Arabian Peninsula, Mesopotamia

Life in Towns and Cities – Indus Valley Civilizations

This civilization was organized around cities and towns that were located at major cross roads and in rich agricultural regions. They appear to have controlled a vast geographical area, some 650, 000 square kilometers

This area is twice as large as that controlled by Mesopotamian or Egyptian cultures at this same time in history. Water came from community wells, smaller wells in courtyards of homes Public drainage systems carried away wastewater Settlements well planned, carefully laid out Streets ran in grid pattern; major avenues twice as wide as minor streets These cities had features which made them unique included brick and had well-planned streets, pottery drainage ditches, large granaries, and a large bath for ritual cleansing.

Town Planning – Indus Valley Civilization

The most characteristic feature of the Harappan Civilization was its urbanization.

The people of the Indus Valley Civilization had achieved some spectacular standards when it came to building their cities.

Each city was carefully planned and at the peak of the civilization housed almost 40,000 people.

The cities show evidence of an advanced sense of planning and organization.

A typical city would be divided into two sections, each fortified separately.

One section, known as the acropolis, was located on an artificially raised mound while the other level was on level ground.

The acropolis contained the important buildings of the city, like the assembly halls, religious structures, granaries and in the case of Mohenjo-Daro the famous Great Bath.

In Mohenjodaro there is also a large building which appears to have been the house of the governor. Another building nearby was either a meeting hall or a market place.

Near the granaries were the furnaces where the metal workers produced a variety of objects in metals such as copper, bronze, lead and tin.

The potters also worked in this part.

The workers lived together in small quarters near the factory.

The lower section of the city was where the housing for the inhabitants was located.

It was here where some truly amazing features have been discovered.

The city was well connected with broad roads about 30 meters long which met at right angles.

The houses were located in the rectangular squares thus formed.

Houses were built with standardized baked bricks (which had a ratio of length to width to thickness at 4:2:1)

and many had spacious courtyards.

Some of the bigger houses even had multiple stories (levels) and paved floors. What is noteworthy is that almost every house had its own wells, drains and bathrooms.

Each house was connected directly to an excellent underground sewer system that ran throughout the city.

The inhabitants of Indus Valley Civilization cities enjoyed to a degree unknown in the ancient world not only sanitary conveniences, but also a highly developed municipal life.

What is absolutely astounding is that these cities existed close to five thousand years ago

Great Bath- Indus Valley Civilization

The city of Mohenjo-Daro possessed an amazing structure known as the Great Bath.

The entire structure is about 179 ft long and 107 ft wide.

The complex has a large quadrangle in the center with galleries and rooms on all sides.

In the center of this quadrangle there is a large swimming enclosure that is 39 feet long, 23 feet wide and 8 feet deep.

The entire complex is connected to an elaborate water supply and sewer system.

The Great Bath was probably used for religious or ritualistic purposes.

The "great bath" is without doubt the earliest public water tank in the ancient world.

The tank itself measures approximately 12 meters north-south and 7 meters wide, with a maximum depth of 2.4 meters.

Two wide staircases lead down into the tank from the north and south and small sockets at the edges of the stairs are thought to have held wooden planks or treads.

At the foot of the stairs is a small ledge with a brick edging that extends the entire width of the pool.

People coming down the stairs could move along this ledge without actually stepping into the pool itself.

The floor of the tank is water tight due to finely fitted bricks laid on edge with gypsum plaster and the side walls were constructed in a similar manner.

To make the tank even more water tight, a thick layer of bitumen (natural tar) was laid along the sides of the tank and presumably also beneath the floor.

Brick colonnades were discovered on the eastern, northern and southern edges.

The preserved columns have stepped edges that may have held wooden screens or window frames.

Two large doors lead into the complex from the south and other access was from the north and east.

A series of rooms are located along the eastern edge of the building and in one room is a well that may have supplied some of the water needed to fill the tank.

Rainwater also may have been collected for this purposes, but no inlet drains have been found

Granaries - Indus Valley Civilization

A special feature of the cities of the Indus Valley Civilization was the large granary that existed.

A general view of the "Great Bath" and adjoining rooms.

In the background is a massive brick structure referred to as the "Granary".

Built on top of a tapered brick platform this building had a solid brick foundation that extended for 50 meters east west and 27 meters north south.

The foundation was divided into 27 square and rectangular blocks by narrow passageways, two running east west and 8 running north south.

Some of these blocks had square sockets for holding wooden beams or pillars and the entire super structure was thought to have been made of timbers.

Now that the entire structure has been excavated it is impossible to determine what types of artifacts were found in the passageways or nearby rooms, but the lack of charred grain or even storage containers, and the absence of sealings from bundles of goods all raise doubts as to the identification of this structure as a granary or a storehouse.

A more appropriate name for this structure would be the "great hall" since it was clearly a large and spacious building with wooden columns and many rooms.

The granary was well ventilated and it was possible to fill grain in from outside. The large size of the granary probably indicates a highly developed agricultural civilization.

ZIGGURAT OF UR-NAMMU (2125 B.C.)

The Ziggurat or holy mountain was erected by the

Mesopotamian King Ur-Nammu, a founder of Third Dynasty of Ur.

This ziggurat was erected to the moon god Nanna, the patron deity of the city of Ur.

It is the most preserved of all ziggurats in Mesopotamia and has been partially reconstructed reaching a height of 11 m.

It stood within a rectangular plan of 60 m x 45 m and 17m high.

The whole mass was solid, with a core of sun dried bricks and outer covering of burnt bricks of 2.5m thick cemented with bitumen.

It was composed of three stages. Access to the ziggurat was through three converging ramps from where a central stairway continued to the second stage. The shape of the staircase to the third stage is unclear.

Large Courtyard around its base and surrounded by shrines, among which one was dedicated to the goddess Ningal, the wife of Nanna.

The temple had inner courtyard surrounded by a no. of rooms – cooking, animal sacrifice, workshops, sotre rooms.

There was also a palace within the courtyard for the King and his family members.

THE CITY OF UR

Ur had three levels.

The richer, like governemnt officials priests and soldiers, were at the top.

The second level was for merchants, teachers, laborers, farmers & craftmakers.

The bottom were for slaves captured in battle.

The entire city was surrounded by a canal– acting as a moat. The streets of Ur were narrow.

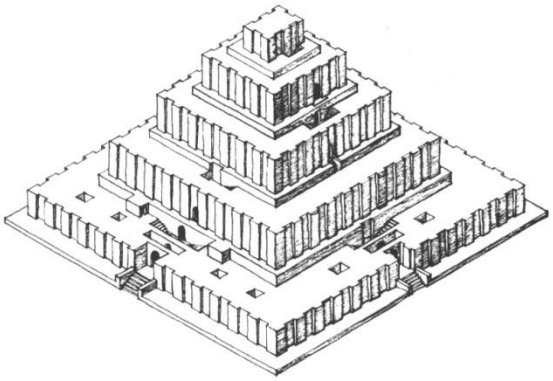
The ziggurats stood like modern skyscrapers over the city. Some ziggurats stood 70 feet tall.

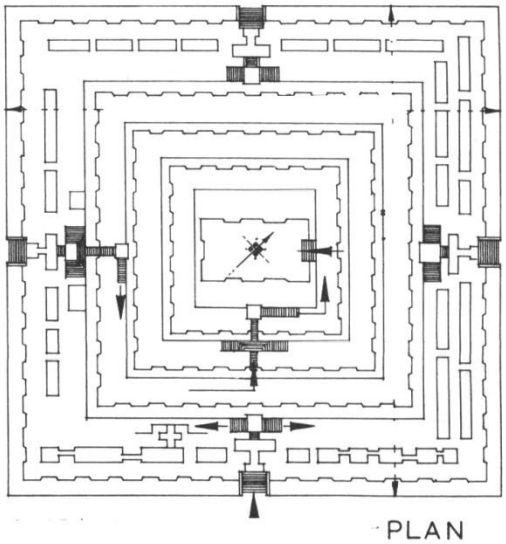
There were big staricases to get up and down. The only level that remains today is the bottom.

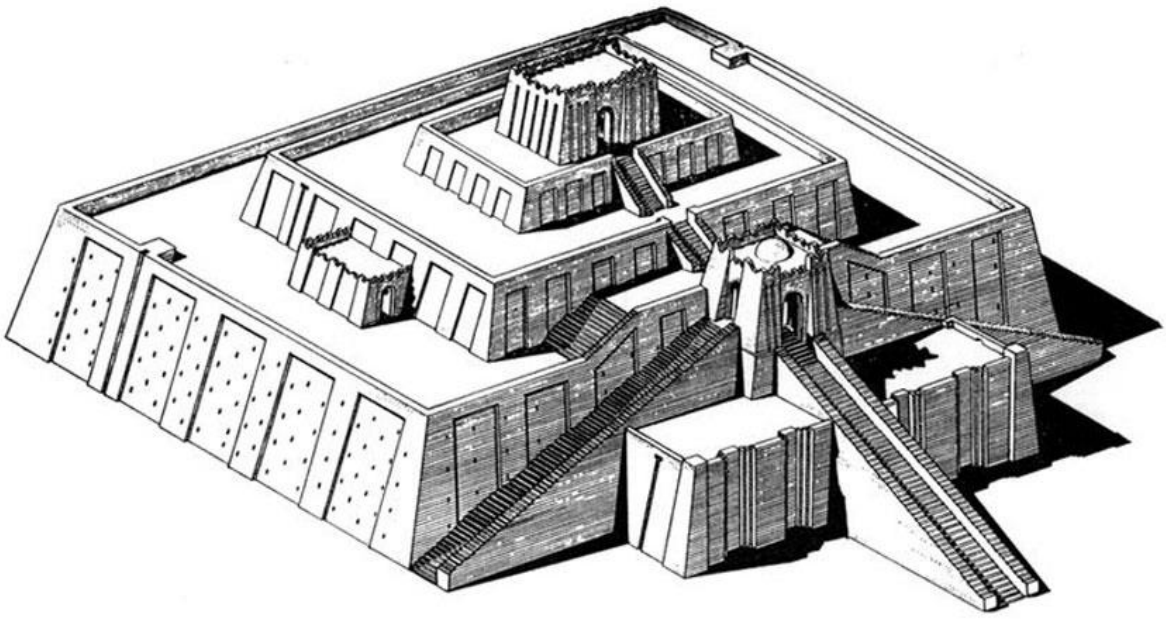
Sumerians had no tools and machinery like us. Brickmakers formed mud bricks there were perfect.

After drying they take them to the site and set them in place with bitumen. Bitumen is a thick sticky black stuff.

River Euphrates which had bought so much glory, prosperity to Ur, suddenly changed its course and started running some 14km east to the city. As a result the canals became dry, lost its shipping trades and ultimately the city lost its value.







THE PALACE OF PERSEPOLIS

Persepolis was used as a showpiece of imperial grandeur of his empire.

It was also executed by Xerxes I(486-465B.C.) and completed in 460B.C. by Arta-XerxesI. The entire building stood on a rectangular plan 460mx275m over a rising terrace of 15m above the ground.

The approach was provided at north-west by magnificent steps 6.7mwide and shallow enough for the horses to ascend.

The gateways were flanked by imposing towers and guarded by man-headed winged bulls.

The gateway on the south opened to the Apadana or Audience hall nearly 76sq.m with 36 slender columns, 20m high 1.5m dia and place at 6m centre to centre.

The stairway of Apadana has bas-relief showing the delegates, nobles, advancing in dignified procession.

The delegates can be easily identified from their national costumes.Next his son Xerxes I added his palace together with women's quarters – Harem on the south end.

The throne room – the famous "Hall of Hundred Columns" situated on the east end, was commenced by Xerxes I and completed by Arta-XerxesI.

The throne room was set up on a high platform with columns 11m high supporting the flat roof.The columns had moulded base, fluted shaft and decorative capitals with continuous vertical scrolls.

The top brackets of the columns were in the form of twin bulls, or dragons the Symbol of power.

Alexander the Great defeated the last king Darius III and put the city including the palace to the torch. Now it stands in ruins state.

Builders in West Asia always had a serious problem - there was not enough stone or wood.

But there was lots and lots of clay. So their buildings were usually built of brick, or mud-brick.

Another thing which made West Asian people build a certain way is the constant arrival of nomadic people into the area: the Persians, the Parthians, the Arabs. All of these people were used to living and entertaining in tents, and they built their houses and palaces kind of like tents, so they would feel at home.

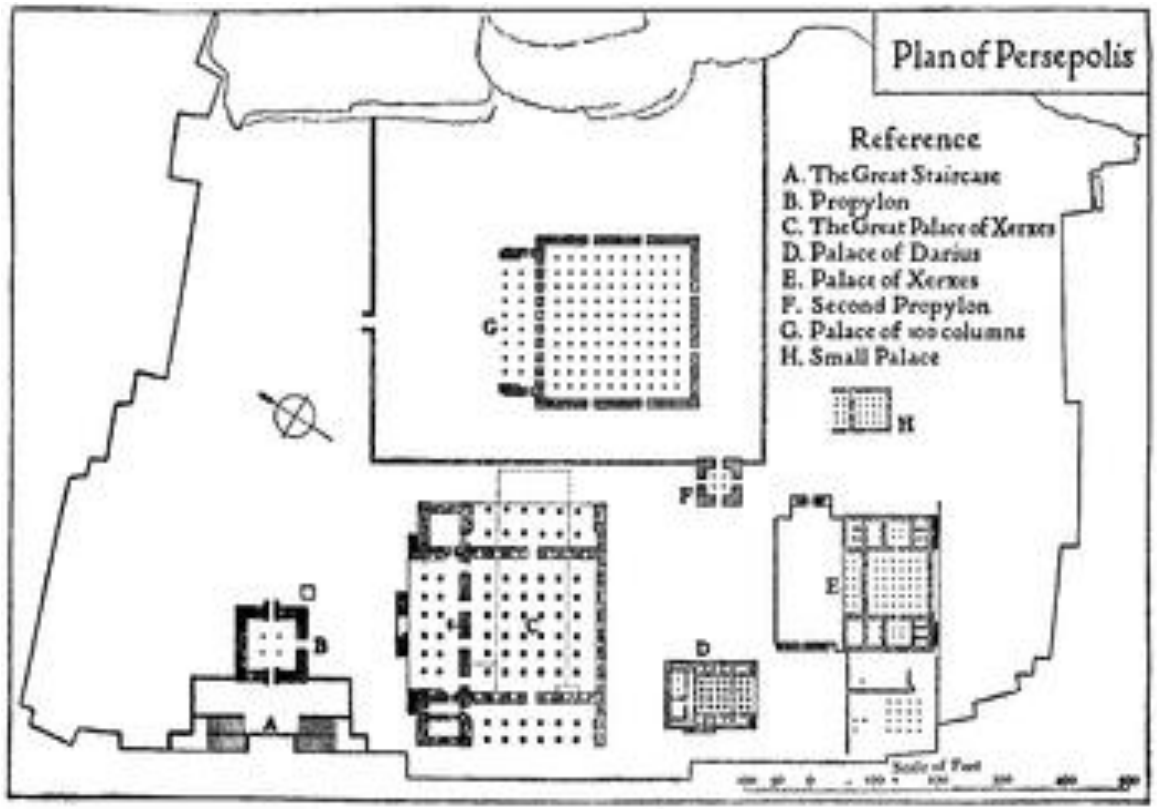
The Assyrians unlike the Babylonians produced Mural decoration. Often the gates of the palaces were flanked by imposing towers and guarded by man-headed winged bulls.

They provided bas reliefs on walls showing scenes of fighting, hunting and ceremonies of states.The chief form of ornmentation was lotus flowers, buds and band of rosettes

The temples, houses and palaces had rectangular plan and were built on high dadoes to protect from heavy floods.

Persian Architecture was columnar Double walls were more common. Doors and Windows were square headed.

They used relief slabs for parapets and surface decoration for the lower portions of the buildings.



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UNIT – II– History of Architecture I -SAR1201

BRONZE AGE

Ancient Egypt, history, religious and funerary beliefs and practices, biomorphism, monumentality, Tomb Architecture: Evolution of the pyramid from Mastaba, Pyramids-Giza, Temple Architecture, Temple of Ammon Ra- Karnak, Temple of Abu Simbel.

RIVER VALLEY CIVILIZATION

civilization started when our evolutionary ancestors grasped the idea that they need not roam to find food; that they could harvest seeds and plant them.

Taken to the next level, our ancestors had to figure out the parameters necessary to successfully plant the seeds.

A place with water, temperate climate, and fertile soil would insure that the seeds would germinate and produce an edible crop.

Rivers that overflow occasionally make the soil very rich.

The water (in the form of a river) was also necessary for travel; so that the hunters/fishermen could find the necessary, essential protein to promote growth and development.

Water also meant that **trade** could be **started between distant colonies**; trading an abundance of rice for an abundance of wheat or nuts or other goods **insured the survival of those inhabiting the "river valleys".**

All the **ancient civilizations** of the world have **flourished near the river beds.**

It was some 5,000 years ago that the southern parts of Asia and the northern parts of Africa saw the first signs of growth worlds 4 most important ancient civilizations.

Indus River, Nile River, Yellow River and Tigris and Euphrates Rivers provided as a perfect place for the development the ancient civilizations i.e. the **Harappa civilization, Nile valley civilization, Mesopotamia civilization and The Xia, the Shang**

These civilizations constitute the next step in the organization and centralization of **Human Economic, Political, Religious, and Social Institutions and Practices.**

Since rivers supplied a continuous if not always dependable flow and supply of water for farming and human consumption.

These rivers along with **climate, vegetation, geography, and topography** shaped the development of the early river valley civilizations.

The rivers also inspired **new technological, economic, institutional, and organizational innovations and developments.**

These civilizations shared certain **characteristics that distinguished them from the collections of Neolithic communities** that preceded them.

Nile River Civilizations

Egypt began along the Nile River in North Africa.

Egypt was bordered on both sides by desert which isolated & protected Egyptians from outsiders.

The Nile River's annual floods were predictable & provided fertile soil for farming.

The Nile flooded so predictably that the Egyptians designed their calendar around it.

Geographical Condition

Egypt's landscape varies from the strip of a fertile land in the valley of the river Nile, then arid region and finally to a vast desert.

In the lower northern part the river meets the mediterranean sea and in eastern part it extends upto Red Sea.

The Nile, the longest, mightiest, life giving river is the conduit of ancient culture and essence of Egypt.

Hence the Egyptian pharaohs founded their cities from time immemorial all along the bank of the Nile both for the living and dead where we generally find massive royal pyramids and priestly temples.

Egypt is therefore really the gift of the Nile.

The availability of the building materials determines the character and style of architecture. Rich clay was abundant from the Nile delta.

Before quarrying was known clay was largely used to manufacture the sun-dried bricks.

To strengthen the clay, it was mixed with palm leaves, reeds etc. Fine lime stone was

quarried from Mokattam Hills, and from Tura near Saqqara for the construction of Pyramids.

Sandstone was plenty at Silsila, with which the ancient Egyptians constructed the finest temples, and sacred sarcophagus or the stone coffin to preserve the dead bodies.

Climatic Condition

There are only two seasons, spring and summer. The climate is warm and bright. Snow and frost are unknown to them.

Due to the bright sunshine, interiors of buildings, temples got sufficient light through doors and roof slits.

So they provided very few windows.

The massive, unbroken walls thus obtained, helped to protect the interiors from the intense heat of the sun.

It also indirectly helped to provide a plain surface for 'hieroglyph' or pictorial representation of historical and religious events.

Except on Nile, storm and rain are very rare so there was no problem of roof drainage and hence flat roofs were most common.

Religious Condition

The mysterious tradition and religious rites are reproduced in their architecture both in the form of tombs, and temples.

Egyptians are worshippers of gods and heavenly bodies like the sun, moon, stars and animals as embodiment of gods.

So Egyptians constructed many temples within great enclosures consisting of a pillared court, hypostyle hall – the dark mysterious chamber and a chapel.

In the early history of Egypt there was no distinction between the gods and the almighty kings known as Pharaohs – the sons of the sun.

Social Condition

Egyptian literature has been preserved on papyrus plant.

It was rather social custom and manner to record the historical events on the temples and social matters on tombs.

The pharaohs employed the prisoners of wars and slaves for agriculture and building construction. The slaves working in stone mines and quarries, toiling on boats and drifting the building materials down the river Nile and placing them in position, have been depicted in pictorial representation on massive unbroken walls of temples and tombs.

CHARACTERISTIC FEATURES

The massive walls imparted simplicity, solidity and grandeur to the structure.

The massive walls were crowned with the characteristic gorge cornice or hollow and roll mouldings.

The gorge might have originally been produced due to the pressure of flat mud roofs on the top of the mud walls.

Egyptian temples based on rectangular plan are but a line of successive buildings, pillared court, hypostyle hall (a mysterious dark chamber) and chapels, their roofs decreasing in heights behind imposing pylons(the entrance gateways).

The pylons recall the Gopurams of Hindu temples.

The flat and massive walls of temples and tombs were eminently suited for incised relief work and explanatory hieroglyphs.

Egyptian temples were fronted by obelisks or monolithic pillars and approached by a row of sphinxes – mythical monsters - the structure with body of a recumbent lion and the head of a man, or woman as the God or Goddess to protect the river Nile and the vast monumental complex.

The temples were usually oriented towards the Nile.

Egyptians possessed great artistic instinct in using natural objects in their building construction.

The Egyptian columns have distinctive character and they exhibit their vegetable origin like the lotus stalk, tied at intervals by bands.

The capital appears like an inverted bell or like a lotus bud, or a papyrus flower.

The columns were usually six times the height and were elaborated with painting and low relief carving.

The circular shaft was curved towards base. The column with the shaft like papyrus plant stem combined with a lotus bud or a flower capital was a sign of union of Upper and Lower Egypt.

In addition to lotus, papyrus and palm, they used grape, rope and feather as their motifs for ornamentation.

They were also advanced in the use of colours and they presented the schemes of decoration, mainly in blue, red and yellow.

The incised relief work on the wall was completed in different stages.

First the surface was chiselled smooth and figures were drawn in red by the artist and corrected in black by the master artist.

The sculptor then deepened the lines or incised the outlines and finally the painter defined the figures with paints.

This pictorial representation thus completed expressed the story of their time in clear terms to the visitors.

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This pictorial representation thus completed expressed the story of their time in clear terms to the visitors.

Mastaba tombs surround the pyramids of the Old Kingdom. Courtiers and families of the monarch were buried in these low rectangular brick or stone structures. Like the pyramids, they were built on the west side of the Nile (symbol of death, where the sun falls into the underworld).

During the Old Kingdom, Egyptians believed that only the souls of kings went on to enjoy life with the gods. The souls of the nobles, on the other hand, continued to inhabit the tomb and needed to be nourished by daily offerings of food and drink. When people died, their ka (the life force or soul of the deceased) was released. To encourage the soul to return to the body, the body was preserved and a statuette in the likeness of the deceased was placed in the tomb. Statuettes called shabti or shawabti, (slaves for the soul) were also placed in the tombs to perform work on behalf of the deceased in the afterlife.

The actual burial chamber was at the base of a deep vertical shaft below a flat roofed stone structure. A false door was carved on the interior tomb wall near the entrance to the shaft. Often an image of the deceased was carved in the false door in order to entice the soul to enter the body. For the comfort and well-being of the deceased, the burial chamber was filled with material goods and food offerings, and the walls were decorated with scenes of daily activities. The mastabas were designed to ensure the well-being of the deceased for all eternity.

Great Pyramid of Giza

The **Great Pyramid of Giza** (also known as the **Pyramid of Khufu** or the **Pyramid of Cheops**) is the oldest and largest of the three pyramids in the Giza pyramid complex bordering present-day Giza in Greater Cairo, Egypt. It is the oldest of the Seven Wonders of the Ancient World, and the only one to remain largely intact.

Built by King Khufu, son of King Snefru, the Pyramid of Khufu (in Greek: Cheops) is known as the Great Pyramid of Giza. It is the oldest and largest of the three tombs in the Giza Necropolis. Approximately 480-feet (146 metres) high, it was the world's tallest man-made structure for nearly four millennia. According to the eminent Egyptologist Sir Flinders Petrie, it was constructed from about 2,400,000 limestone blocks, each weighing 2.5 tons, it took roughly 20 years to build. Most of the rough interior blocks were quarried locally, but the granite for the royal chambers came from quarries at Aswan, some 500 miles away. In addition to roughly 6 million tons of limestone, Khufu's pyramid used up 8,000 tons of granite and about 500,000 tons of mortar.

The original entrance to the Great Pyramid is on the north, 17 metres (56 ft) vertically above ground level and 7.29 metres (23.9 ft) east of the center line of the pyramid. From this original entrance, there is a Descending Passage 0.96 metres (3.1 ft) high and 1.04 metres (3.4 ft) wide, which goes down at an angle of 26° 31'23" through the masonry of the pyramid and then into the bedrock beneath it. After 105.23 metres (345.2 ft), the passage becomes level and continues for an additional 8.84 metres (29.0 ft) to the lower Chamber, which appears not to have been finished. There is a continuation of the horizontal passage in the south wall of the lower chamber; there is also a pit dug in the floor of the chamber. Some Egyptologists suggest that this Lower Chamber was intended to be the original burial chamber, but Pharaoh Khufu later changed his mind and wanted it to be higher up in the pyramid.

Queen's Chamber

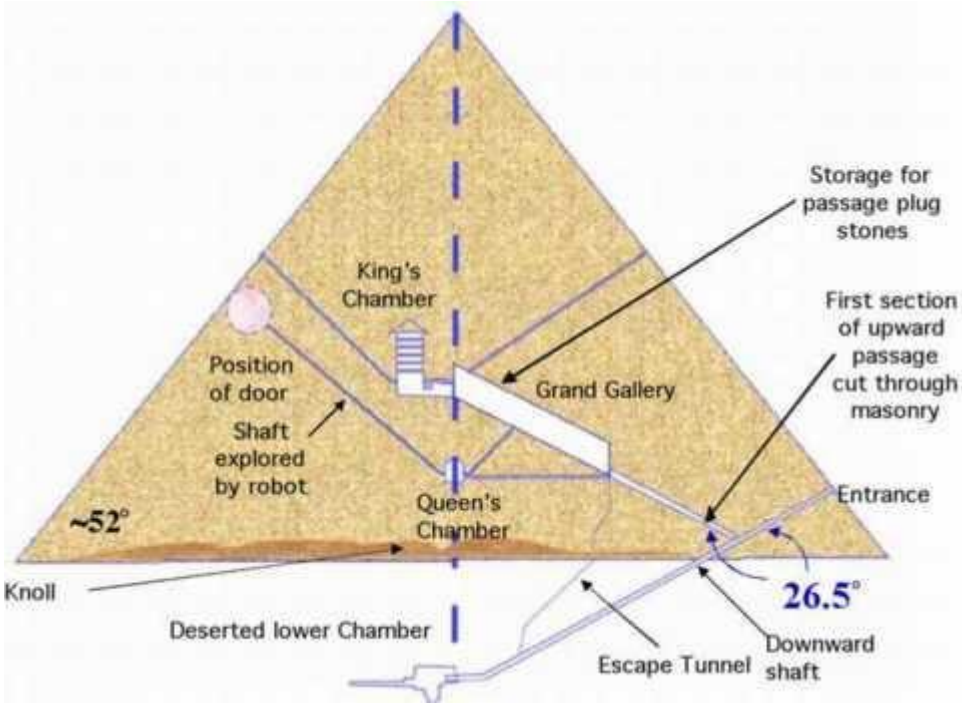
The "Queen's Chamber" is exactly halfway between the north and south faces of the pyramid and measures 5.75 metres (18.9 ft) north to south, 5.23 metres (17.2 ft) east to west, and has a pointed roof with an apex 6.23 metres (20.4 ft) above the floor. At the eastern end of the chamber there is a niche 4.67 metres (15.3 ft) high. The original depth of the niche was 1.04 metres (3.4 ft), but has since been deepened by treasure hunters

Grand Gallery

The Grand Gallery continues the slope of the Ascending Passage towards the King's Chamber, extending from the 23rd to the 48th course, a rise of 21 metres (69 ft). It has been praised as a "truly spectacular example of stonemasonry". It is 8.6 metres (28 ft) high and 46.68 metres (153.1 ft) long. The base is 2.06 metres (6.8 ft) wide, but after two courses (at a height of 2.29 metres (7.5 ft)) the blocks of stone in the walls are corbelled inwards by 7.6 centimetres (3.0 in) on each side.There are seven of these steps, so, at the top, the Grand Gallery is only 1.04 metres (3.4 ft) wide. It is roofed by slabs of stone laid at a slightly steeper angle than the floor of the gallery, so that each stone fits into a slot cut in the top of the gallery like the teeth of a ratchet. The purpose was to have each block supported by the wall of the Gallery, rather than resting on the block beneath it, in order to prevent cumulative pressure.

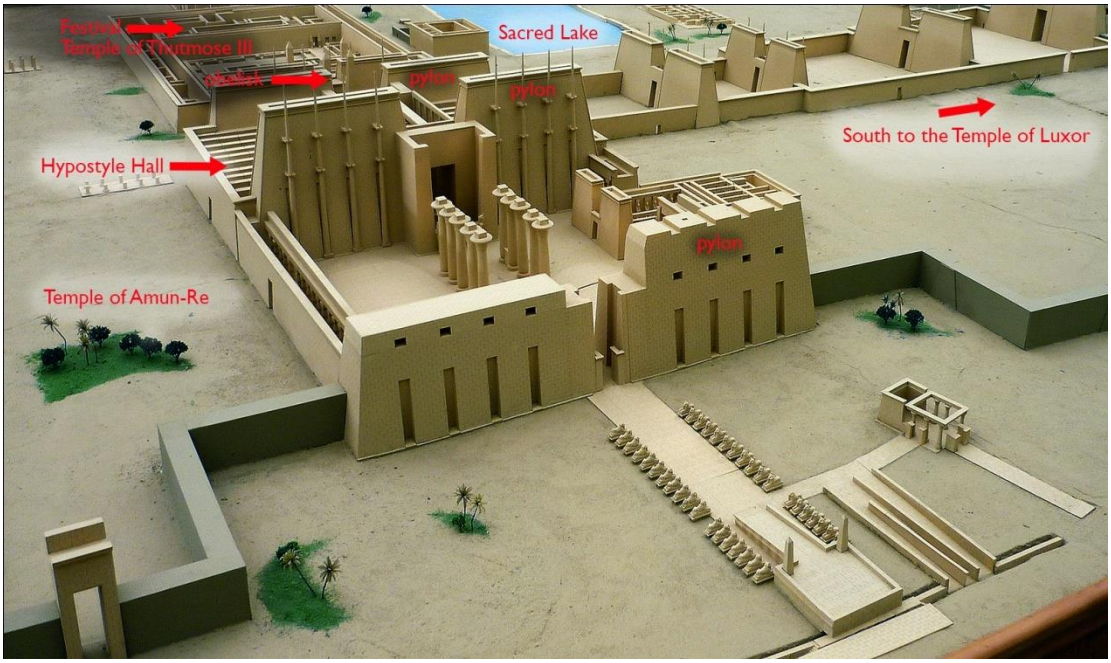
King's Chamber

The "King's Chamber" is faced entirely with granite and measures 20 Egyptian Royal cubits or 10.47 metres (34.4 ft) from east to west and 10 cubits or 5.234 metres (17.17 ft) north to south. It has a flat roof 11 cubits and 5 digits or 5.852 metres (19.20 ft) above the floor formed of nine slabs of stone weighing in total about 400 tons. 0.91 m (3.0 ft) above the floor there are two narrow shafts in the north and south walls (one is now filled by an extractor fan in an attempt to circulate air inside the pyramid). The purpose of these shafts is not clear: they appear to be aligned towards stars or areas of the northern and southern skies, yet one of them follows a dog-leg course through the masonry, indicating no intention to directly sight stars through them. They were long believed by Egyptologists to be "air shafts" for ventilation, but this idea has now been widely abandoned in favour of the shafts serving a ritualistic purpose associated with the ascension of the king's spirit to the heavens.



Temple of Amun-Re and the Hypostyle Hall, Karnak

The massive temple complex of Karnak was the principal religious center of the god Amun-Re in Thebes during the New Kingdom (which lasted from 1550 until 1070 B.C.E.). The complex remains one of the largest religious complexes in the world. However, Karnak was not just one temple dedicated to one god—it held not only the main precinct to the god Amun-Re—but also the precincts of the gods Mut and Montu.



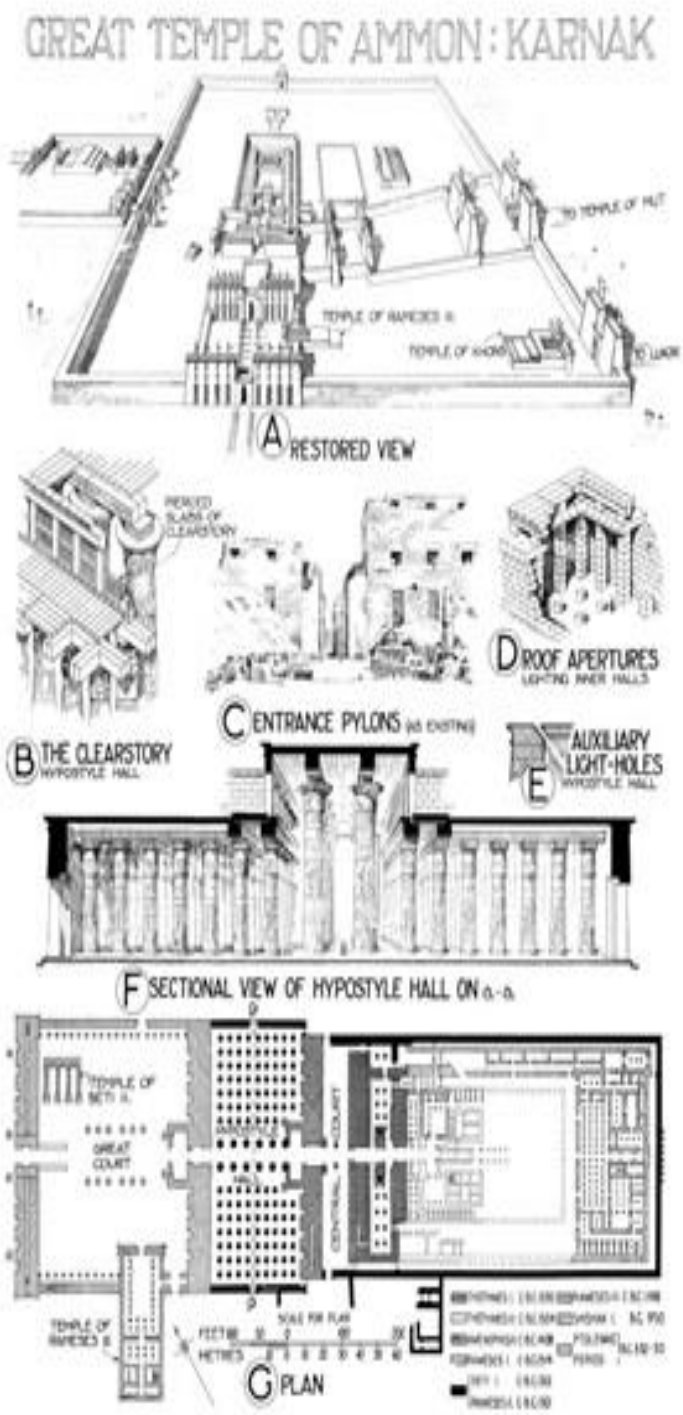
Hypostyle Hall

One of the greatest architectural marvels of Karnak is the hypostyle hall built during the Ramesside period (a hypostyle hall is a space with a roof supported by columns). The hall has 134 massive sandstone columns with the center twelve columns standing at 69 feet. Like most of the temple decoration, the hall would have been brightly painted and some of this paint still exists on the upper portions of the columns and ceiling today. With the center of the hall taller than the spaces on either side, the Egyptians allowed for clerestory lighting (a section of wall that allowed light and air into the otherwise dark space below). In fact, the earliest evidence for clerestory lighting comes from Egypt.

Temple as cosmos

Conceptually, temples in Egypt were connected to the idea of *zep tepi*, or “the first time,” the beginnings of the creation of the world. The temple was a reflection of this time, when the mound of creation emerged from the primeval waters. The pylons, or gateways in the temple represent the horizon, and as one moves further into the temple, the floor rises until it reaches the sanctuary of the god, giving the impression of a rising mound, like that during creation. The temple roof

represented the sky and was often decorated with stars and birds. The columns were designed with lotus, papyrus, and palm plants in order to reflect the marsh-like environment of creation.



Abu Simbel temples

The **Abu Simbel temples** are two massive rock-cut temples at Abu Simbel, a village in Aswan Governorate, Upper Egypt, near the border with Sudan. They are situated on the western bank of Lake Nasser, about 230 km (140 mi) southwest of Aswan (about 300 km (190 mi) by road). The complex is part of the UNESCO World Heritage Site known as the "Nubian Monuments",[1] which run from Abu Simbel downriver to Philae (near Aswan). The twin temples were originally carved out of the mountainside in the 13th century BC, during the 19th Dynasty reign of the Pharaoh Ramesses II. They serve as a lasting monument to the king and his queen Nefertari, and commemorate his victory at the Battle of Kadesh. Their huge external rock relief figures have become iconic.

Entrance

The single entrance is flanked by four colossal, 20 m (66 ft) statues, each representing Ramesses II seated on a throne and wearing the double crown of Upper and Lower Egypt. The statue to the immediate left of the entrance was damaged in an earthquake, causing the head and torso to fall away; these fallen pieces were not restored to the statue during the relocation but placed at the statue's feet in the positions originally found. Next to Ramesses's legs are a number of other, smaller statues, none higher than the knees of the pharaoh, depicting: his chief wife, Nefertari Meritmut; his queen mother Mut-Tuy; his first two sons, Amun-her-khepeshef and Ramesses B; and his first six daughters: Bintanath,
Baketmut, Nefertari, Meritamen, Nebettawy and Isetnofret.[9]

The façade behind the colossi is 33 m (108 ft) high and 38 m (125 ft) wide. It carries a frieze depicting twenty-two baboons worshipping the rising sun with upraised arms and a stele recording the marriage of Ramesses to a daughter of king Ḫattušili III, which sealed the peace between Egypt and the Hittites.

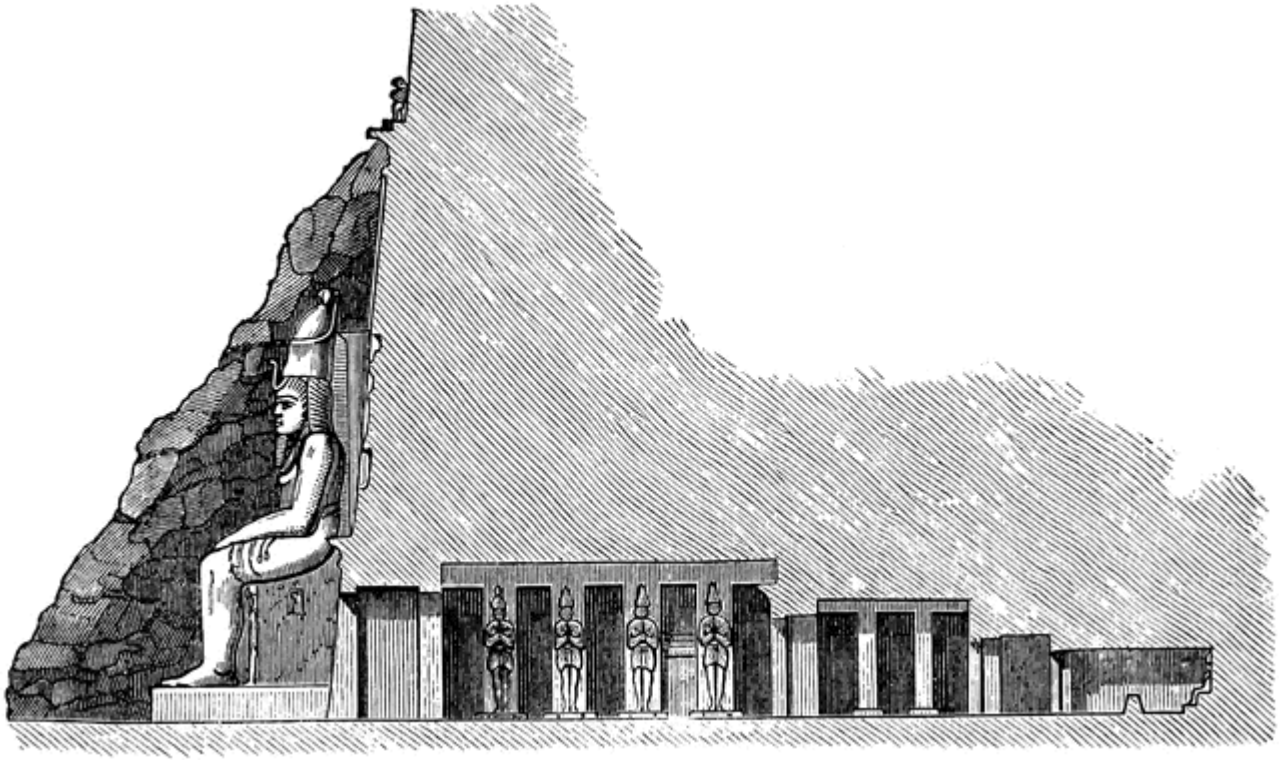
The entrance doorway itself is surmounted by bas-relief images of the king worshipping the falcon-headed Ra Horakhty, whose statue stands in a large niche.[9] Ra holds the hieroglyph user and a feather in his right hand, with Maat (the goddess of truth and justice) in his left; this is a cryptogram for Ramesses II's throne name, User-Maat-Re.

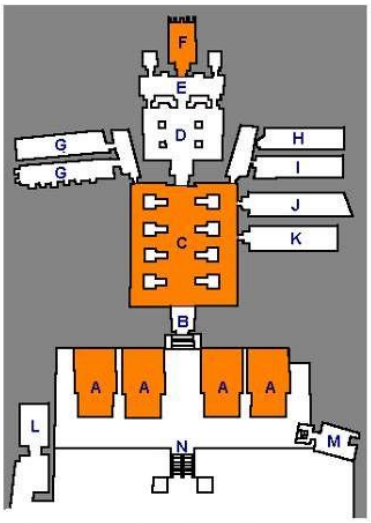
Interior

The inner part of the temple has the same triangular layout that most ancient Egyptian temples follow, with rooms decreasing in size from the entrance to the sanctuary. The temple is complex in structure and quite unusual because of its many side chambers. The hypostyle hall (sometimes also called a pronaos) is 18 m (59 ft) long and 16.7 m (55 ft) wide and is supported by eight huge Osirid pillars depicting the deified Ramesses linked to the god Osiris, the god of fertility, agriculture, the afterlife, the dead, resurrection, life and vegetation, to indicate the everlasting nature of the pharaoh. The colossal statues along the left-hand wall bear the white crown of Upper Egypt, while those on the opposite side are wearing the double crown of Upper and Lower Egypt (pschent). The bas-reliefs on the walls of the pronaos depict battle scenes in the military campaigns that Ramesses waged. Much of the sculpture is given to the Battle of Kadesh, on the Orontes river in present-day Syria, in which the Egyptian king fought against the Hittites. The most famous relief shows the king on his chariot shooting arrows against his fleeing enemies, who are being taken prisoner. Other scenes show Egyptian victories in Libya and Nubia.

From the hypostyle hall, one enters the second pillared hall, which has four pillars decorated with beautiful scenes of offerings to the gods. There are depictions of Ramesses and Nefertari with the

sacred boats of Amun and Ra-Horakhty. This hall gives access to a transverse vestibule, in the middle of which is the entrance to the sanctuary. Here, on a black wall, are rock cut sculptures of four seated figures: Ra-Horakhty, the deified king Ramesses, and the gods Amun Ra and Ptah. Ra-Horakhty, Amun Ra and Ptah were the main divinities in that period and their cult centers were at Heliopolis, Thebes and Memphis respectively.





A Four gigantic statues of the seated king Ramses II, which form the impressive facade of the temple
B Entrance
C Large rock cut hall with eight massive pillars
D Second hall with four square pillars, decorated with religious and offering scenes
E Vestibule (probably for offerings)
F Sanctuary with 4 statues of the gods Ptah, Amun-Ra, the deified Ramses II, and Re-Horakhte
G-K Storerooms (probably), with images of the king offering to various gods
L-M Chapels
N Stareway to the temple plateau

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SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT – III– History of Architecture I -SAR1201

EARLY IRON AGE

Aryan civilization, Evolution of City States, Greece: The Geometric period, Emergence of Greek Temple, Shape grammar, Theater Epidaurus, orders, optical illusion, Examples: Parthenon, Erecthion, Evolution of Republic states, The founding of Rome, Pompei.

Aryan civilization

The 'Aegean' civilization which had started in about 3000B.C. suffered due to northern invaders and further by incursions of northern Greeks and in about 1100 B.C., it was entirely destroyed by the Dorian Greeks. The 'Aegeans' migrated and settled on the coasts of Asia Minor but latter built new cities there.

Mean while Dorians spread to Italy and Sicily in 7th century B.C.

The territory they occupied was collectively known as "Magna-Graecia".

Thus 'Hellenic' Greece was born with a humble start and made very rapid development with new civilisation.

And by 600 B.C. the Greeks Founded most of their colonies.

Most of the temples and world famous buildings were built during this period on the high ground at Acropolis (upper city) in Athens.

The nation had its wonderful growth and prosperity, under pericles (444 – 429 B.C.).Supremacy passed to Sparta n 404 B.C.Sparta's rule, next came Philip (359 – 335 B.C.), the able king of Macedonia, under whose rule, the Athenian prosperity was at its hightest peak.

His son 'Alexander the Great' (336-323 B.C.) rose to a high position. In334 B.C. Alexander set out on his world conquering expedition and within a span of 6 years he conquered Egyptian and Persian Empire.

DARK AGES

Maybe a lot of people died, because there don't seem to have been very many people living in Greece at this time and the people who were still there were poor,

It even seems that there were no more potters or shoemakers or other craftsmen, and people mostly had to make their own pots and other things.

Because Greece was in such bad shape during the Dark Ages, and could not defend herself, it also seems that some of their neighbors to the north invaded Greece and began living in some of the Greek cities.

The Greeks called these invaders the Dorians (DOOR-ee-anns), and called the old Mycenaean, Bronze Age Greeks the Ionians (i-OWN-ee-anns).

By about 900 BC, the Dark ages were ending, and the Greeks began trading with West Asia and Egypt

People began to form city-states and experiment with different kinds of governments for them: oligarchies and tyrannies. This is the Archaic Period; it ends about 500 BC when the Athenians try a new experiment in government: the world's first democracy.

OPTICAL REFINEMENT

To loosen up the mathematical strictness and to counteract distortions of human visual perception, a slight curvature of the whole building, hardly visible with the naked eye, was introduced.

The ancient architects had realised that long horizontal lines tend to make the optical impression of sagging towards their centre.

To prevent this effect, the horizontal lines of stylobate and/or entablature were raised by a few centimetres towards the middle of a building.

This avoidance of mathematically straight lines also included the columns, which did not taper in a linear fashion, but were refined by a pronounced "swelling" (entasis) of the shaft.

Additionally, columns were placed with a slight inclination towards the centre of the building.

Curvature and entasis occur from the mid 6th century BC onwards.

TERMINOLOGIES

PEDIMENT : The pediment is the triangular place under the roof of a Greek temple. Each temple has two one on the front and one at the rear. At first pediments were probably plain but soon the Greeks began to decorate pediments with stone sculpture.

TRIGLYPH & METOPES: Most Greek temples have a pattern under the pediment known as Triglyph and Metopes. The Triglyphs alternate with the Metopes across the front of the temple. Inbetween the Triglyphs are the Metopes.

TYMPANUM: Triangular surface between the cornice and the pediment’s two sloping cornices.

ACROTERION: Ornamental feature that rests on a base at the apex and corners of the pediment

ENTABLATURE: The Entablature is that part of a structure which is immediately above the column.

In classical architecture, the top of an Order, horizontally divided into cornice, frieze, and architrave, supported by a colonnade. Essentially the beam which spans between columns.

CORNICE: In Classic Architecture the top, projecting, horizontal division of the entablature. Also used to describe any projecting moulding at a wallhead, to denote an attic storey, and above windows, doors etc.

FRIEZE: A large piece of stone that has a picture carved on it. In classical architecture, the frieze is located on the entablature, which is between the architrave and cornice.

ARCHITRAVE: An Architrave is a horizontal beam that lies across the top of two vertical columns. The architrave is a lintel that forms the lower part of the entablature

CAPITAL: The upper portion of a column or pilaster upon which the entablature rests. In classical architecture capitals are one of the most distinctive elements defining the different orders.

ABACUS: The abacus is a square slab that sits on top of the column's capital and supports the architrave or arch. The function of an abacus is to broaden the support provided by the column.

ECHINUS: Decorative moulding. Used on columns in classical architecture, the echinus sits below the abacus and above the necking

ANNULETS: A moulding in the form of a ring, as at the top of a column adjoining the capital

NECKING: A molding between the upper part of a column and the projecting part of the capital.

ENTASIS: Entasis is the application of a convex curve to a surface for aesthetic purposes.

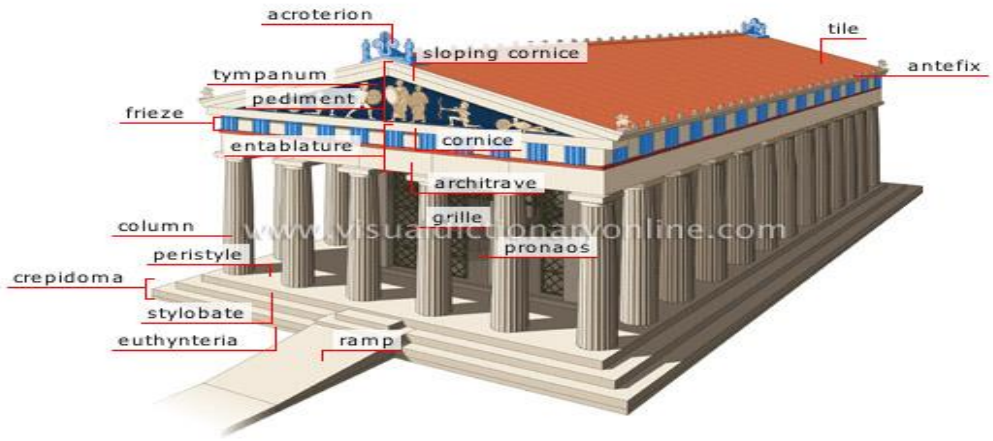
ARRISES: The sharp edge or salient angle formed by the meeting of two surfaces especially in moldings

FLUTES:

CREPIDOMA: Base upon which the building rests; it is composed of several levels

STEREOBATE: The foundation of a stone building, its top course sometimes being a stylobate

STYLOBATE: Upper section of the crepidoma; it supports the columns



MEANING OF ORDER

An Order in Classic Architecture consists of upright column or support and the horizontal entablature or part supported.

Entablature consists of

architrave, the lower part,

Frieze the middle part and

Cornice the upper most part

The column consists of

Base, the bottom part,

Shaft, the middle part and

Capital the top part

The Greek classic order is distinguished from other in the sense that the different forms are brought to a definite set of rules. The orders we study are based on the measurement of the existed classic Orders.

THE GREEK DORIC ORDER

The word Doric comes from Dorians, the people of ancient Greece.

It was constructed in B.C. 438 on the high ground of acropolis by the architects Ictinus and Callicrates.

In their original Greek version, Doric columns stood directly on the flat pavement (the *stylobate*) of a temple without a base;

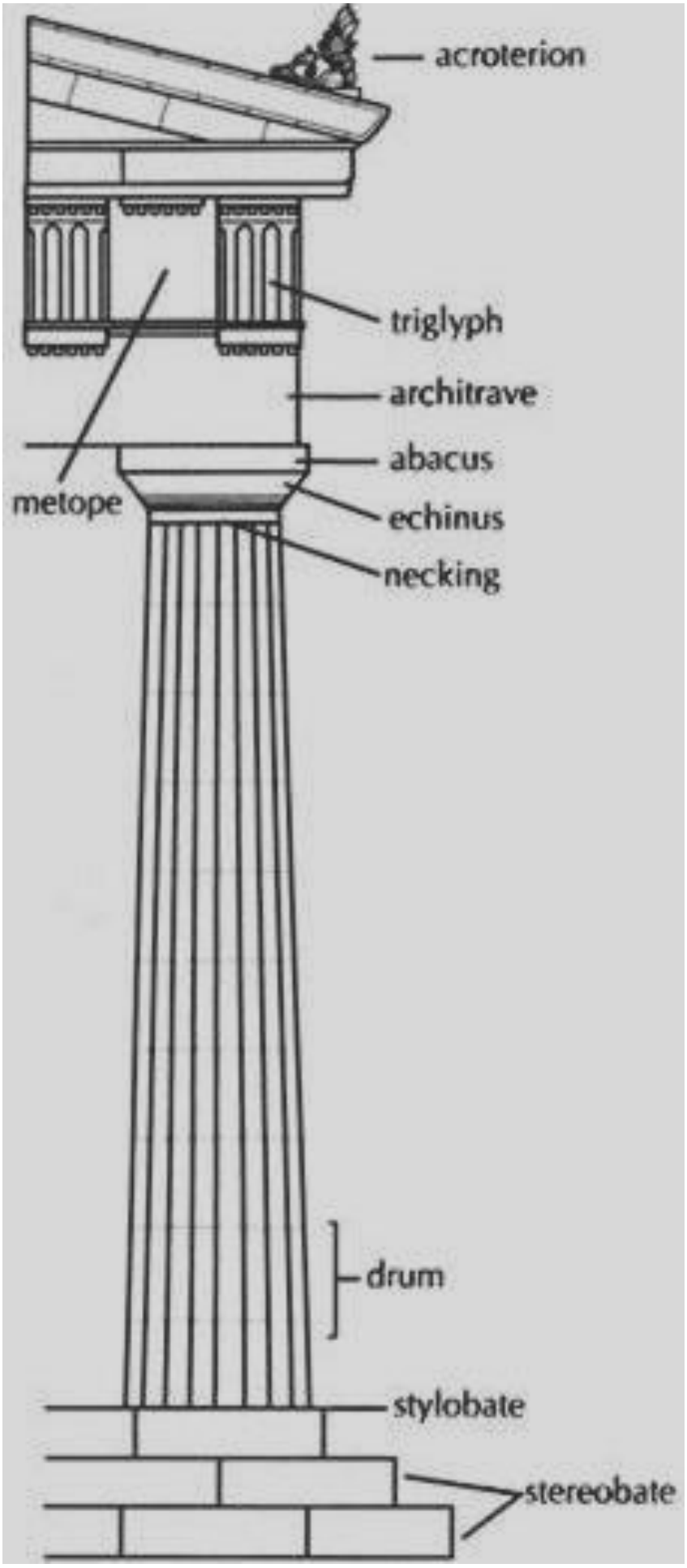
Their vertical shafts were fluted with 20 parallel concave grooves;

They were topped by a smooth capital that flared from the column to meet a square abacus at the intersection with the horizontal beam (entablature) that they carried

Doric columns are the heaviest in appearance

The capital is plain.

The shaft is thick – though it loses some of its mass over time.


acroterion
triglyph
architrave
abacus
metope
echinus
necking
drum
stylobate
stereobate

COLUMN:

The column height is six to seven times its lower diameter ‘D’.

The column stands directly on platform of three steps called crepidoma.

The bottom and middle part is plinth called stereobate.

The top one, the stylobate, each part being ‘1/4D’ in height.

The shaft has a slightly convex profile called ‘Entasis’ to counteract the hollow appearance which results from straight sided column.

The shaft is circular and gradually tapers to 3/4 to 2/3 at top.

The shaft in length is divided into 20 flutes I.e. elliptical channels or grooves, separated by sharp projections or ‘arrises’.

The ‘intercolumniation’ or centre to centre distance between two adjacent columns measured at the lower diameter of their shafts is 2D.

The shaft ends in one to three splayed grooves known as hypo-trachelion’ which produces a pleasing band of shading, and strip above it is known as ‘Trachelion or Necking’.

COLUMN:

The distinctive capital which is semi diameter high consists of ‘Abacus’ and ‘Echinus’.

The abacus which is a square block, often unmoulded, forms the upper member of the capital.

The ‘Echinus” has a varying outline such as parabolic curve or ovolo of subtle profile.

Below that, there are horizontal fillets three to five in numbers called the ‘Annulets’ which break the vertical lines of the arrises and flutes of shaft

. **ENTABLATURE:**

The entablature which is two diameter high, consists of three parts, namely ‘Architrave’, ‘Frieze’ and ‘Cornice’.

(a) **Architrave :**

It is lintel proper which is plain and 3/4D in height.

It has flat moulding at top called the ‘Taenia’ and below it is a ‘regula’ a short band with 6 ‘Guttae’ i.e. small cone-like blocks occuring under each triglyph.

The architrave projects slightly beyond the face of the column.

ENTABLATURE:

(b) Frieze :

The Frieze which is 3/4D high contains ‘Triglyph’ and ‘Metope’.

The triglyph is formed by two upright v-shapes channels with similar half channels on both ends which are rounded at top.

The width of the triglyph is usually one module.

The triglyphs are placed immediately over the columns and at centres of the bays.

But at the corners of the buildings the two triglyphs meet with a bevelled edge and their centres do not coincide with that of the corner columns.

The triglyphs are so arranged that the spaces between them are nearly squares.

These squares are called ‘Metopes’ which unlike the triglyphs are set back from the face of architrave as they generally contain sculptures of hunting, fighting etc.

ENTABLATURE:

(c) Cornice :

It is the crowning part. It is semi diameter high

The cornice projects beyond the frieze by one module.

The soffit or the underside of the cornice is made inclined in the direction of the sloping roof and has flat Blocks called ‘Mutules’ which form the eaves.

THE GREEK IONIC ORDER

This order is named after the Ionians of ancient Greece.

The order is taken from the temple of ‘Erechtheion’ built in 409 B.C.

It is situated to the north of the parthenon and constructed by the architect Mnesicles at the time of Pericles.

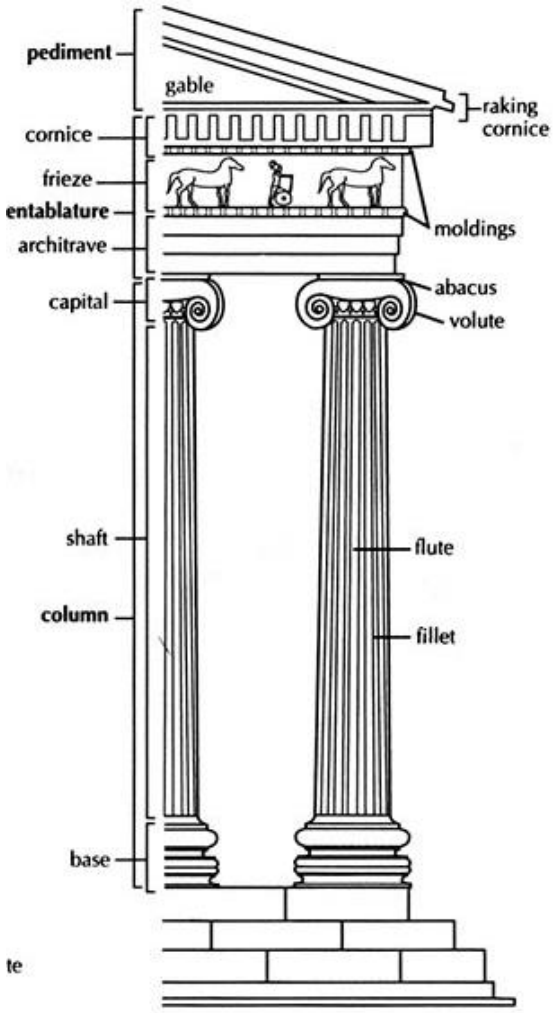
COLUMN:

The Ionic columns has a base.

The column stands on platform of three steps called crepidoma.

The column height including base, shaft, and capital is usually nine times the lower diameter.

The moulded base which is semi-diameter in height consists of upper and lower ‘torus’ seperated by ‘scotia’ and ‘fillets’.



COLUMN:

The circular shaft has 24 flutes separated by fillets and not by arrises as in Doric Order.

The shaft diminishes to 5/6 the diameter at its top.

The inter columniation is 4D.

The Ionic order is specially remarkable for its ‘Volute’ or scroll capital of decorative motif derived from lotus or nautilus shell.

The capital which is 3/4 to 2/3 diameter high has a pair of volutes both on the front and back of the column and connected at sides by the concave cushion either or ornamented with flutes, fillets and beads.

The volutes are placed parallel to the entablature.

The outline of the volutes are obtained either by geometrical construction or by smooth free-hand.

ENTABLATURE:

The Ionic entablature varies in height but is usually two diameter high, consists of three parts, namely ‘Architrave’, ‘Frieze’ and ‘Cornice’.

Architrave :

(a) It is 3/4 diameter high.
(b) It consists of triple fasciae i.e. three beams projecting one above the other.
(c) The top cyma reversa contains ‘leaf and dart’ ornament.

Frieze :

It is either plain or ornamented by a continuous band of sculptures

It is 3/4 diameter high.

Cornice :

It has similar treatment like Doric Order.

It is semi diameter high. There is usually no antifixae on the flanks

It is elaborately enriched by lotus and papyrus Ornament.

It is also carried along the side cornices and rain water spouts in the shape of lion’s heads are provided at regular intervals to drain out the rain water from the roof.

THE **GREEK CORINTHIAN ORDER**

The Order is taken from the ‘Choragic Monuments of Lysicrates’.

It is constructed in 335 B.C. at Athens to celebrate the victory in a Choragic contest.

The column stands on a square base and is cylindrical which supported elaborately sculptured entablature.

COLUMN:

The Corinthian columns has a base.

The column stands on platform of three steps called crepidoma.

The column height including base, shaft, and capital is about ten times its lower diameter

The moulded base which is semi-diameter high like Ionian Order with its upper and lower torus separated by Scotia and fillets.

The lower torus is 11/3 times the diameter of the shaft.

The shaft is circular and tapered to 5/6 the diameter at top.

It has 24 flutes separated by fillets which are nearly one fourth of the width of the flutes.

The Intercolumniation is 3D

COLUMN:

The corinthian order has distinctive capital which is much deeper than Ionic being about 11/3 D high.

Its origin is uncertain but it might have been evolved from the Egyptian bell shaped capital.

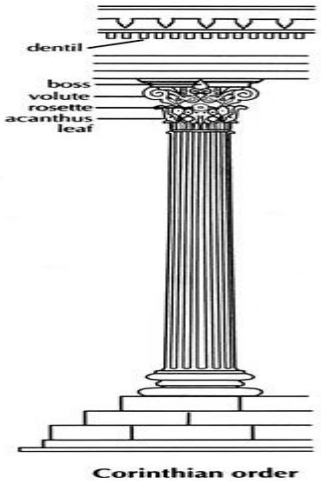
Usual type of capital has a deep inverted bell shape, the lower part of which contains two rows of eight acanthus leaves resting on lotus or water leaves and in the upper part rise eight ‘caulicoli’ in between the leaves of the upper row.

Each face of the abacus containing a rosette in the centre is cut at an angle and it fully covers the bell of the capital.

ENTABLATURE:

The corinthian entablature which is usually 21/4 D high bears a close resemblance to the Ionic Order. It contains the following

(a) **Architrave:** It is 3/4 diameter high and is divided in three fasciae i.e. three slabs raised one above the other with slight projections.
(b) **Frieze:** It is also 3/4 diameter high and ornamented by a continous band of sculptures.
(c) **Cornice:** It is lighter than other types. It is also 3/4 diameter hign and contains dentils below the corona. At top ‘Antefixal ornament is provided



Corinthian order

TEMPLES

The basic principles for the development of Greek temple architecture have their roots between the 10^{th} century B.C. and the 7^{th} century B.C.

In its simplest form as a 'Naos', the temple was a simple rectangular shrine with protruding side walls 'antae' forming a small porch.

Until the 8th century BC, there were more or less semi-circular back walls, but the rectangular type prevailed.

By adding columns to this small basic structure, the Greeks triggered the development and variety of their temple architecture.

technical term	number of columns at front
distyle	2 columns
tetrastyle	4 columns, term used by Vitruvius
hexastyle	6 columns, term used by Vitruvius
octastyle	8 columns
decastyle	10 columns

The temples were main types of buildings in the Hellenic period.The Greek temples are oriented to face east so that the statue of the deity would be lit by the glory of the rising sun.

The temples stood on the crepidoma of three steps.

The 'Naos' which was core of the temple contained the statue of the god or goddess with treasury chambers in front and rear known as 'Pronaos' and 'Epinaos" which were provided with metal grills for safety.

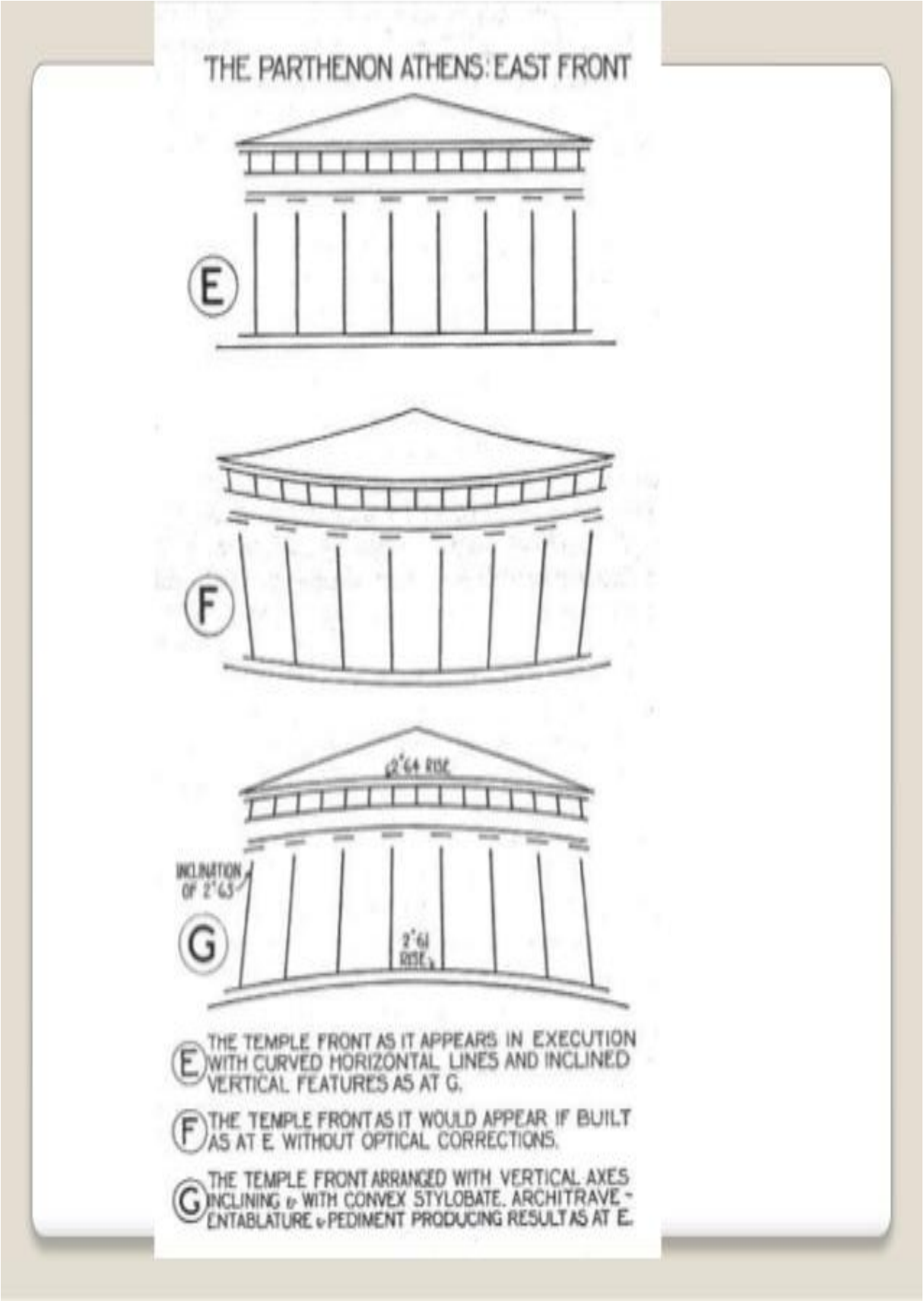
The temple is usually surrounded by open colonnades which is character of the Greek architecture.

The entrance doors on the east front were tall about $2/3^{rd}$ the height of the naos so as to allow plenty of light for general purpose.

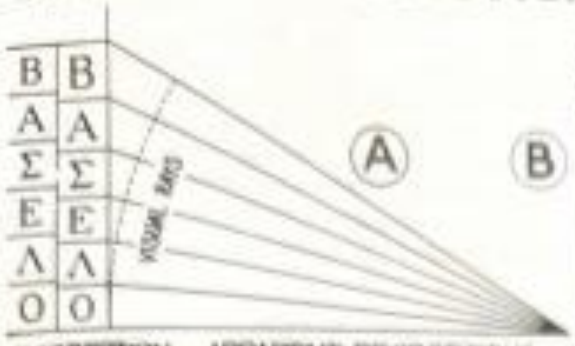
The front consists of closely spaced columns supporting a triangular shaped pediment.The tympanum in the pediment is usually filled with sculptures.

The timber roofs were most common, covered with terra-cotta or marble tiles overlapping one above the other.To cover the ends of the marble tiles, the lower edges of the roof were masked with 'Antefixae' ornament.

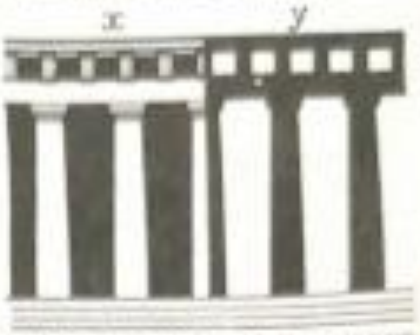
Optical correction



OPTICAL CORRECTIONS IN ARCHITECTURE



CORRECTION OF APPARENT PROPORTIONS FROM AN INSCRIPTION ON THE FACES OF THE ANTAE OF A TEMPLE AT PRIENE



COLOUR EFFECT ON PROPORTIONS

x THE METOPES & NAOS WALL BEING BLACK THE COLUMNS APPEAR STURDIER & THE ARCHITRAVE, TRIGLYPHS & CORNICE HAVE IMPORTANCE

y WITH REVERSED COLOURING THE COLUMNS APPEAR THINNER & HIGHER & THE ENTABLATURE LOSES IN IMPORTANCE.

C THE PARTHENON
INCLINATION OF COLUMNS AND ENTABLATURE

THE PARTHENON ATHENS: EAST FRONT

E THE TEMPLE FRONT AS IT APPEARS IN EXECUTION WITH CURVED HORIZONTAL LINES AND INCLINED VERTICAL FEATURES AS AT G.

F THE TEMPLE FRONT AS IT WOULD APPEAR IF BUILT AS AT E WITHOUT OPTICAL CORRECTIONS.

G THE TEMPLE FRONT ARRANGED WITH VERTICAL AXES INCLINING & WITH CONVEX STYLOBATE, ARCHITRAVE, ENTABLATURE & PEDIMENT PRODUCING RESULT AS AT E.

D METHOD FOR ENTASIS

a b and c d ARE BOTTOM & TOP DIAMETERS RESPECTIVELY. DESCRIBE SEMICIRCLES ON THESE & AT c ERECT PERPENDICULAR CUTTING LARGER ONE IN 3. DIVIDE SEGMENT a 3 & HEIGHT OF COLUMN INTO ANY NUMBER OF EQUAL PARTS: SAY 3: & NUMBER BOTH 1,2,3. FROM a, THROUGH POINTS 1,2,3 IN SEGMENT ERECT PERPENDICULARS CUTTING CORRESPONDING DIVISIONS OF THE HEIGHT. THROUGH THE POINTS THUS OBTAINED DRAW CURVE

PARALLEL STRAIGHT LINES HAVING CONVEX CURVES ON EITHER SIDE APPEAR WIDER APART IN THE CENTRE

PARALLEL STRAIGHT LINES HAVING CONCAVE CURVES ON EITHER SIDE APPEAR CLOSER TOGETHER IN THE CENTRE.

A SIMILAR EFFECT PRODUCED BY INCLINED LINES AS INDICATED IN H & J BY DOTTED LINES

TEMPLE OF PARTHENON AT ATHENS (447B.C. – 432 B.C.)

The temple is built entirely in marble on the high ground of Acropolis, south of temple of Atena.It is constructed by the architects Ictinus and Callicrates.

The temple is built on a rectangular plan 71m long and 32m wide.

It stands on crepidoma, a platform of three steps with tread 70cm and rise 50cm.

Smaller steps are also provided at the centre of east and west ends.

The temple is designed in octa-style i.e. eight columns in front and back, which lean inward.

There are seventeen columns on either side.

The intermediate columns are about 1.88m whereas the corner columns are 1.90m in dia at base.

The corner columns are not only made stouter, but also set closer to the adjacent columns.

All columns are 10.4m high and or Doric Order.

The fluting of the columns represent the highest degree of artistry.

The temple is constructed facing east and naos measures 30m long and 19m wide with three rows of columns, ten on each side and five on rear side in two piers.

The statue of Athena in gold and ivory and measured 13m with its pedestal.

To its west is the parthenon-the virgin's chamber from which the temple derived its name.

The entablature supported on columns is about 3.4m high and curve up in the middle.

The architrave was ornamented with bronze shields.

The sculptured metopes are about 1.34m square numbering 14 on front and back and 32 on either sides.

The metopes contained contests between gods and giants, scenes from capture of Troy etc.

The pediment inclined at 13*-30' had floral decoration about 3m high at its top and lower angles.

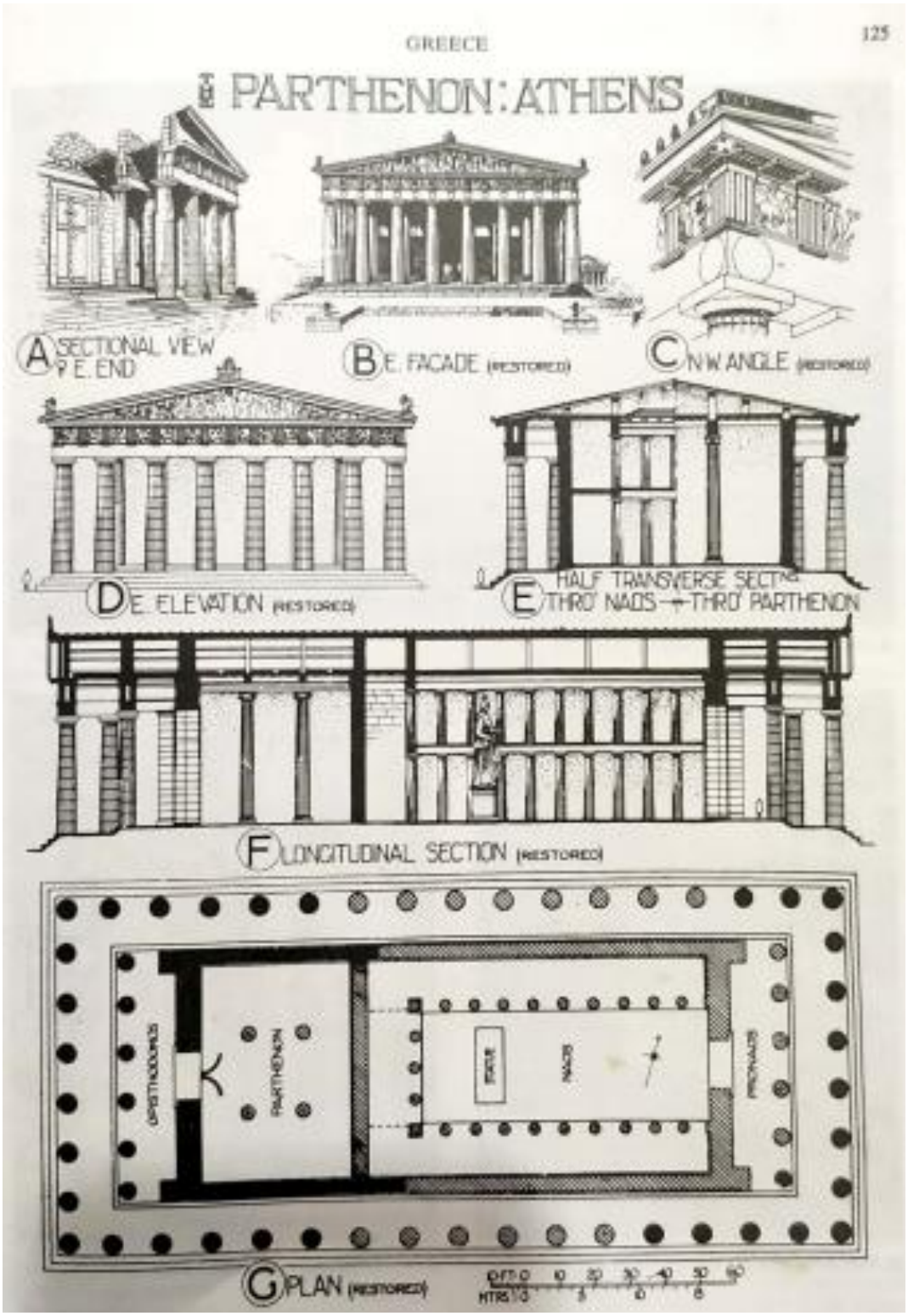
The tympana in the pediment are fully enriched with fine sculptures in bright colours

All these have undergone ravages of time and now remained in the ruin state.

After the fall of Greeks, it was under the Romans but still it received the same status and it did during the Greek's control.

The temple at its glory stood as a miracle of architecture with its shining marble, sensous sculptures in glowing colours.

It has influenced number of writers, artists and architects.

“ 

Theater Epidaurus

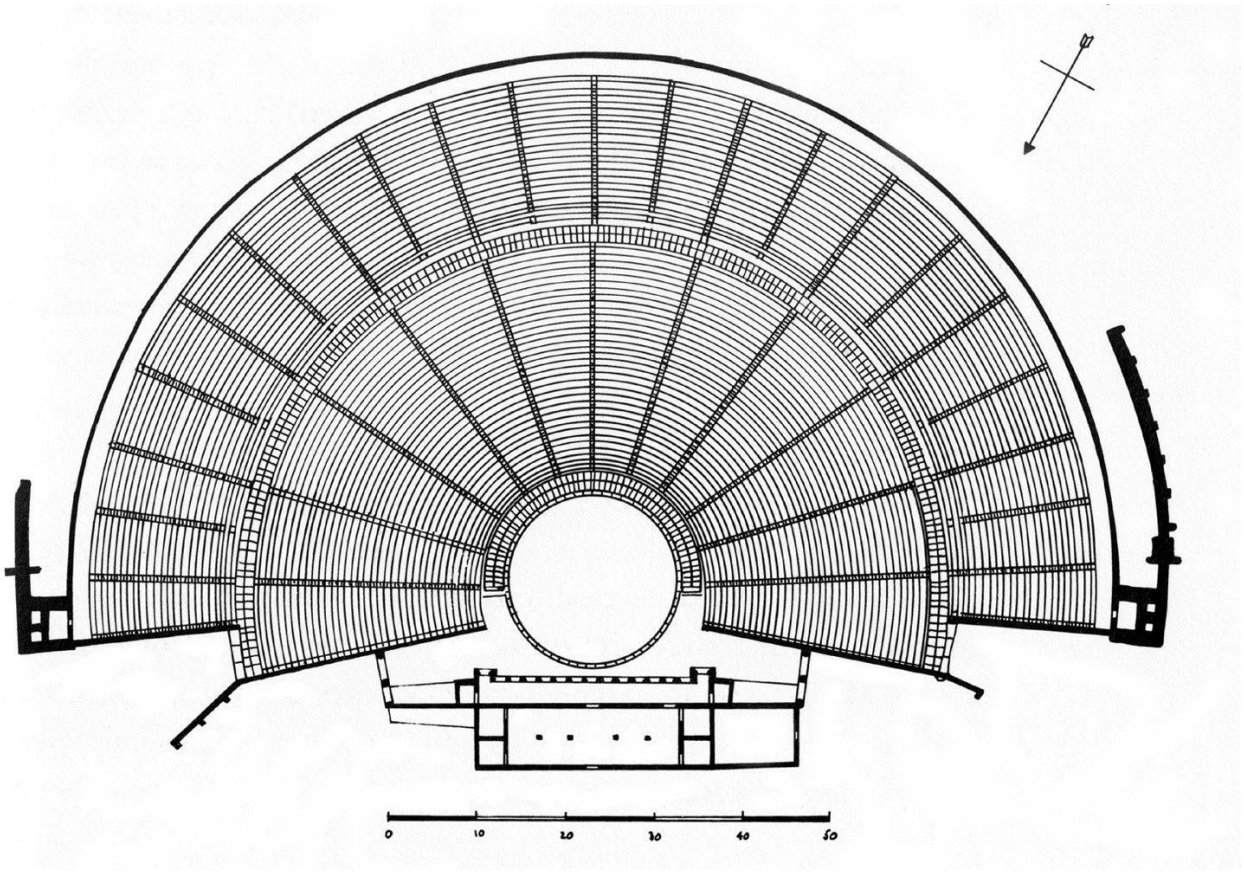
The Ancient Theatre of Epidaurus is a theatre in the Greek city of Epidaurus, located on the southeast end of the sanctuary dedicated to the ancient Greek God of medicine, Asclepius. It is built on the west side of Cynortion Mountain, near modern Lygourio, and belongs to the Epidaurus Municipality. It is considered to be the most perfect ancient Greek theatre with regard to acoustics and aesthetics.

The monument retains the characteristic tripartite structure of a Hellenistic theatre that has an theatron, orchestra, and skene. During Roman times, the theatre (unlike many Greek theatres) did not suffer any modifications.

The auditorium is divided vertically into two unequal parts, the lower hollow or theatre and the upper theatre or epitheatre. The two sub-sections are separated by a horizontal corridor for the movement of spectators (width 1.82 m.), the frieze. The lower part of the auditorium wedge is divided into 12 sections, while the upper part is divided into 22 sections. The lower rows of the upper and lower auditoriums have a presidency form, namely places reserved for important people. The design of the auditorium is unique and based on three marking centres. Due to this special design, the architects achieved both optimal acoustics and an opening for better viewing.

The circular orchestra, with a diameter of 20 m, constitutes the centre of the theatre. In the centre is a circular stone plate, the base of the altar or thymele. The orchestra is surrounded by a special underground drainage pipeline of 1.99 m width, called the euripos. The euripos was covered by a circular stone walkway.

Opposite the auditorium and behind the orchestra develops the stage building of the theatre (skene), which was constructed in two phases:[7] the first is placed at the end of the 4th century BCE and the second in the middle of the 2nd century BCE



HISTORICAL CONDITION-ROMAN

Greece, in its turn, formed a stepping-stone for the Romans to Western Asia, which was gradually subdued till in B.C. 133 it also became a province of Rome.

With the conquests of Syria (B.C. 190) and Spain (B.C. 150) the Roman Empire extended from the Euphrates to the Atlantic.

The prolonged and often desperate wars had a deleterious effect of breaking the system government devised for a city state.

It gave rise to the succession of military dictatorships of which that of Julius Ceasar is the most famous.

Julius ceasar conquered Goul in 58 B.C. and Britain in 55B.C. He brought immense prosperity to Rome.

He reformed the calendar later known as Julian Calendar.

After the defeat of Pompy in 48 B.C Julius Ceasar became almost a monarchy, but was murdered in 44 B.C. and social chaos created for some time.

The political power gradually became weak by social chaos, economic decline and crises, but were averted by the Emperor Constantine.

He declared Christianity as state religion and shifted the capital from Rome to Byzantium. The constant attack by barbarians from north, east of Rhine finally caused the fall of Roman Empire in 5^{th} century A.D. and laid the foundation of feudal Europe.

The Romans adopted the columnar and trabeated style of the Greeks and developed also the arch, vault, and dome of the Etruscans.

This combined use of column, beam, and arch is the keynote of the Roman style in its earliest stages.

The Piers strengthened and faced by attached half-columns support arches, which in their turn carry the entablature. Thus the Orders of architecture which, as used by the Greeks, were essentially constructive were frequently employed by the Romans as decorative features which could be omitted and even at times lost their original use, although the Romans also used them constructively in temple colonnades and basilicas.

The Doric, Ionic, and Corinthian Orders of architecture were used by the Greeks and the Romans added the Tuscan and Composite making five in all. Vitruvius, the Roman authority on architecture in the time of Augustus, gives the proportions of the Tuscan, Doric, Ionic, and Corinthian Orders, but does not mention the Composite Order, which was evolved later.

Temples were the predominating buildings of the Greeks and were of one storey, but the complex civilisation and varied needs of the Romans introduced other types and necessitated the use of several storeys which were frequently ornamented.

Therm, temples, amphitheatres, aqueducts, bridges, tombs, and basilicas all testify to the great constructive ability of the Romans, whose majestic buildings are in accord with the grandeur of Roman Imperial power. The Romans adopted the Greek method of using large blocks of stone without mortar during the Republic.

But their practical mind eventually hit upon greater economy of materials by the use of concrete, a hard composition which consists of small fragments of stone, such as tufa, peperino, marble, pumice-stone, or even broken bricks, mixed with lime.

This extended use of concrete originated a new constructive system which was adapted with rare sagacity to diverse types of important buildings. Roman walls, both of stone and concrete, are of special character and must be described in detail. Walls of " opus quadratum," i.e. rectangular blocks of stone,

with or without mortar joints but frequently secured with dowels or cramps, still continued in use.

Concrete, both unfaced and faced, was largely employed, (a) unfaced for foundations, and (b) faced for walls.

Usage of Concrete throughout the Roman dominions, it gave uniformity and similarity to the buildings, whose character was thus largely independent of local conditions.

The character of Roman architecture depended largely on the extended use of vaulting inherited from the Etruscans and standardized as a structural system.

Concrete vaults were erected which were never equaled in magnitude till the introduction of steel for building in the nineteenth century. With the use of concrete, decoration had little connection with construction ; for concrete was a material which required a facing, both for protection and decoration.Walls of concrete were sheathed externally and internally with marble, stone, brick, or mosaic, and these materials merely formed an appropriate finish to the structure, thus differing essentially from the homogeneous marble walls of Greek architecture. Besides many-coloured marbles, cements and stuccoes were also frequently used for wall surfaces, and the final coat was polished.

Pompeii

The Roman Domus
The Roman domus, or house, played two important roles in Roman society, serving both as a home and as a place of business for patricians and wealthy Romans. To facilitate this dual functionality, the domus had a distinct set of rooms that could be used as either public or private spaces. While no modern domus adheres to the standard model of a domus, many Roman houses, both small and large, have nearly all of these different rooms.

Domus at Pompeii
Each domus throughout Pompeii represents the various ways the standard components of a domus were used to create unique floor plans that showcase the status and wealth of the owner. The large complex of the House of the Faun encompasses an entire city block . This domus has two atria, each with its own fauces, although with two peristyles of different sizes. In essence, the House of the Faun was a private villa despite its urban setting.
Two houses, the House of the Vettii and the House of the Tragic Poet -- both discussed for their wall paintings -- are simpler constructions than the House of the Faun, but both house plans still readily depict the wealth of the household. Visitors entering the House of the Vettii were greeted by a frescoed image of Priapus, an image that portrayed the wealth and luck of the two bachelors who lived inside. The main attributes of their house were the *atrium* and the large garden peristyle, surrounded by decorated *triclinium* and a garden complete with fountains, statues, and flowers. While this house had fewer public-private access restrictions than the standard *domus*, it did include the main attributes of a traditional Roman house.

Public Architecture
The ash cloud that blanketed Pompeii in 79 CE preserved public buildings, as well as domi. Among the best preserved are the amphitheatre, the Temple of Isis, and the Suburban Baths.

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SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT – IV– History of Architecture I -SAR1201

MIDDLE IRON AGE

Mauryan dynasty, Asokan pillar, Development of Mahayana Buddhism, Symbolism, Sanchi complex, Amaravati stupa, Chaitya halls and Viharas, Lomas Rishi Cave, Rani Gumpha-Udaigiri, Takht-i- Bahai, Chaitya halls at Karle, Baja, Ajanta and Ellora caves.

MAURYAN

The Maurya Empire was a geographically extensive Iron Age historical power based in Magadha and founded by Chandragupta Maurya, which dominated the Indian subcontinent between 322 and 185 BCE. Comprising the majority of South Asia, the Maurya Empire was centralized by the conquest of the Indo-Gangetic Plain, and its capital city was located at Pataliputra (modern Patna). The empire was the largest political entity that has existed in the Indian subcontinent, extending over 5 million square kilometres (1.9 million square miles) at its zenith under Ashoka.

INTERACTION OF HELLENIC AND INDIAN IDEAS IN NORTH INDIA Like Egyptian pharaohs they built everlasting monuments in honor of the gods

Ashoka showed THE ENDURANCE OF THE GOOD LAW

- Thus arose the pillar for a beginning which was 50' high which carried the Buddhist emblem
- Other monolithic productions were
- Railings
- Stupa finials- umbrellas
- Lion thrones
- Colossal figures
- Hypostyle halls at the royal palaces of Pataliputra
- Most important aspect of these stone structures was the smooth enamel finish
- This was the *infancy of stone architecture* and yet it reached its peak immediately after wood
- Stone art developed even without a background and traces of Greek, Persian and Egyptian
- Influence in the method of usage of stone could be seen.
- The Graeco-Persian culture influence in Indian art could be seen from above examples
- Source of inspiration-
- Pharoic-Hellenic-Iranian elements
- Spread by Alexander's conquest of Persia together with the downfall of Achaemenid Empires
- Downfall in 330 BC, which ensured the rise of the Macedonian empire by the extension
- of Greek colonies to east till the borders of the Mauryan Empire

Evolution of the Stupa

The first Buddhist 'shrines' were mere piles of stone or rubble containing relics of the Buddha.

Over time it became necessary to 'upgrade' these structures, in conformity with Buddhism's rising status.

For structural reasons it was necessary to have a wide base, tapering towards the top.

The form chosen for the Buddhist Stupa was that of a ***sphere*** - as much for the shape's metaphysical associations as for the fact that it was an antipode to the square/rectangular form of Hindu temples.

"*The embryo of the most powerful architectural form of Buddhism, the famous Stupa, thus emerged* for the first time under the architectural patronage of Ashoka".

The buddhist practice of circumambulation was in the form of a processional passage or Pradakshina Patha

It was enclosed in a wooden railing- Vedika leaving a space for promenading with an entrance at each of the cardinal points

Surmounted by a finial or the Harmika The harmika on top represented the Bodhi Tree under which the Buddha first gained enlightenment.

Ashoka used wood and bricks whereas Sungas used stone

Characteristic features of a Stupa

The Stupa was the most sacred symbol of the Buddha

These were tumuli of brick with a great spiritual significance

Normally consisted of:

Masonry hemisphere 70’ 0” dia.,35’0” high

Solid of large unburnt bricks each around 16”x10”x3”

In the center of this mound or Anda was a small space for a receptacle containing the relic of the Buddha

On the summit was an honorific umbrella – wooden parasol Chattrayashti

The brickwork of the stupa was finished of with a thick layer of plaster in which recesses were left at intervals for small lamps to be lit during festivals

A certain amount of colour and gilding was also applied, furnished with festoons of flowers and drapery with banners and flags.

SANCHI STUPA - 150 BC

After the end of the Mauryan dynasty in 185 BC we had the *Sungas* taking over and ruling till 70 BC in the N and W regions

The Sungas were tolerant to the Buddhists

During the Sungan period we had the main change being- improvement of the stupa into a more dignified architectural structure

Replacement of the impermanent materials with permanent materials such as stone

This is understood by analysing the alterations made to surviving egs., the chief one being Sanchi

Details

- Reconstructed around 150 BC
- Enlarged to nearly twice the size retaining the original Brick tumulus of Asokan period
- The Stupa was hence encased within an envelope – *Achchaday*
- The structure was hence 120'0" dia. 54'0" high
- A terrace- *Medhi* was added 16'0" from the ground providing a separate lower and upper ambulatory
- Access to the medhi was on the S side by a double stairway- *Sopana*
- The whole structure is finished by means of *dry masonry of hammer dressed stones* laid in even courses
- The *Anda is flattened on the top* and is surmounted by a square railing enclosing a pedestal- *Harmika* which supported the shaft- *Yashti* and a triple umbrella- *Chattri* made of stone
- This form of the finial is seen only in the earlier Stupas, which developed into a shape resembling an inverted stepped pyramid or cone in later egs.
- The work during Asoka's period of the wooden palisade structure is hence lost
- The structure has projections at the cardinal points
- There are large elaborately carved gateways or *Toranas* providing access to the Stupa
- The Toranas are designed in a Swastika pattern thereby enabling privacy for the m,monks using the Pradakshina Patha inside
- The Toranas are provided with relief work based on tales from the Jataka or stories from the life of the Buddha
- ***Vedika-***
    - made entirely of stone
    - 1100" high with an entrance in each of the cardinal points
    - The emblem of protection from the Vedic times

    - Large in proportion and austere in treatment
    - Uprights consist of octagonal posts 9’0” high placed at an interval of 2’0” in between
    - Three horizontal bars or rails connect these posts, each 2’ wide and separated by a narrow space of 3.25”
    - An immense beam was placed over this forming a coping stone to the whole
- The railing is entirely of stone but is a copy of the wooden original it replaced
- The shape and the joints of the railing are common to timber as seen in the tenon of the ***Thaba,*** and the scarf jointing of the coping- ***Ushnisha,***
- The triple cross bars- ***Suchi*** are derived from the bamboo rails of the palisade fence
- *The craftsmen were hence thinking in wood although they were working with stone*

Ornamentation:

- Highly carved
- It was a copy of the wooden railing
- A bit out of proportion
- Inspiration from the megalithic stone age
- Joints used are appropriate for wooden than for stone
- Shows primitive craftsmanship

Gateway

- Square vertical posts totaling 34' high 2 thk.
- Ornamental balusters in-between the horizontal members
- The four gateways took 50 years
- style remained constant
- 1st gate was built by Andhras in 75BC in the south
- 10 years gap for the N, E and W gateways
- Best carved gateway on the south
- Less detailed gateway on the north
- South gateway bears inscriptions made by ivory carvers of Mortise holes to hang chains and bells
- Decoration overtook construction techniques
- It is compared to the Stonehenge(proportions)

Torana:

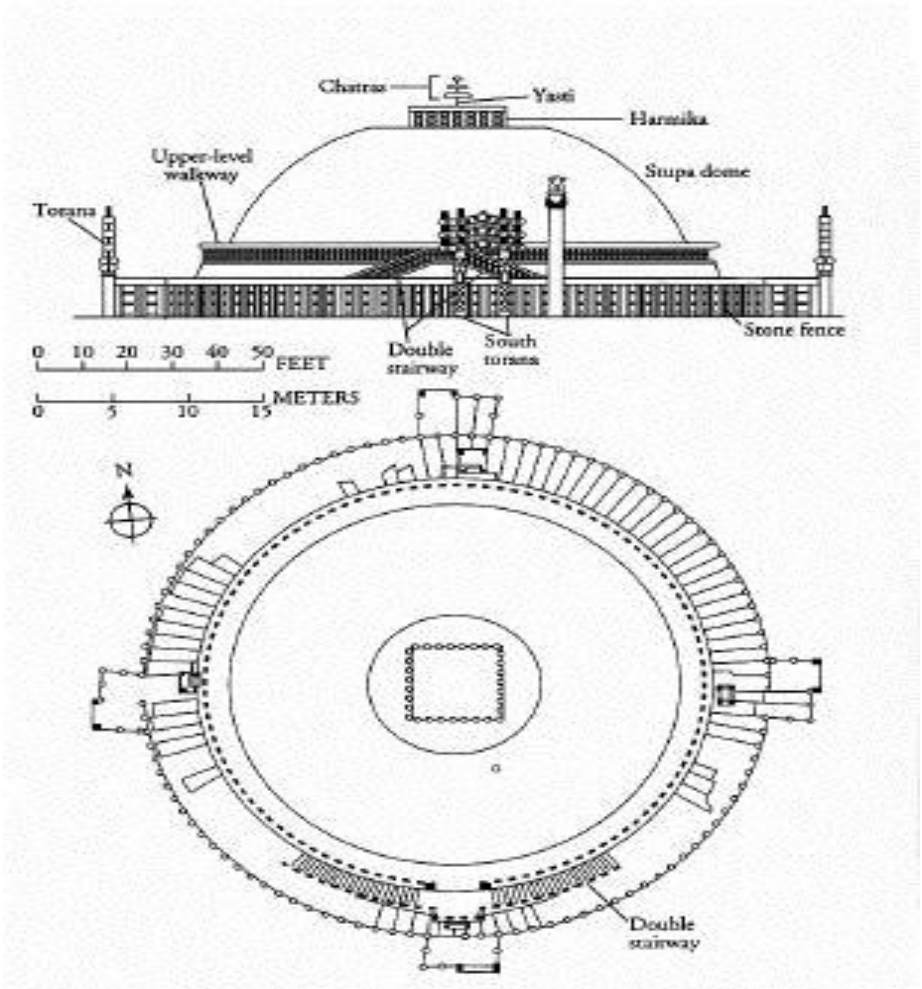
The entrances to religious buildings were always imposing structures with ornamental treatment

The **Torana (tor in sanskrit is pass)** was designed on the same principle as the **bamboo and wood portcullis**

It was an archway accepted as a **ceremonial portal**

There are **5 gateways** in the complex- 4 for the main Stupa and one Stupa 3 added later

- Consists of **2 square uprights 15' high,** prolonged vertically and connected by 3 separate lintels between each of which is a band of ornamental balusters
- **The total ht. Is 34' with a width of 20' at the broadest part**
- The **thickness averages 2'** and it stands without support for **2000 years**
- Top heavy with a jointing which is highly irrational
- Indigenous composition as there is no recognizable form of pillar or capital
- In comparison with the unadorned railing the elegant intricacy of the gateways forms a contrast



Amarāvatī *Stupa,*

The **Amarāvatī *Stupa,*** popularly known as the great *stūpa* at Amarāvathī, is a ruined Buddhist monument, probably built in phases between the third century BCE and about 250 CE, at Amaravathi village, Guntur district, Andhra Pradesh, India. The site is under the protection of the Archaeological Survey of India.

The Stupa, or *mahācetiya*, was probably founded in the third century BCE in the time of Asoka but there is no decisive evidence for the foundation.The earliest inscription from the site belongs to the early centuries BCE but it cannot be assigned to Aśoka with certainty.

The main construction phases of Amaravati fall in two main periods, with the additions consisting of railings (*vedikā*) and carved slabs placed around the *stūpa* proper. These slabs are usually called 'drum slabs' because they were placed round the base of the *stūpa* which has a shape similar to a circular drum.[7] In the early period (circa 200-100 BCE), the *stūpa* had a simple railing consisting of granite pillars, with plain cross-bars, and coping stones. The coping stones with youths and animal reliefs, the early drum slabs, and some other early fragments belong to this period. The *stūpa* must have been fairly large at this time, considering the size of the granite pillars (some of which are still seen *in situ*, following excavations).

The late period of construction started around ca. 50 BCE and continued until circa 250 CE. This period is divided into three phases by Akira Shimada on the basis of the dates that can be assigned to parts of the great limestone railing. The first phase is 50-1 CE, and the same period as the Sanchi *stūpa* I gateways. The second phase is 50-100 CE, the same period as Karli *caitya* and the Pandavleni Caves (no. 3 and 10) at Nasik. The third phase is circa 200-250 CE based on comparisons with Nagarjunakonda sculpture. Some other types of sculpture of belong to an even later time, about the seventh or eighth centuries, and include standing Bodhisattvas and goddesses. Amaravātī continued to be active after this time, probably to about the thirteenth century.

chaitya

A **chaitya**, chaitya hall, **chaitya-griha**, or caitya refers to a shrine, sanctuary, temple or prayer hall in Indian religions. The term is most common in Buddhism, where it refers to a space with a stupa and a rounded apse at the end opposite the entrance, and a high roof with a rounded profile.Strictly speaking, the chaitya is the stupa itself,[4] and the Indian buildings are chaitya halls, but this distinction is often not observed.

Lomas Rishi Cave

The **Lomas Rishi Cave**, also called the **Grotto of Lomas Rishi**, is one of the man-made Barabar Caves in the Barabar and Nagarjuni hills of Jehanabad district in the Indian state of Bihar. This rock-cut cave was carved out as a sanctuary. It was built during the Ashokan period of the Maurya Empire in the 3rd century BC, as part of the sacred architecture of the Ajivikas, an ancient religious and philosophical group of India that competed with Jainism and became extinct over time. Ājīvikas were atheists and rejected the authority of the Vedas as well as Buddhist ideas. They were ascetic communities and meditated in the Barabar caves.Still, the Lomas Rishi cave lacks an explicit epigraphical dedication to the Ajivikas, contrary to most other Barabar Caves, and may rather have been built by Ashoka for the Buddhists.

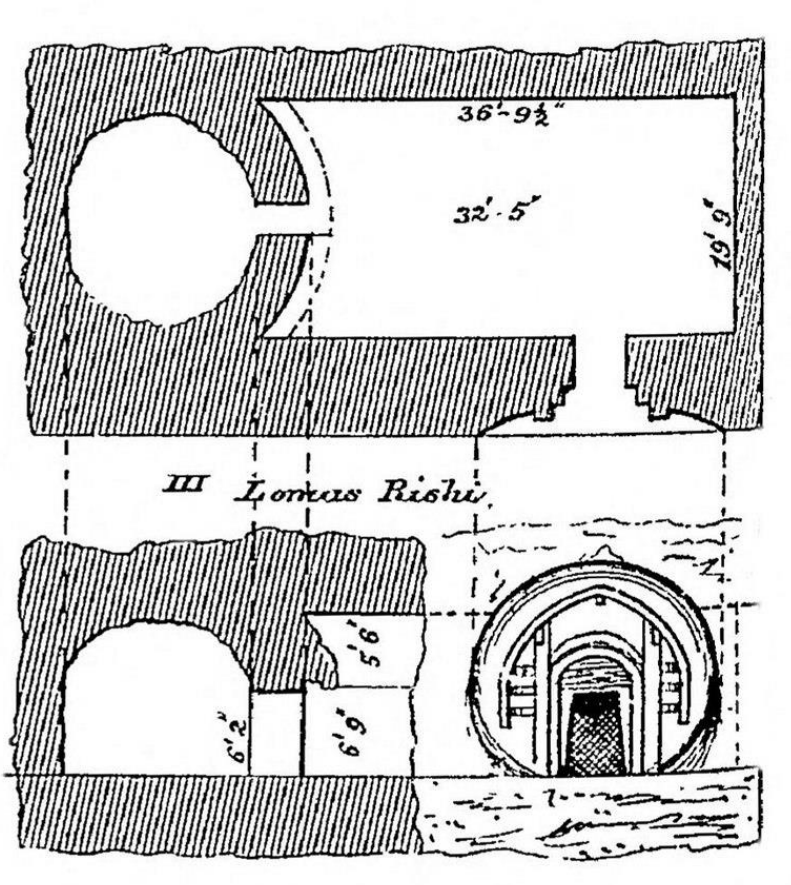
The hut-style facade at the entrance to the cave is the earliest survival of the ogee shaped "chaitya arch" or chandrashala that was to be an important feature of Indian rock-cut

architecture and sculptural decoration for centuries. The form was clearly a reproduction in stone of buildings in wood and other vegetable materials.

According to Pia Brancaccio, the Lomas Rishi cave, along with nearby Sudama cave, is considered by many scholars to be "the prototype for the Buddhist caves of the western Deccan, particularly the chaitya hall type structure built between 2nd century BCE and 2nd century CE.

First is a large hall, entered at the side and rectangular in shape measuring 9.86x5.18m, which functioned as an assembly hall. Further inside is a second hall, smaller in size, which is a semi-hemispherical room, 5m in diameter, with a roof in the form of a dome, and which is accessed from the rectangular room by a narrow rectangular passage. The interior surfaces of the chambers are very finely finished.

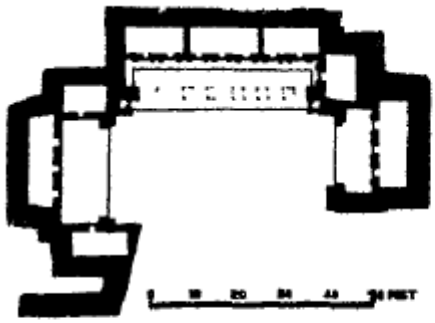
This cave has an arched facade that probably imitates contemporary wooden architecture. On the periphery of the door, along the curve of the architrave, a line of elephants advances in the direction of stupas emblems. This is the characteristic form of the "Chaitya arch" or chandrashala, to be an important feature of architecture and sculpture in the rock for many centuries. It is clearly a stone reproduction of wooden buildings and other plant materials. According to Gupta, Lomas Rishi's immediate successors are the Kondivite and Guntupalli caves. The facade of the rock-cut cave is in the form of a thatched hut supported by timber struts and has a doorway that is intricately carved to replicate timber architecture. Its eaves are curved and the finial is in the shape of a pot. The ornamentation on the "curved architrave" consists of carvings of elephants on their way to a stupa-like structure.



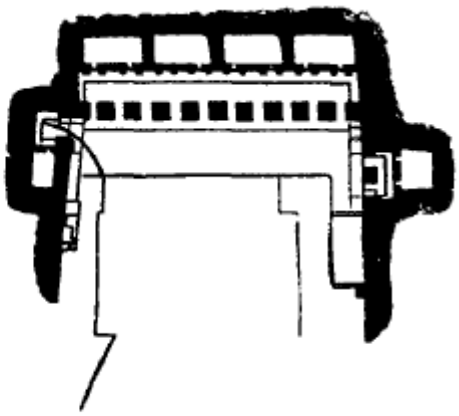
Rani Gumpha "Cave of the Queen"

Rani Gumpha is the largest and most popular cave among the caves of Udayagiri and Khandagiri. The word 'Rani' means Queen. Although it is not an architectural marvel, it has some ancient beautiful sculptures.

This cave is double storeyed. Each storey has three wings and the central wing is bigger among all the three wings. The lower floor has seven entrances in the middle wing whereas the upper floor has nine columns. The upper portion of the central wing has relief images depicting the victory march of a king. Many of the cells have carved *dwara pala* images; some of them are disfigured. The area that connects the central wing with right and left wings have some panels where the sculptures of wild animals, fruit-laden trees, human figures, women playing musical instruments, monkeys and playful elephants are found. The pilasters contain the *toranas* (arches) decorated with sculptures of Jain religious importance and royal scenes.



No. 17. Lower Storey, Ràni kâ Nûr, from Plan by C. C. Locke.



No. 18. Upper Storey, Ràni kâ Nûr. Scale 50 feet to 1 inch.

Chaitya halls at Karle

The **Karla Caves**, **Karli Caves**, **Karle Caves** or **Karla Cells**, are a complex of ancient Buddhist Indian rock-cut caves at Karli near Lonavala, Maharashtra. It is just 10.9 Kilometers away from Lonavala. Other caves in the area are Bhaja Caves, Patan Buddhist Cave. Bedse Caves and Nasik Caves. The shrines were developed over the period – from the 2nd century BCE to the 5th century CE. The oldest of the cave shrines is believed to date back to 160 BCE, having arisen near a major ancient trade route, running eastward from the Arabian Sea into the Deccan.

The group at Karla is one of the older and smaller of the many rock-cut Buddhist sites in Maharashtra, but is one of the best-known because of the famous "Grand Chaitya" (Cave 8), which is "the largest and most completely preserved" chaitya hall of the period, as well as containing unusual quantities of fine sculpture, much of it on a large scale.

Great Chaitya cave

The main cave, called the Great Chaitya cave, or Cave No.8, features a large, intricately carved chaitya, or prayer hall, dating back to 120 CE. This is the largest rock-cut chaitya in India, measuring 45 metres (148 ft) long and up to 14 metres (46 ft) high. The hall features sculptures of both males and females, as well as animals such as lions and elephants.

This Great Chaitya cave, the largest in South Asia, was constructed between 50-70 CE, and 120 CE, during the reign of the Western Satraps ruler Nahapana, who recorded the dedication of the cave in an inscription. Numerous donors, mainly local merchants, several of them Yavanas, and Buddhist monks and nuns provided donations for the construction of the chaitya cave, as recorded by their dedicatory inscriptions. An inscription among the sculpted decorations at the left end of the veranda mentions the completion of the cave by a local merchant or banker (a "setthi") named Bhutapala, from Vaijayanti. The completion of the cave mentioned by Bhutapala may refer to the ornate sculptures of the veranda, during the final phase of decoration. About a generation after Nahapana, the Satavahana ruler Vasishthiputra Pulumavi (130-159 CE) also left a dedicatory inscription.

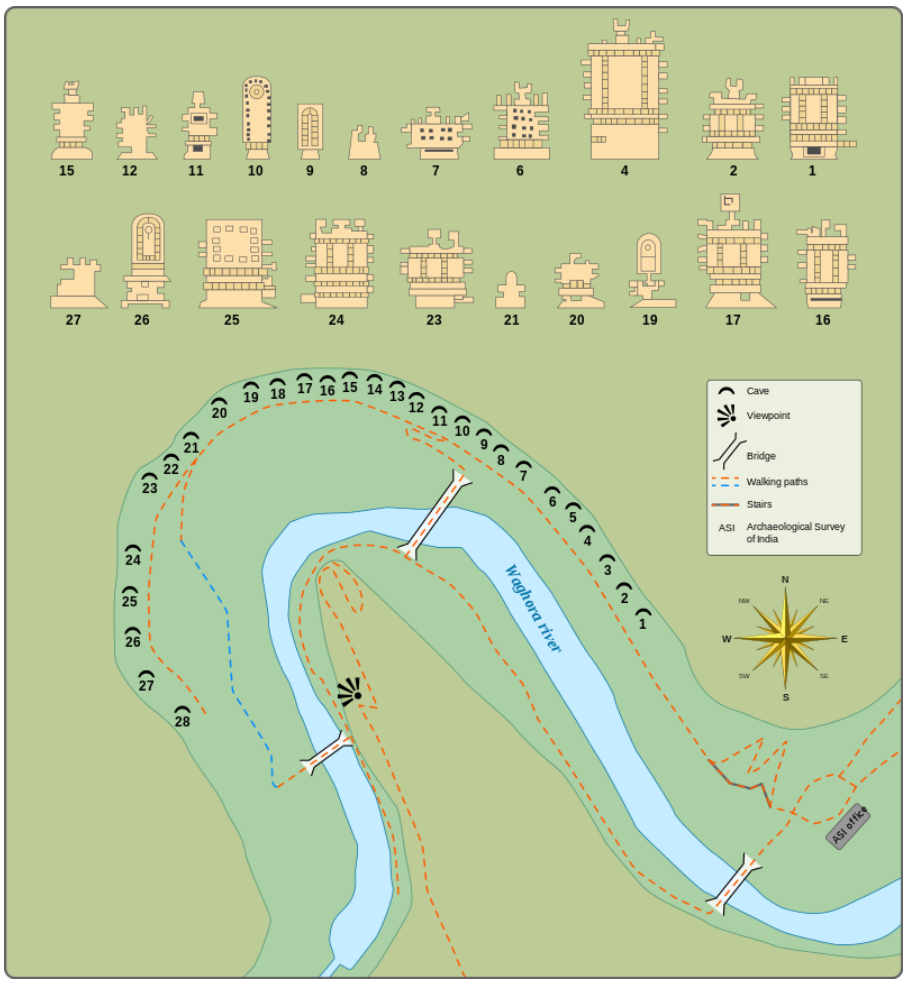
The chaitya follows the usual pattern for the period, but is unusually large. It is exceptional for preserving original elements in wood: the prominent lateral ribs and other roof timbers, and the umbrella over the stupa. The chaitya hall only survives in rock-cut examples, but these replicate in stone the form of examples in wood and thatch. In most rock-cut chaityas, the roof timbers are replicated in stone, to considerable visual effect, but in others actual timber was used, for purely aesthetic rather than structural reasons. In most of these cases the timber has long decayed away, as for example in the chaitya at Cave 3, Kanheri Caves.

Ajanta Caves

The Ajanta Caves are approximately 30 rock-cut Buddhist cave monuments which date from the 2nd century BCE to about 480 CE in Aurangabad district of Maharashtra state of India. The caves include paintings and rock-cut sculptures described as among the finest surviving examples of ancient Indian art, particularly expressive paintings that present emotions through gesture, pose and form.

They are universally regarded as masterpieces of Buddhist religious art. The caves were built in two phases, the first starting around the 2nd century BCE and the second occurring from 400–650 CE, according to older accounts, or in a brief period of 460–480 CE according to later scholarship. The site is a protected monument in the care of the Archaeological Survey of India, and since 1983, the Ajanta Caves have been a UNESCO World Heritage Site.

The Ajanta Caves constitute ancient monasteries and worship-halls of different Buddhist traditions carved into a 75-metre (246 ft) wall of rock. The caves also present paintings depicting the past lives and rebirths of the Buddha, pictorial tales from Aryasura's Jatakamala, and rock-cut sculptures of Buddhist deities. Textual records suggest that these caves served as a monsoon retreat for monks, as well as a resting site for merchants and pilgrims in ancient India. While vivid colours and mural wall-painting were abundant in Indian history as evidenced by historical records, Caves 16, 17, 1 and 2 of Ajanta form the largest corpus of surviving ancient Indian wall-painting.



Ellora

Ellora is a UNESCO World Heritage Site located in the Aurangabad district of Maharashtra, India. It is one of the largest rock-cut monastery-temple cave complexes in the world, featuring Hindu, Buddhist and Jain monuments, and artwork, dating from the 600–1000 CE period. Cave 16, in particular, features the largest single monolithic rock excavation in the world, the Kailasha temple, a chariot shaped monument dedicated to Lord Shiva. The Kailasha temple excavation also features sculptures depicting the gods, goddesses and mythologies found in Vaishnavism, Shaktism as well as relief panels summarizing the two major Hindu Epics.

There are over 100 caves at the site, all excavated from the basalt cliffs in the Charanandri Hills, 34 of which are open to public.These consist of 12 Buddhist (caves 1–12), 17 Hindu (caves 13–29) and 5 Jain (caves 30–34) caves, each group representing deities and mythologies prevalent in the 1st millennium CE, as well as monasteries of each respective religion. They were built close to one another and illustrate the religious harmony that existed in ancient India.All of the Ellora monuments were built during the Rashtrakuta dynasty, which constructed part of the Hindu and Buddhist caves, and the Yadava dynasty, which constructed a number of the Jain caves. Funding for the construction of the monuments was provided by royals, traders and the wealthy of the region.

The Kailāśa temple: Cave 16

Kailash temple at Ellora.

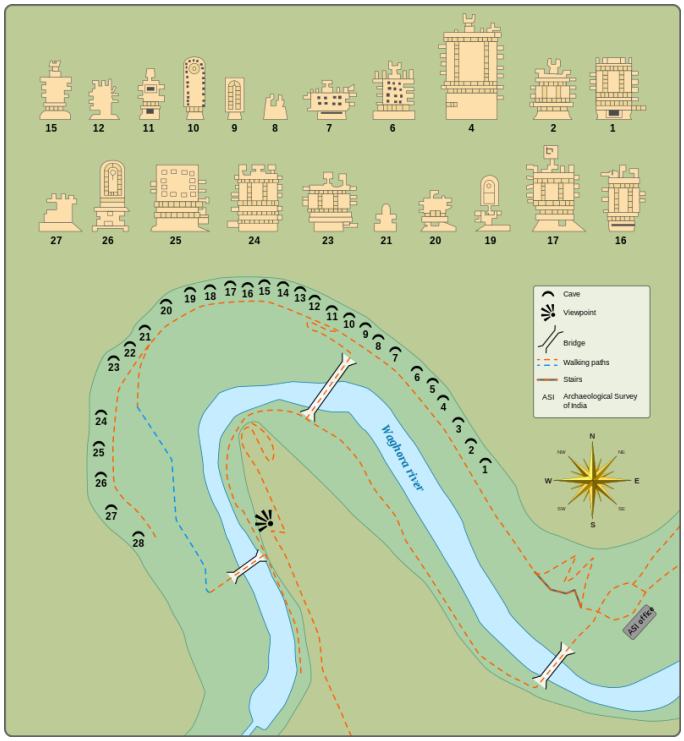
Cave 16, known as the Kailasa temple, is a particularly notable cave temple in India as a result of its size, architecture and having been entirely carved out of a single rock.

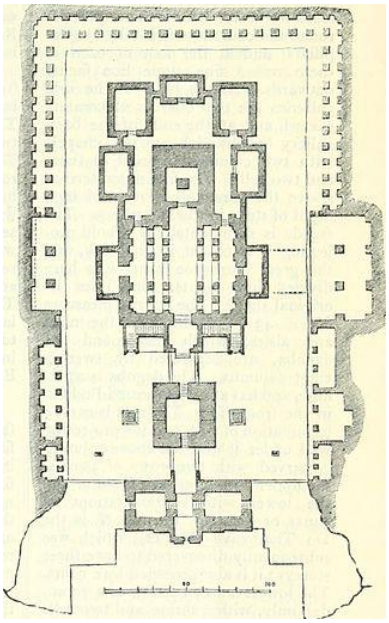
The Kailasha temple, inspired by Mount Kailasha, is dedicated to Shiva. It is modeled along similar lines to other Hindu temples with a gateway, an assembly hall, a multi-storey main temple surrounded by numerous shrines laid out according to the square principle, an integrated space for circumambulation, a garbha-grihya (sanctum sanctorum) wherein resides the linga-yoni, and a spire-shaped like Mount Kailash – all carved from one rock. Other shrines carved from the same rock are dedicated to Ganga, Yamuna, Saraswati, the ten avatars of Vishnu, Vedic gods and goddesses including Indra, Agni, Vayu, Surya and Usha, as well as non-Vedic deities like Ganesha, Ardhanarishvara (half Shiva, half Parvati), Harihara (half Shiva, half Vishnu), Annapurna, Durga and others. The basement level of the temple features numerous Shaiva, Vaishnava and Shakti works; a notable set of carvings include the twelve episodes from the childhood of Krishna, an important element of Vaishnavism.

Kailasanatha temple, remarkably carved out of one single rock was built by Rashtrakuta king Krishna I (r. 756–773 CE)

The Ramayana panel-The structure is a freestanding, multi-level temple complex covering an area twice the size of the Parthenon in Athens. It is estimated that the artists removed three million cubic feet of stone, weighing approximately 200,000 tonnes, to excavate the temple.

The construction of the temple has been attributed to the Rashtrakuta king Krishna I (r. 756–773 CE), but elements of Pallava architecture have also been noted. The dimensions of the courtyard are 82 meters by 46 meters at the base, and 30 meters high (280 × 160 × 106 feet).[56] The entrance features a low gopuram. The central shrine housing the lingam features a flat-roofed mandapa supported by 16 pillars, and a Dravidian shikhara. An image of Shiva's mount Nandi (the sacred bull) stands on a porch in front of the temple. Two of the walls in the main temple house rows of carvings depicting the Mahabharata, along the north side, and the Ramayana, on the south side.





The Kailāśa temple