

UNIVERSITY OF ABOUBEKR BELKAID TLEMCEN

FACULTY OF TECHNOLOGY

DEPARTEMENT OF ARCHITECTURE

ACADEMIC YEAR 2024/2025

1st Year Architecture

Subject title: Critical History Of Architecture

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ANCIENT ROMAN ARCHITECTURE

L'ARCHITECTURE DE LA ROME ANTIQUE

LECTURE 5

Historial contexte/ Roman History Timeline

According to legend, twin brothers Romulus and Remus founded Rome. As babies, both are nursed by a wolf.

Rome and neighboring villages are ruled by Etruscans. Rome grows from a village to a city.

The Romans overthrow the Etruscan empire. Rome becomes a republic ruled by elected officials.

The Twelve Tables of Roman Laws are published by Decemviri.

Construction begins on the Appian Way. This is Rome's first military highway.

The Punic Wars: Rome engages in 3 wars with Carthage, defeating the Carthaginian general, Hannibal. Carthage is eventually destroyed. The Punic wars ended in 146 BCE.

Rome controls the Mediterranean coasts of Spain, France, Greece, Turkey and Northern Africa.

Caesar becomes dictator of Rome. Few years before, he conquered Gaul (France).

c. 753
BCE

c. 600
BCE

c. 509
BCE

451
BCE

312
BCE

264
BCE

131
BCE

45
BCE

The Roman Empire

↑ RISE and FALL ↓



Apogee
2nd century

44
BCE

27
BCE

79 CE

98-117
CE

122
CE

306
CE

395
CE

476
CE

Julius Caesar is assassinated on the Ides of March by Marcus Brutus. They hope to bring back the republic, but civil war breaks out.

Octavian, Caesar's great-nephew and adopted son, becomes the first emperor of Rome. He takes the name Augustus, which means the first emperor.

Mount Vesuvius erupts and buries the cities of Pompeii, Herculaneum and Stabiae in ash.

Rome reaches its greatest size under the rule of Emperor Trajan.

The Hadrian Wall was built. It was a long wall built across northern England in an effort to keep the barbarians out.

Constantine becomes Rome's first Christian emperor. He later moves his capital to Constantinople.

Rome is split into two empires - the Western Roman Empire and the Eastern Roman Empire. Each side had a ruler in charge of it.

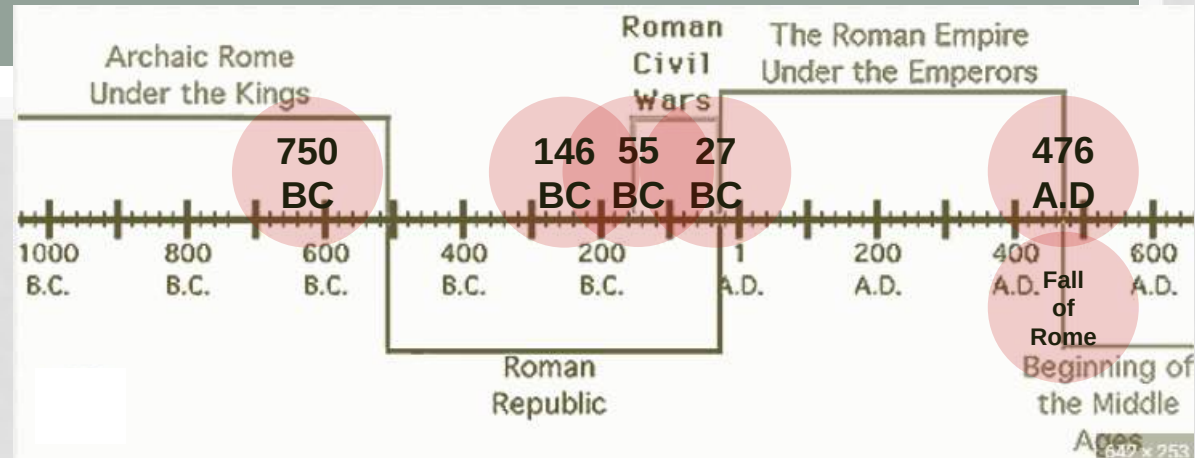
Germanic armies invade Rome and overthrow the last Roman emperor. The Roman Empire finally falls.

Historial contexte

Roman Republic and Roman Empire

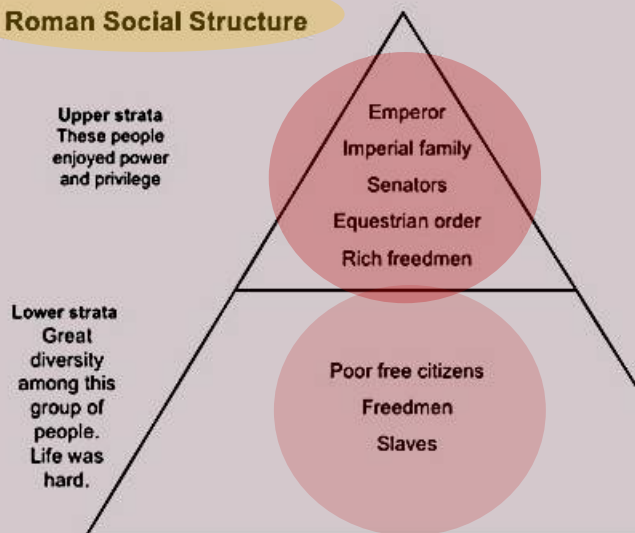


The Senate



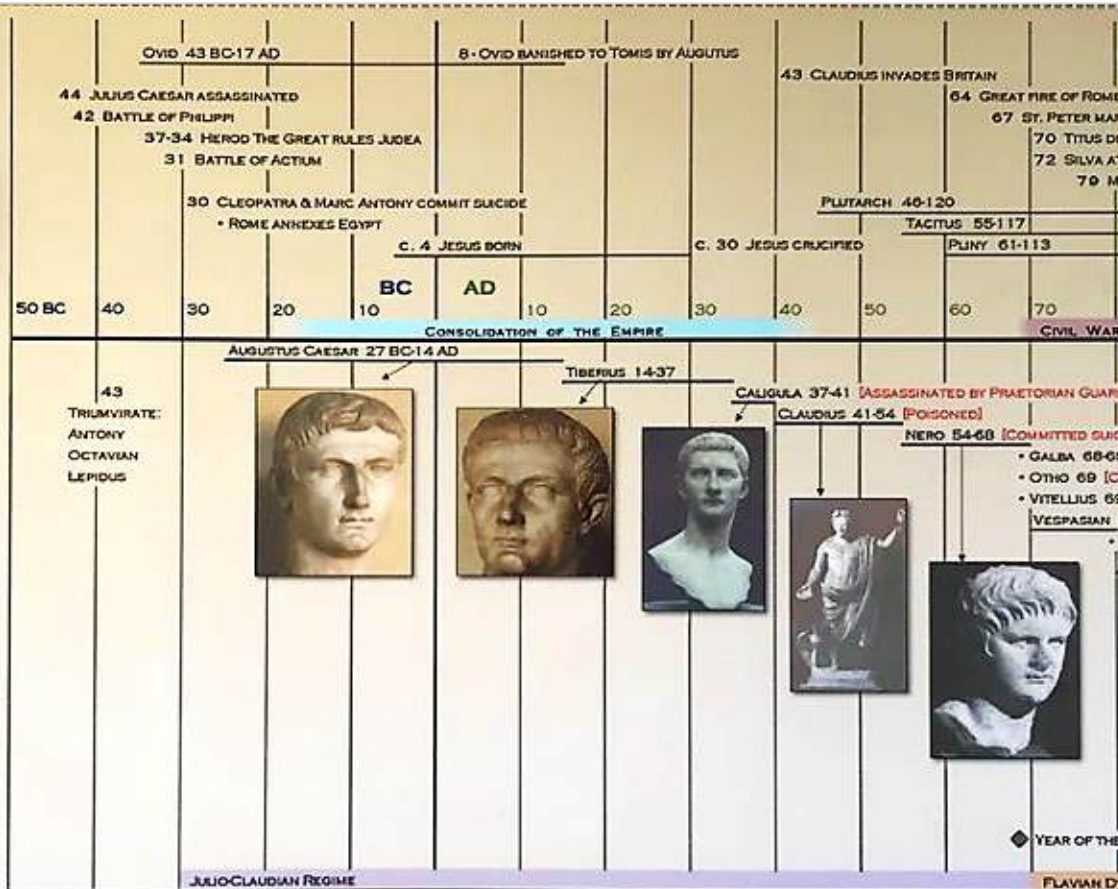
The Roman republic started its dominion from **its grandest city, Rome** which is estimated to be established at 750 B.C.

Roman Social Structure



- The beginning was by **fighting the Etruscans and controlling their lands.**
- **Punic war** :Romans faced many severe wars against the Phoenicians until it was able to control Sicily and north Africa (146 B.C.)
- Greece became a Roman province in 133 B.C. and became a **gate towards Asian territories.**
- In 55 B.C. Julius Cesar crossed to Britain.
- The Roman empire stayed in **power till the 4th century.**

General Contexte of ancient Rome



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- The Italians unlike the Greek **did not have tendency for sailing.**
- The main material on the Italian mainland was marble, and they also used terracotta, stone and brick.
- The Roman civilization can be divided into the **Roman Republic and the Roman Empire.**
- The nation became a prototype for an international nation inspiring many others to follow it.
- **Romans developed several systems of construction: vault, arches, aqueduct, baths ...**

The Roman Empire

The empire's apogee around the 2nd century

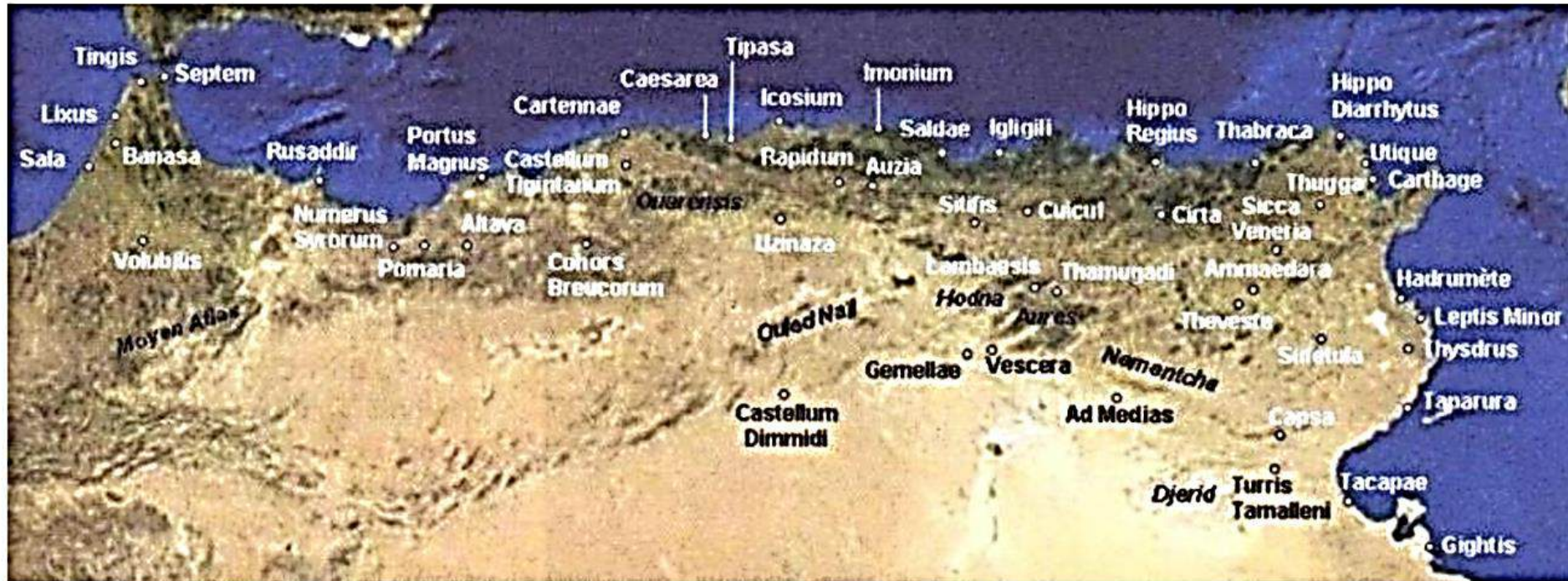
- The vast Roman Empire spanning from the main lands of Italy, Greece extending up to England & France in the north, as well as encircled around the Mediterranean Sea confronting with Asia Minor & North Africa was subject to dismantling due to lack of central power.



Roman Empire in the 2nd century

The Roman Empire

The Roman presence in Numidia and Mauritania after the fall of Carthage (146 BC during the Third Punic War)

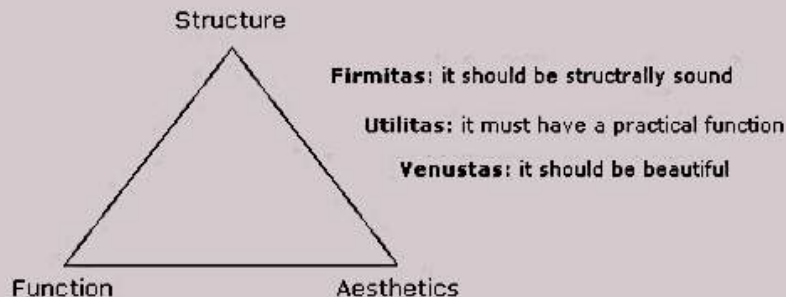
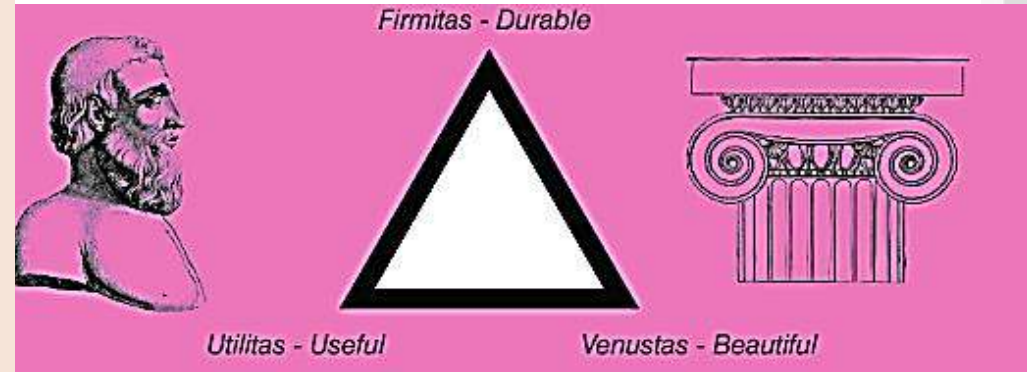


General architectural features

The principles of Vitruvius (Les principes de Vitruve)

The Vitruvian principles are architectural and design concepts outlined by the ancient Roman architect Vitruvius in his influential work "**De architectura**" (On Architecture), written during the 1st century BCE.

These principles, often referred to as the Vitruvian triad, emphasize three fundamental aspects that Vitruvius believed were essential for well-designed and enduring architecture. The Vitruvian principles are: **Firmitas** (Soundness, Durability), **Utilitas** (Functionality, Utility), **Venustas** (Delight, Beauty, aesthetic qualities)



Roman constructions

The Roman invented concrete which was forgotten after the collapse of the empire. Together with bricks, these were commonly used in construction.

The Roman also used arches extensively. Many of its buildings used curves in their construction. The Coliseum and the Pantheon are two well-known examples.



122 Stone and brick walling at Ostia, Italy. Opus reticulatum



126 Roman pantle roofing, Cirencester, England



Rubble Wall



128 Roman rubble walling with brick bonding courses

123 Roman mosaic paving



125 The interior of the Pantheon, Rome AD 120 onwards



124 Coffered vault, Basilica of Maxentius

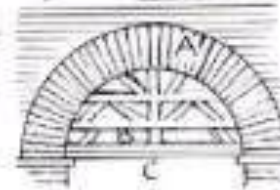
Coffered vault



Concrete vault



127 Building a brick and concrete vault
A Wood centering
B Brick structure
C Concrete infill



129 Building a brick and concrete arch over wood centering
A Brick masonry
B Wood centering
C Springing line of arch

Arch



Central heating

130 Roman underfloor (hypocaust) heating. Hot air flows from an exterior furnace through the stove-hole, round the hypocaust piers (blue) and heats the walls by means of wall flues

Roman architecture is affected heavily by the Greek and Etruscan architecture.

- They used the same post and lintel system or (column-trabeate system) and **added the arch as a new development.**
- They also **took the dome architecture from the Etruscans**, and it became an important development for the Roman architecture.
- They also **used the Greek order after developing it**, and thus we had five main orders: Tuscan, Doric, Ionic, Corinthian and the Composite.
- The construction abilities were visible in the various **building types** the Romans built, such as: **theaters, baths, temples, amphitheaters, aqueducts, bridges, tombs, basilicas and Fora.**

General architectural features



Triumphal arch of Trajan._ Timgad, Batna, Algeria

Architecture Forms in a Roman City



**El Rahman mosque
in Cherchell , Algeria**
Built over the ruins of a
Roman temple and that
later became a cathedral
(St Paul)



**Temples, Forums, Basilicas, Theaters,
Amphitheaters (Arena), Complex Thermae (public
baths), Bridges, Aqueducts, Sewer System, streets
and road, Houses...**



Architecture Innovations in a Roman City

Typology and types of buildings

Roman Architecture

Typology and Type of Buildings

The Ancient Romans were responsible for significant developments in housing and public hygiene, for example their public and private baths and latrines, under-floor heating in the form of the hypocaust, mica glazing, and piped hot and cold water.

They were making buildings such as Apartment blocks, Warehouses, public latrines, and amphitheaters to improve the living standards of people residing in towns and cities across the empire.



Insula



Latrines



Theater

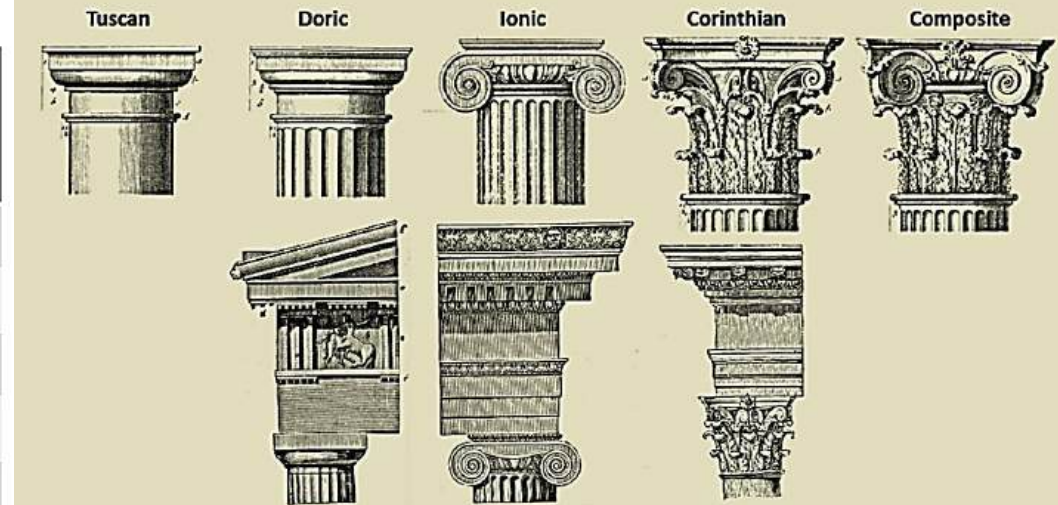
Architecture Key Principles

The five Roman Orders

Column and entablature proportions

Roman classical orders

Roman order	Ht of column	Ht of Entablature
Doric	8 D	2 D
Ionic	9 D	2 ¼ D
Corinthian	10 D	2 ½ D
Composite	10 D	2 ½ D
Tuscan	7 D	1 ¾ D

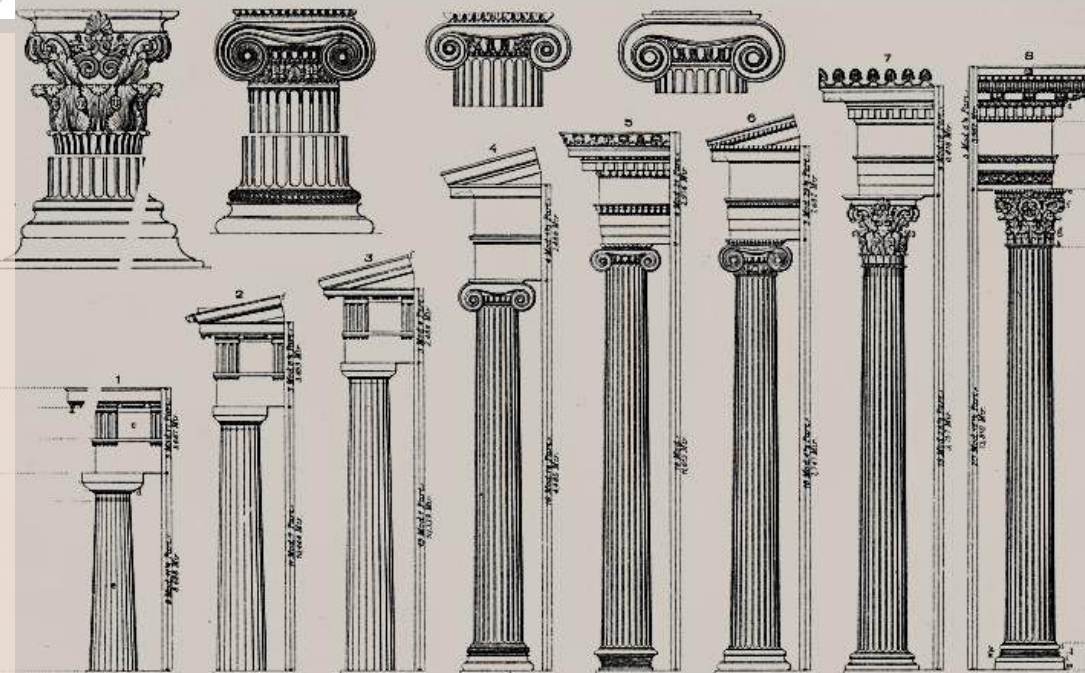


The Corinthian column is the favorite of the Romans. The column often plays a non-supporting decorative role. The 5 styles can be superimposed as for the facade of the Colosseum.

La colonne corinthienne est la favorite des romains.

La colonne joue souvent un rôle décorateur non porteur.

Les 5 styles peuvent être superposés comme pour la façade du Colisée.



Key principles of Greek architecture

Roman ornaments and symbols



Relief panel from **Trajan's Column** in Rome, showing the building of a fort and the reception of a **Dacian** embassy



Frieze



Portico and pediment in the entrances



Mosaic floor and wall in opus reticulatum (reticulated wall), Hadrian's Villa

Mosaic floor and wall

This type of painting is usually defined by the word **(Fresco)** consist of trapping pigments in the lime mortar before it sets
As Vitruvius clearly states "as for the colors , carefully applied on the wet rendering , they do not come off and are fixed forever "



Starting work at the top of the wall and working downwards so as not to spoil the surface once covered

Painted decorations

Key principles of Greek architecture

Roman ornaments and symbols



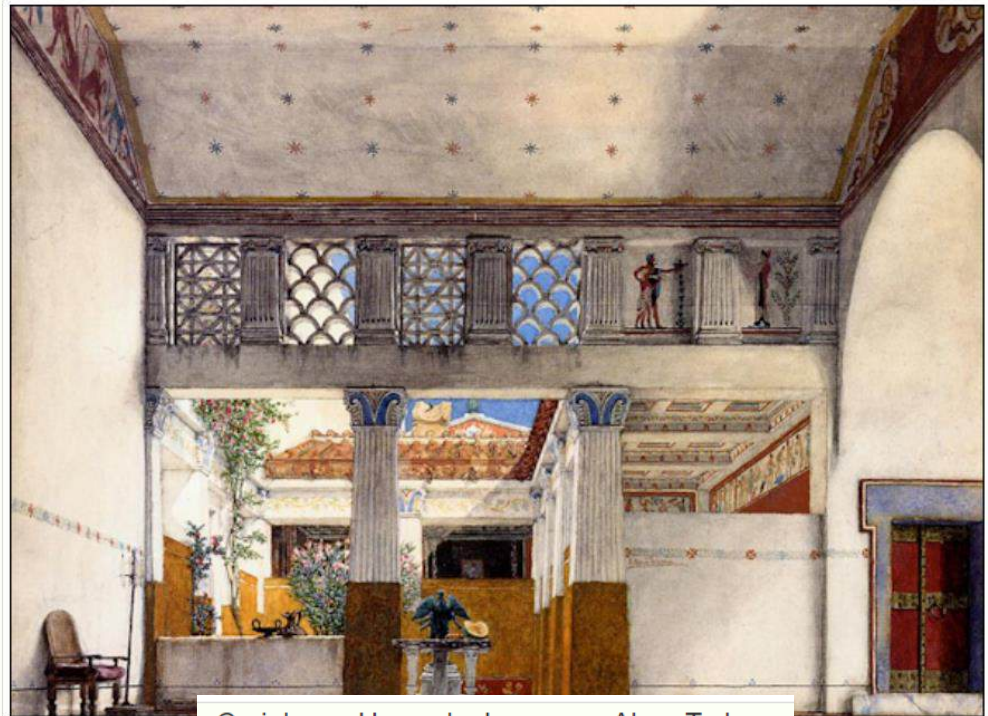
Casa Vettii in Pompeii

Interior decoration

The use of terracotta and ceramics allowed an immense degree of freedom in a wide range of areas of construction such as the tiling of roofs and floors .



Terracotta and ceramic mosaics

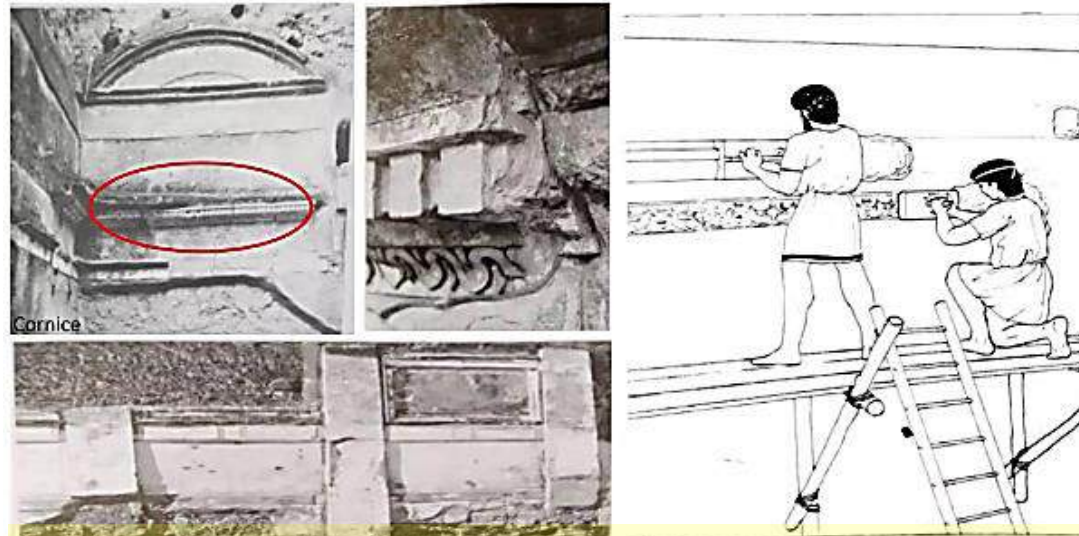


Coriolanus House by Lawrence Alma-Tadema

Key principles of Greek architecture

Roman ornaments and symbols

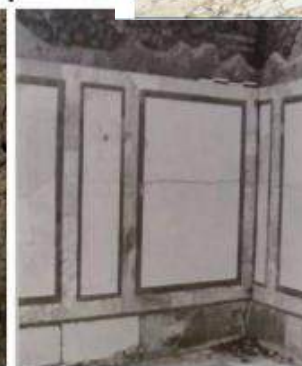
Decoration could be done with mortar itself , this was known as **stucco** , it could be made out of templates that were pressed into the wet mortar .



Stucco (Le stuc) : Decorating walls with imitation of stone block construction



marble veneer



Veneer (Le Placage): Sheets of material (marble 1cm) placed over the stone wall

Architecture Key Principles

The Roman Techniques Of Construction

Structural system and Materials

- Building systems:

- Lintelled:

- Copied from the Greeks
 - Spaces are closed by straight lines

- Vaulted

- Use of arches
 - Barrel vaults

- Use of domes

- Strong walls so that they do not use external supports

- Materials:

Limestone

Concrete

Mortar

- Arches:

They used half point or semicircular arches

They could use lintels above these arches

Pediments were combined with them

Oil- mill of Brisgane , Thebessa,
Algeria



Shot on OnePlus
By smovich

Architecture Key Principles

The Roman Concrete (*opus caementicium*)

A revolutionary material

Concrete (*opus caementicium*) =

Aggregate (gravel, chunks of stone and rubble, broken or crushed bricks) + Lime+ volcanic ash (pozzolana) + water

Pozzolana
as a key
ingredient

This unique mixture endowed a Roman concrete with exceptional durability.

The discovery of **slow-drying concrete**, made with **pozzolana sand** created a revolution in architectural design.

This allowed not only bases, but also walls to be constructed of mainly concrete or concrete and rubble.

Facings could be made of more expensive stone or inexpensive brick.

The result was **strong structures** that could be formed in any desirable shape



Architecture Key Principles

The Roman Concrete (*opus caementicium*)

A revolutionary material



- **Durability:** some structures continue to exist from 2 millenars
- **Pozzolanic Reaction:** lime+ pozzolana+ seawater= a strong coesive matrix within the concrete
- **Resistance to Seawater:** resistance to the corrosive effects of seawater, making it ideal for maritime structures like harbors, docks, and lighthouses.
- **Flexibility and Workability:** this allowed for greater architectural innovation and the construction of structures with curved and intricate shapes.
- **Reduced Environmental Impact:** compared to the production of modern Portland cement. The use of locally available materials, and the production process emitted less carbon dioxide.
- **Structural Innovation:** Concrete provided the flexibility to experiment with new forms and designs, including the construction of large domes, arches, and complex vaulted structures

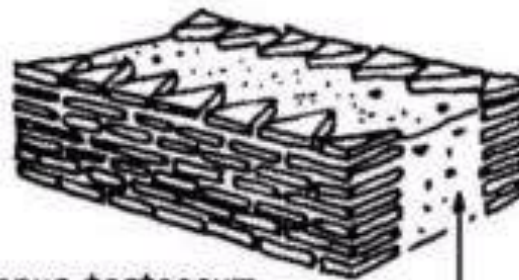
Architecture Key Principles

The Roman Walls technique

Wall cladding (Maçonnerie de chemisage / Maçonnerie de blocage)



USE OF BRICK ON OUTER
FACING AND FILLING OF
CONCRETE RUBBLE



opus testaceum

opus caementicium



Architecture Key Principles

The Roman Techniques Of Construction

Wall Cladding

Walls were made in one of these ways:



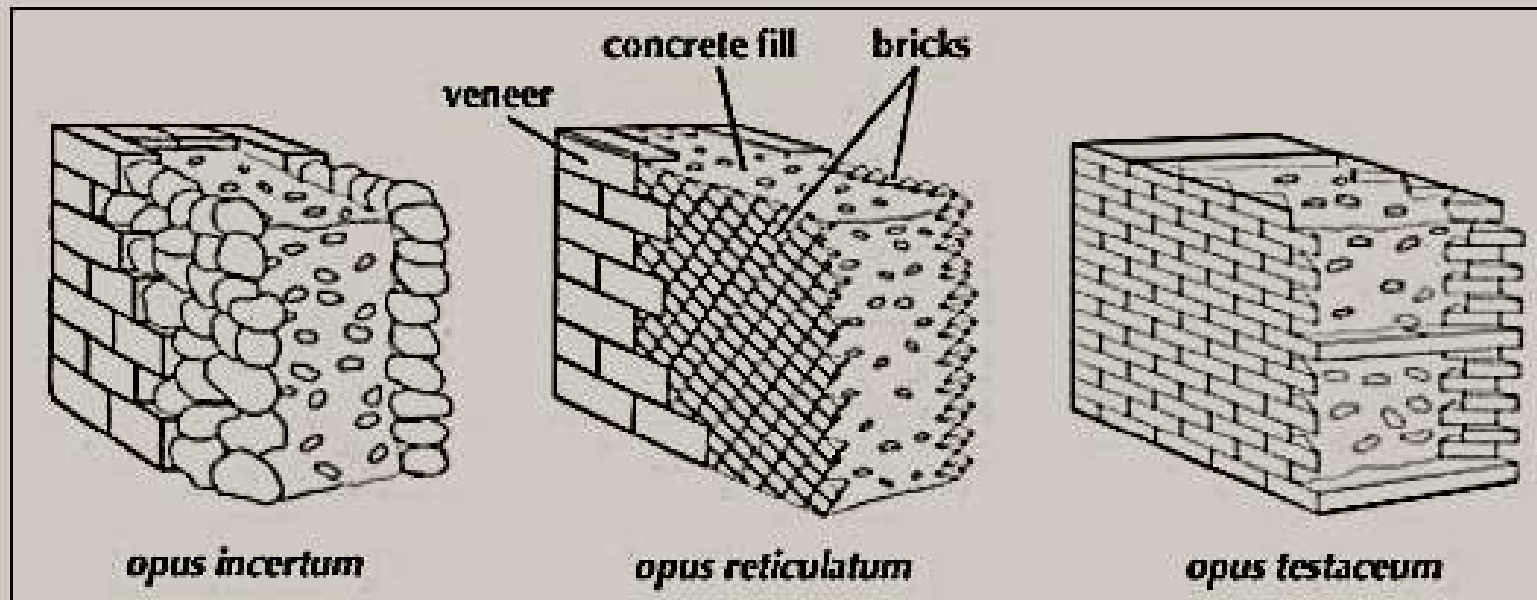
Ashlar

Masonry

Brick



Material combinations in walls:



opus incertum

opus reticulatum

opus testaceum

Architecture Key Principles

The Roman Techniques Of Construction

Wall Cladding

Walls were made in one of these ways:



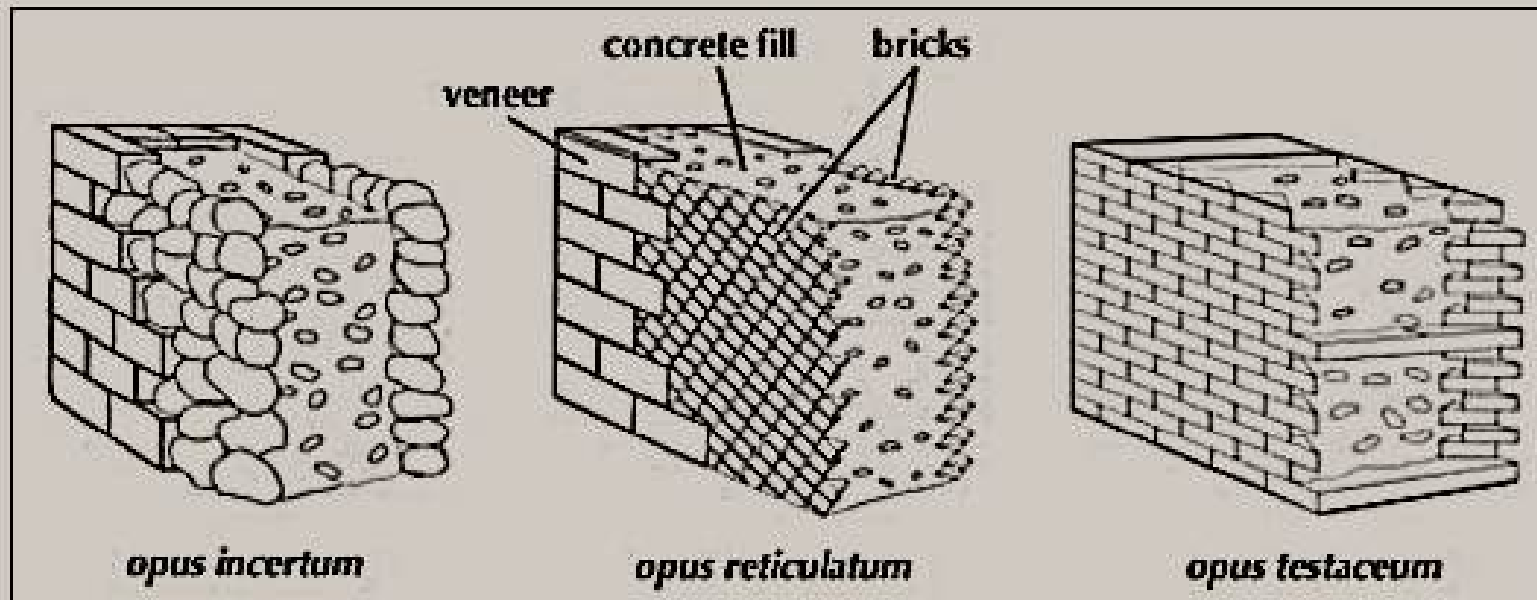
Ashlar

Masonry

Brick



Material combinations in walls:



opus incertum

opus reticulatum

opus testaceum

Architecture Key Principles

Structure System: Vault and Arches

The arc a structure which cancels the bending stress and only resists to the compressive stress

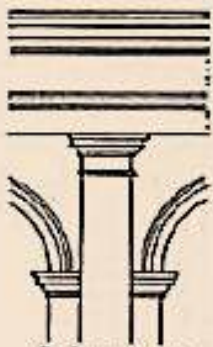


Columnar and trabeated style of Greeks combined with Etruscan's arch and vault.

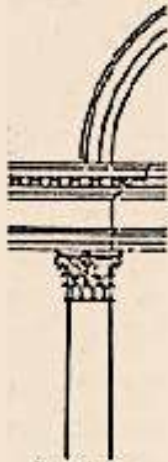
The various vaults used were: Semi Circular Vault, Cross Vault, Cupolas or Hemispherical domes.

Capacity to span over large spaces.

Lime concrete and lime plaster was used.



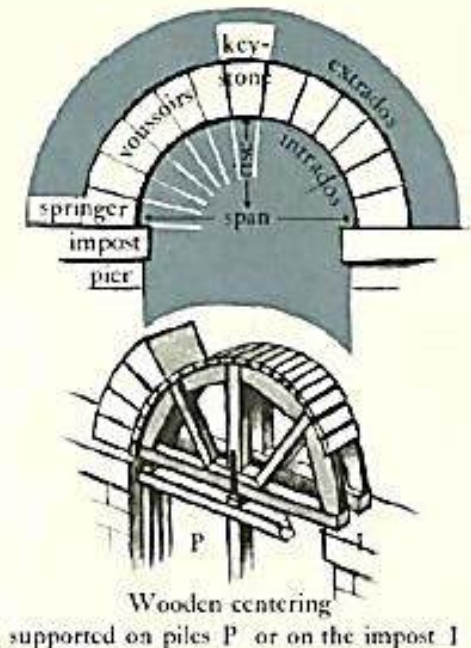
Colosseum
Roman arch order
c70 A.D.



Pantheon
Central niche
c125 A.D.



Thermae
of Caracalla
c130 A.D.



Architecture Key Principles

Seismic techniques: Lead seismic sealing

Techniques parasismiques: Scellement parasismique en plomb



Lead sealing

Le plomb est un matériau malléable et ductile , ce qui signifie qu'il peut être facilement façonné pour s'adapter aux besoins spécifiques de la construction.

Cette caractéristique permettait aux Romains de l'utiliser pour créer des joints flexibles qui pouvaient absorber les mouvements sismiques.

Lead is a malleable and ductile material, which means it can be easily shaped to meet the specific needs of construction. This characteristic allowed the Romans to use it to create flexible joints that could absorb seismic movements.

Architecture Key Principles

Structure System: The relief arc to reinforce the walls



Relief arc

arc de décharge

linteau

Lintel

Le Capitole. Ostie. Italie. IIe siècle après J.-C.

Architecture Key Principles

Structure System: Vaulting

Barrel vault (Semi-circular vault) and Groin Vault (Cross vault)

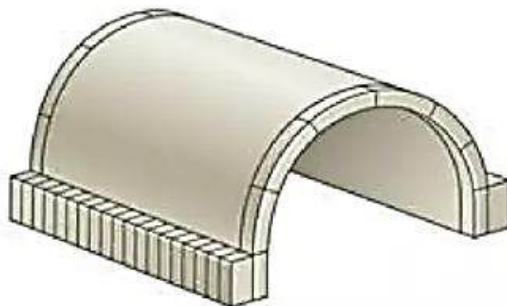
The vaulting technique of the Etruscans was absorbed by the Romans the development of a mature vaulting system.

The Romans created vaults of perfect rigidity, devoid of external thrust, and requiring no buttresses.

Thus vaults and domes could be easily erected over vast spaces, producing impressive and complex thermae, amphitheaters, and basilicas.

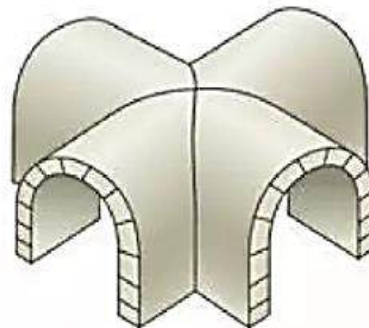
Roman vaults were the basis on which more complex and varied forms were developed in the Middle Ages. The tunnel (or barrel) vault spans between two walls, like a continuous arch.

The cross, or groined, vault is formed by the intersection at right angles of two barrel vaults, producing a surface that has arched openings for its four sides the four corner points of the square or rectangle. Roman vault square or rectangular compartments.



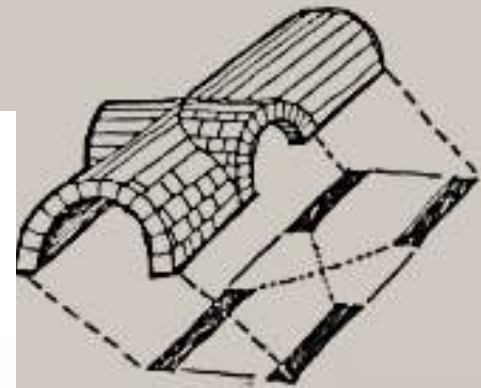
barrel vault

Voûte en
berceau



groin vault

Voûte
d'arêtes



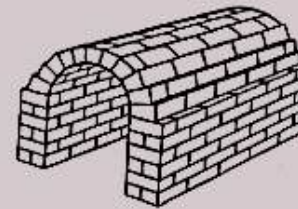
ROMAN CROSS VAULT

Architecture Key Principles

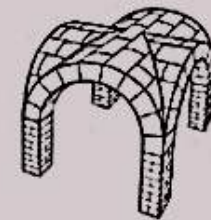
Structure System: The construction of vaults

Brick vault and concrete vault

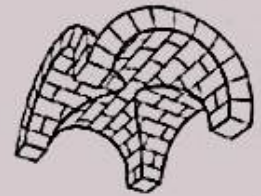
Innovative Vaulting in the Architecture of the Roman Empire



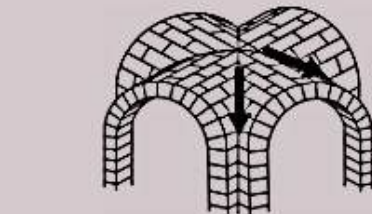
Barrel or Tunnel Vault



Groin Vault
(view from above)

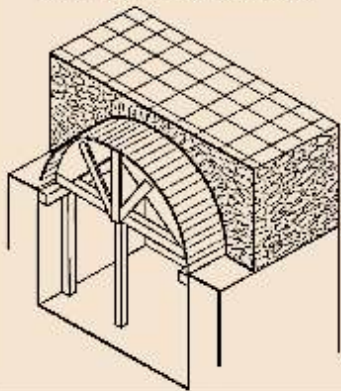


Groin Vault
(view from below)

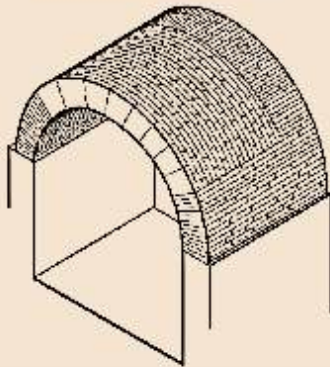


Picture of a cross or groin vault which shows the forces distributing towards the corners of the vault.
(Source: Google Images)

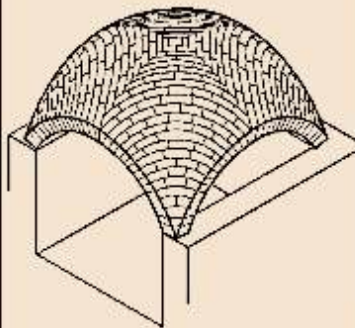
Ch 2 - *Opus Caementicium*



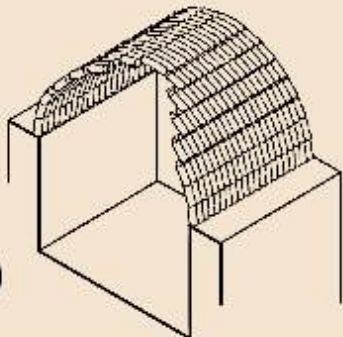
Ch 3 - Brick Barrel Vaults



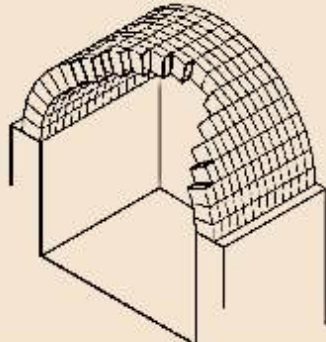
Ch 4 - Complex Brick Vault Forms



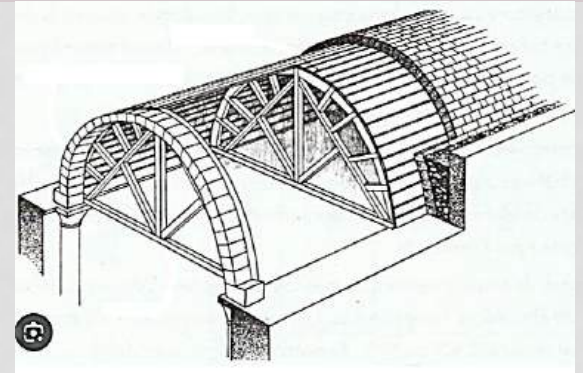
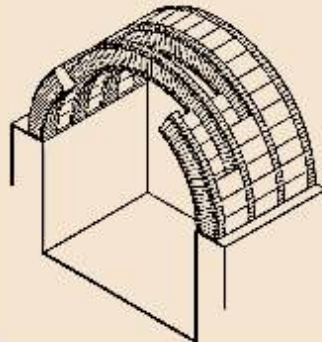
Ch 5 - Vaulting Tubes



Ch 6 - Hollow Voussoirs

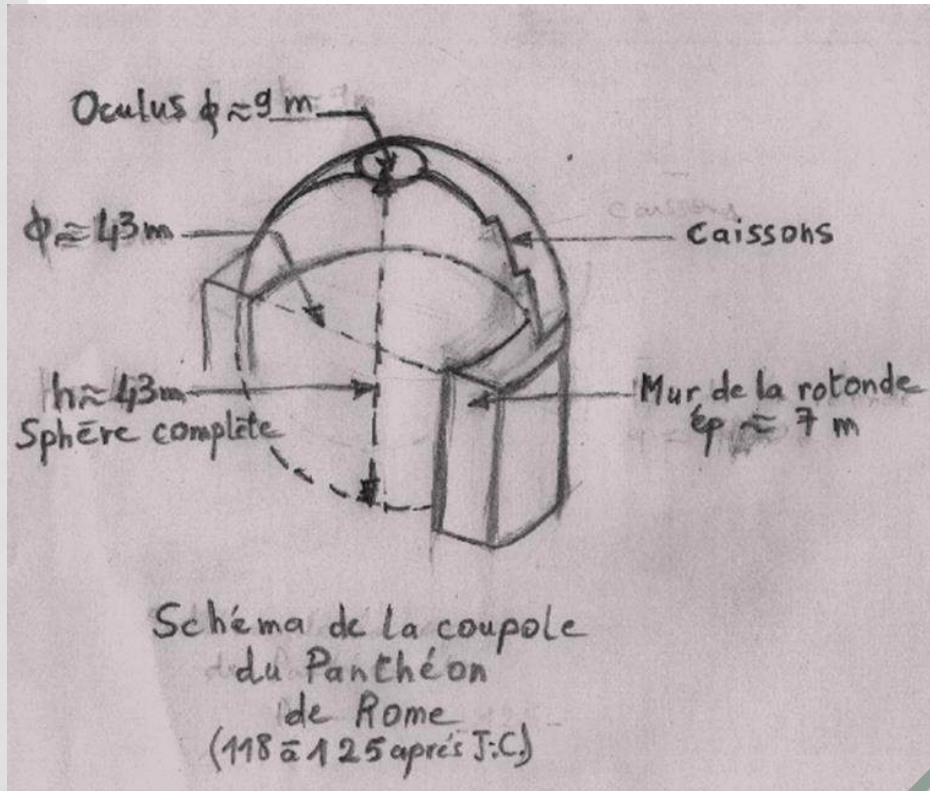


Ch 7 - Armchair Voussoirs

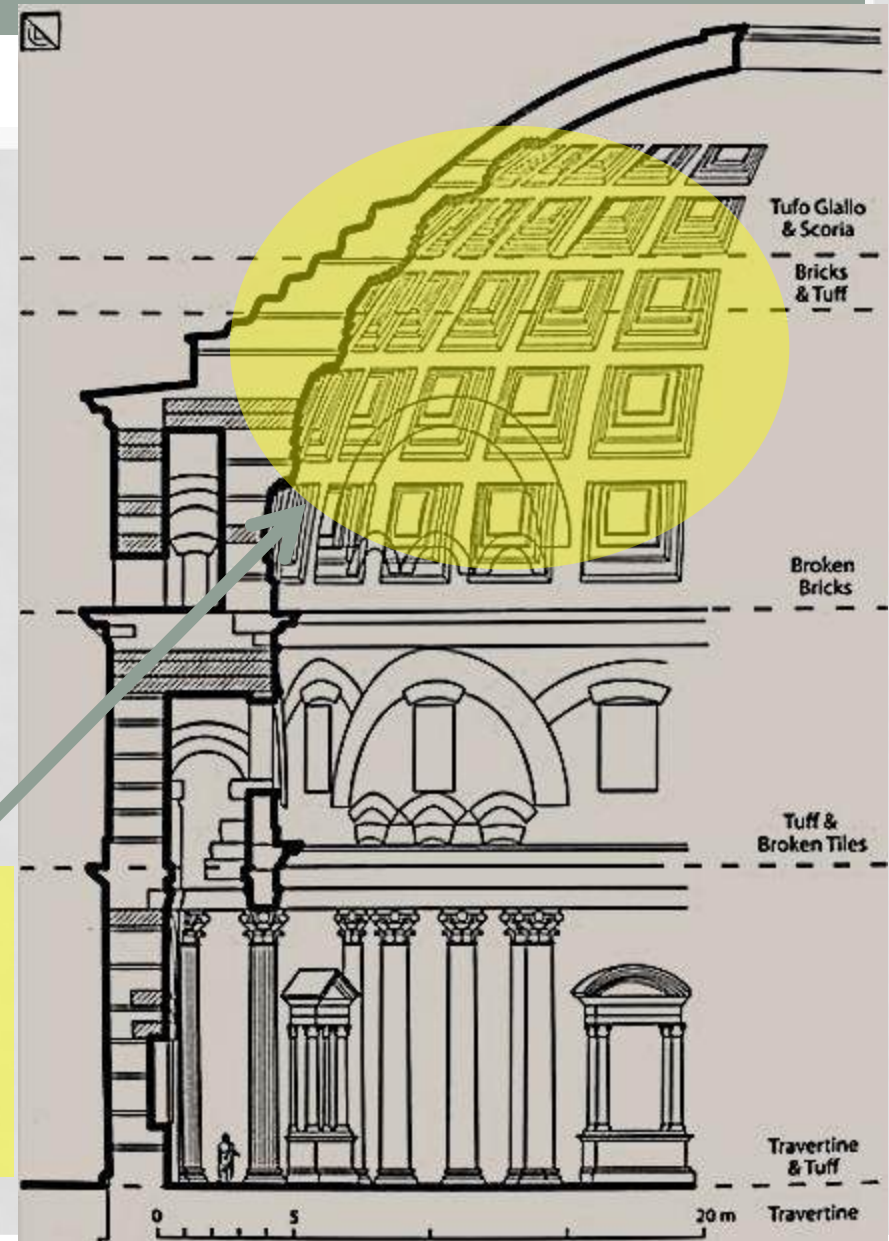


Architecture Key Principles

Structure System: Cupolas or hemispherical domes



The Pantheon's Dome is the largest dome in the world with 43,30 m in diameter, lightened **with boxes (coffers)** and an **oculus (9m Ø)**, and supported by **a 7 m thick rotunda**.





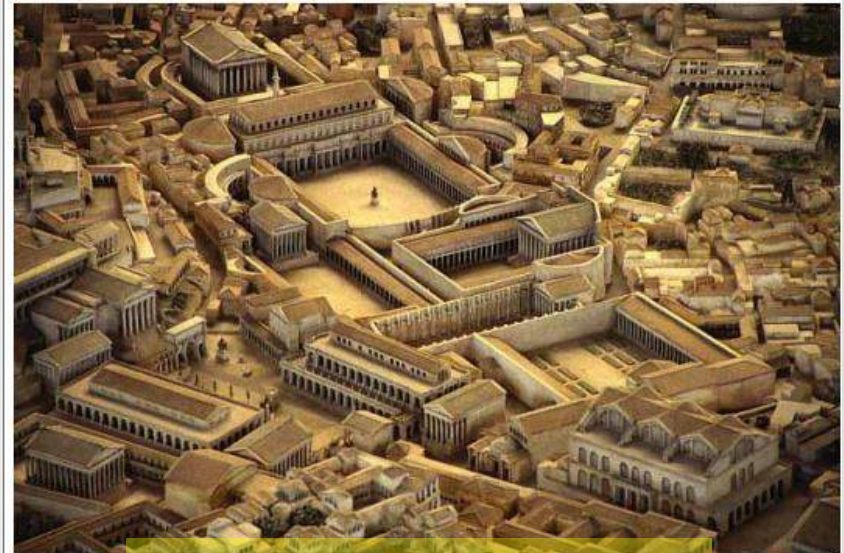
Forum of Gerasa ([Jerash](#) in present-day [Jordan](#)), with columns marking a covered walkway (*stoa*) for vendor stalls, and a semicircular space for public speaking

The Forum is associated with Greek Agora.

It is an open space used as meeting place, marketing and political reasons. Bounded by columns and surrounded by public amenities.

The Roman Forum (Forum Romanum) is the most important one since it includes many other Fora.

The Roman Forum



Fora of Rome



Forum of Timgad

Roman temples were very similar to the Greek ones.

They used the steps from the Etruscan temples, raising them from the ground.

The Roman temples were larger than the Greek but shorter in length.

The Romans also used circular and polygonal temples.

Religious ceremonies took place inside the temple.

The colonnade usually would not surround the whole temple. Absence of peristyle. The podium replaces the stylobate.



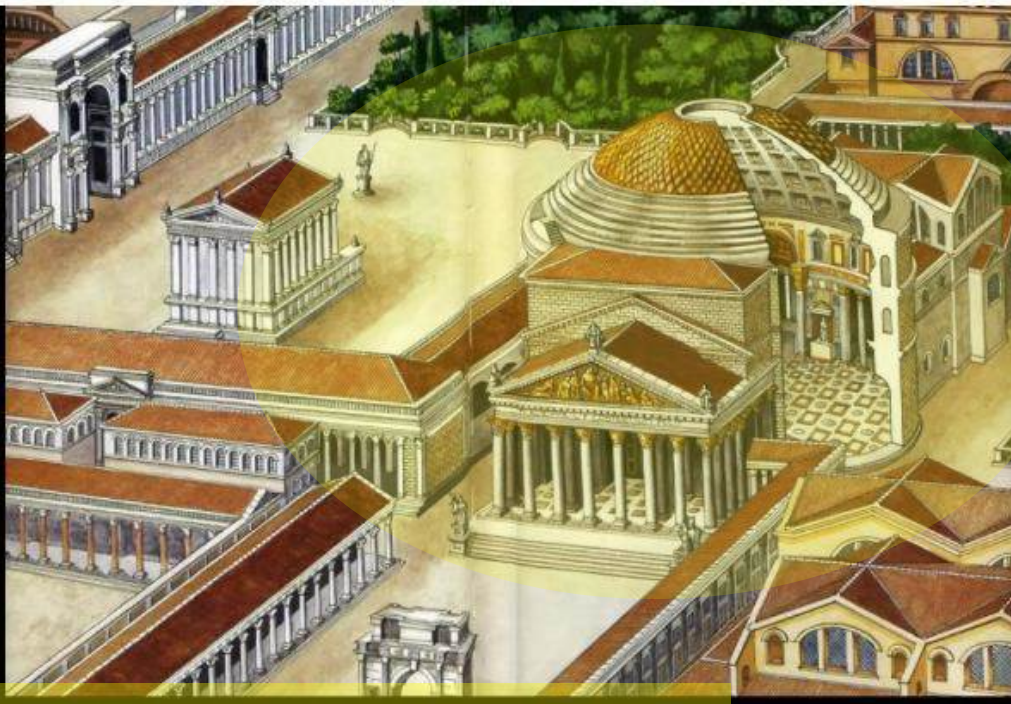
The Roman Temple



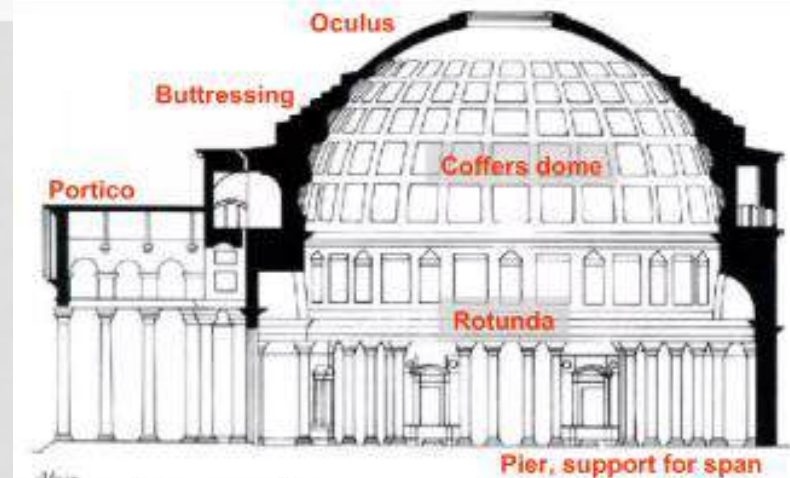
**The temple of Septimius Severus
(Septime Sévère) at Djmila, Cuicul,
Sitifus, Algeria**

The Roman Temple

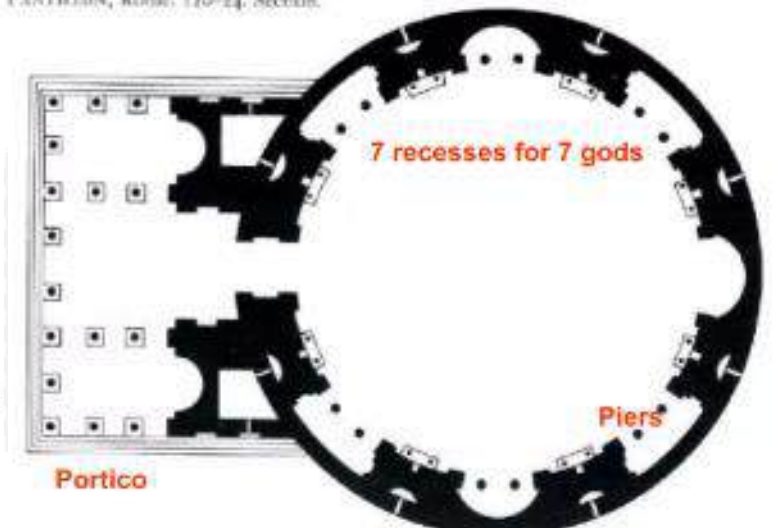
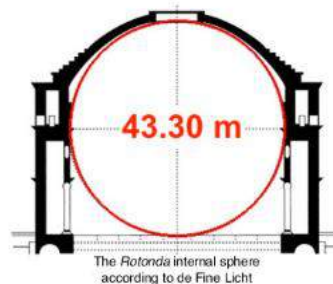
The Pantheon of Rome



The dome of the Pantheon in Rome is one of the largest domes in the world in terms of **unreinforced diameter**. It measures approximately 43.3 meters in diameter. Designed and built by the Roman architect Apollodorus of Damascus, the dome of the Pantheon is a remarkable feat of engineering that dates from the 2nd century.

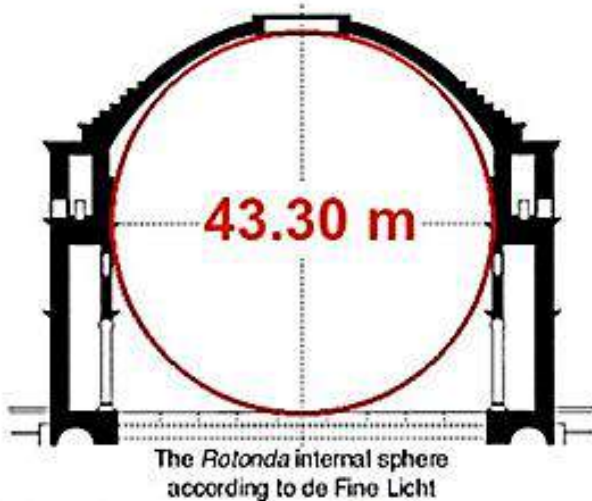
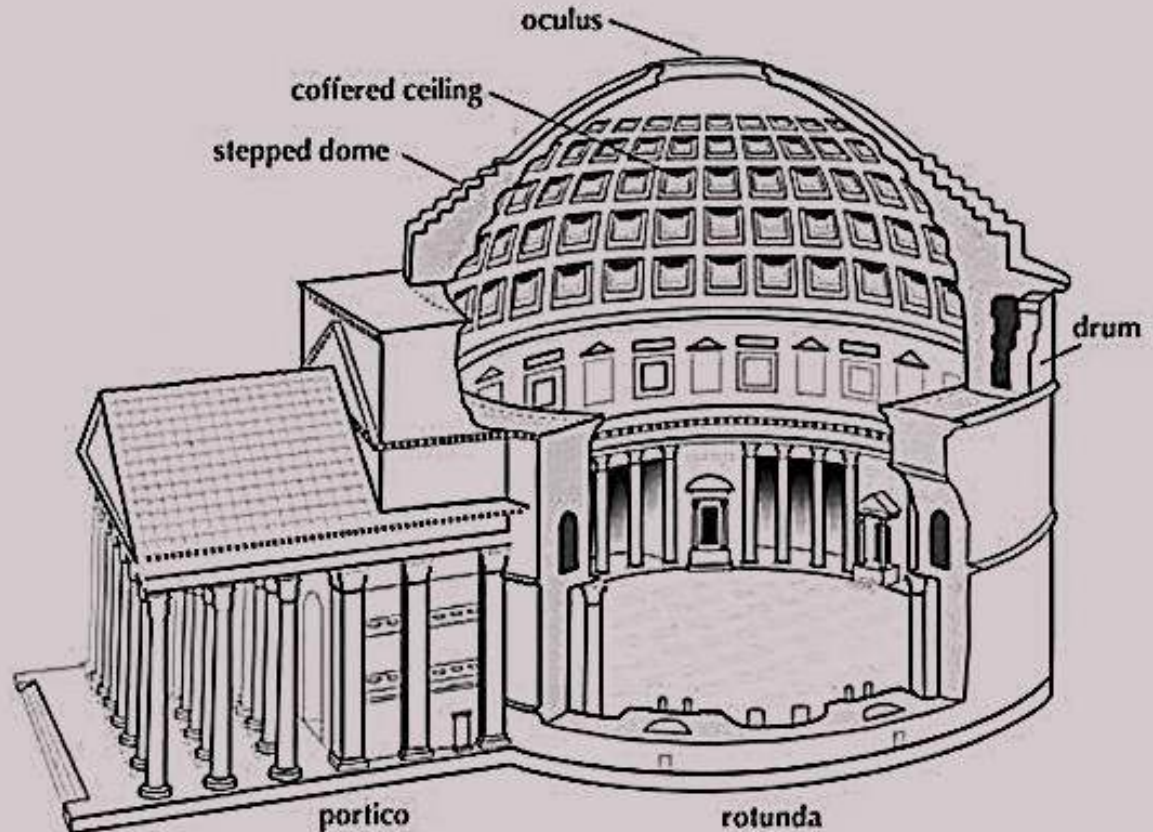


Alamy
DAMASCUS: Roman architect
Bridg
PANTHEON, Rome: 110-124. Section.



The Roman Temple

The most famous Temple/ Pantheon of Rome



The current structure of the Pantheon was built by the Emperor Hadrian between 118 and 125 AD. Hadrian retained the original facade of the Pantheon, but the interior and the dome were entirely reconstructed.

The Roman Civic Architecture

The Basilica

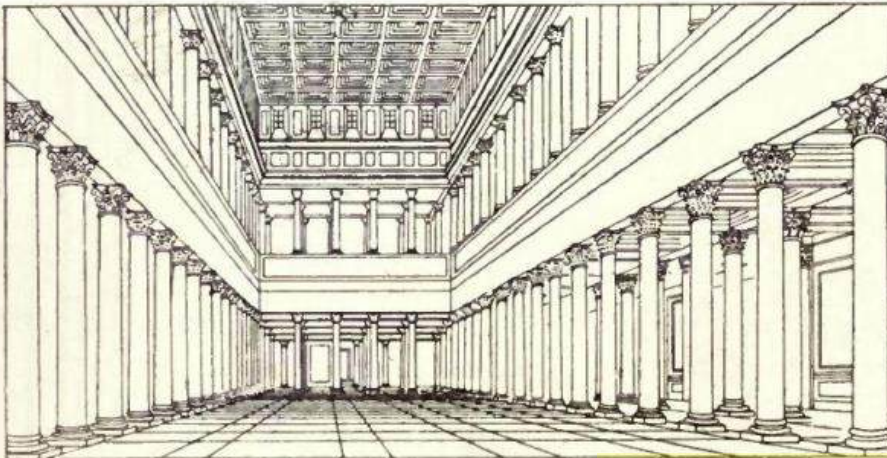
Basilicas were established as halls of justice and exchanges for merchants.

It was usually a rectangular building, with two or four rows of columns.

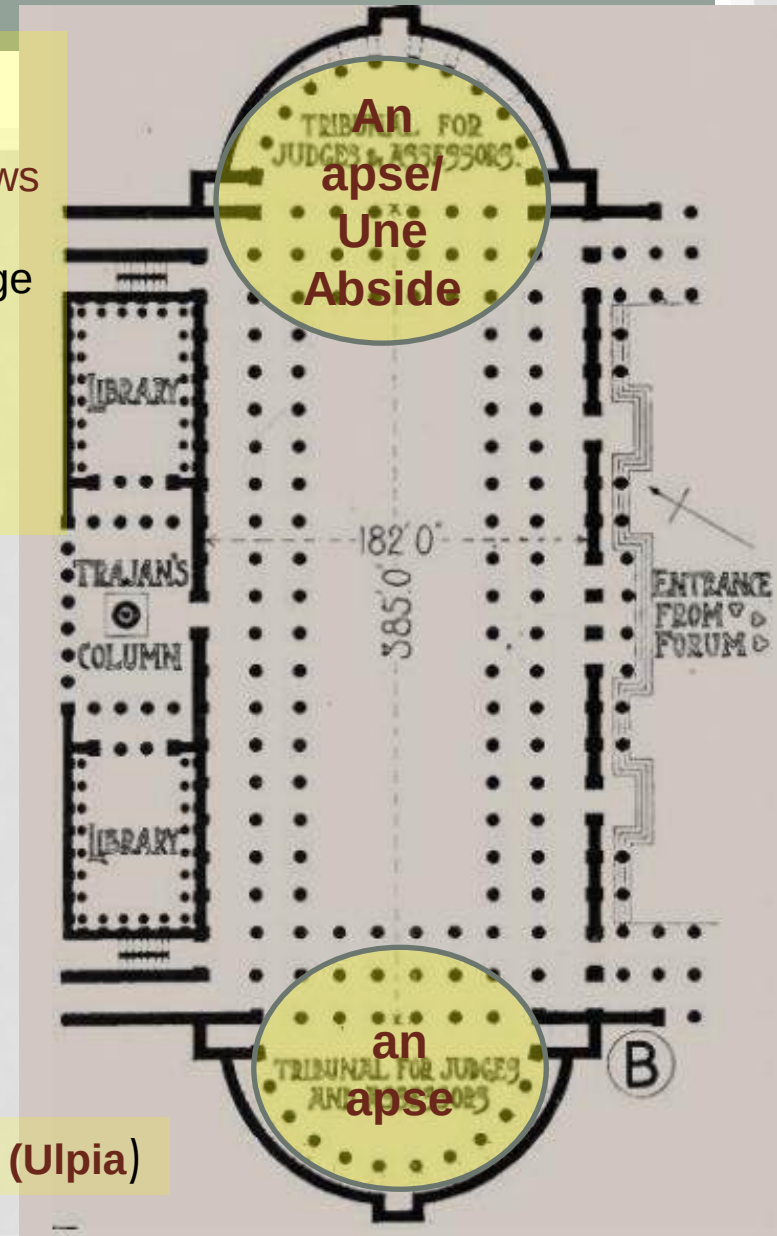
The end was a semi-circular sanctuary in which the judge would sit. **This part is called an apse.**

The roof was made of wood, flat or gabled.

The entrances were on the sides of the building.

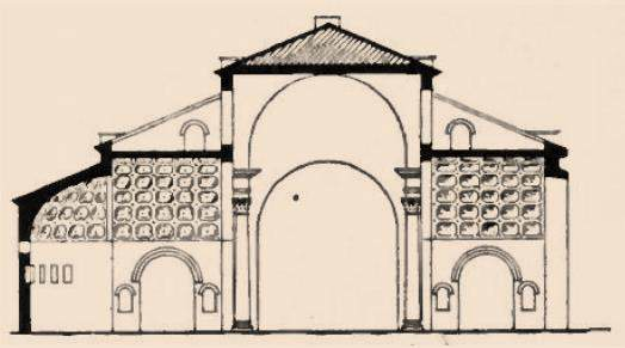
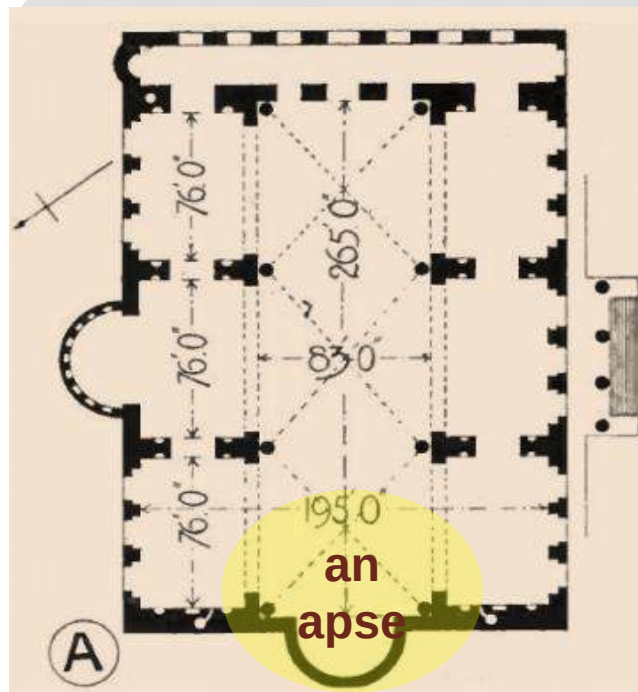


Basilica of Trajan (Ulpia)

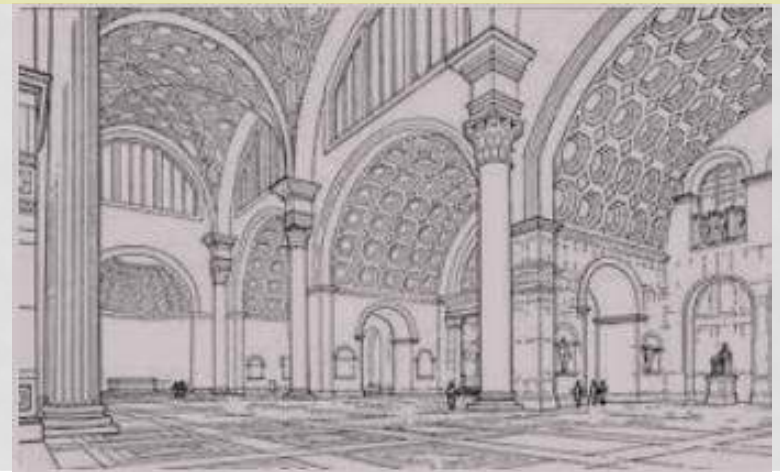
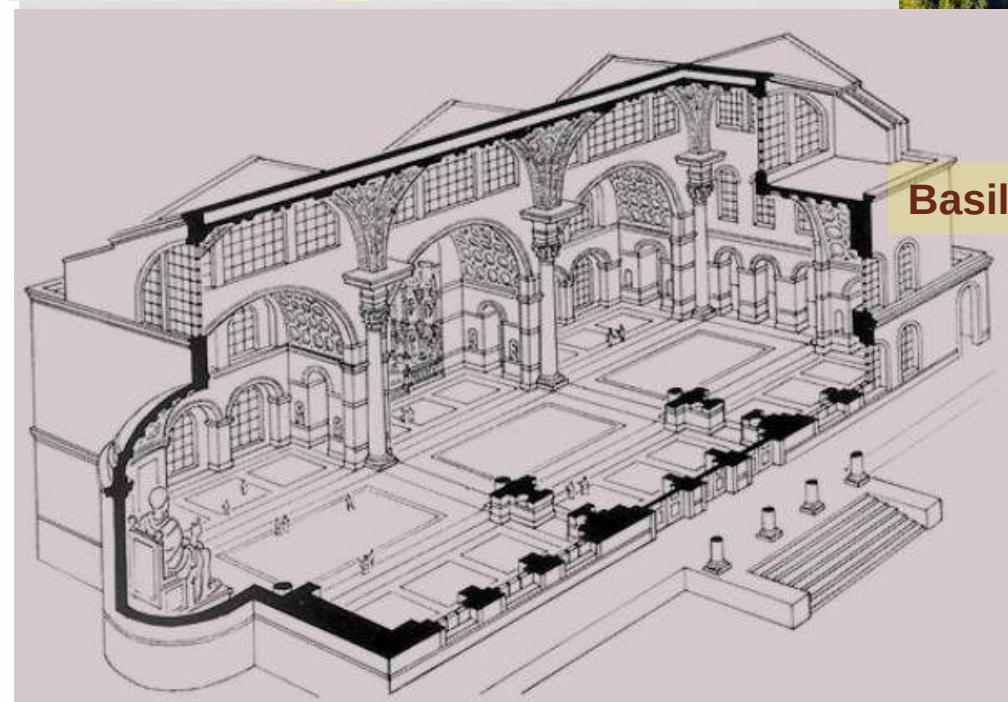


The Roman Civic Architecture

The Basilica



Basilica of Constantine and Maxentius at Rome





The Roman Civic Architecture

The Thermae or public baths

Thermae were distinctive and innovative Roman buildings.

These were multi-functional buildings, where cleaning was the main one.

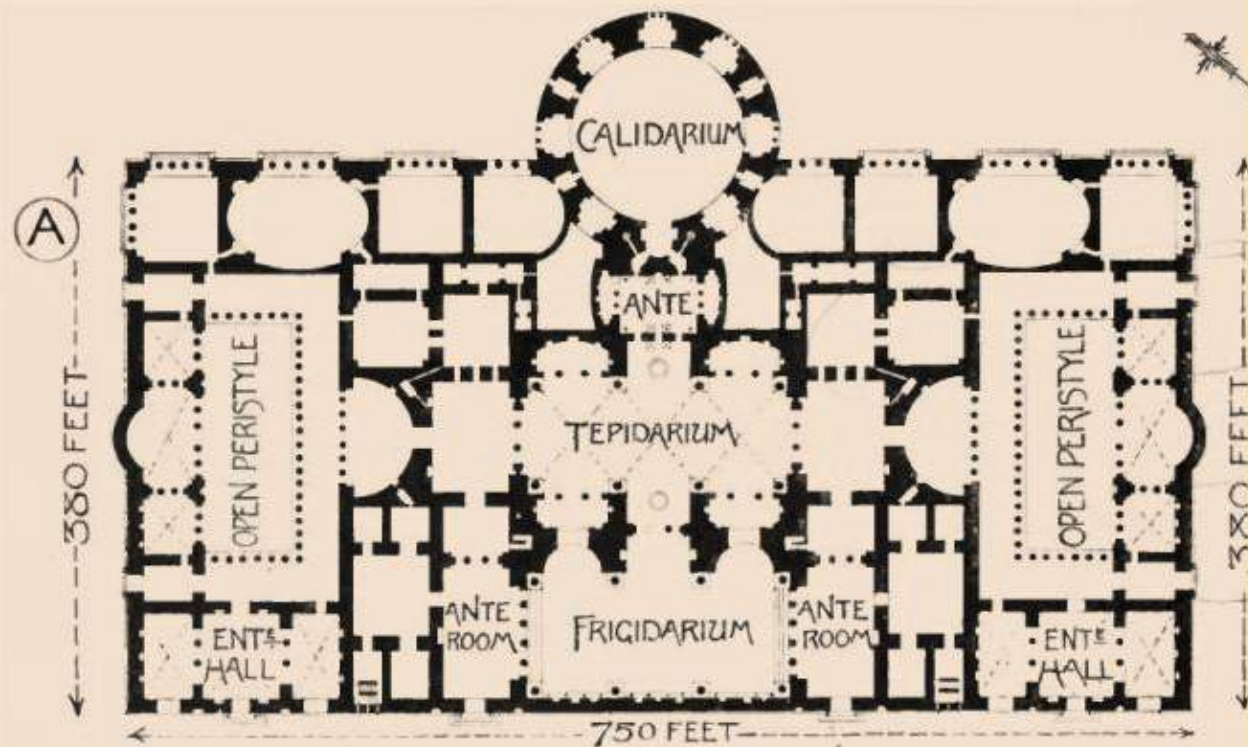
The baths were **heated by a hypocaust system.**

• **Usually a Roman bath would consist the following parts:**

• **The central block:** contains the warm bath(**Tepidarium**), hot bath (**Caldarium**) and the cold bath(**Frigidarium**) .

• **The courtyard:** this was a large open space, with suitable sitting areas where spectators would watch sport events and wrestling.

• **Surrounding apartments:** here people would listen to lectures in history and philosophy, and deep discussions and conversations took place.



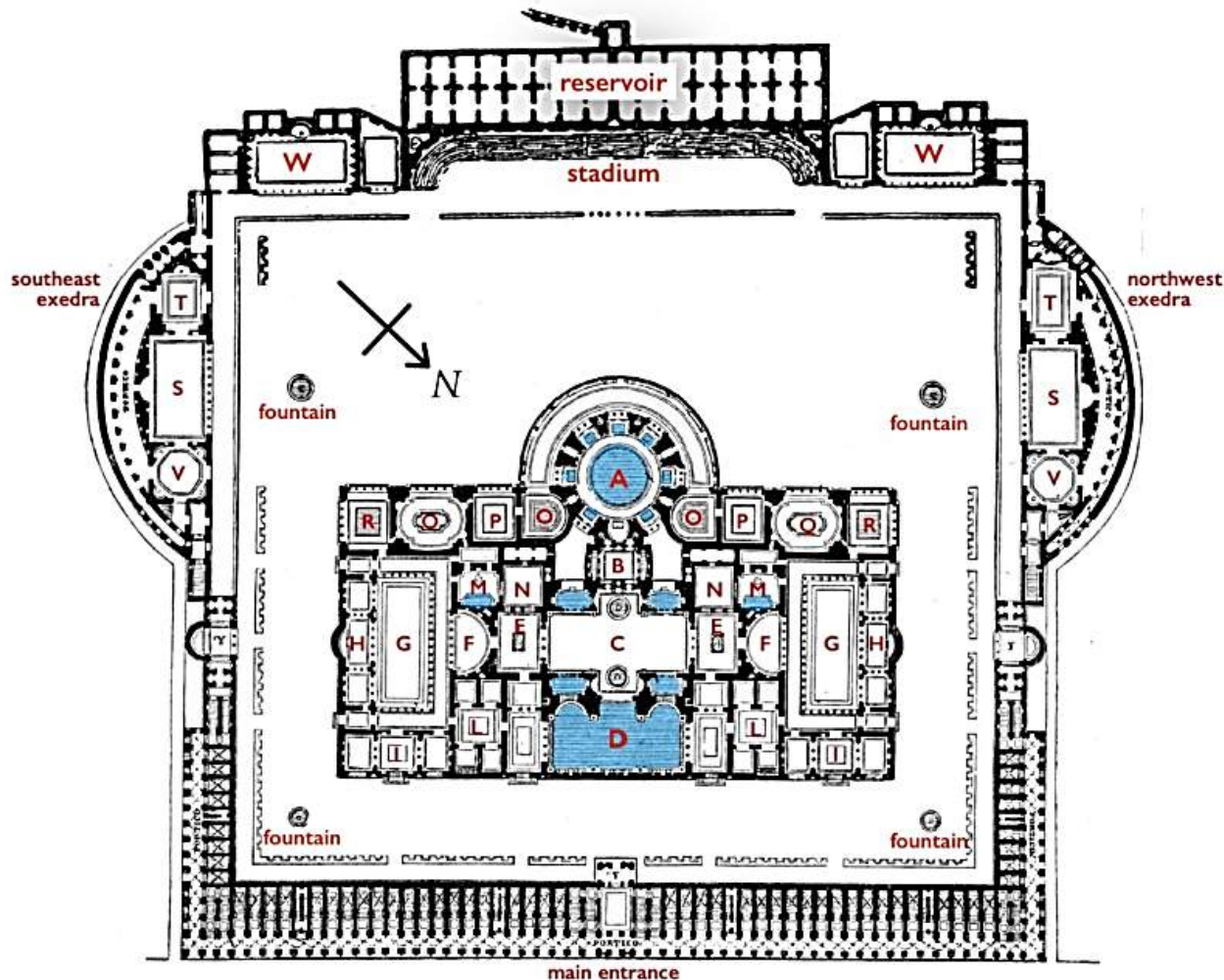
BATHS OF CARACALLA

THEN AND NOW

The Roman Civic Architecture

The Thermae, More than just Baths

The Famous Baths of Caracalla, Rome



- A. caldarium (hot baths)
- B. tepidarium (warm baths)
- C. Great Hall / frigidarium (cold baths)
- D. natatio (swimming pool)
- E. halls
- F. exedra (semi-circular rooms)
- G and H. palestra (open exercise spaces) and adjoining rooms
- I. entrance
- L. apodyterium (changing room)
- M. steam bath with plunge pool
- N. bath services/massage room
- O, P, Q, and R. steam rooms
- S. gymnasia
- T. lecture hall/study room
- V. nymphaea (fountains or grottos)
- W. library
- X. fountains

The heating system of baths

Hypocaust Floor heating

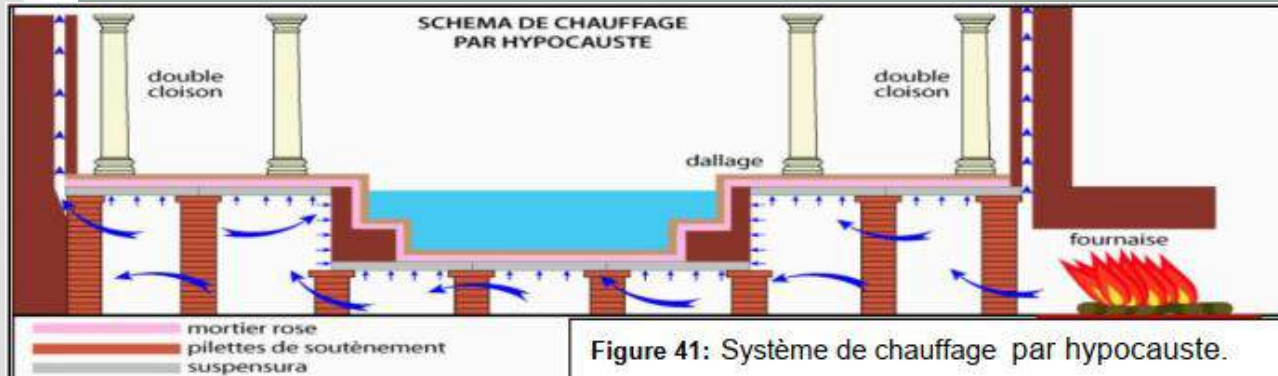
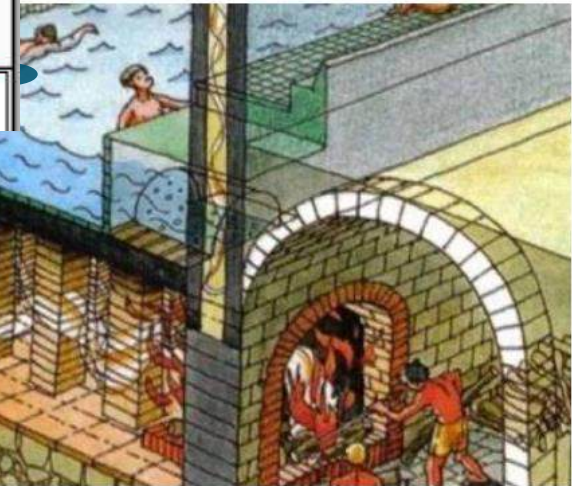
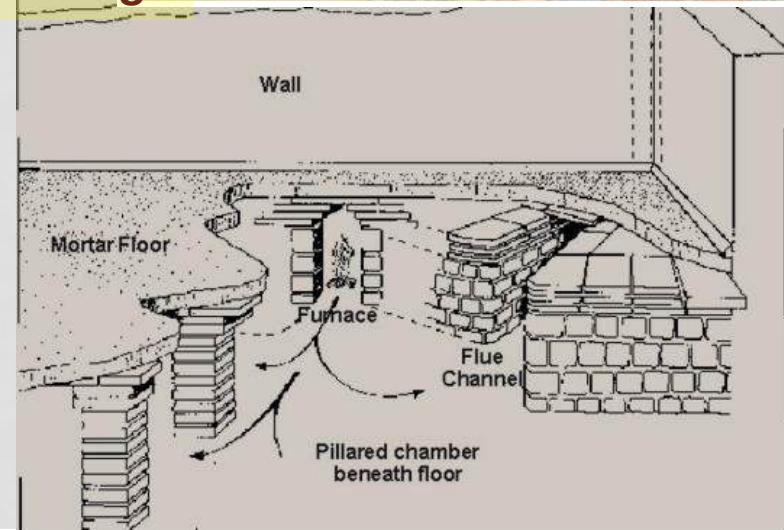


Figure 41: Système de chauffage par hypocauste.



Hypocaust, is a heating system, more common in public baths, used a furnace to force heat into a series of hollow chambers between the ground and the floor, and up pipes in the wall, heating the rooms.

It is considered the world's first central heating.



The Roman Civic Architecture

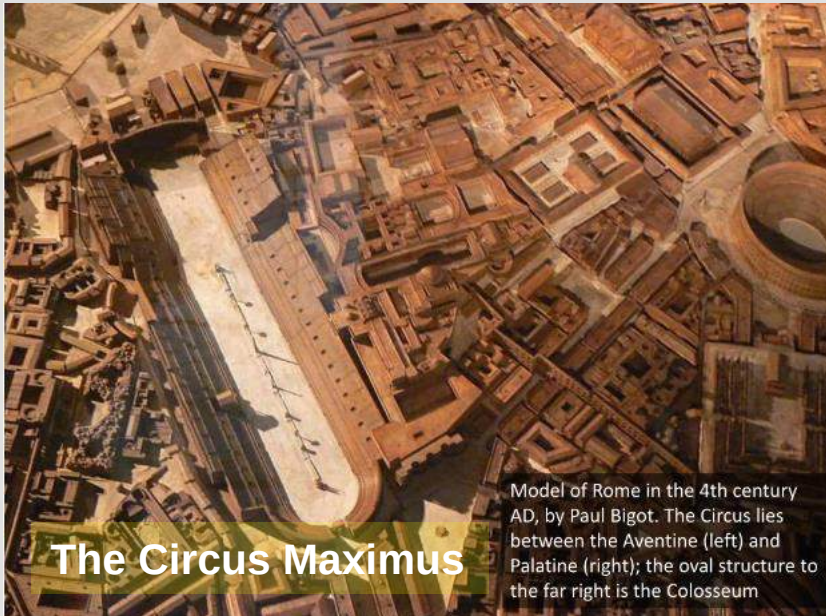
The Amphitheater and Circus Maximus



The Flavian Amphitheatre, more commonly known as the Colosseum

The Colosseum of Rome

- 2nd Century AD 175,000 people received public assistance from the city
- Increased number of annual holidays 169 to 200 annually and high proportion of holidays were devoted to games;
- Recreation centre like Circus Maximus attained dimension of 1962 feet by 654 feet provided seating for 385,000
- The colosseum was designed to accommodate about 50,000 spectators
- Baths including shops, stadia, rest rooms, library, museums and numerous other facilities were present for public



The Circus Maximus

Model of Rome in the 4th century AD, by Paul Bigot. The Circus lies between the Aventine (left) and Palatine (right); the oval structure to the far right is the Colosseum



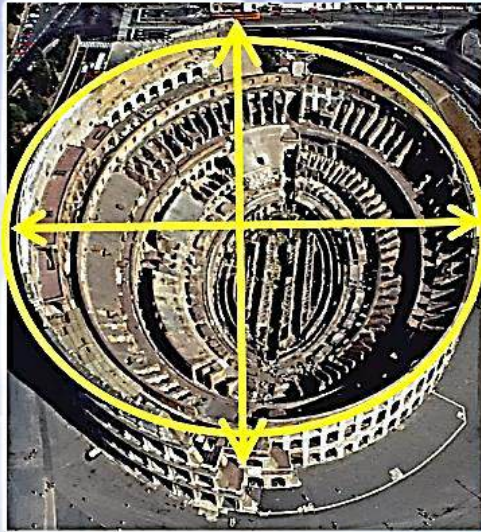
The Roman Civic Architecture

Analysis of The Coliseum

189 meters long

156 meters wide

24,000 square
meters (6 acres)

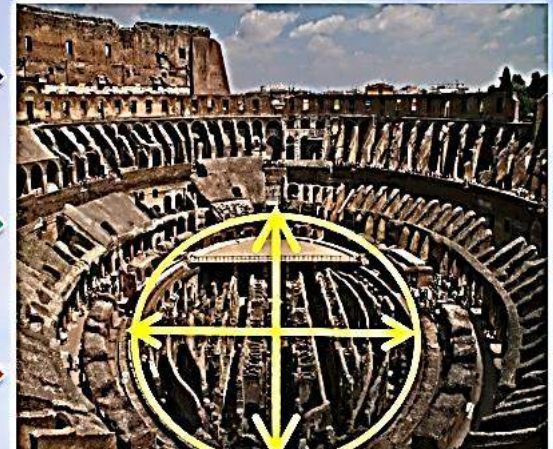


The central arena

an oval

87 meters long

55 meters wide



More than 1.1 million



Stones



Concrete



Bricks

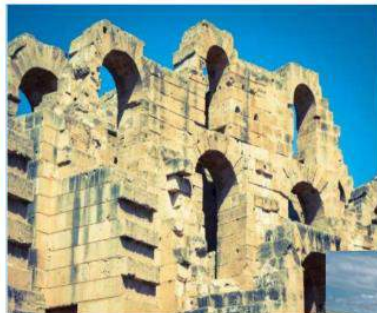
erect this massive structure.

240 mast corbels



about 80 entrances

accommodate 50,000
spectators

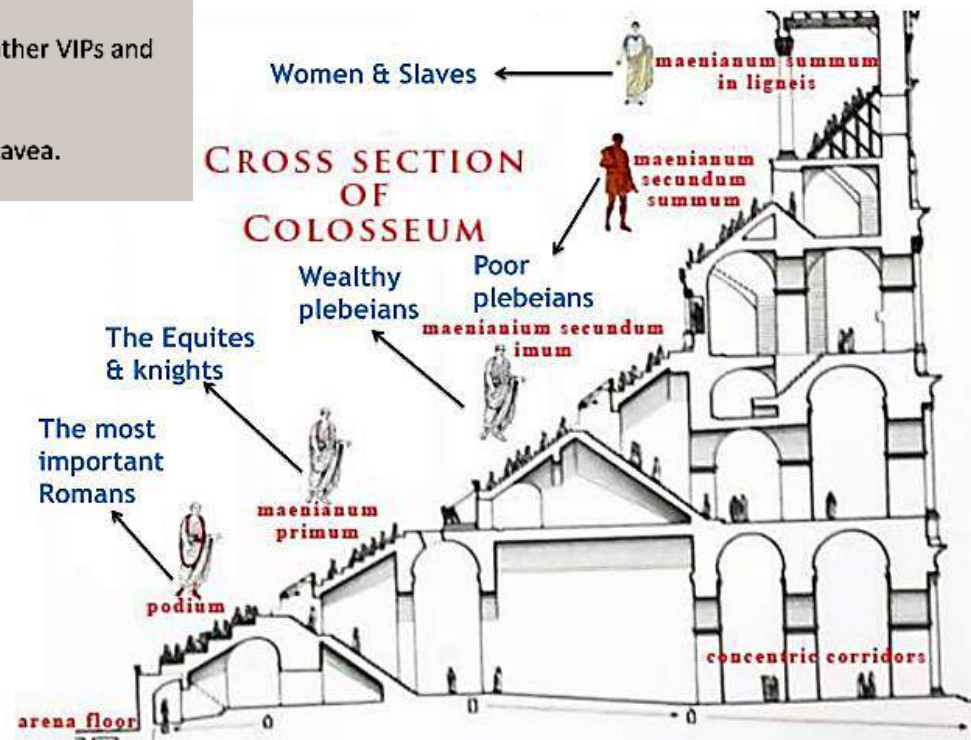


The Roman Civic Architecture

Analysis of The Coliseum

General Features

- Construction was initiated by the Emperor Vespasian around 72 AD. His son Titus reigned over its completion and the official opening ceremonies, about 8 years later, in 80 AD.
- It got its popular name, the Colosseum, because of Nero's colossus (120 ft. high) statue of himself.
- The huge theatre was originally built encompassing four floors. The first three had arched entrances, while the fourth floor utilized rectangular doorways.
- The floors each measured between 10.5-13.9 meters in height.
- The total height of the construction was approximately 48 meters
- The arena measured 79 x 45 meters and consisted of wood and sand.
- The Colosseum had a total spectator capacity of 45,000-55,000.
- The Amphitheatre is built of travertine outside, and of tufa and brick in the interior.
- 100,000 cubic meters of marble
- It has a total of 76 entrances and 4 additional entrances for the emperor, other VIPs and the gladiators
- the entire audience could exit the building in five minutes
- The interior was divided into three parts: the arena, the podium, and the cavea.

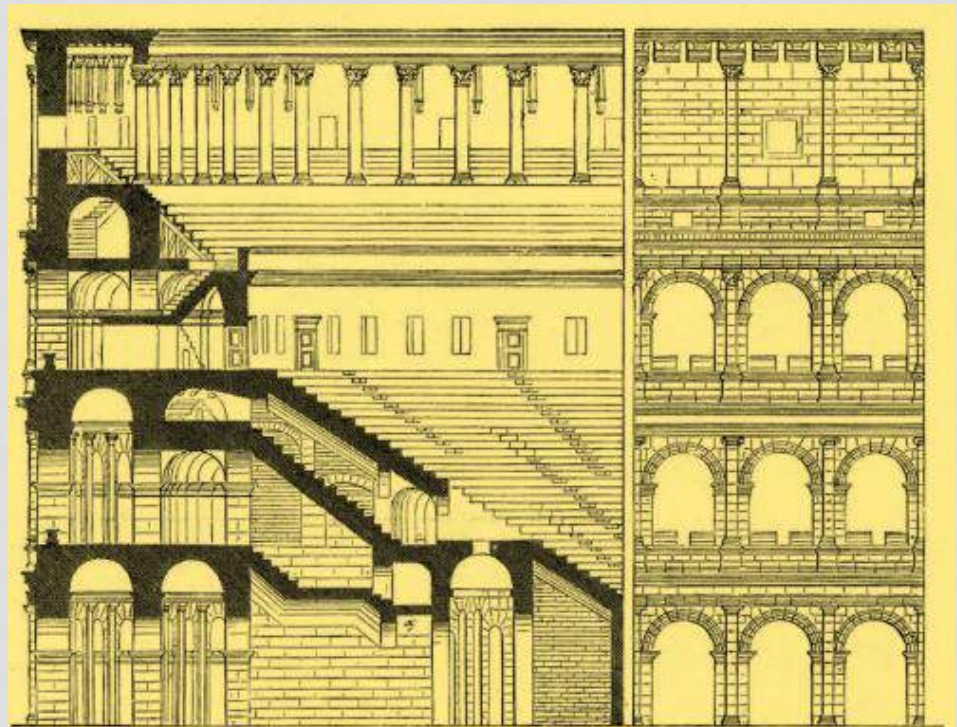
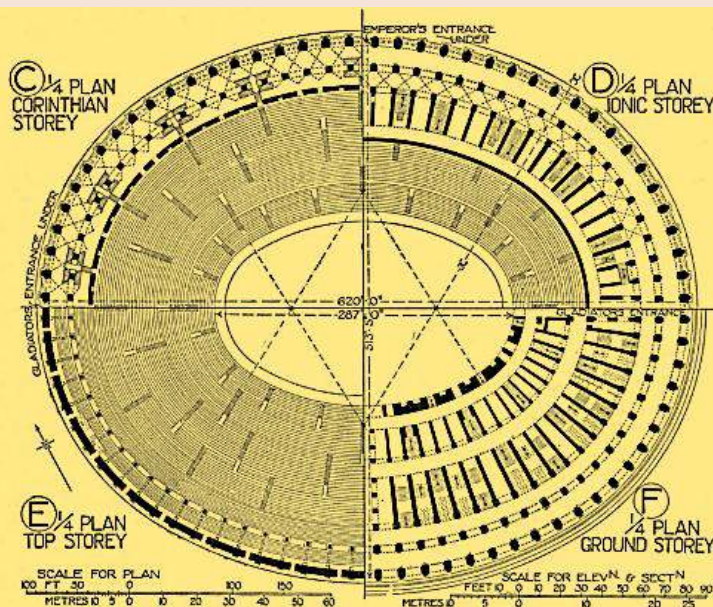


The Roman Civic Architecture

Analysis of The Coliseum

The Colosseum, Rome's most famous amphitheater, could accommodate approximately **50,000 to 80,000 spectators**. Its capacity depended on the nature of the event organized and the temporary arrangements that could be put in place.

The largest stadiums today can accommodate between **80,000 and 90,600 spectators**.



Colosseum. Section and elevation. Begun under Vespasian, finished under Titus 80 A. C.

Challenges of good acoustics, good visibility and good traffic organization. For a number of spectators ranging from 20,000 to 80,000 spectators.

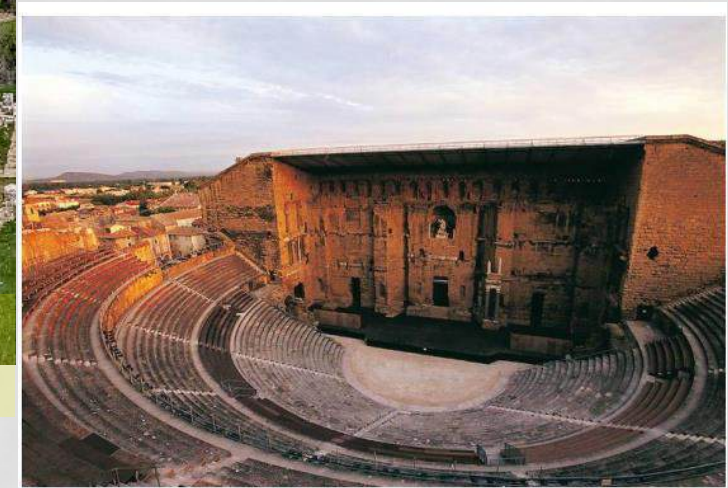
The Roman Civic Architecture

The Theater

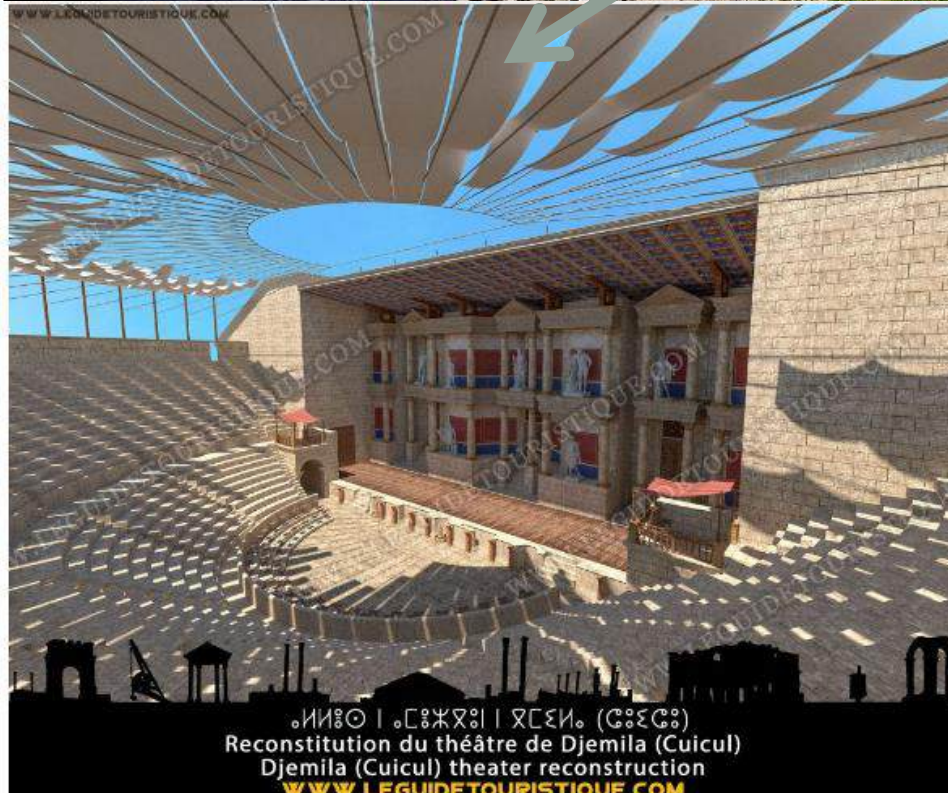
Theaters and amphitheaters had stretched fabric covers.



Theater at
Algeria



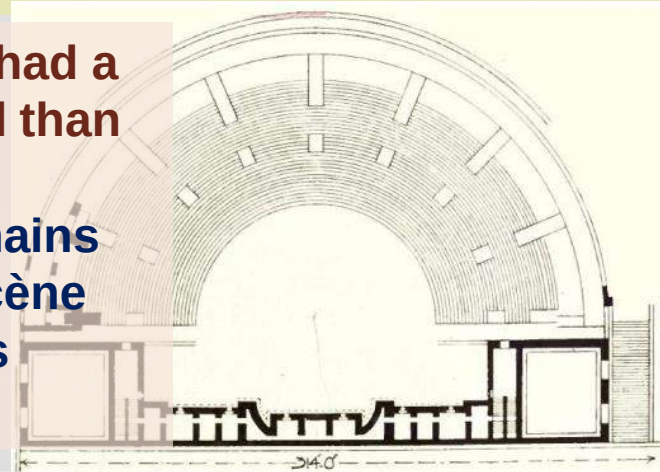
The Roman Theater at Orange,
France



Reconstitution du théâtre de Djemila (Cuicul)
Djemila (Cuicul) theater reconstruction
WWW.LEGUIDETOURISTIQUE.COM

Roman theaters had a stage wall taller than Greek theaters.

Les théâtres romains ont un mur de scène plus haut que les théâtres grecs.



The Roman Civic Architecture

Triumphal arches



Arch of Constantine, 312-315 C.E., and older spolia, marble and porphyry, Rome

The monumental arch stands approximately 20 meters high, 25 meters wide, and 7 meters deep. Three portals punctuate the exceptional width of the arch, each flanked by partially engaged Corinthian columns. The central opening is approximately 12 meters high, above which are identical inscribed marble panels.



vici Vici.org

Arch of Caracalla at Djemila - Vici...

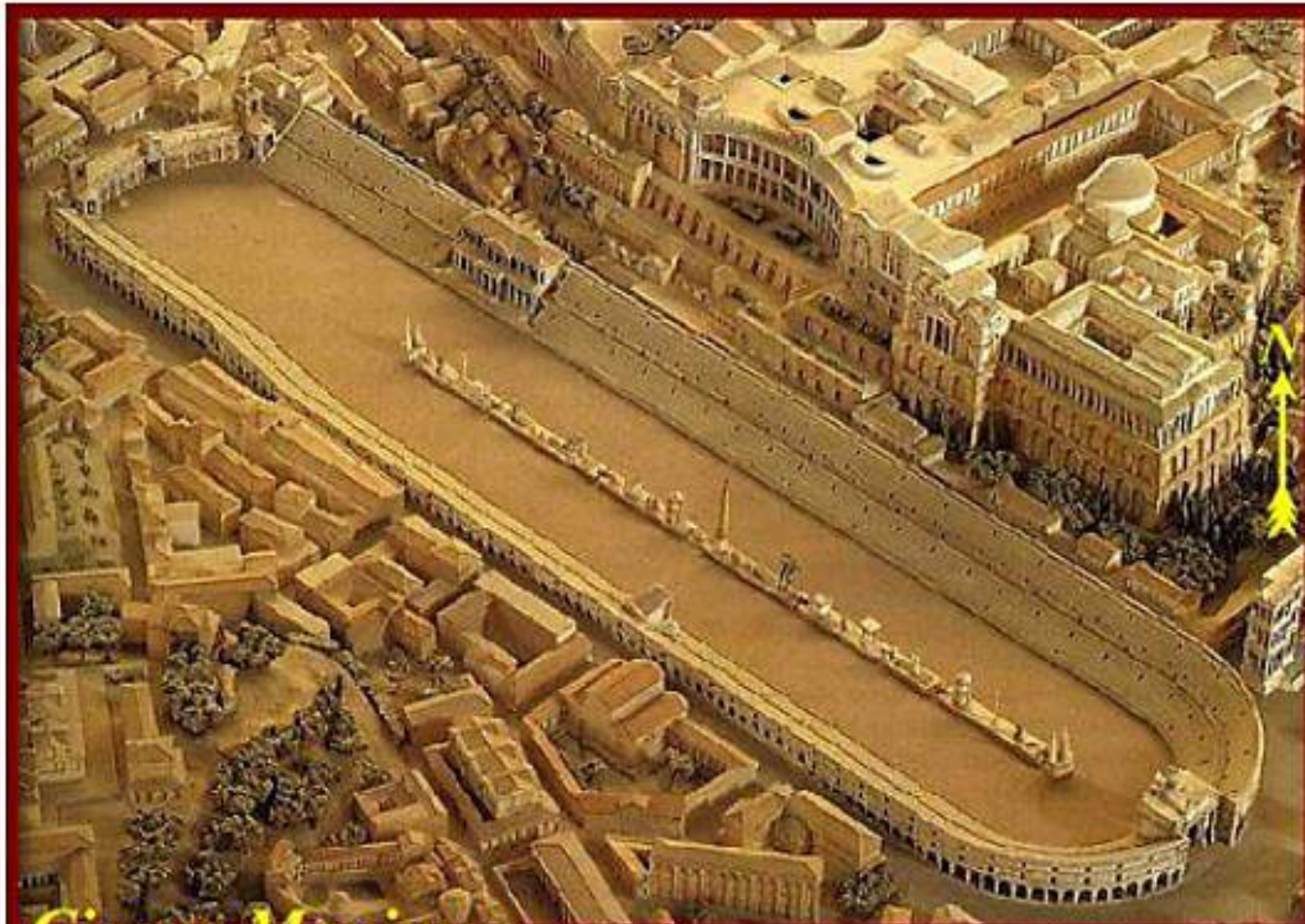


Reddit

Arch of Trajan, Timgad,...

The Roman Civic Architecture

Roman Circus



Circus
Maximus
at Rome

Circus Maximus – Normally a venue for chariot races, the *Circus Maximus* sometimes also hosted combat games. The complex north of the Circus on the Palatine Hill housed the imperial palaces. Buildings to the south are on the Aventine Hill.

The Roman Civic Architecture

Triumphal arch



Arch of Constantine, 315 C.E.

The Roman Civic Architecture

Victory Columns or Triumphal Columns

The most famous triumphal column is the **Trajan's Column, erected in Rome** by Emperor Trajan to commemorate his victories in the Dacian Wars (modern-day Romania) in the early 2nd century.





The Pont du Gard aqueduct, which crosses the river Gardon in southern France, is on UNESCO's list of World Heritage Sites.

The Famous Pont du Gard aqueduct, France

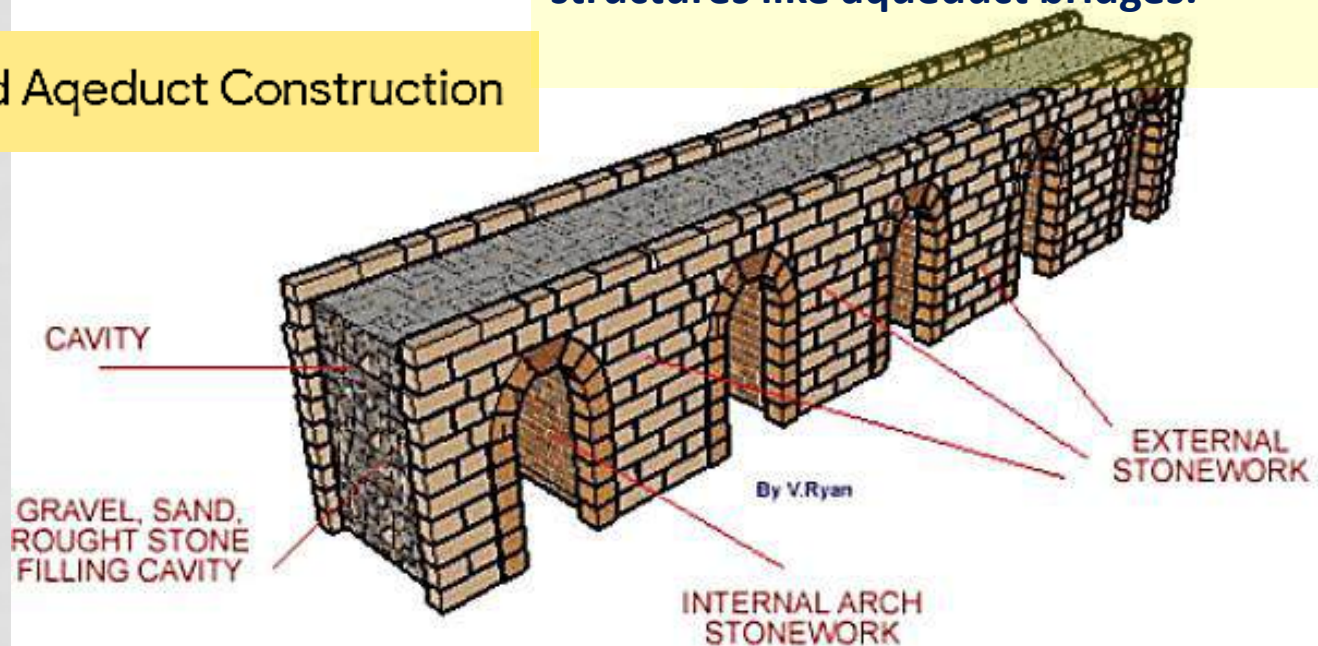
The Roman Urban infrastructure The Aqueduct

An **aqueduct** is a structure designed to **transport water** over long distances, typically from a water source to a specific destination such as a city, industrial site, or irrigation system.

Aqueducts took various forms, including **earthen channels**, **underground conduits**, **tunnels carved into rock**, or **elevated structures like aqueduct bridges**.

Roman Bridge and Aqeduct Construction

water is transported by natural gravity or by siphon technique



The Roman Urban infrastructure

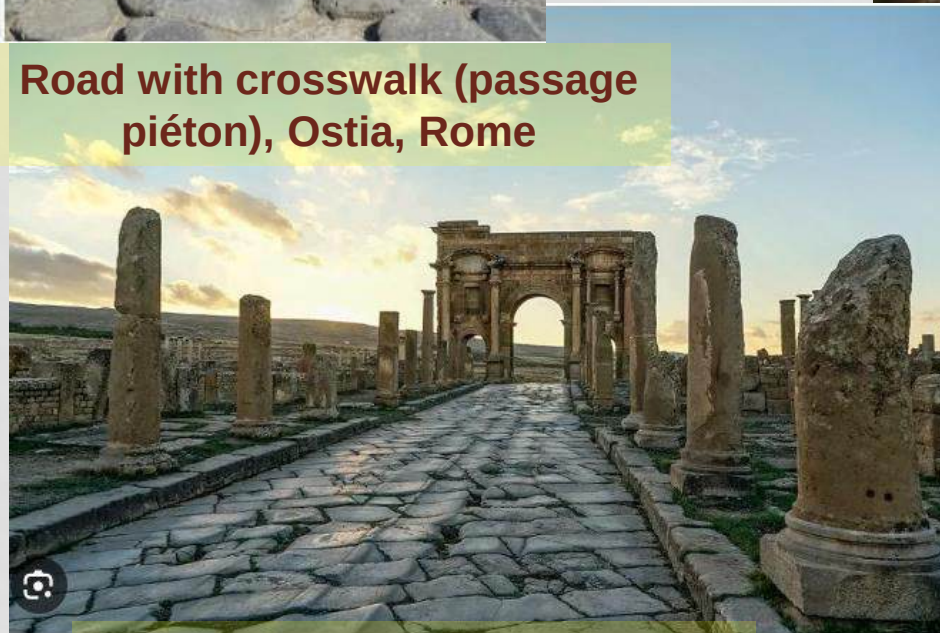
The Roads



Road with crosswalk (passage piéton), Ostia, Rome



Remains of the Roman City of Hippone, Annaba, Algeria



The road of Cardo, Timgad, Algeria

The roads are made of stone paving and with curbs. Designed to withstand the load of carts.

Les routes sont réalisées en pavé de pierre et avec des bordures de trottoirs. Conçues pour résister à la charge des charrettes .

The Roman Urban infrastructure

The Roman road network



Ancient road trip
“All roads lead to Rome”

Examination of the domestic architecture

House types

Roman Houses

The Romans lived in a wide variety of homes, depending on whether they were poor or wealthy.

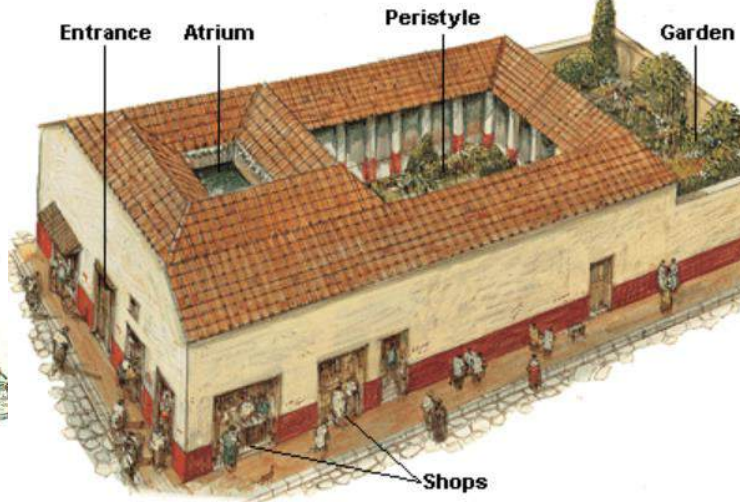
The three types of houses were *insulae*, *domus*, and *villa*.

Roman Houses types

Insulae

Domus

Villas



Examination of the domestic architecture

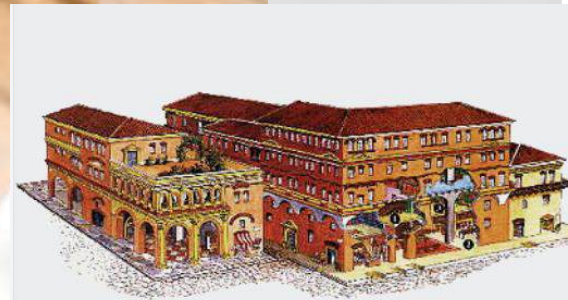
The Roman Houses

Insula

Insulae

The majority of the people living in Roman cities lived in cramped apartment buildings called Insulae. They were normally 3 to 5 stories high and accommodated 30 to 50 people. The individual apartments usually consisted of 2 rooms.

The bottom floor of the insulae often housed shops and stores. Insulae were often not constructed well and could be dangerous if the building were to catch fire or collapse.



Examination of the domestic architecture

The Roman Houses

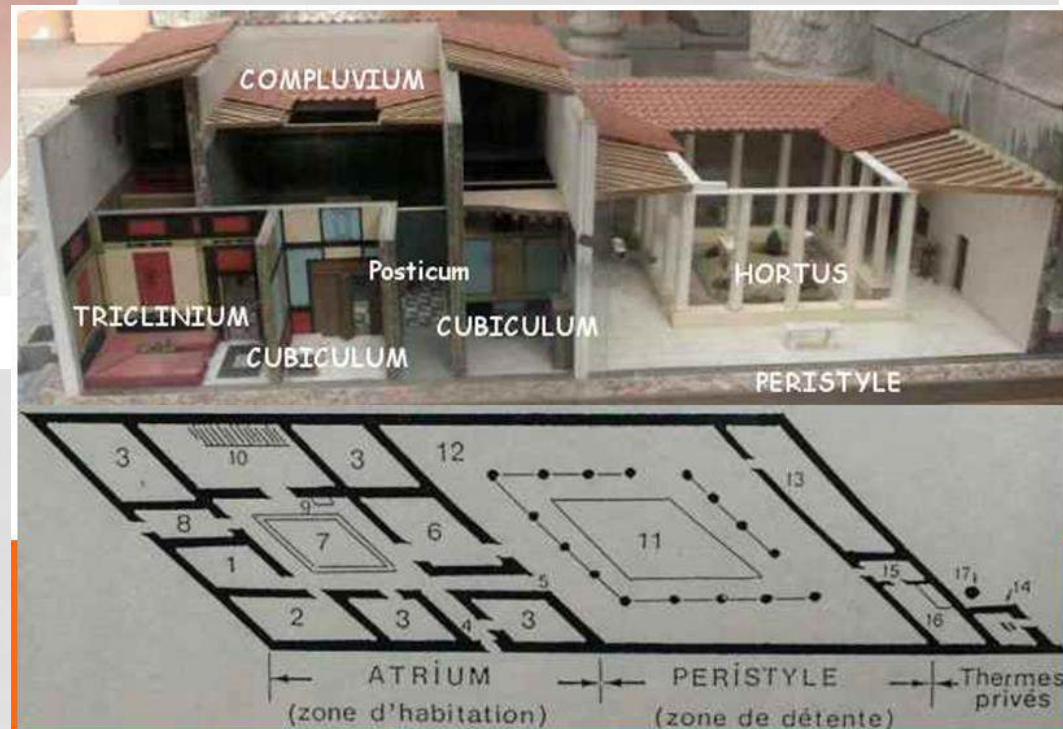
Domus

Domus

The wealthy or rich Romans lived in domus. They were safer, larger, and cleaner than Insulae. Most Roman houses had similar rooms and features. The entryway that led to the main area of the house was the *atrium*. The *cubiculum* (bedrooms), *triclinium* (dining room), and *culina* (kitchen) might be off to the sides of the *atrium*. Beyond the *atrium* might be the study/office. In the back of the home, there was often the *hortus* (garden).



The main parts of the domus

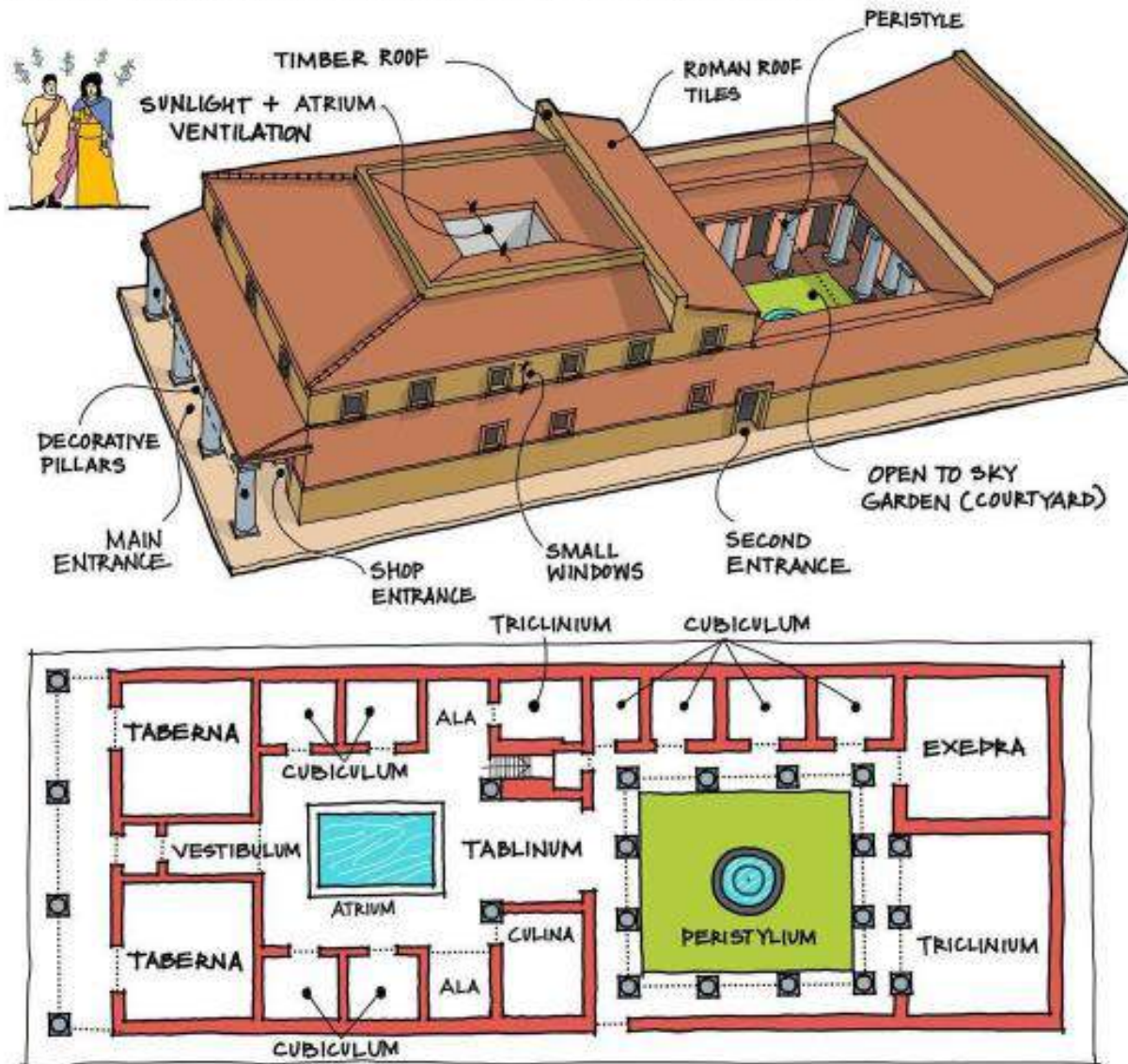


Examination of the domestic architecture

The Roman Houses

Domus

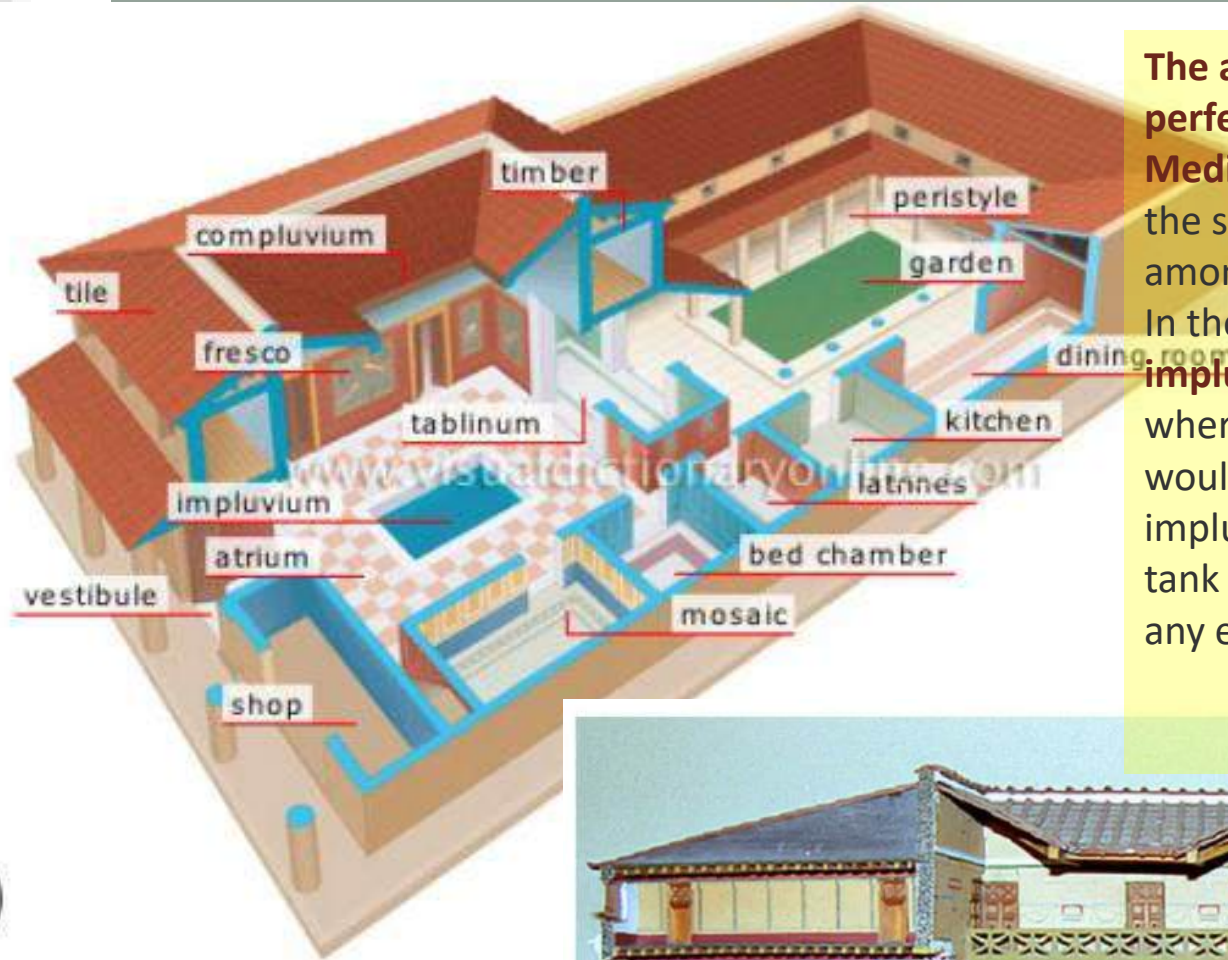
RICH ROMANS HOUSE (DOMUS) @07SKETCHES



Early Roman houses grouped around the **atrium**, with a small **garden, the so-called hortus**, at the back. The classic Roman house, however, was divided into two parts. The first part grouped around **the atrium**, the second around the **peristylum**. The peristylum having developed out of the earlier hortus.

Examination of the domestic architecture

The Roman Houses



The atrium and the peristylum were perfect adaptations to the heat of the **Mediterranean**. They were open to the sky, letting fresh air in to circulate among the corridors and rooms. In the atrium **a small pool, the impluvium would catch the rainwater**, whereas in the peristylum, the rain would water the plants. Further to the impluvium there was an underground tank connected to it which could catch any excess rainwater.



Vestibulum

Fauces

Atrium

Ala

Tablinum

Peristylum

Examination of the domestic architecture

The Roman Houses Villas

Villas

the poor and slaves lived in small shacks or small shacks in the countryside, but the wealthy lived in large expensive homes called *villas*. *Villas* were often much larger and comfortable than city houses.

They had many rooms such as the servants' quarters, courtyards, baths, pools, storage rooms, exercise rooms, and gardens. They also had more modern comforts like heated floors and indoor plumbing.



Roman Bath House Still in Use After 2,000
Years in Algeria

Examination of the domestic architecture

The Roman Houses Villas

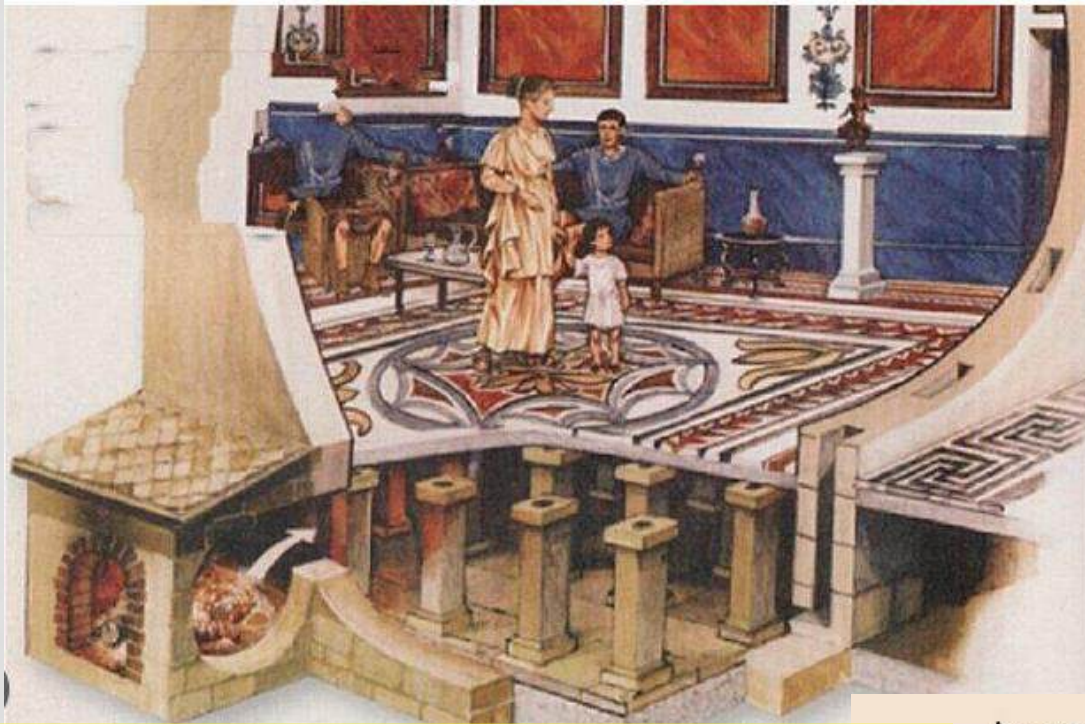


Private thermae

Farm

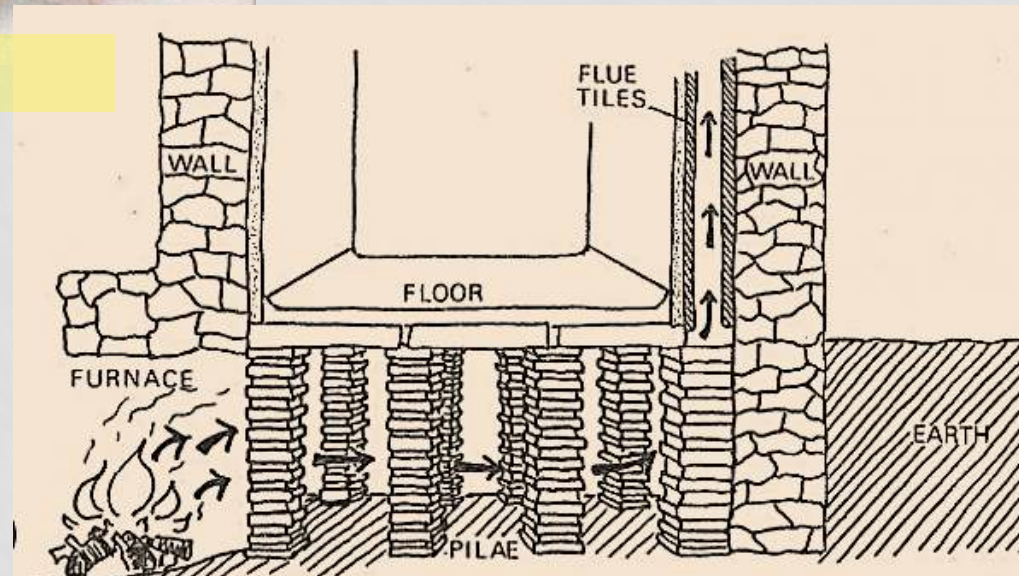
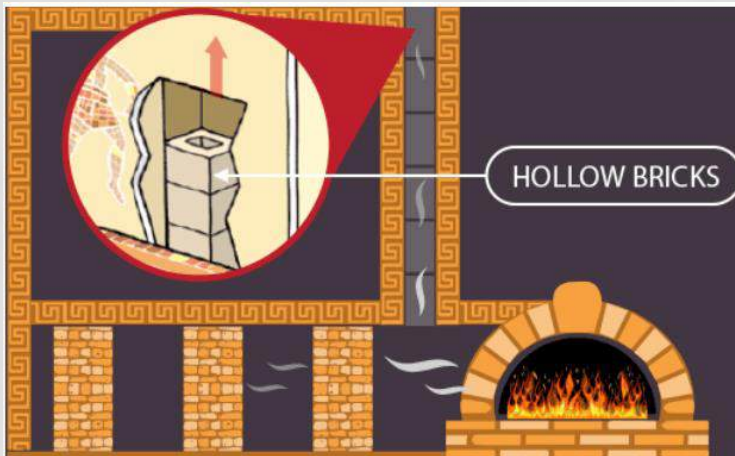
Examination of the domestic architecture

The Roman Houses Floor heating



When the Romans built their houses in northern Italy or the northern European provinces, they adopted a system of heating, circulating warm air under the floors and along the walls.

It is also an adopted system in villas.



Roman urban planning and organization

Adaptation of the Greek grid plan



Newly-created towns followed a similar plan:

- Square/rectangular shape
- Surrounded by walls
- Two central roads:
 - *Cardum* – North/South
 - *Decumanus* – East/West
- Central square, *forum*
- Streets forming a grid

Roman urban planning and organization

The urban form components

- Town grew beyond the defensive walls of the hills and spread on the lower areas;
- Intrinsic natural deficiencies: Flooding, Disease, River pollution, drinking water problem, poor bearing capacity, hilly topography etc.
- Man induced constraints: Large scale sewer, aqueduct system;

Urban Form Components

- Recreation
- Fortifications
- Street Systems
- Housing
- Markets
- City Centre



Roman use of street pattern as module

- ✓ to achieve a sense of overpowering grandeur
- ✓ made for military government

street are built first; buildings came later

Greek use of house as module for town planning

Roman use of street pattern as module

- ✓ to achieve a sense of overpowering grandeur
- ✓ made for military government

.... In Synthesis

Roman architectural influence and differentiation

Elements of Roman architecture show very significant Greek influence.

However, Roman functional needs sometimes differed, resulting in interesting innovations. The Romans were less attached to "ideal" forms and extended Greek ideas to make them more functional.

Romans needed interior space for worship, whereas the Greeks worshipped outside. Their solution was to extend the walls outward, creating engaged columns, while maintaining the same basic shape.

The Romans adopted and adapted architectural elements from various cultures, incorporating Greek, Etruscan, and Egyptian influences into their own style. This ability to assimilate and enhance contributed to the richness and diversity of Roman architecture

	Greek	Roman
Construction method/material:	Post and lintel/marble.	True arch (barrel/groin vaults)/concrete.
Preferred architectural order:	Doric, Ionic.	Corinthian.
Most famous temple:	Parthenon.	Pantheon.
Dedicated to:	Athena.	"All the gods" (7 planetary gods).
Location:	Athens.	Rome.
Ceremonies took place:	Outside, in front of temple.	Inside.

...In synthesis

The timeless influence of the Greco-Roman Architecture

Influences on Medieval styles, Renaissance and Baroque styles and on Neoclassical styles (for the construction of luxurious palaces, tribunals, town halls....).

The Pantheon has influenced countless architects through the ages, and its design elements can be seen in various structures worldwide.



...In synthesis

The timeless influence of the Greco-Roman Architecture

Inspiration from classical orders in Arab-Muslim styles



...In synthesis

The timeless influence of the Greco-Roman Architecture

Reproduction of Greco-Roman columns in Renaissance and Baroque styles



L'architecture de la Renaissa...
cosmovisions.com



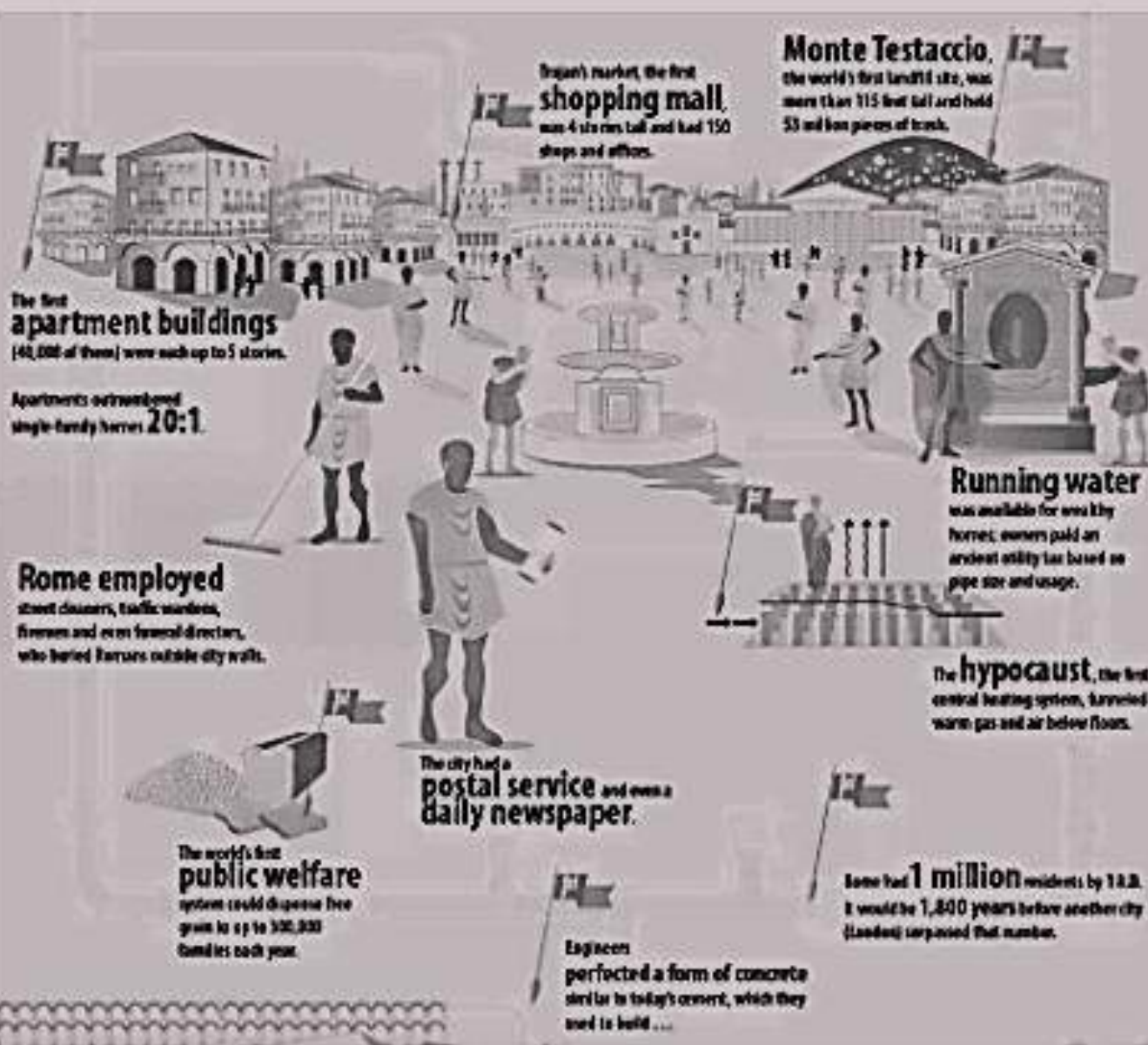
Piliers Baroques, Colonnes Fissurées De L...

Renaissance style columns in the 17th century

.... In Synthesis

Rome lays the Foundations for Modern Life

The Roman urban planning established a model that has influenced many cities throughout history, including the grid layout, the large public square, straight and paved streets, the sewer system, the drinking water supply network, and administrative, sports, and recreational facilities. Roman cities were designed to be functional, clean, aesthetic, and suited to urban life.

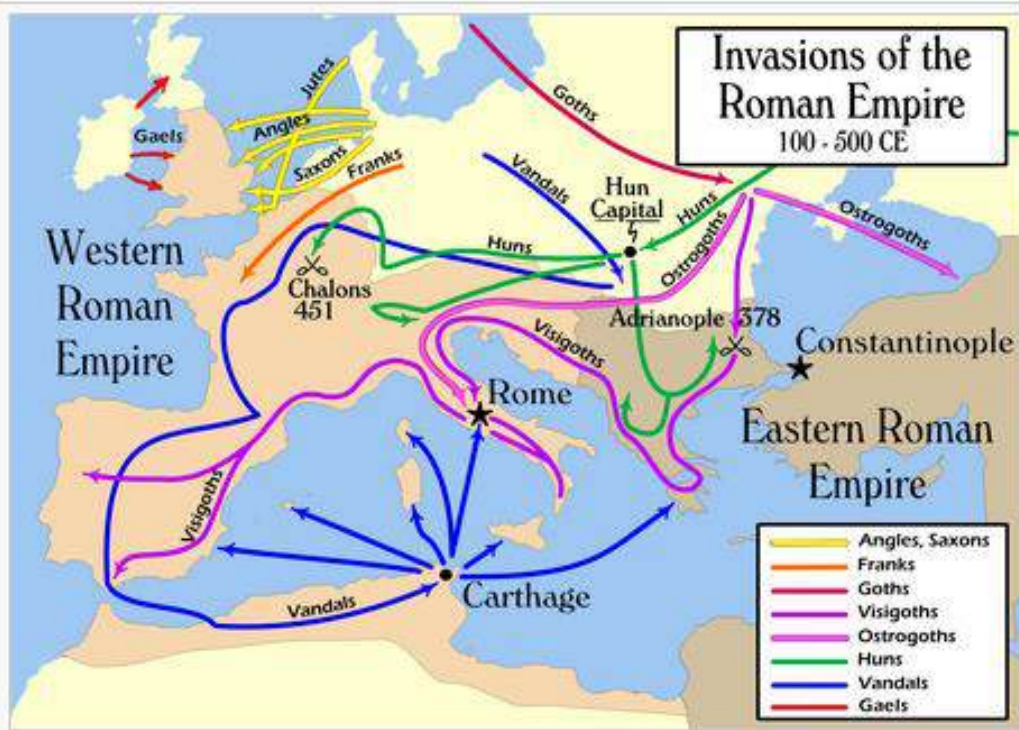


Invasions of the Roman Empire By Vandals

The Fall Of Rome

The Fall of the occidental Roman Empire

The beginning Of The Middle Ages



The **Barbarian Invasions** consisted of the movement of (mainly) ancient **Germanic peoples** into Roman territory. Historically, this event marked the transition between **classical antiquity** and the **Middle Ages**.

Division of the Empire: Emperor Diocletian divided the Roman Empire into the Eastern and Western Roman Empires in the late 3rd century. While the Eastern Roman Empire (Byzantine Empire) thrived for several more centuries, the Western Roman Empire faced greater challenges.

Sack of Rome (410 CE): In 410 CE, the Visigoths, led by Alaric, sacked Rome. This event shocked the Roman world, as it was the first time in nearly 800 years that the city had been successfully invaded.

Fall of Carthage (439 CE) and Rome (476 CE): The fall of Carthage to the Vandals in 439 and the subsequent deposition of the last Roman emperor in the West, Romulus Augustulus, in 476 by the Germanic chieftain Odoacer, are often considered symbolic endpoints of the Western Roman Empire.

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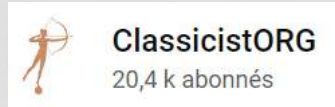
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<https://www.youtube.com/watch?v=1ek1SI1oAwU>

The Classical Influence on Renaissance Architecture

