2nd Year Architecture
2018/2019 second Semester

History of Architecture I

Lecture (6 and 7) :

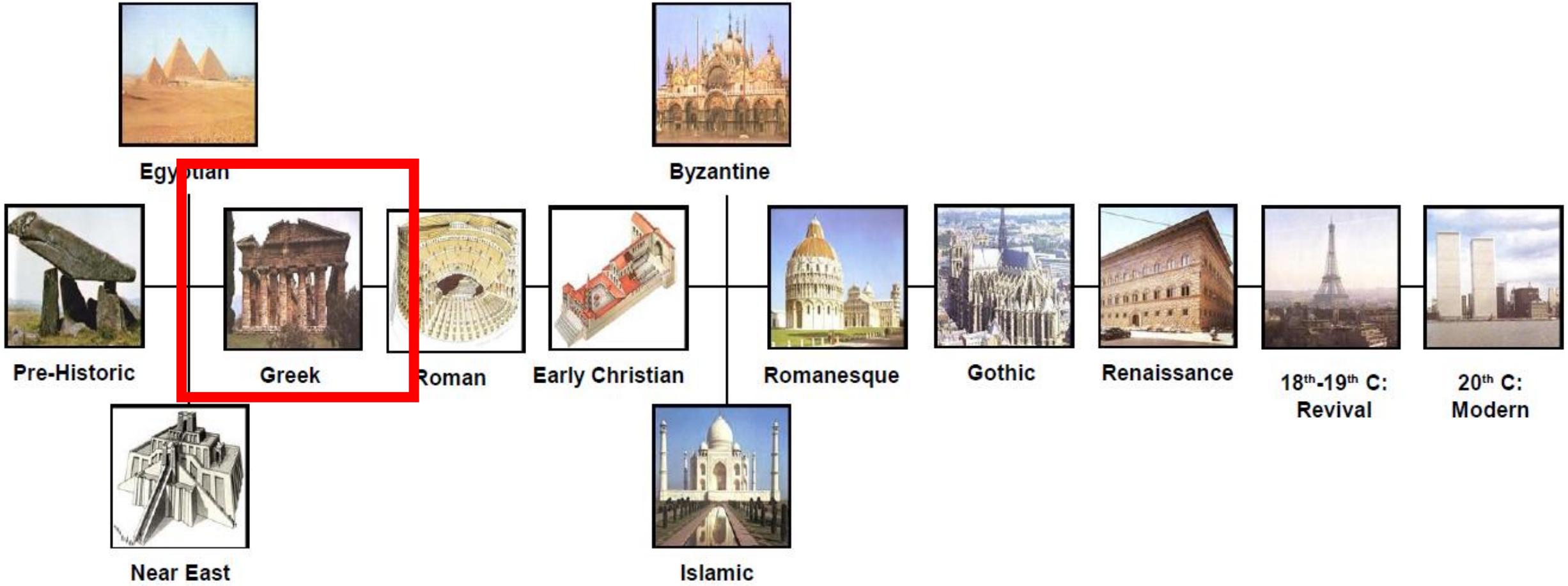
Classic Greek Architecture

by : SEEMA K. ALFARIS

Lecture ’s information

Course name	History of Architecture I
Lecturer	Seema k. Alfaris
Course ’s information	This course traces the history of Architecture from the early developments in the Paleolithic Age (Early Stone Age) to the Rome (16th century)..
The objective	1. Understanding the Greek Architecture , and the factors which shape this Architecture. 2. Understanding The Main Types of buildings that Greek famous with .

The Historical Timeline of Architecture



FACTORS INFLUENCING ARCHITECTURE

Greek and Rome Architecture

CLASSICAL PERIODS – GREEK AND ROMAN

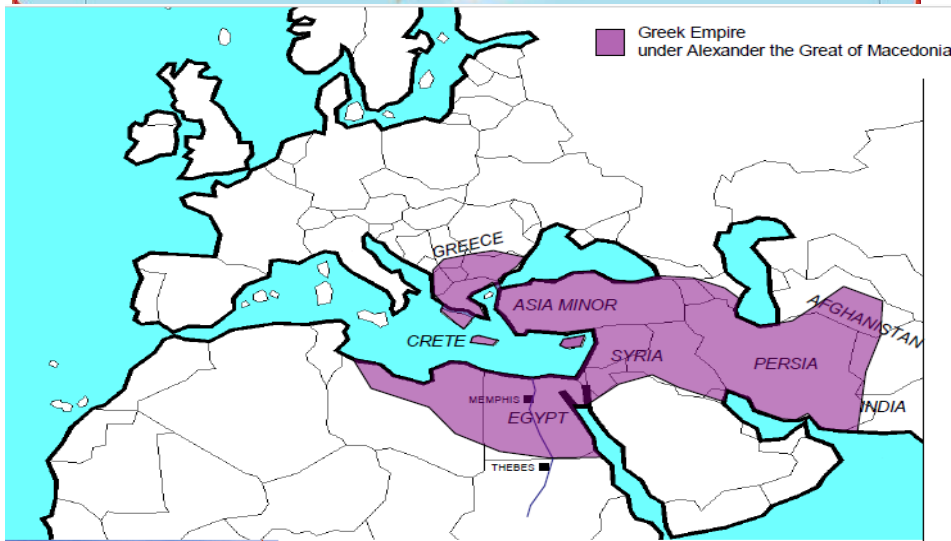
Classical antiquity (also the **classical era**, **classical period** or **classical age**)

- is the period of cultural history between the 8th century BC and the 5th or 6th century AD centered around the Mediterranean Sea, comprising the interlocking civilizations of ancient Greece and ancient Rome, collectively known as the Greco-Roman world.
- It is the **period** in which Greek and Roman society flourished and wielded great influence throughout Europe, North Africa and Western Asia.

Greek Architecture

1. Geographical factor:

- Greek civilization started from group of islands in the Mediterranean Sea .
- Greece has a broken coast line with about **3000 islands**, which made the Greeks into a **sea-faring people**.
- Greek civilization occurred in the area around the Greek mainland, on a peninsula that extends into the Mediterranean Sea .
- **Greek civilization expanded by The colonization of neighboring lands** such as **the Dorian colonies** of **Sicily & the Ionian colonies of Asia minor , and that's the reason of the separation** of Greek civilization.
- In the Hellenistic period, Greek civilization spread to other far away places including Asia Minor and Northern Africa (Libya and Egypt).
- Because of there expansion , Greece and her islands became the controller on the sea trade route and extended to along the whole eastern Mediterranean seaports, which include Asia Minor, Cyprus, Syria, Palestine, Egypt and Libya extending to south Italy and Sicily.



Greek Architecture

1. Geographical factor:

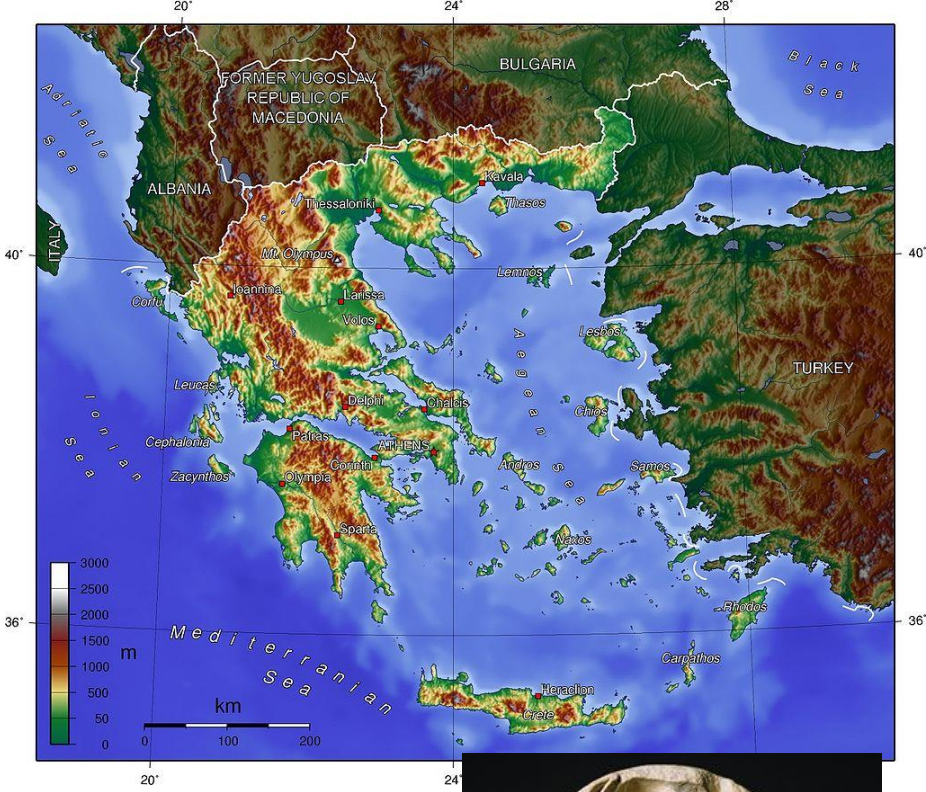
- The civilization grew and expanded, developing a commercial empire protected by **naval power**.
- Crafts, pottery, communications and trade through coastal towns produced a **unity of culture and economic stability**.
- **The rugged nature of Greece and its islands**, with mountainous made the internal communication difficult and made the sea the inevitable means of interrelationship.
- The mountainous character of the country separated the inhabitants into various small groups that led to the evolution of **(city- states)** like Athens, Troy, Delphi etc.

Greek Architecture

2. Geological factor:

- Most of the Greek mainland was **rocky therefore bad for agriculture.**
- Most Greeks therefore lived along the coastline or on islands where the soil was good for farming .

- The Aegean and Mediterranean Seas provided a means of communication and trade with other places
- The chief mineral wealth of Greece was her **marble,(the most beautiful of all building materials that facilitates exactness of line & refinement of detail)** .
- This material is found in great abundance in various parts of Greece, e.g., in the mountains of Hymettus and Pantelakos, a few miles from Athens, and in the islands of Paros and Naxos.



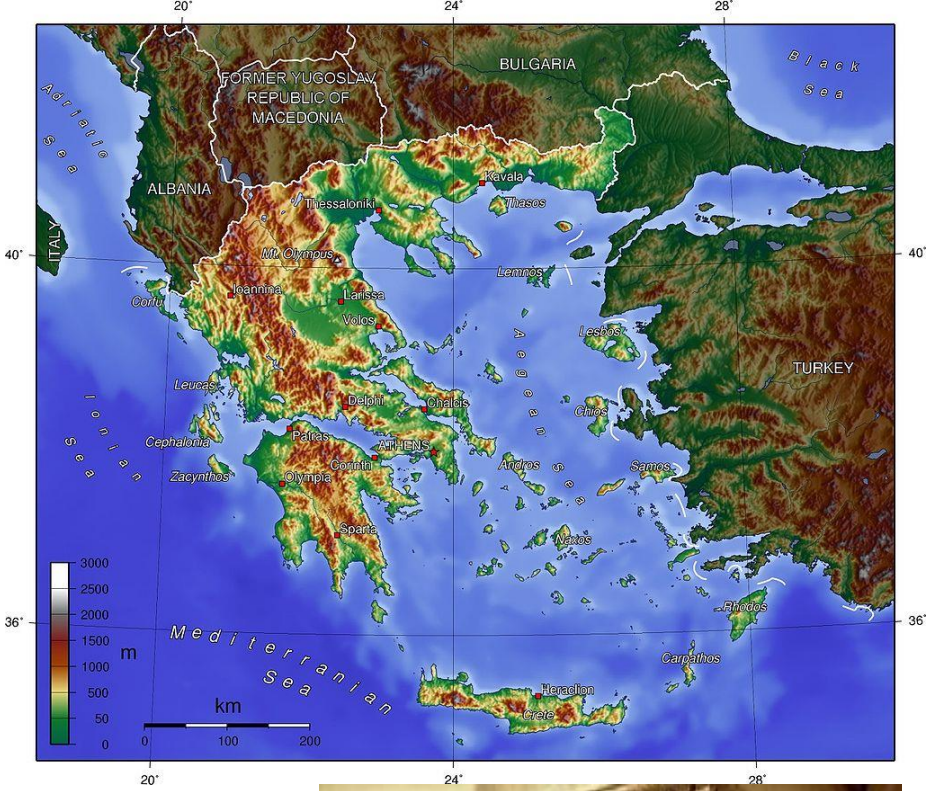
Greek Architecture

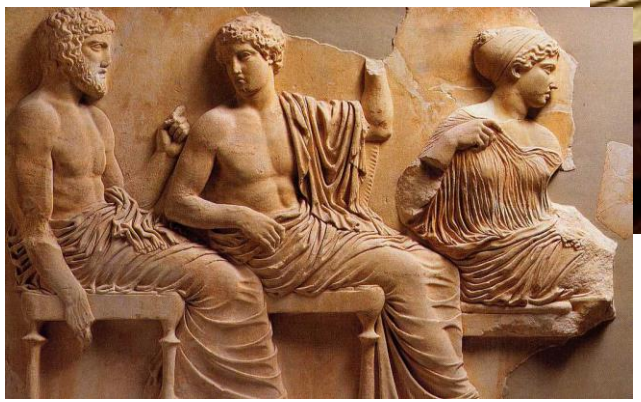
2. Geological factor:

- In the effort to obtain refinement of line and smoothness of **Marble** surface , they applied many **techniques** to the other materials they have :

1. The Greeks coated **coarse limestone** with a layer of marble stucco to achieve the effect of fine grained marble.
2. **Bricks** were used, cases coated with a fine cement formed of marble dust and lime **.**
3. **Marble** itself was often treated in the same way, the cemented marble surface much susceptible of a higher polish than the un-cemented one.

- The country also was also rich in **silver, copper, and iron**.





Greek Architecture

3. Climatic factor:

- The Greek climate is a **pure Mediterranean type of climate(the nice sun and the heavy rains)** that encouraged outdoor activity and made the architecture type opened to outside .
- **That's made the Greek structures tried to be in harmony with the natural landscape**),applied by 2 points :

1. most public ceremonies took place in the open air, which resulted in building types such as **the Greek theatre .**
2. The sunny climate with sudden showers necessitated the **porticoes & colonnades** that were important features of the of the Greek Architecture .

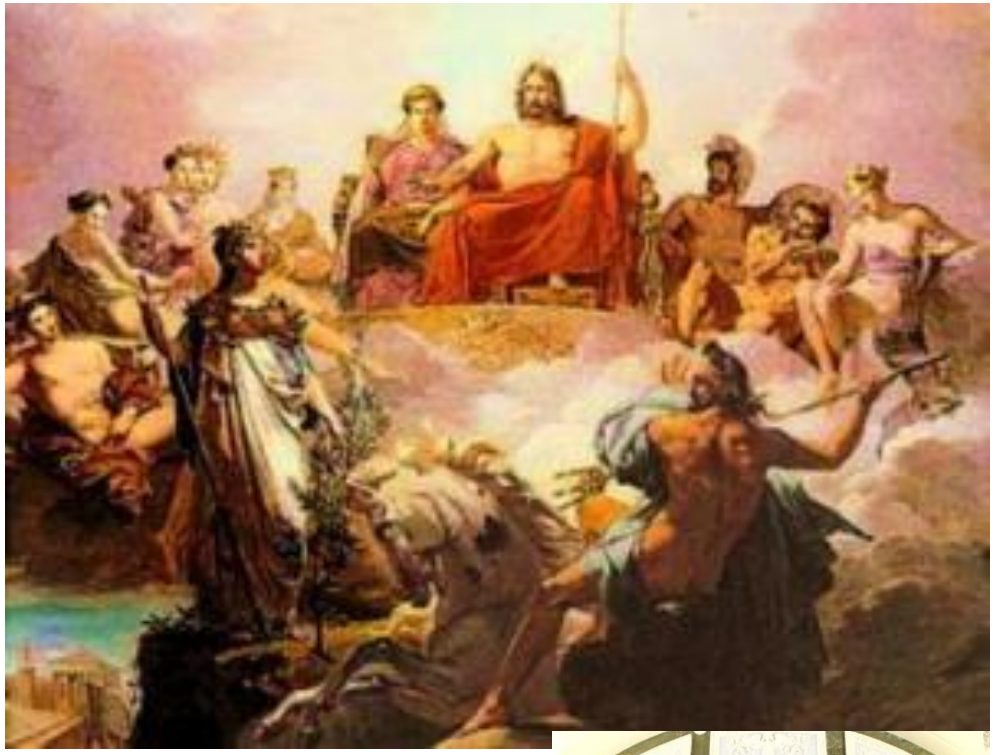
- Greece enjoyed a **position intermediate** between (the rigorous surroundings of the Northern nations) and (the relaxing conditions of Eastern life) . Hence the Greek character combined the activity of the North with the passivity of the East in a way that **lead to the growth of a unique civilization.**

Figure 2.1 : The Landscape of Greece

Greek Architecture

4. Religious factor:

- Greeks people considered as **a religious people**.
- That's appeared by the Worship centered on sacrificial **: Altars in open-air enclosures, small chapels or household shrines, and countless temples .**
- The Greek religion was in the main a worship of natural phenomena (nature-worship ,: major and minor), of which the gods were personifications.
- Gods were conceived in **human form**, and represented by small idols, rocks and stone pillars .
- When **temple architecture began**, the Greeks began to represent their gods by large statues.
- The religious ceremonies of classical Greek included sacred games, ritual dances, athletic contests and arts.
- **The Greek gods** were personifications of particular elements, or were deified heroes, and each town or district has its own local preferences, ceremonies and traditions.



Greek Architecture

4. Religious factor:

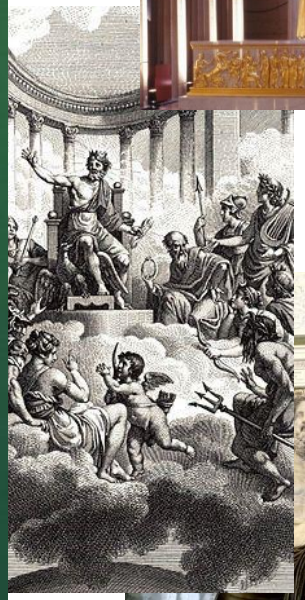
In ancient Greek religion and mythology, the **12 Olympians** are the major gods, they are :

- **Zeus-** King of all Gods
- **Hera-** Wife of Zeus and a representation of excellent wife and motherly qualities
- **Athena-** Goddess of Wisdom and patron Goddess of Athens. It is said that she emerged fully-grown at of Zeus's head.
- **Apollo-** God of light, music, sun, healing, and male beauty
- **Aphrodite-** Goddess of love and beauty. She was said to have born out of sea foam.
- **Demeter-** The mother of nature and Earth; watches over planting and harvest time.

Background-Zeus

- **Poseidon-** Brother to Zeus and God of the seas
- **Ares-** God of war and battles
- **Dionysus-** God of spring
- **Artemis-** Sister of Apollo and Goddess of the forest and the moon. She is a huntress
- **Hephaestus-** Blacksmiths for the gods
- **Hades-** Ruler of the underworld (the dead)

Background-Poseidon

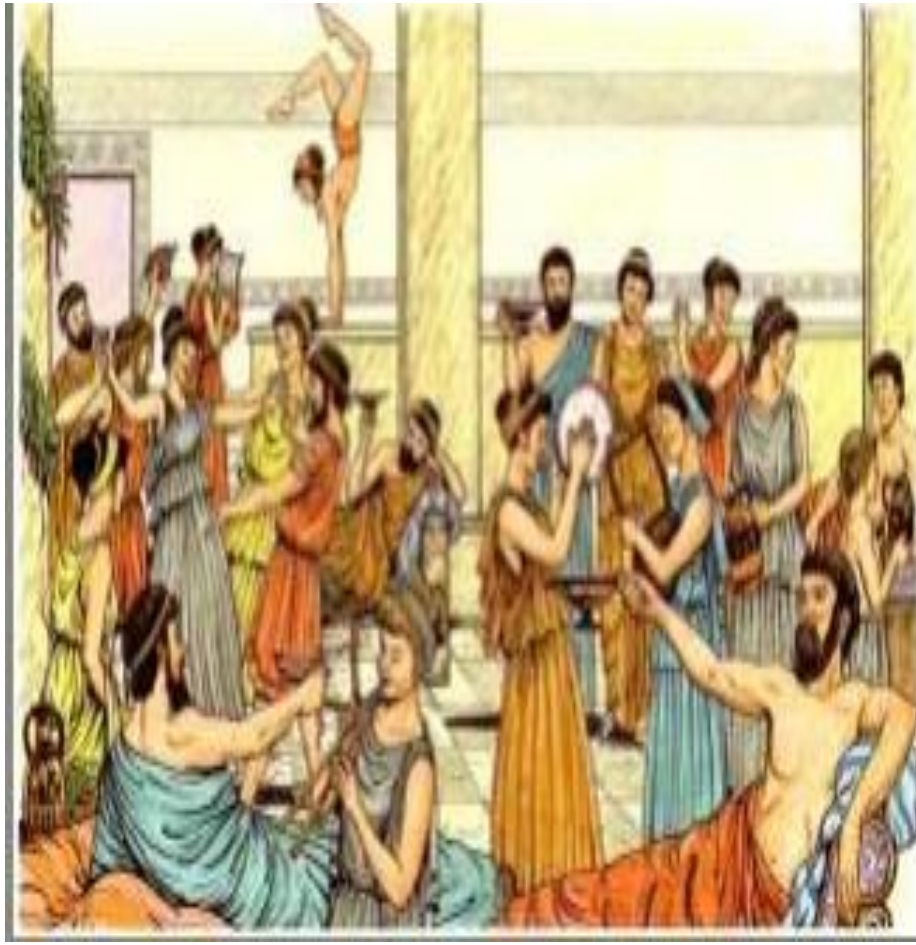


Greek Architecture

4. Social structure:

- Classical Greece was peopled by Ionians, Dorians, Aeolians & Corinthians.
- The people of the various Greek states were very religious , they love music, drama, fine arts & passion for sports & games.
- Classical Greece had a social system from **4 levels** :

1. **Upper Class:** The upper class in the Greek social hierarchy was very elite. Only men who: did not have any jobs that dealt with economics like trading, had slaves, and have property and material value . Greeks, believed that only if you were this wealthy could you spend time for politics, philosophy, leisure, etc.
2. **Middle Class:** The middle class was primarily composed of professional workers like merchants, contractors, craftsmen, and managers. Many people in the middle class were non citizens, which means they were not slaves, but of foreign birth.
3. **Lower Class:** In classical Greece, the lower class mainly consisted of freed slaves.
4. **Slaves:** This group of people were composed of prisoners of war, infants of criminals, and of course slaves. Few people of this class were actually of Greek race.



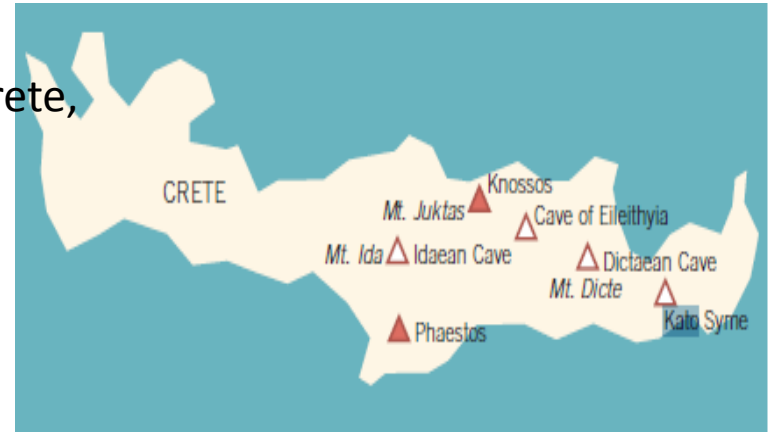
Historical Background

Greek Architecture

- Several clusters of habitation developed on the northern edge of Mediterranean, generating the bases on which later European civilization grew. We can divide them to **3 periods each period has a different building style** :

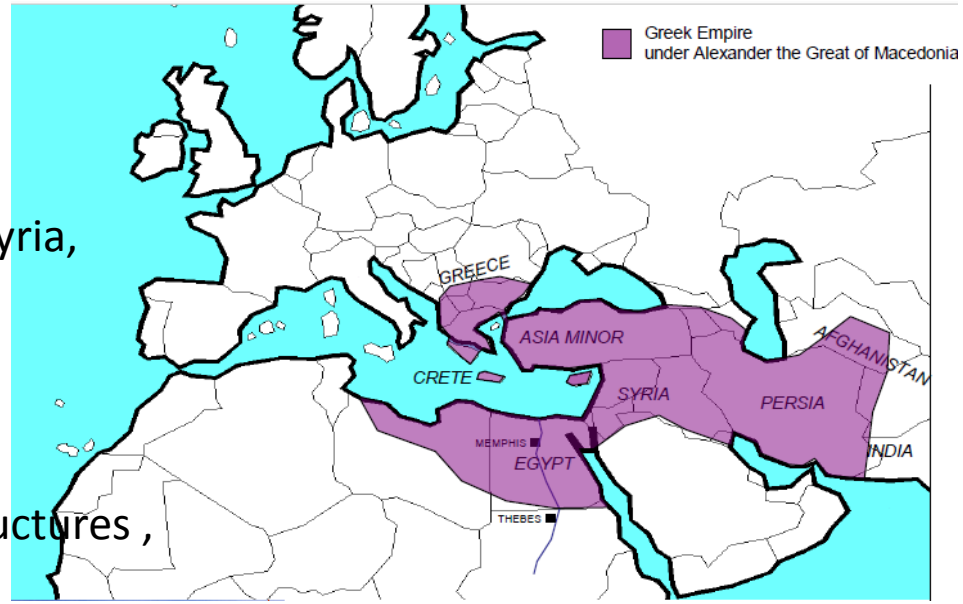
1. **Early period (2700 – 700 BC) : Minoan & Mycenaean Architecture**

- Communities developed on small islands in the Aegean Sea, on the larger island of Crete, and on the mainland of Greece beginning around 2000 BC.
- It is a rough and massive Architecture .
- Cities : Knossos , Troy , Tiryns , Mycenae .



2. **Hellenic Period (800 to 323 B.C.) : Greek Architecture**

- Building system is(column-trabeate) system.
- City-states developed on the plains between mountains
- Cities : Delphi , Sparta and Athens were most important cities .
- Each had its own ruler, government and laws. Unified by a ferial system .
- Mostly religious architecture (**because of the emerge of Temples**) .
- Alexander the Great of Macedonia conquered Persia, Asia Minor, Egypt, Syria, Afghanistan.

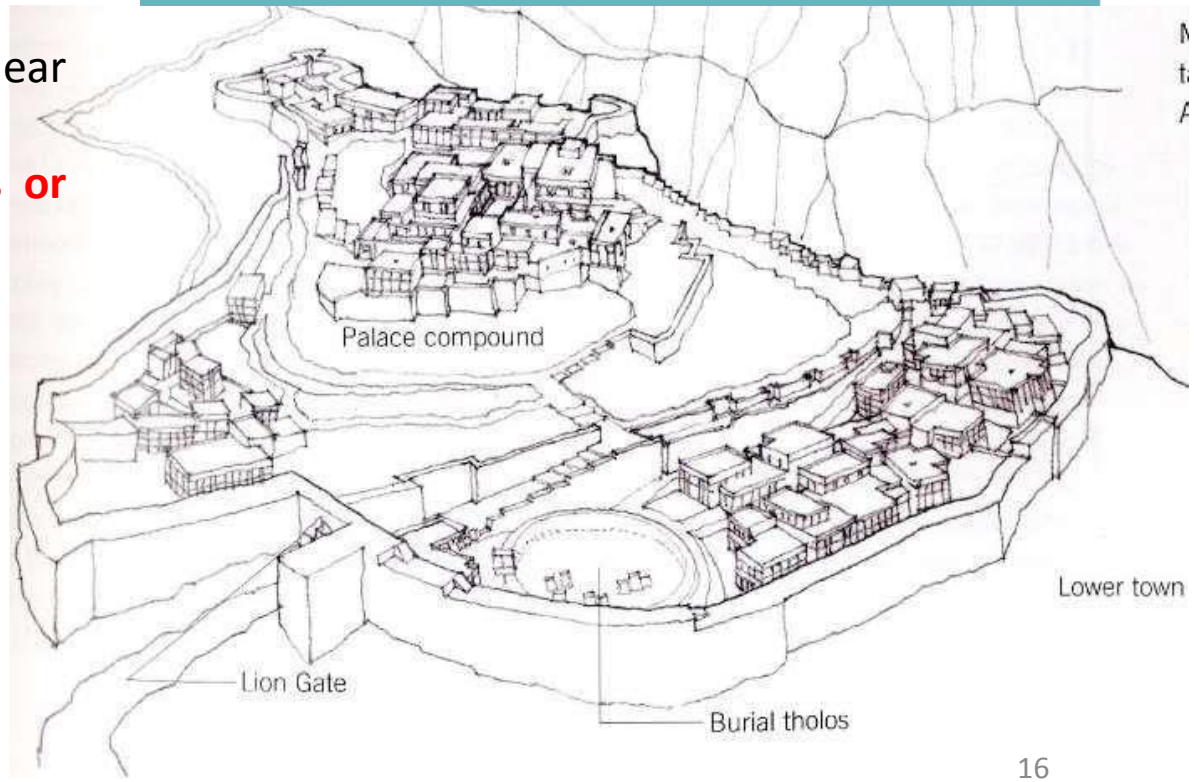


3. **Hellenistic Period (323 to 30 BC) : Secular Architecture**

- Hellenistic Empire established, Greek civilization extended .
- Not religious in character, but civic – for the people.
- Provided inspiration for Roman building types , Dignified and gracious structures , Symmetrical, orderly
- Ended by the Roman conquest .

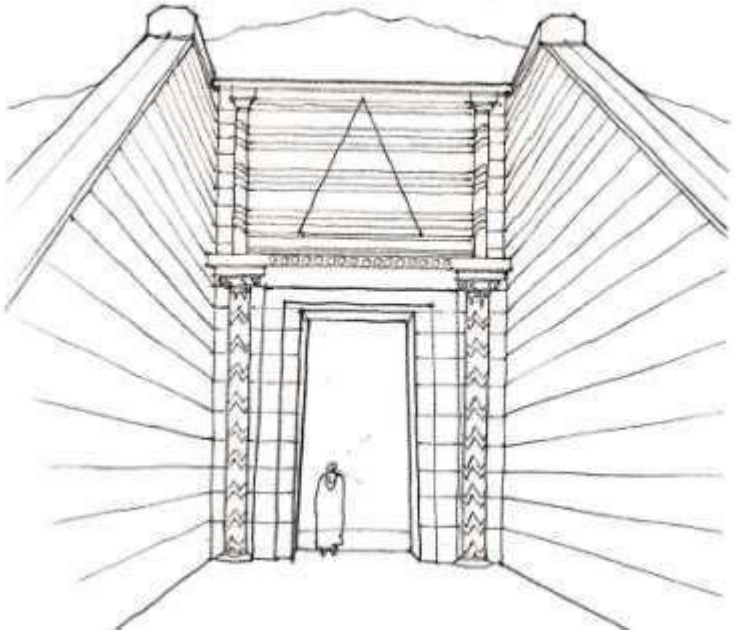
Greek Architecture

- **Mycenaean** is the culture that dominated mainland Greece, the Aegean islands, and the shores of Asia Minor during the late Bronze Age (1600-1100 BCE). con
- The Mycenaean Era occupies the tail end of the Helladic Civilization, which flourished in mainland Greece since 3000 BCE.
- **Mycenae citadel** is one of the most important archaeological sites for **Mycenaean** and also for Greece.
- The fortified citadel is nested over the fertile plain of **Argolis** near the seashore in the northeast Peloponnese.
- The most famous buildings : **lion gate , Treasury of Atreus or beehive-tombs** and **Nestor's palace complex at Pylos.**

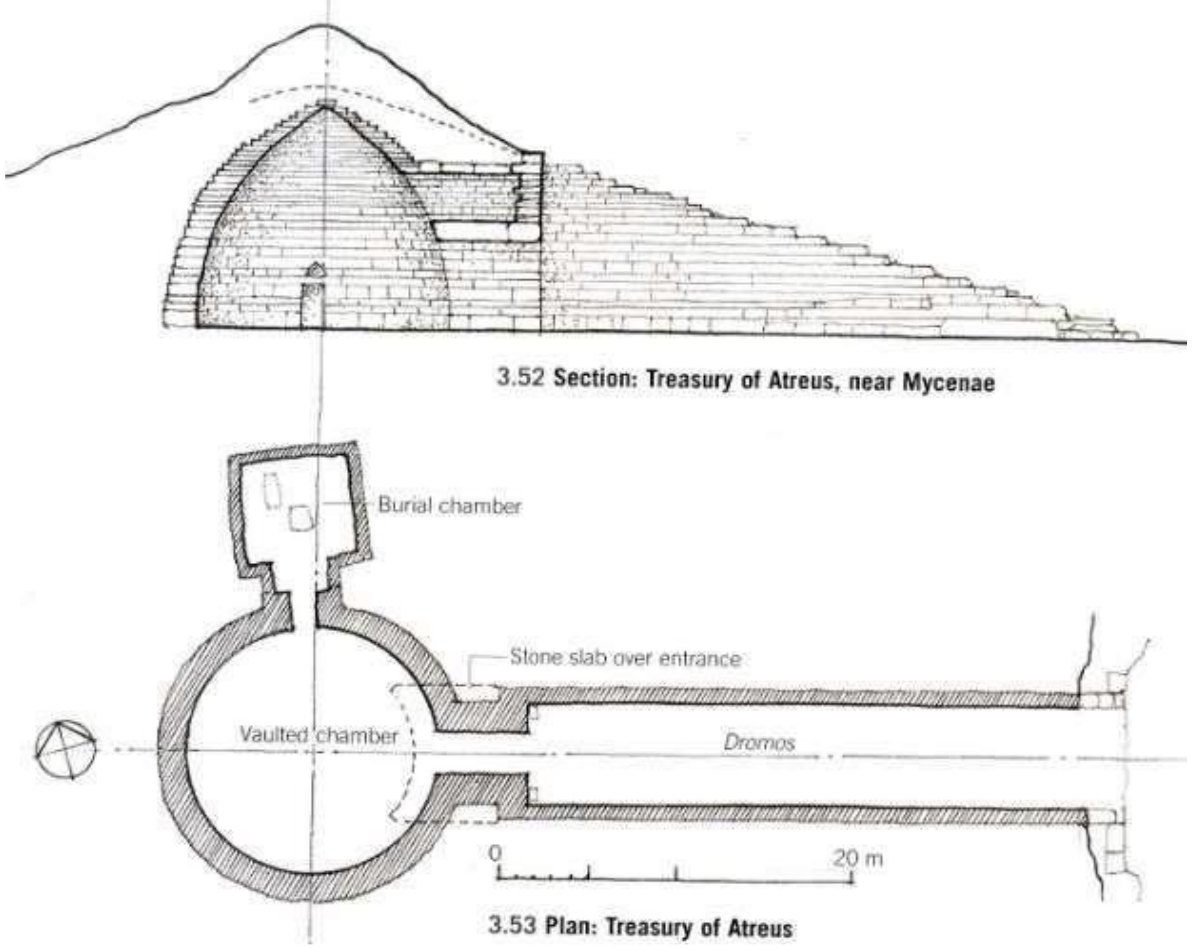


Greek Architecture

- Kings were buried outside the cities in **beehive tombs or Treasury of Atreus** : it is a monumental symbols of wealth and power.
- **Circular chamber** - 15m high and 15m diameter; into the hillside.
- 36 m long and 6 m wide **corridor .**
- **Corbelled dome** was covered with earth to form conical hill
- **2 half columns** and **stone lintel** above the entrance.
- Served as place for gathering, trade and rituals



- **Corbels masonry -**



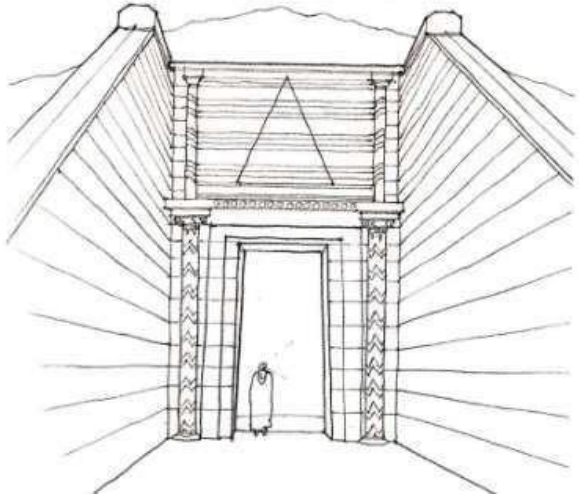
3.52 Section: Treasury of Atreus, near Mycenae

3.53 Plan: Treasury of Atreus

Treasury of Atreus

Greek Architecture

Mycenaean :



Treasury of Atreus : beehive tombs or (tholos)

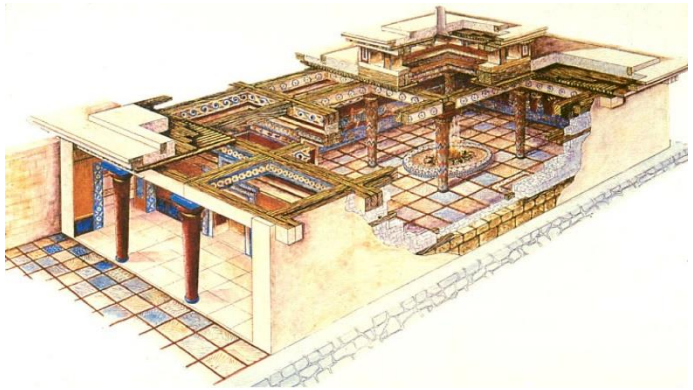
Greek Architecture

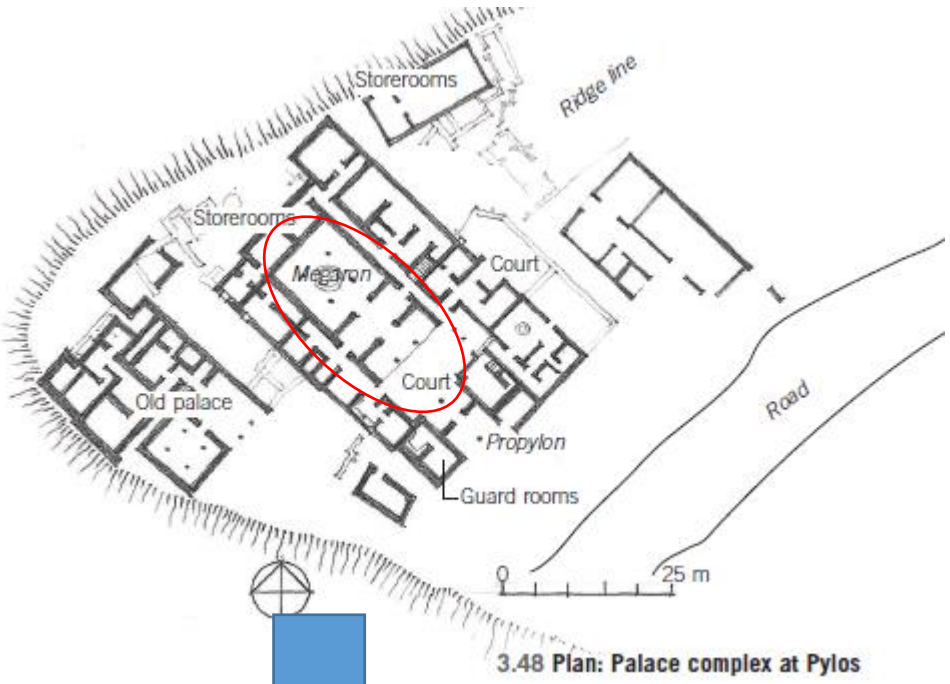
2.Mycenaean :

- Mycenaean architectural sensibilities were, however, their own and centered around **the megaron, or great hall as it seen in Nestor's palace complex at Pylos .**

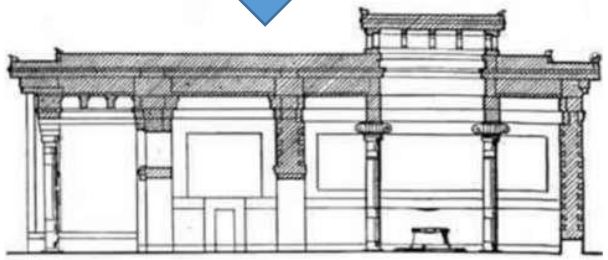
***(Megaron)*: The Great Hall in the Palace of Pylos**

- A square rooms with 4 columns
- Place for religious Rituals
- It believes that this room is represent the **origin of the Greek Temples in the next period .**
- A **hearth** in the center
- Clerestory ceiling

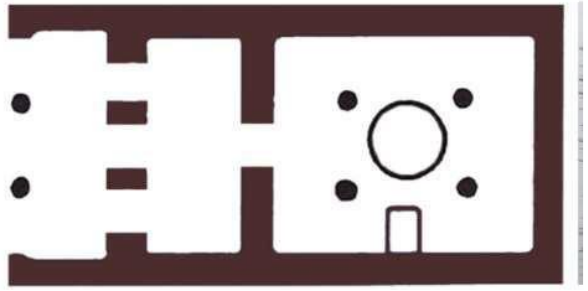




3.48 Plan: Palace complex at Pylos



Megaron plan



Greek Architecture

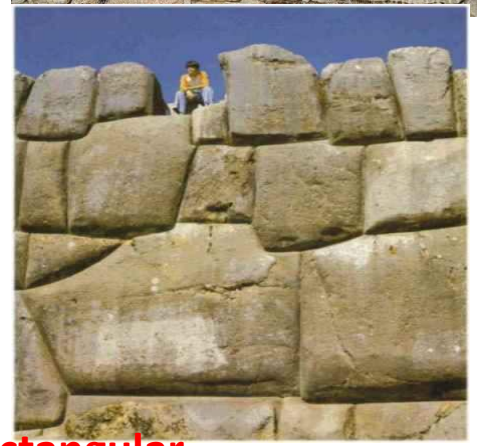
Architectural characteristics for Minoan & Mycenaean Architecture

The building system was massive and rough (Thick walls) , they have **3 kind of masonry for walls**:

1. **Cyclopean**- roughly stones piled on each other, The interstices between the larger stones were filled with smaller blocks.
2. **Rectangular**- carefully rectangular blocks arranged in regular courses, but the joints between stones in the same course are not always vertical. used in Mycenaean Architecture - the entrance passage in beehive-tombs .
3. **Polygonal**- many sided blocks accurately worked so as to fit together.
4. **Corbels -** horizontal courses of stones were laid, projecting one beyond the other till the apex was reached.

- This produced either a triangular opening (found above the doorways of Treasury of Atreus), or a dome shaped roof (also found at the Treasury of Atreus) in Mycenae .

Cyclopean-



Rectangular

Polygonal

Corbels -

Greek Architecture

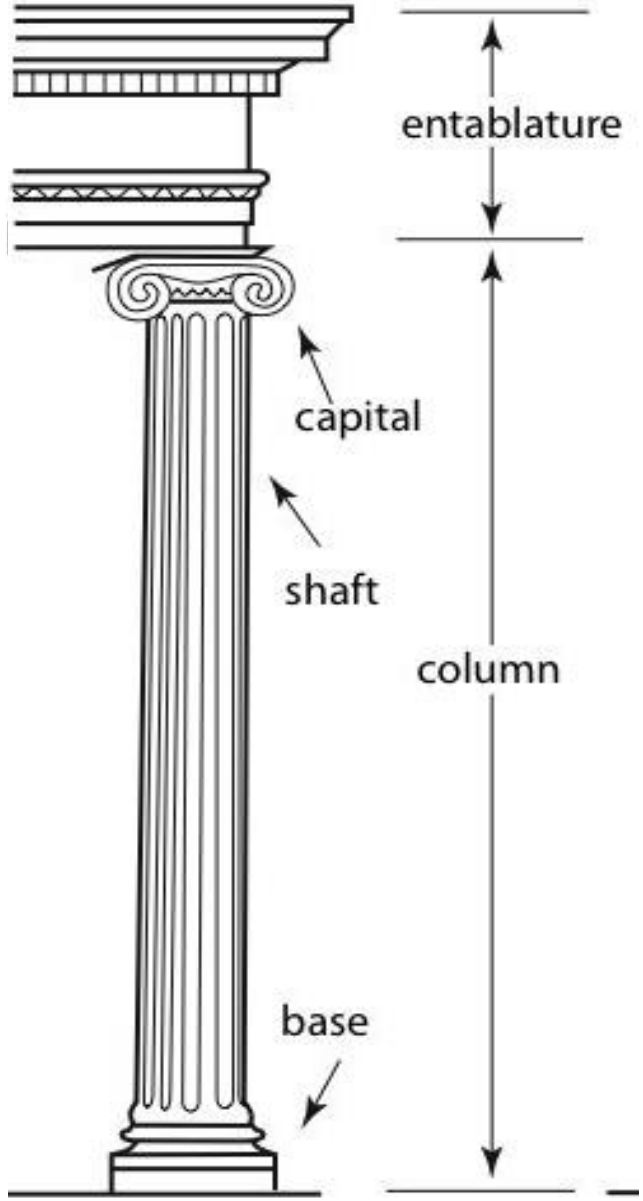
Q: Every Greek column order consist of two components , Number with sketching with marking .

The classical orders in Greek:

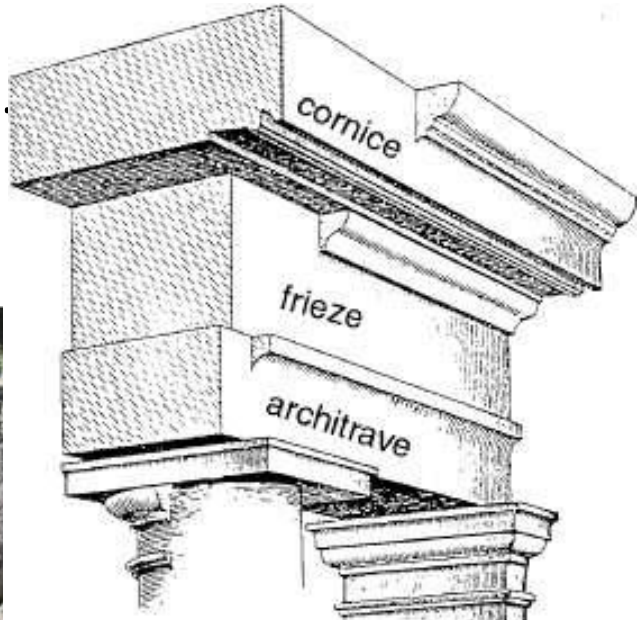
- The Greek orders were Introduced by a Roman architect, **Marcus Vitruvius ,** by his (**De Architectura, or Ten Books on Architecture**) , believed Builders used mathematical principles when constructing temples .
- The use of the orders also provided a **means** for the Greeks to design buildings to **meet their ideals of harmony, balance and symmetry** .
- Without symmetry and proportion, no temple can have a regular plan.
- Columns were understood by the Greeks to be **representative of the body of a human.**

An Greek column order consist of :

1. Column(Base , Shaft “Body” ,Capital , Abacus) .
2. Entablature (cornices, the frieze and the architrave).



- The column it self consist of usually of a series of solid stone **“drums”** , set one upon the other , without mortar .



Entablature elements

Greek Architecture

Q: Define the order ? And What are the Greek columns orders , sketch them with marking .

The classical orders in Greek:

What is an order ? :

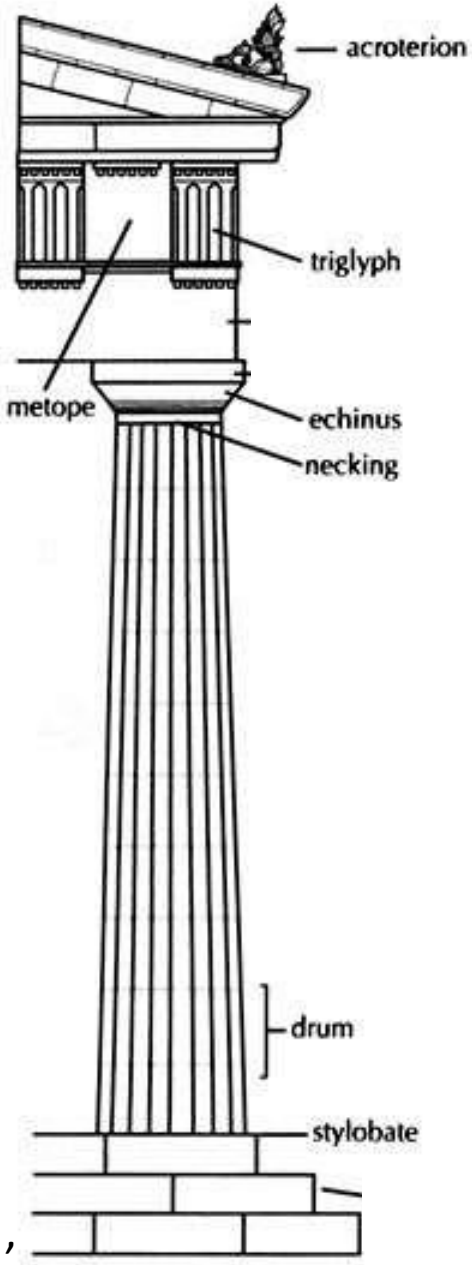
- is defined by the particular type of **column** and **entablature** .
- The form of **the capital** is the most distinguishing characteristic of a particular order.
- The basic unit of dimension was the **diameter of the column** .

There are **3 distinct orders** in Classic Greek Architecture: **Doric, Ionic**, and **Corinthian**.

1. Doric order :

- The Doric order was the earliest to be developed By the 6th century, a set of universal proportions for the Doric temple had been developed.
- The Doric order is made up of **three elements**; **stylobate**, **Column and entablature.**
- **Doric order** generally is directly sits on a (**stylobate)** is a raised three steps on which the temple sits . (without base). It had a height of between 5 and 6 times its diameter.
- **Doric capitals** had two parts – the square abacus above and circular echinus below .
- **The Doric column (**The shaft) **is tapered and made to bulge slightly to provide correction for optical illusion** , is usually divided into 20 shallow flutes.
- **Doric entablature** is divided into an **architrave**, a **frieze**(Has **triglyph** and **metope**) and the **cornice**..

Q: compare between the Greek columns orders , with sketch and marking .



Doric order

Greek Architecture

The classical orders in Greek:

- The Doric column represents **the proportions of a man's body, its strength and beauty**.
- **Examples : The Parthenon temple , Hephaestos temple in Athens .**

The Parthenon temple in Acropolis , Athens

The Temple of Hephaistos in Agora , Athens

Greek Architecture

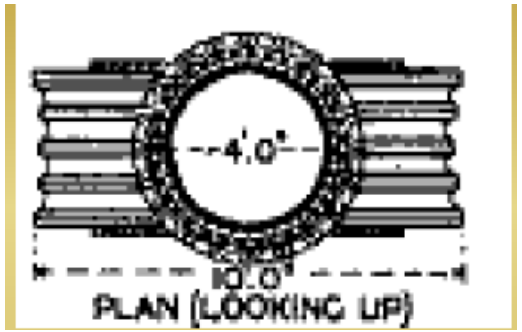
The classical orders in Greek:

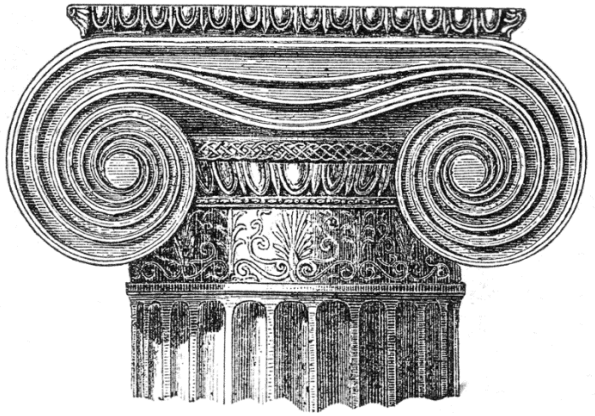
2. *Ionic order:*

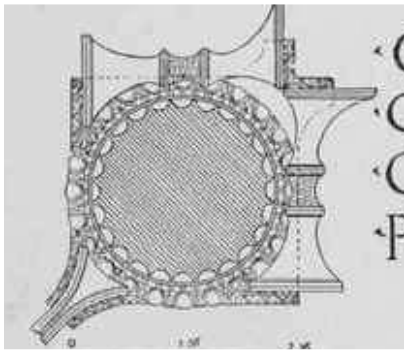
- The Ionic order evolved and took its name from Ionia in modern day Turkey .
- **Ionic capital:** (a pair of Volute or scroll capital (derived from Egyptian lotus and Aegean art) ,Ornaments are used to decorate the area between the capital and the volute. One of the limitations of the Ionic Capital is that it is **designed to be seen from the front only .**
- **Ionic column** (the shaft) It had 24 flutes separated by fillets, even though it is smaller in diameter ,it is more slenderer from the Doric. Had a base to spread load

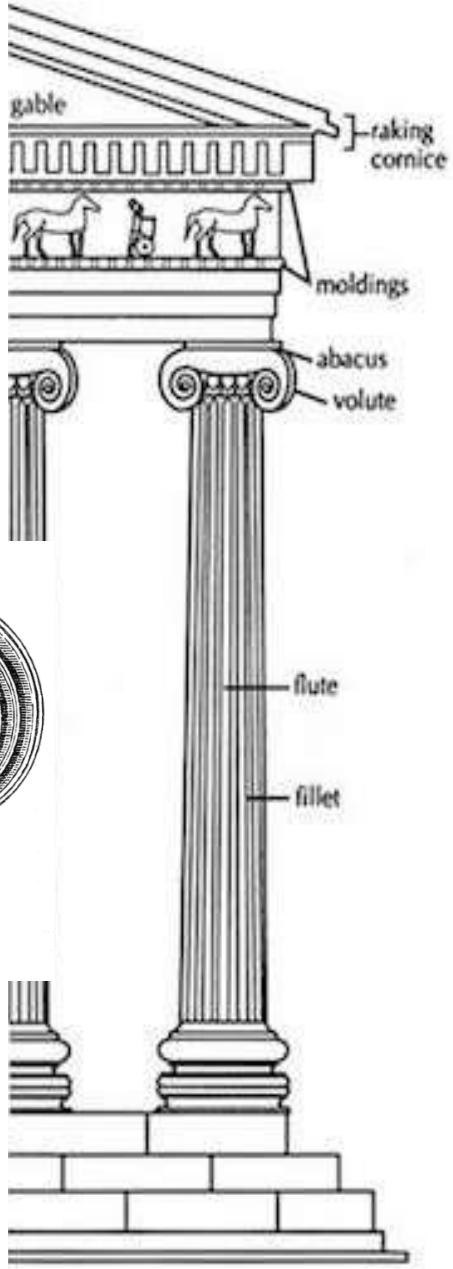
- **Ionic entablature** is divided into 2 parts (an architrave with **moldings**) and a **raking cornice** without frieze .

- The Ionic is has a height of 10 times the base diameter.
- At the corner of rectangular buildings, an angular volute had to be used









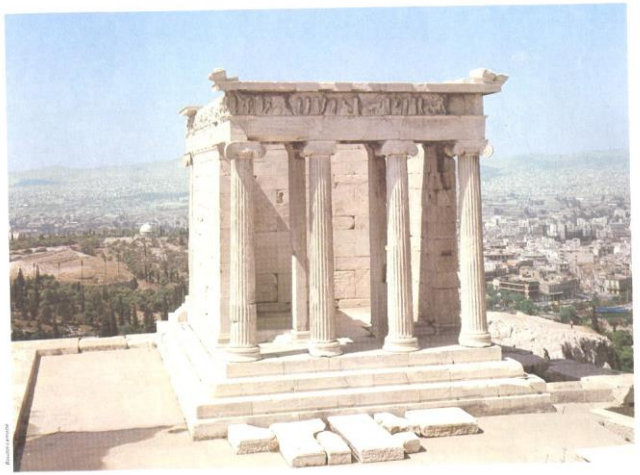
Ionic order

Greek Architecture

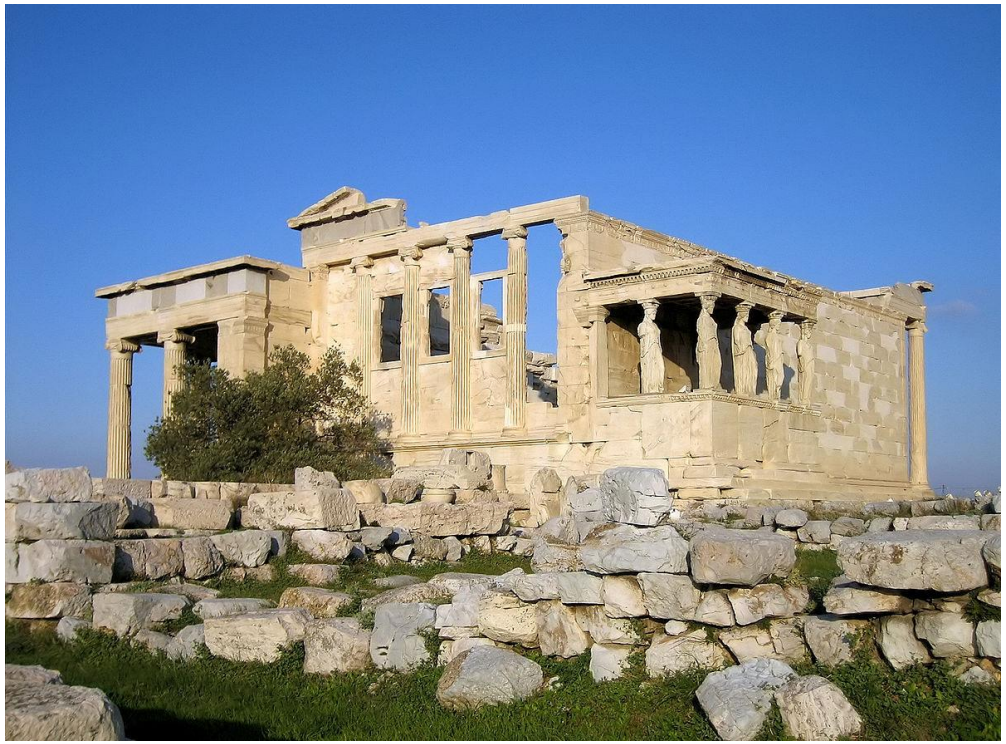
The classical orders in Greek:

2. *Ionic order:*

- The Ionic column is said to represent **the shape of a women with its delicacy and feminine slenderness.**
- **Examples : the Erechteion Temple, Athens , Temple of Athena Nike, Athens_The Colosseum, Rome.**



Temple of Athena Nike, Athens



the Erechteion Temple, Athens

Greek Architecture

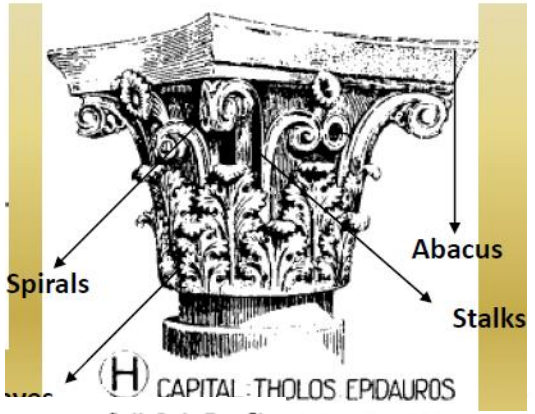
The classical orders in Greek:

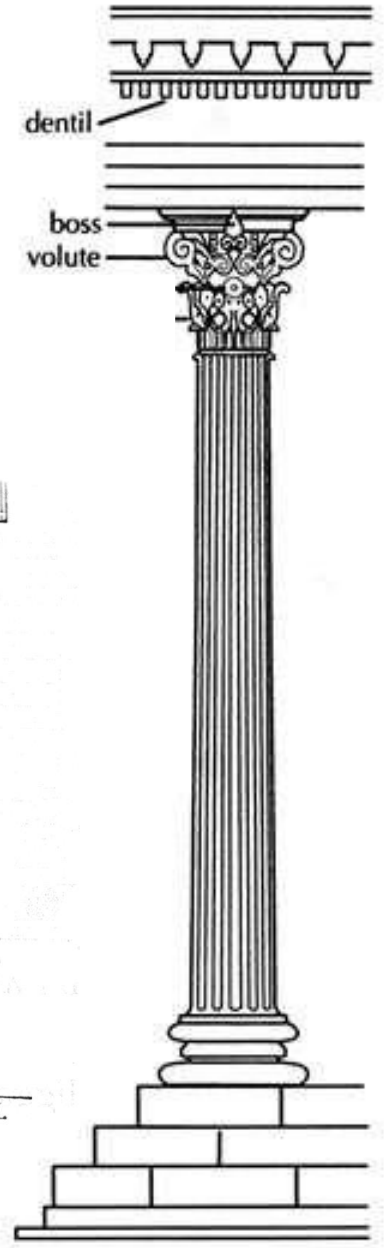
Capital invented by Callimachus, inspired by basket over root of acanthus plant

3. Corinthian order:

- The Corinthian order takes its name from the city of Corinth in Greece , It however appeared to have been developed in Athens in the 5th century BC .
- This order is similar in its proportions to the Ionic order but has a different capital .
- **Corinthian capital** is shaped like an inverted bel ,is decorated with rows of carved acanthus leaves , This rich decorative effect made it attractive.
- **Corinthian column**, the most beautifully ornate of the three orders. Height of 10 diameters .
- **Corinthian entablature** is divided into 2 parts (an architrave , frieze and cornice developed type with dentils.

- Because of its symmetry, the Corinthian capital unlike the ionic capital is designed to be seen from all directions





Corinthian order

Greek Architecture

The classical orders in Greek:

- Also The corinthian column is said to represent **the shape of a women with its delicacy and feminine slenderness.**
- This order was not extensively used during the Greek period , It became popular during the ancient Roman period .
- **Examples : Temple of Zeus, Athens.**

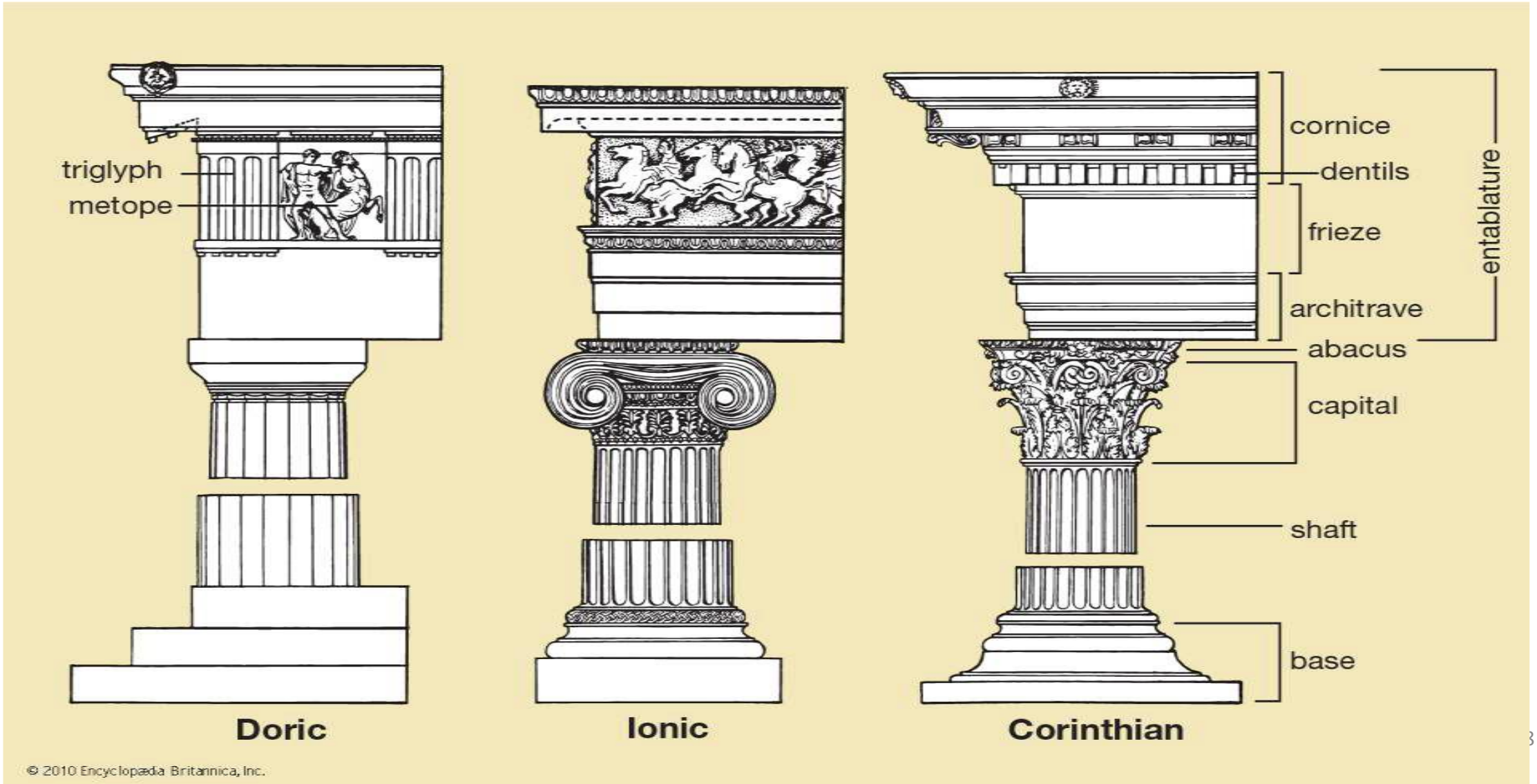
Temple of Zeus, Athens

Greek Architecture

The classical orders in Greek:

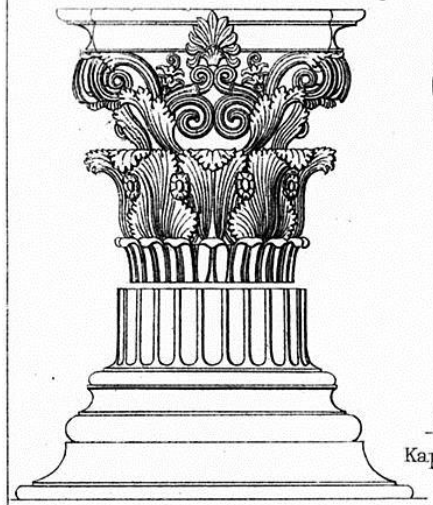
A Comparison between the orders

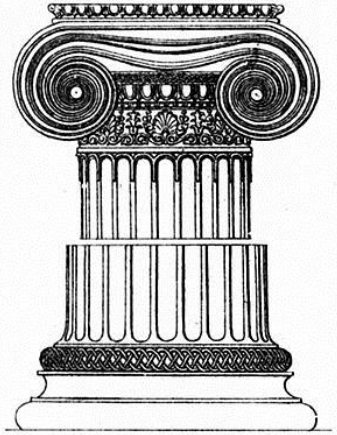
Q: Draw the Greek columns orders with marking .



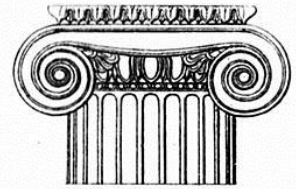
Korinthische Ordnung

Jonische Ordnung

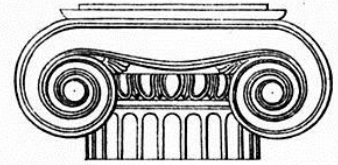




Kapitäl u. Basis vom Tempel der Athene zu Athen.



Kapitäl vom Tempel der Athene zu Priene.

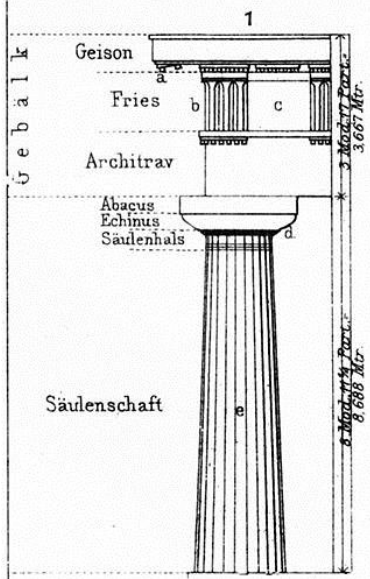


Kapitäl vom Tempel am Ilissos zu Athen.

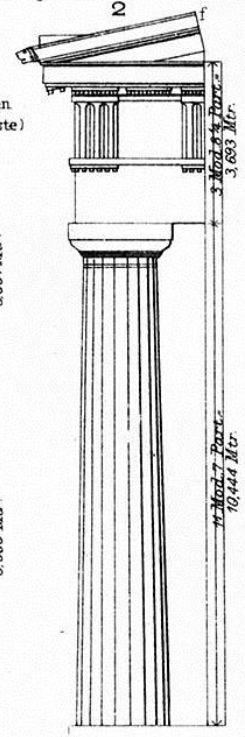
Kapitäl u. Basis vom Monument des Lysikrates zu Athen.

Zu 1. 2. 3.

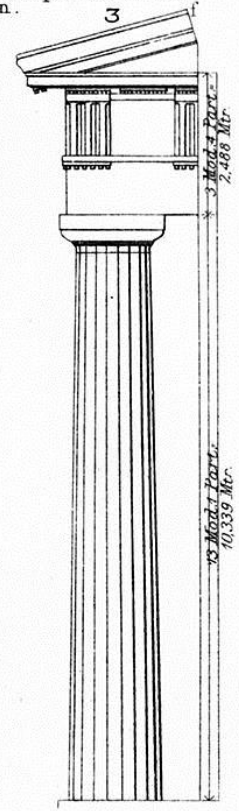
a Mutuli (Dielenköpfe)
b Triglyphen (Dreischlitze)
c Metopen
d Riemchen
e Kannelirungen
f Sima (Rinnleiste)



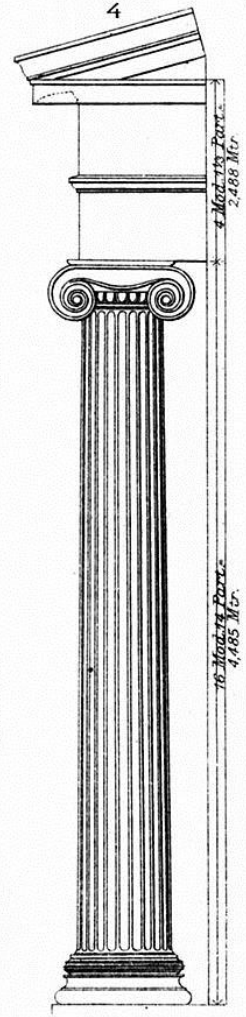
Vom Tempel in Pästum



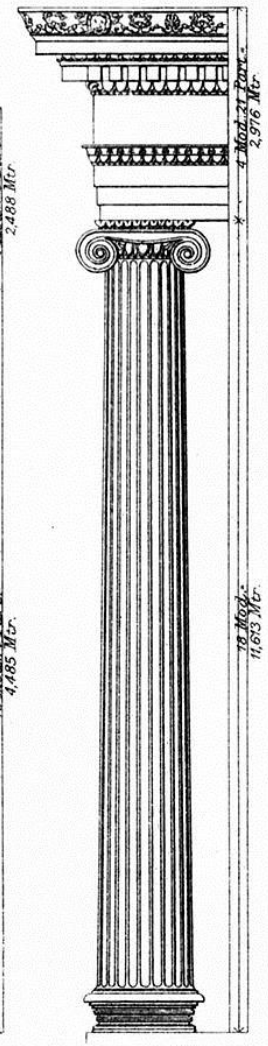
Vom Parthenon in Athen.



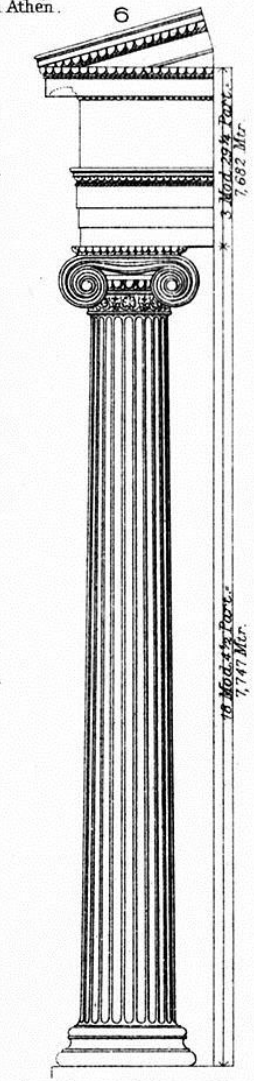
Vom Tempel des Nemëischen Zeus.



Vom Tempel am Ilissos in Athen



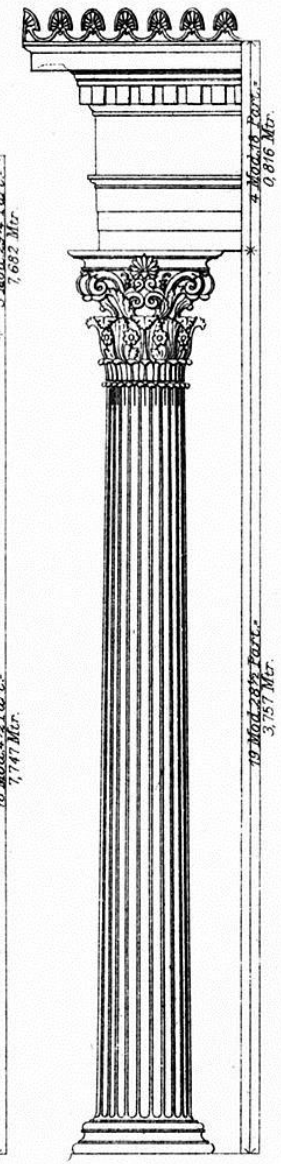
Vom Tempel d. Athene Polias in Priene.



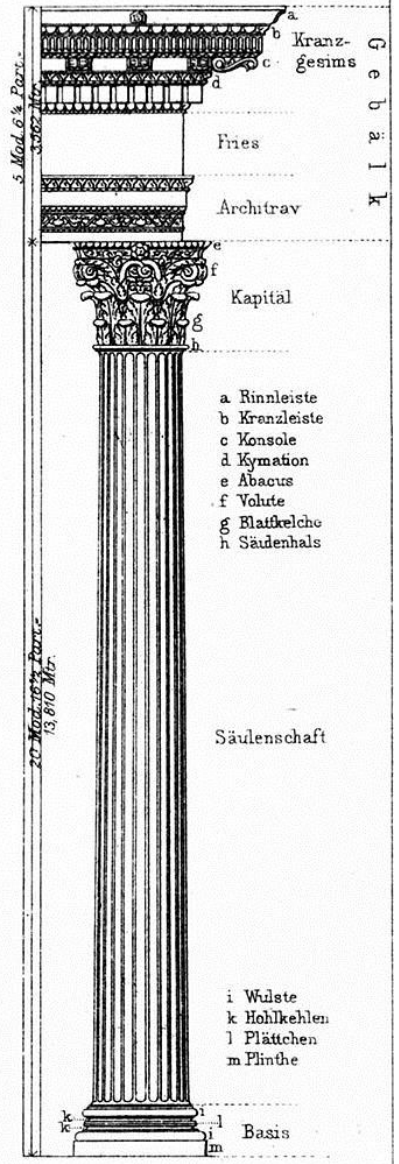
Vom Tempel d. Athene Polias in Athen

Korinthisch

Römisch-Korinthisch.



Vom Monument des Lysikrates in Athen.



Vom Tempel d. Jupiter-Stator in Rom.

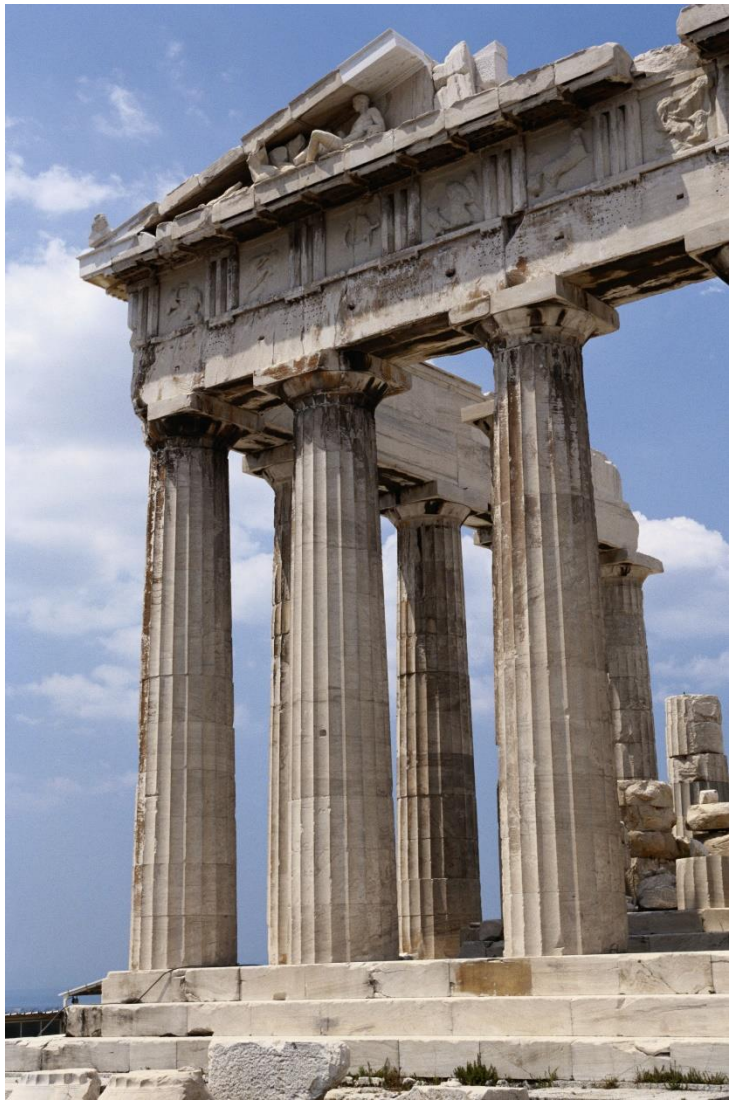
Dorische Säulenordnung.

Jonische Säulenordnung.

Korinthisch u. Römisch-Korinthisch.

Greek Architecture

The classical orders in Greek:



Greek Architecture

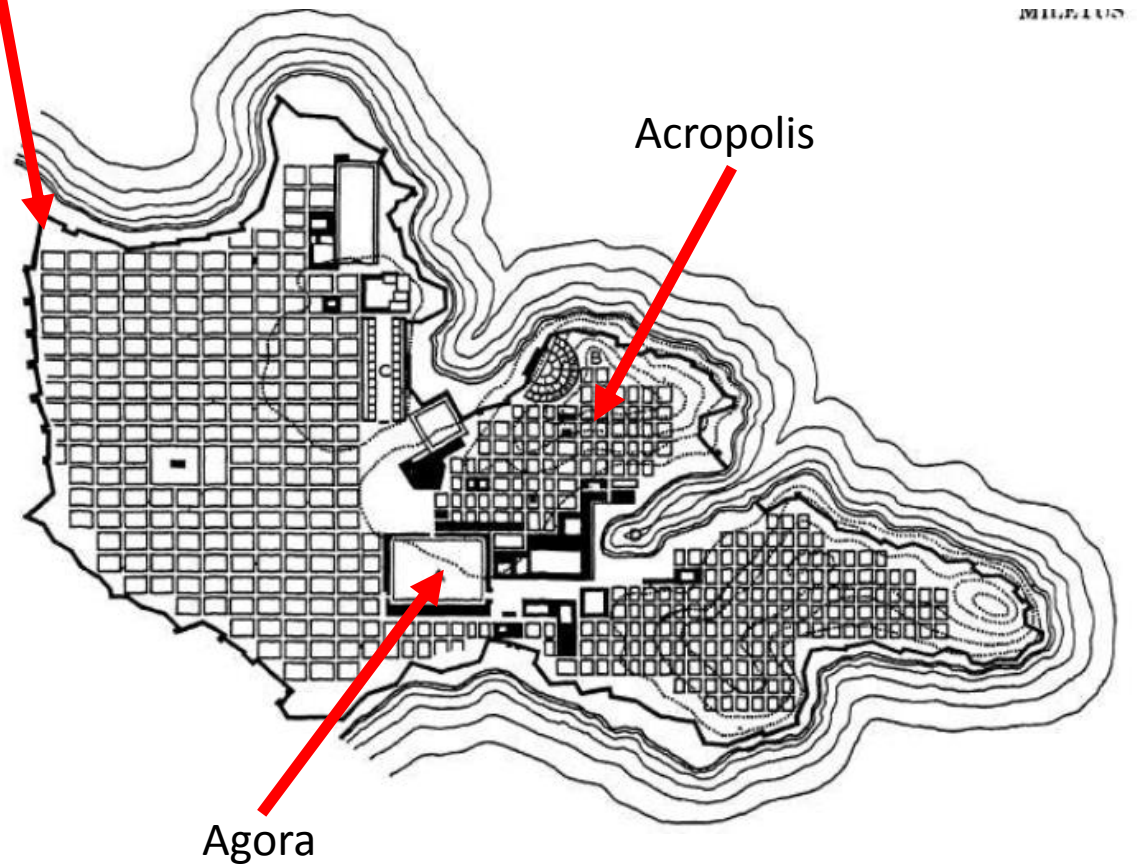
a. The enclosing city wall

- **Greek Principals of City Planning :**

- Ancient Greeks not only develop ideals of architectural aesthetics, but they also developed principles for the design and planning of cities as location for architecture.
- The ancient Greek city states developed a standard plan of the city .
- Principles were developed for organizing each element of the city based on activities and its symbolism.
- The city consisted of four defined elements:

1. **the town** :It was composed of simple courtyard houses separated by streets ,It could either be organic or grid-iron layout.
2. **Acropolis** :was the city of the gods ,it has isolated objects arranged in open space(temples).
3. **Agora :**was a meeting place for social, commercial and political activities ,The principle of its design centers on creating boundaries to contain space for activities.
4. **stoas** and other civic buildings are used to define the space.

- These are usually treated with continuous colonnades or porticoes along the side of the court with occasional penetrations by footpaths



Greek Architecture

There are 7 types of Greek Architecture Buildings :

1. Acropolis (a sacred hill contains Temples)
2. Agora .
3. sota
4. Temples .
5. Theaters.
6. Bouleuterion
7. Stadium .
8. Houses ,palaces (both periods) .
9. Tombs .

2. Hellenic Period (800 to 323 B.C.) :

Mostly religious architecture.

3. Hellenistic Period (323 to 30 BC) :

In this period the civic buildings start to appear in the Greek city cityscape.

- The building system for these two periods structure is the **(column-trabeate)** system

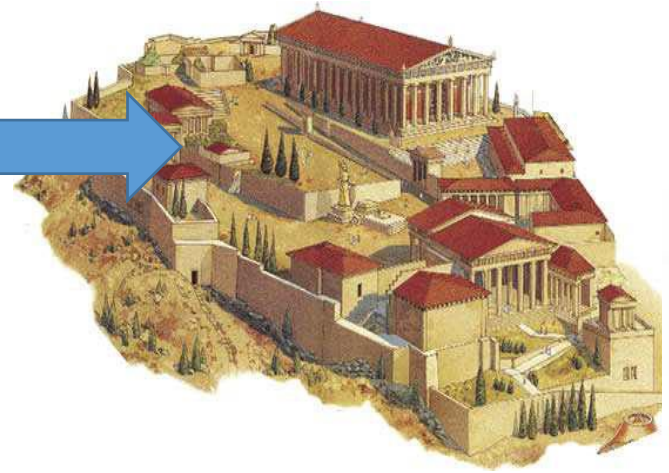
Greek Architecture

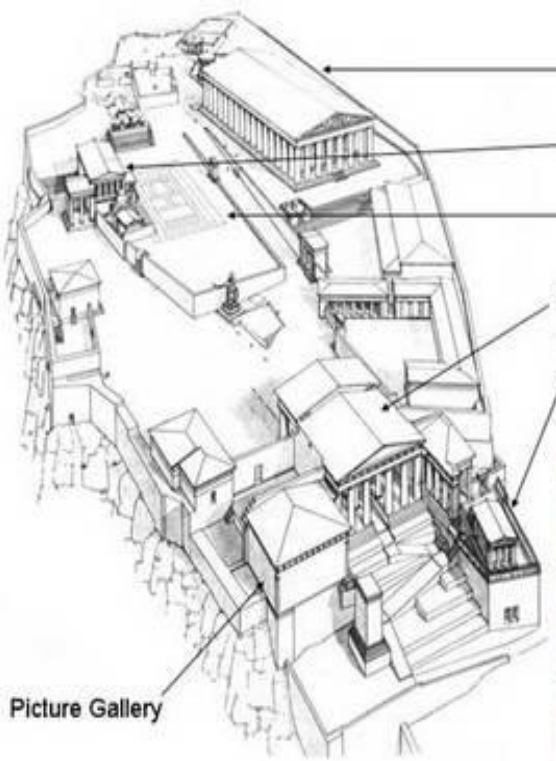
1. The Acropolis:

- The high points of the city were treated as **sacred**.
- A powerfully assertive landscape influenced the Urban planning.
- The Acropolis: is the general term for the original defensive hilltop of the older Greek cities.
- The site for the temples of Gods, their treasures and artifacts.
- If the acropolis is at the center then, there were no need of city wall.

- In case of **Athens**, the high place was originally a fortified hilltop which became the Acropolis .

Athens



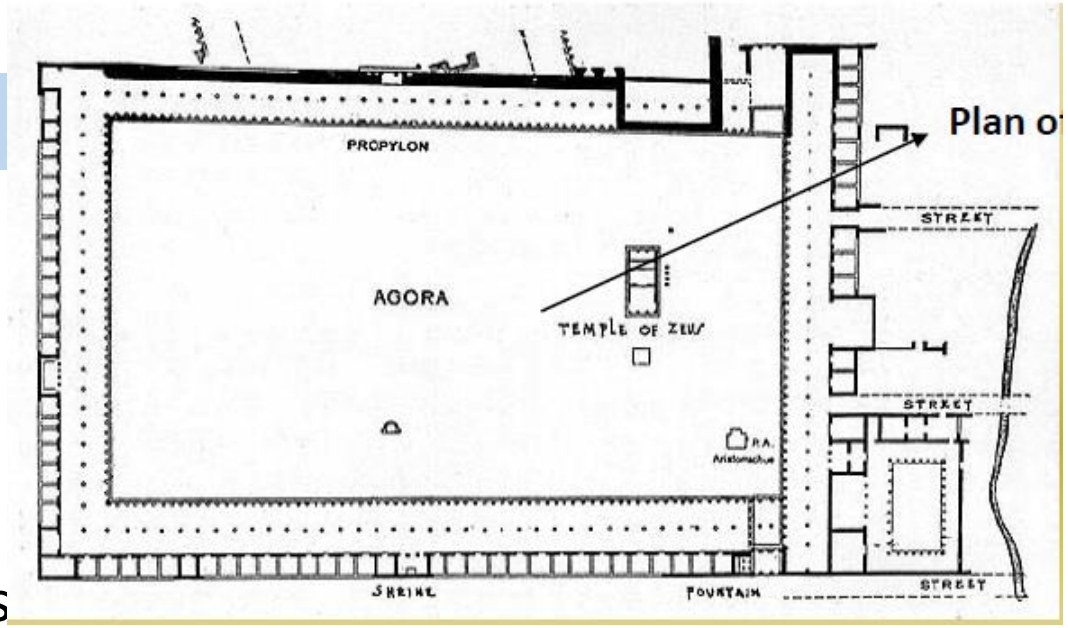


Acropolis of Athens

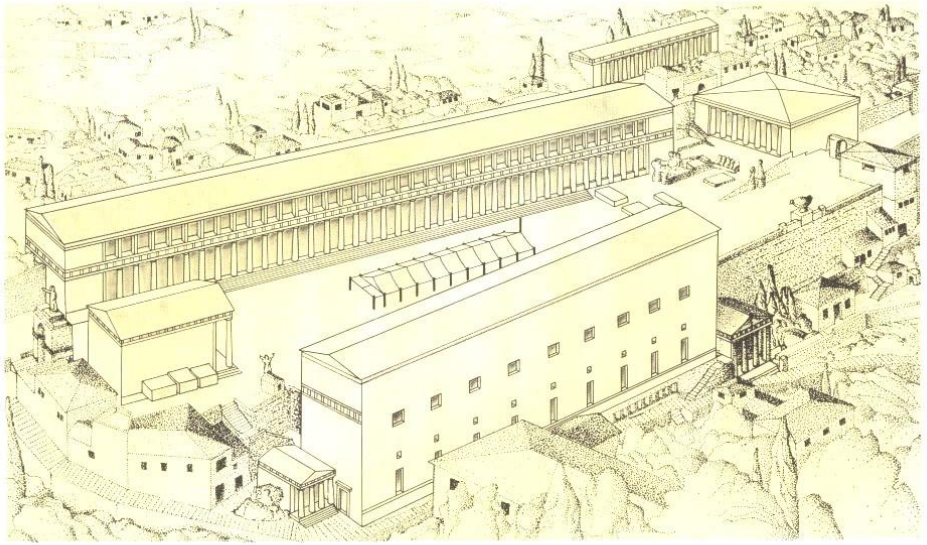
Greek Architecture

2. The Agora:

- The agora was a central spot in ancient Greek city-states.
- The literal meaning of the word is“ **gathering place**“.
- The agora was the center of athletic, artistic, spiritual and political life of the city also , Served as a marketplace for merchants.
- The Agora was an open air meeting place, the Greek equivalent of the town square.
- It was enclosed by Stoa or colonnades giving access to public buildings all around such as temples, etc.



Plan of Athens city Agora

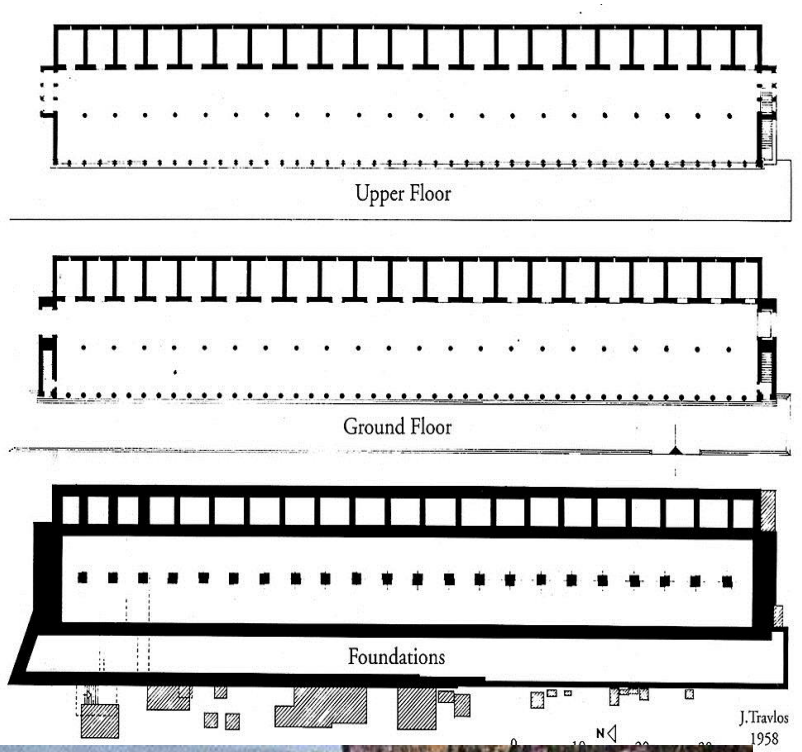


Greek Architecture

3. Stoa:

- The **Stoa it is covered walkway (portico) used for many purposes, has internal shops , surrounding the Agora, and around the public buildings .**
- Example : the stoa of Attalos in the Agora of Athens, Greece:
- It was built by and named after King Attalos II, who ruled between 159 BC and 138 BC.
- Typical of the Hellenistic age, the stoa was more elaborate and larger than the earlier buildings of ancient Athens.
- it is made of marble and limestone. The building skillfully makes use of different architectural orders.
- **The Doric order** was used for the exterior colonnade on the ground floor with Ionic for the interior colonnade.
- It was reconstructed from 1952 -1956 by American architects.

Stoa of Attalos plan in Athens



Greek Architecture

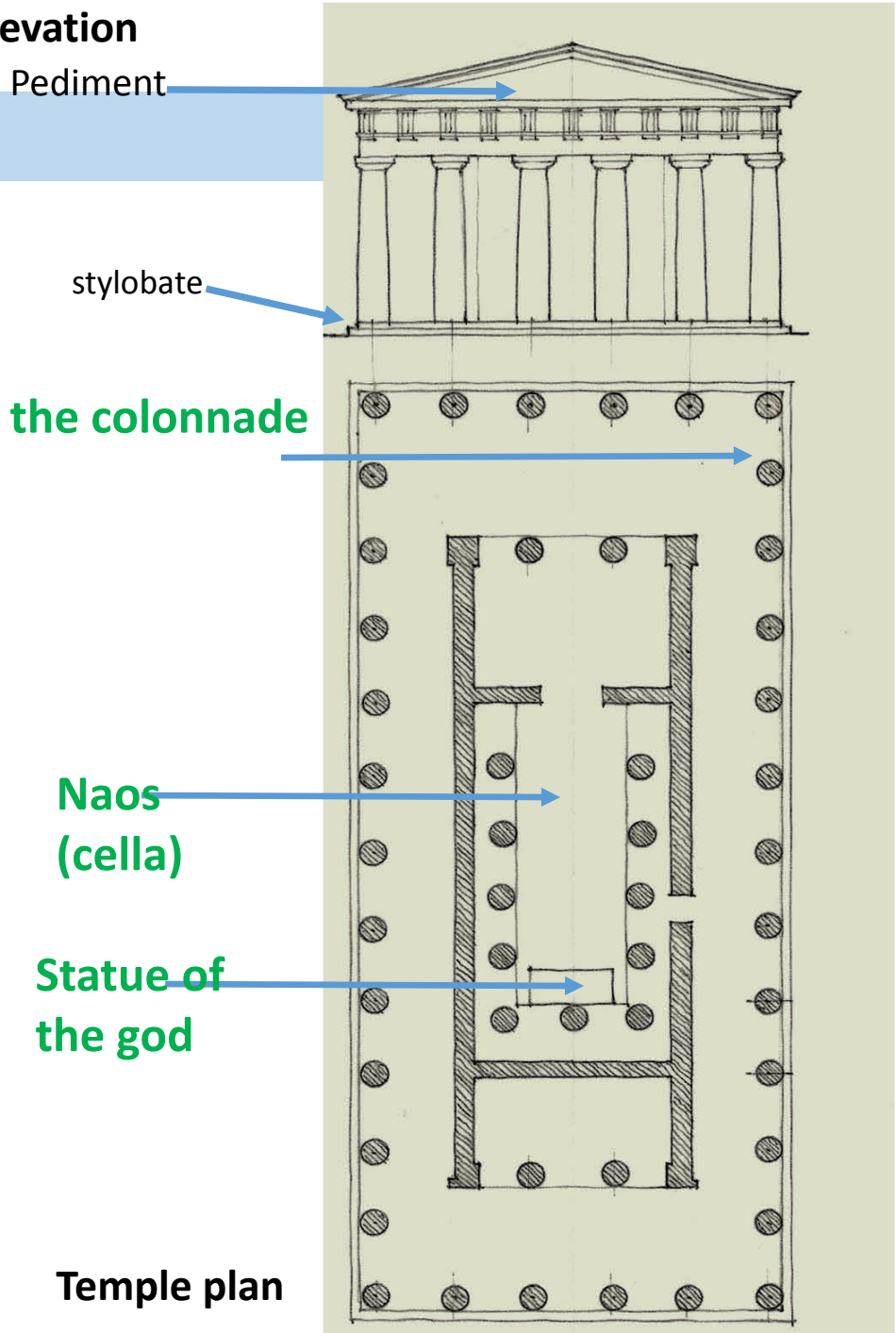
4. Temple:

- Chief building type in Greek Architecture.
- **Structures built to house Gods statues** within Greek sanctuaries in ancient Greek religion. e
- **The temple interiors did not serve as meeting places,** since the sacrifices and rituals dedicated to the respective deity **took place outside them.**

(Greek temple terminology) :

The temple plan is made of :

1. The most basic element of the temple is the colonnade , It was actually a unique innovation of the Greeks. Its define a **portico** around the temple .
2. four walls enclosing a rectangular space called the naos or cella, this was the house of the god to whom the temple is dedicated.



Greek Architecture

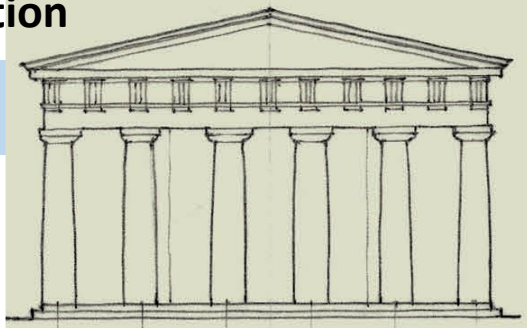
4. Temple:

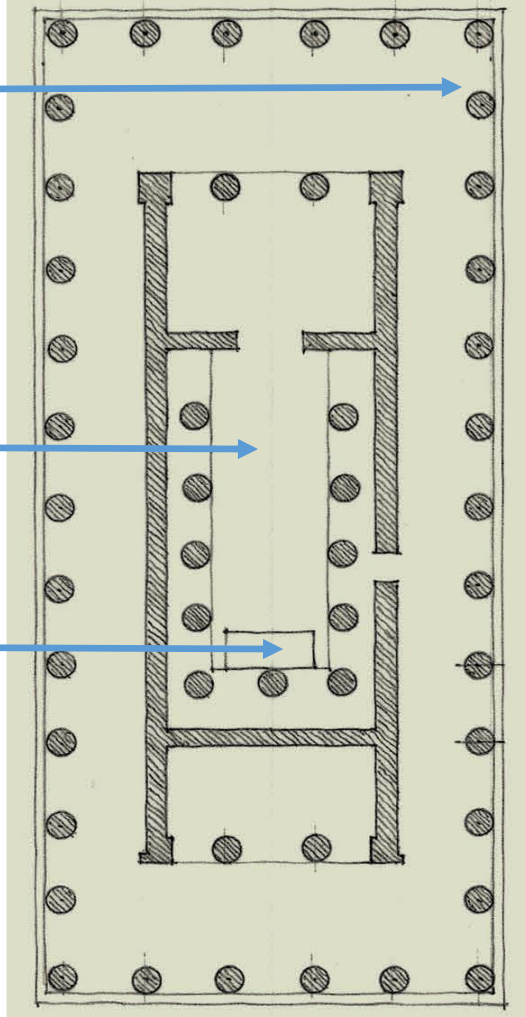
4. The interior rectangular space of the naos is framed by a pair of colonnades on the long side creating a central processional space.
5. At the head of the processional space is the statue of the god to whom the temple is dedicated, The temple interior was generally dark, with only the entrance as a source of light.

Temple Plans classification :

- Temple Classification is based on **2 main points** :
  1.Type of Colonnade(portico) arrangement surrounding the naos.
  2.The number of columns on the front entrance.

Temple elevation





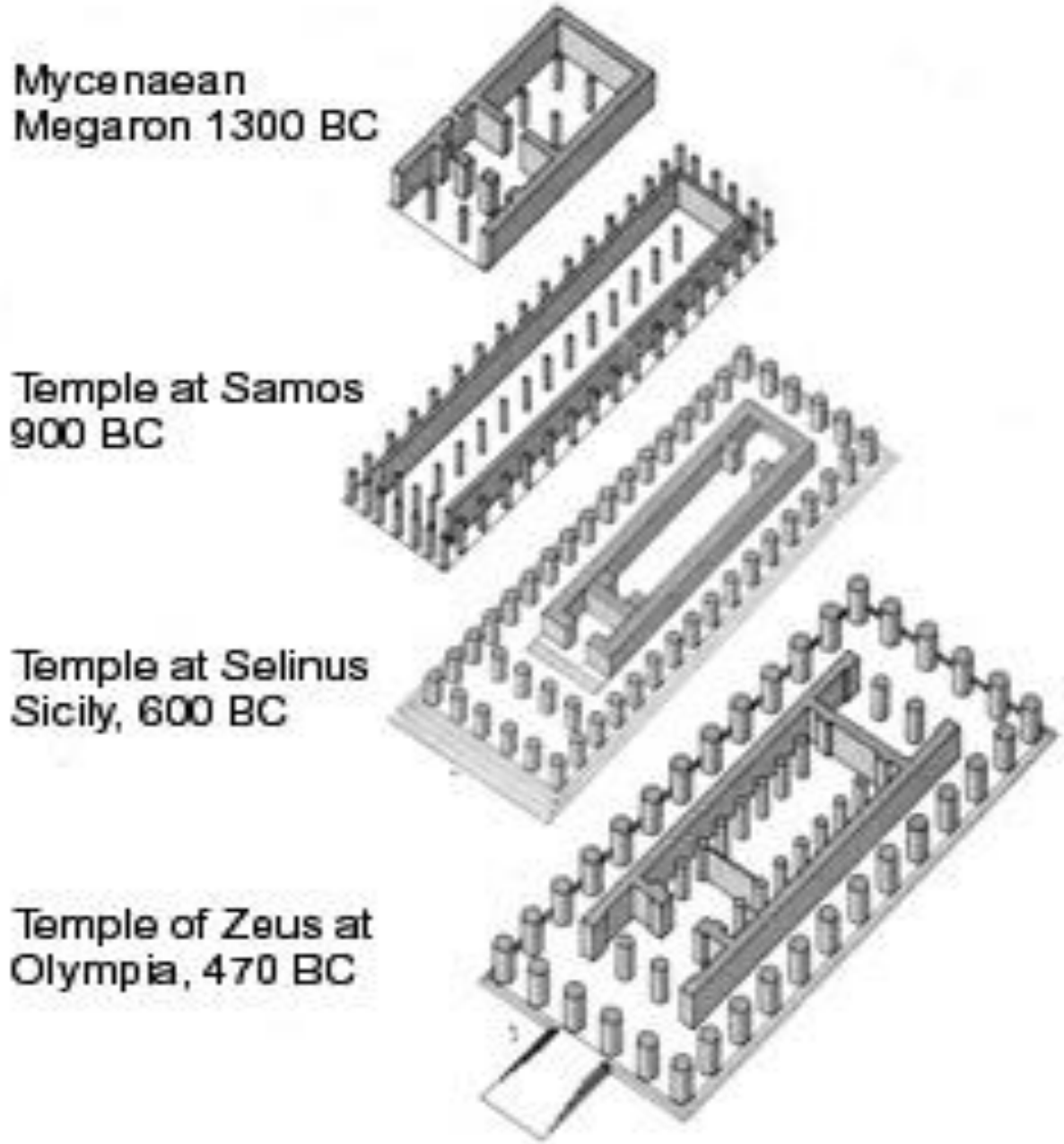
Temple plan

Greek Architecture

4. Temple:

Evolution of the Greek temple form:

- Temples were designed to be admired from the outside rather than used
- The Greek temple is believed to originate from the Mycenaean megaron
- From the megaron, it went through several stages of evolution as shown in the diagram
- By 470 BC, the final form of the Greek temple had emerged.



Evolution of the Temple Form
Source: Norwich J. J. (ed) (1975)

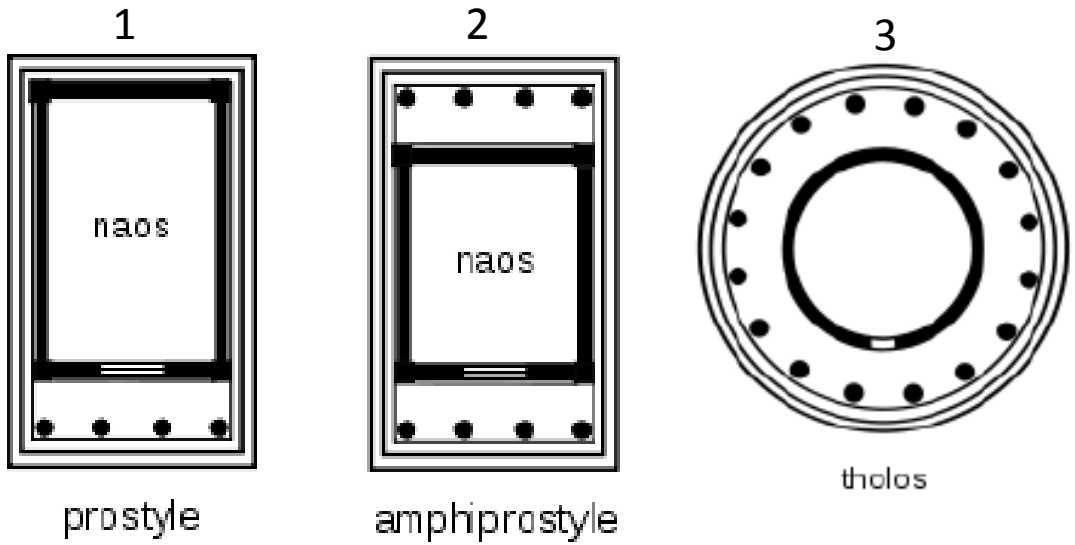
Greek Architecture

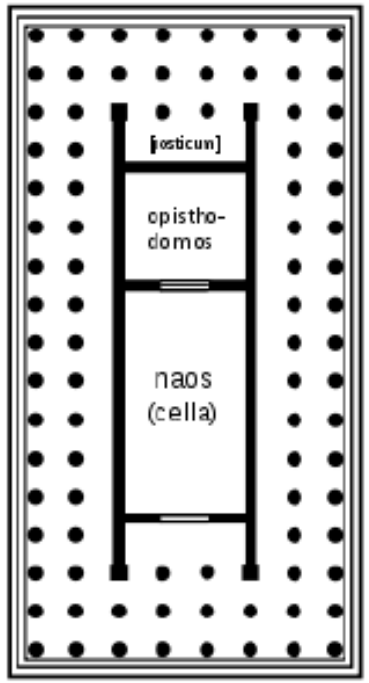
4. Temple:

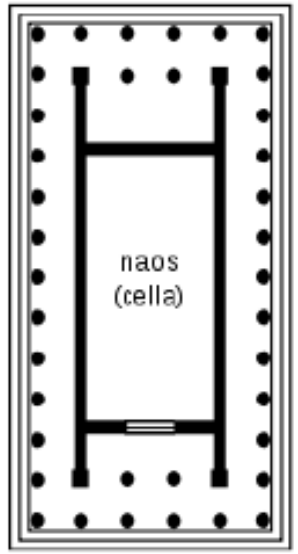
Temple Plans classification :

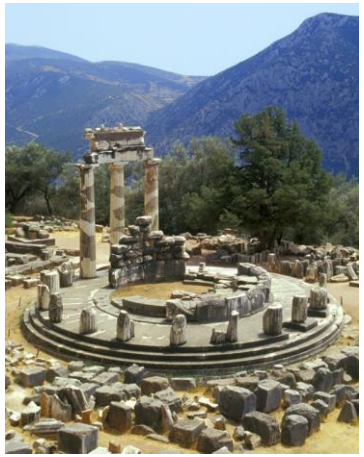
- Temples has **6** typed ,and that based on their ground plan and the way in which the columns are arranged :

1. **Prostyle** temple: is a temple that has columns only at the front
2. **Amphiprostyle** temple has columns at the front and the back.
3. One of the more unusual plans is the **tholos**, a temple with a circular ground plan.
3. **Peripteral :** Temples with a **colonnade** arrangement have a single line of columns arranged all around the exterior of the temple building.
4. **Dipteral** temples simply have a double row of columns surrounding the building.









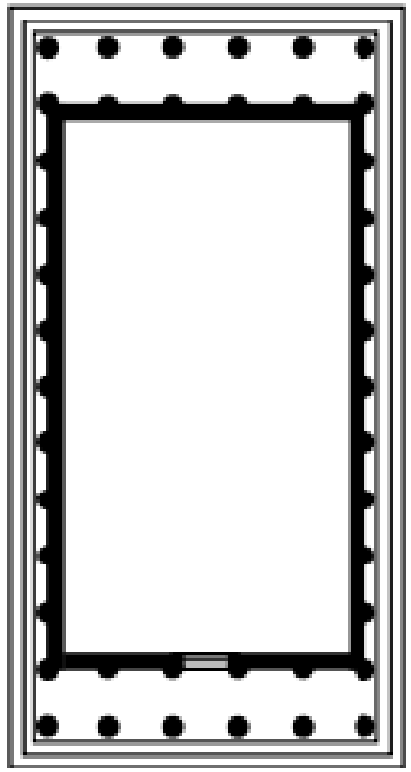
[Temple Tholos, Delphi, Greece]

Greek Architecture

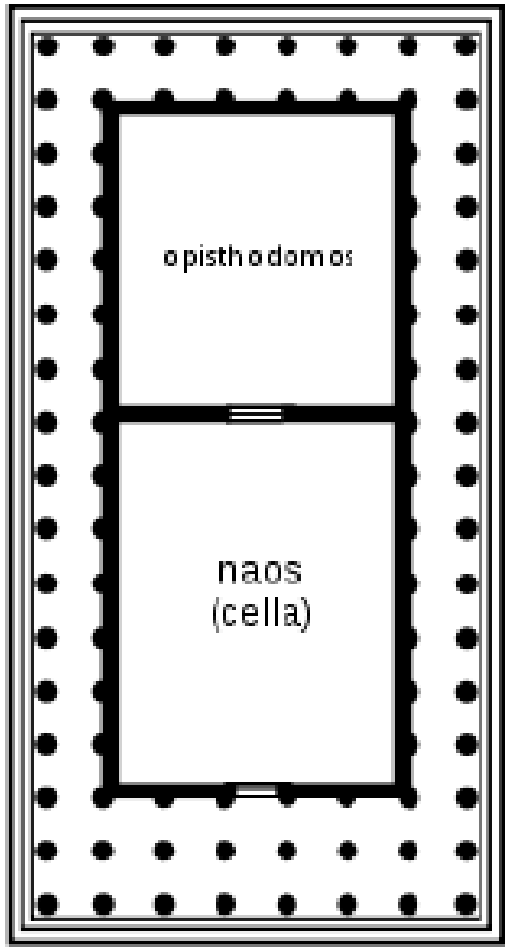
4. Temple:

Temple Plans classification :

5. **Pseudodipteral** :Temples with a room behind the naos (cella).
6. **Pseudoperipteral** temples , the naos room is closed by walls from four sides.



pseudoperipteral



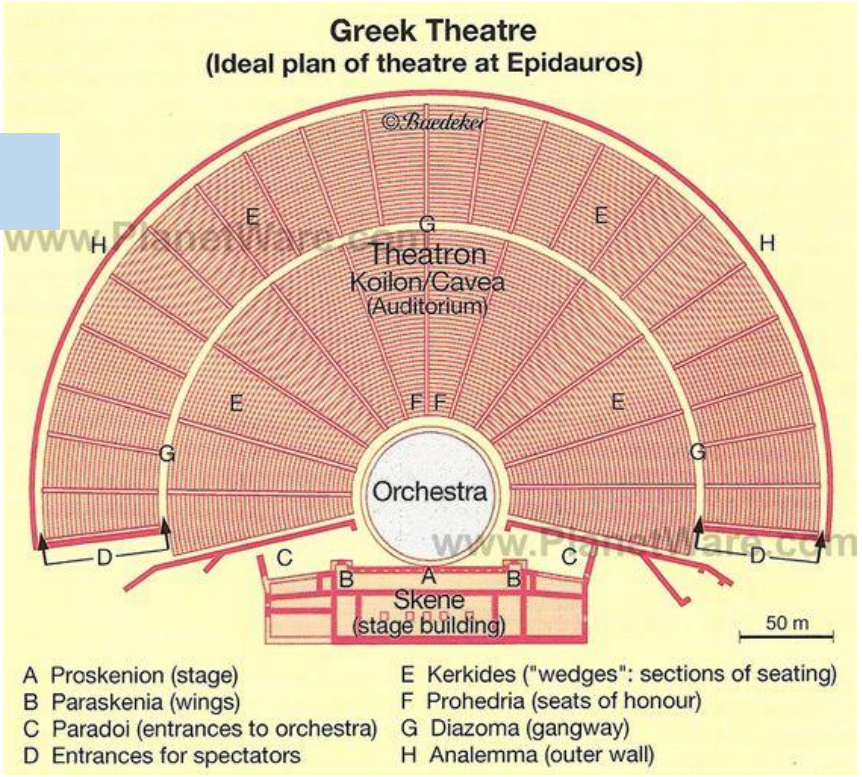
pseudodipteral

Greek Architecture

5. Greek Theater :

- The second important type of building that survives are **the open-air theatre**.
- The Greeks invented the theater design that is still used in movies and auditoriums today.
- Every important Greek city had a theater
- The theater had a bank of seats steps created from the landscape.
- It would usually commands a view to the landscape
- The main elements of the Greek theater are :

1. cavea (Auditorium).
2. Orchestra.
3. Skene (stage building).



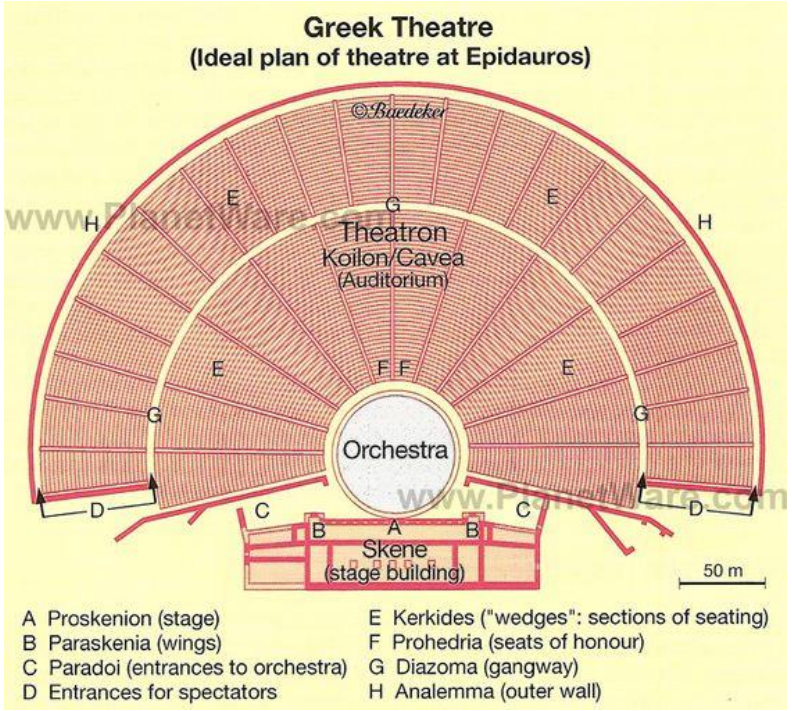
Main charechtirestices:

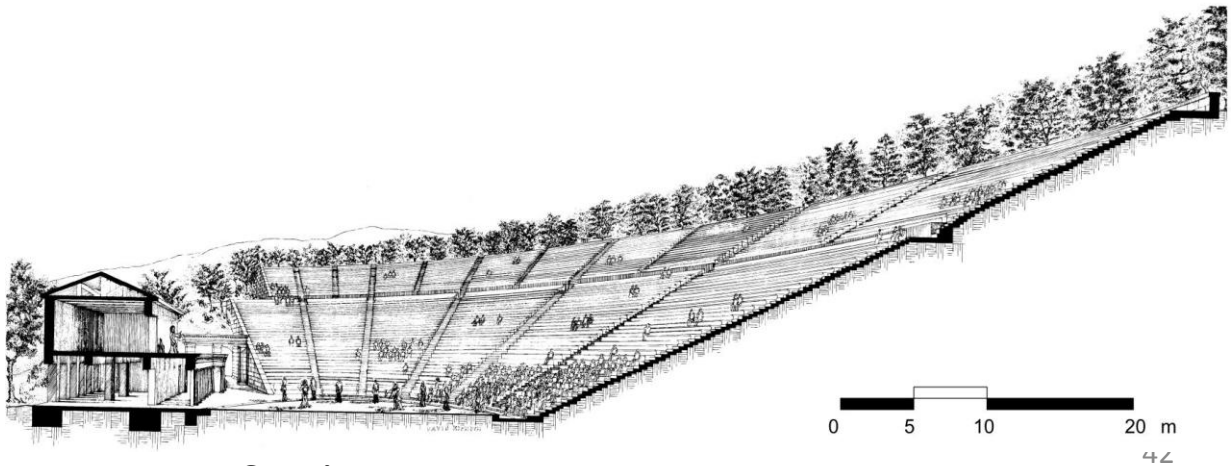
- Often built in to a hillside
- It has a circular Orchestra .
- Not enclosed on all sides
- Spectators can see “outside world”
- The original 34 rows of the Auditorium and more **.**
- **Capacity : 14,000 person and more**

Greek Architecture

5. Greek Theater :

- **Theater Epidaurus** it was the largest theater in ancient Greece It is still in use today .
- The theatre is admired for its exceptional acoustics, which permit almost perfect intelligibility of unamplified spoken words from the *skēnē* to all 14,000 spectators, regardless of their seating.
- The theater was designed by **Polykleitos the Younger in the 4th century BC. , The original 34 rows were extended in Roman times by another 21 rows.**



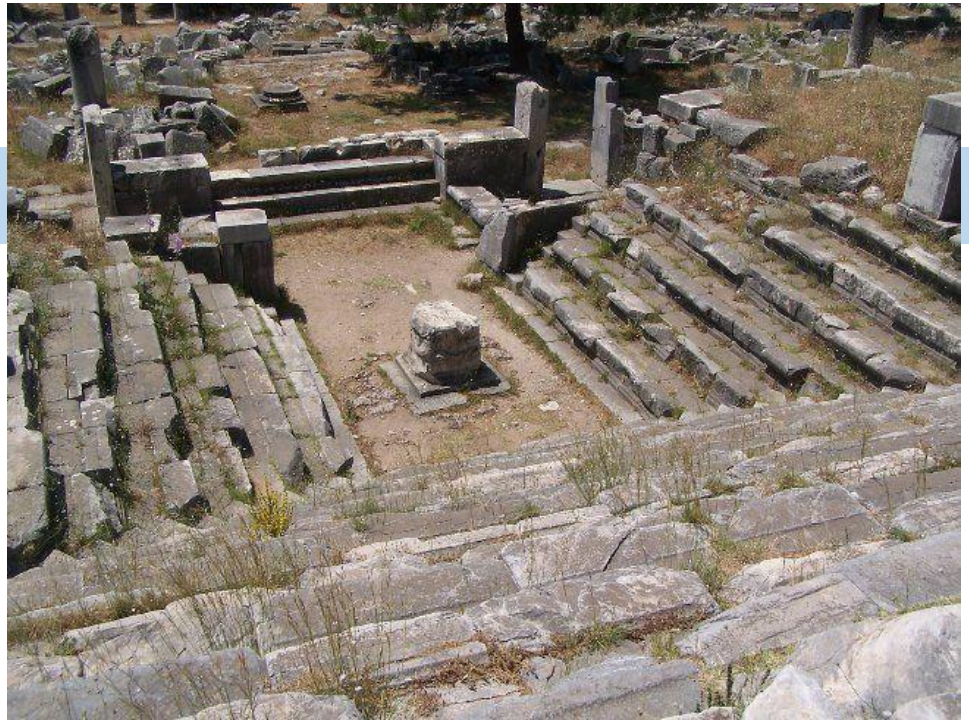


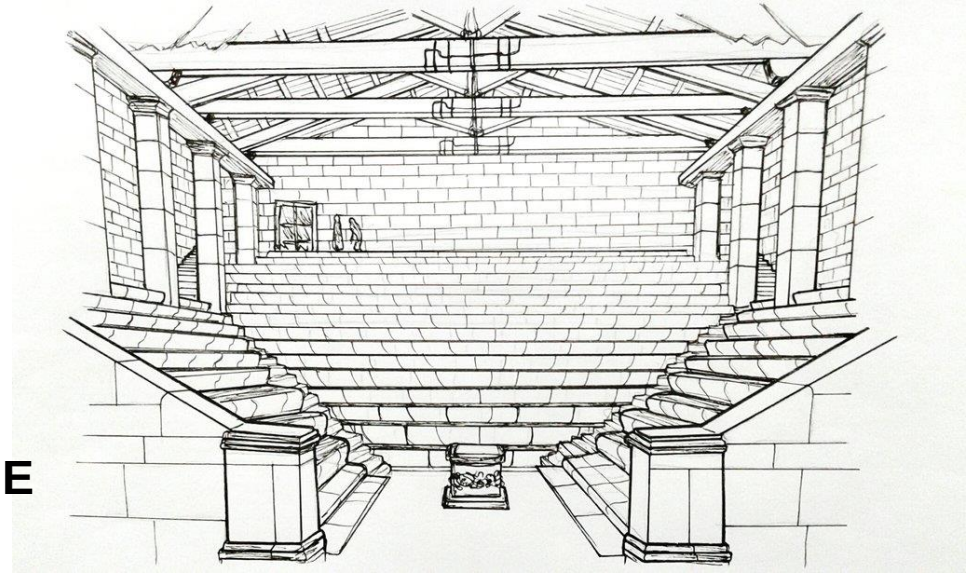
Section

Greek Architecture

6. Bouleuterion (boule):

- It is the town council building , was an important civic building in a the Greek city.
- It was a covered meeting place for the democratically-elecated councils **(citizen council)** of the city.
- Small with many columns .
- These selected representatives assembled to handle public affairs and represent the citizenry of the polis (in ancient Athens the boule was comprised of 500 members).
- The boule generally was a covered, rectilinear building with stepped seating surrounding a central speaker's well in which an altar was placed.



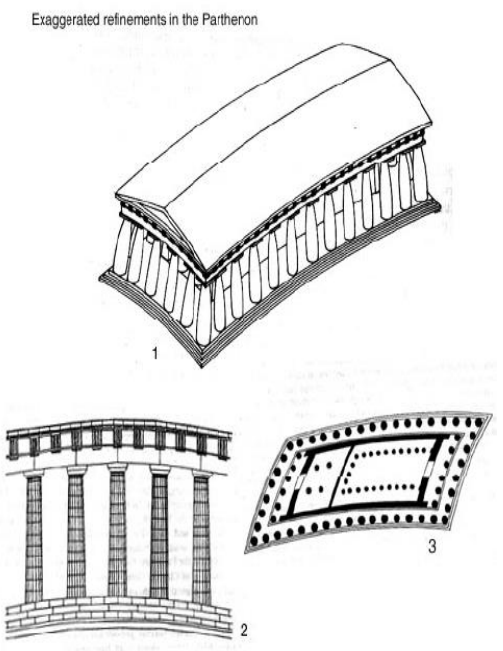


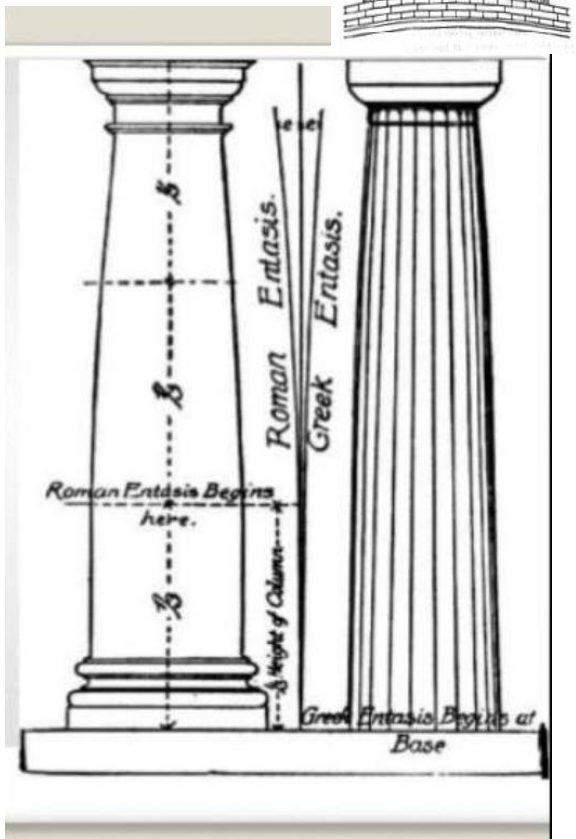
BOULEUTERION, PRIÈNE (TURKEY), C. 200 B.C.E

Greek Architecture

OPTICAL CORRECTIONS (REFINEMENTS) IN GREEK TEMPLES (Method of Entasis)

- A characteristic of the Doric order is the use of entasis
- The use of optical correction, **entasis**, is a pointer to the desire of the Greeks to achieve their ideals of beauty in architecture.
- **Method of Entasis:** refers to the practice of optical correction in Greek Doric temples
- All buildings are arranged with a slight curve to correct the optical illusion when they are viewed.
- This technique applied by: **slight convexity in columns : it is the slight curvature of a classical column that diminishes as it rises .**
- This is done to counteract the concave appearance produced by straight edges in perspective .
- The best example of the application of **entasis** is found in the **Parthenon temple.**





Greek Architecture

The classical orders in Greek:

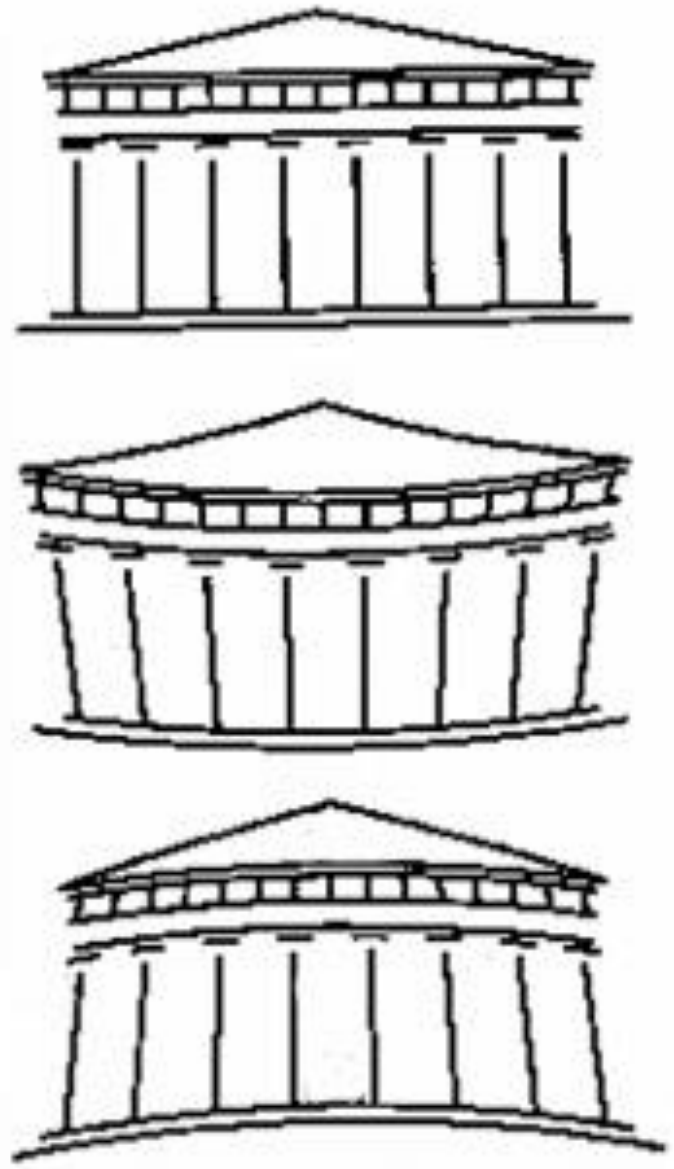
OPTICAL CORRECTIONS (REFINEMENTS) IN GREEK TEMPLES

(Method of Entasis)

The drawing explains **Entasis method** :

1. **Diagram 1:** on top shows how the ancient Greeks wanted the temple to appear.
2. If the temple is built without correction, then **diagram 2** shows how it would actually appear
3. To ensure that it appears correctly as desired in one, the Greeks introduced the distortions shown in **diagram 3** :

- The vertical axis of the columns were inclined inwards, by **2.65 inches** to prevent the appearance of falling outward that occurs in perspective.
- Similarly, the stylobate, entablature & pediment were made convex with the center raised by 2.6 inches with respect to the ends to correct the sagging appearance.



Optical Correction (Entasis) In Doric Temples

THANK YOU ...