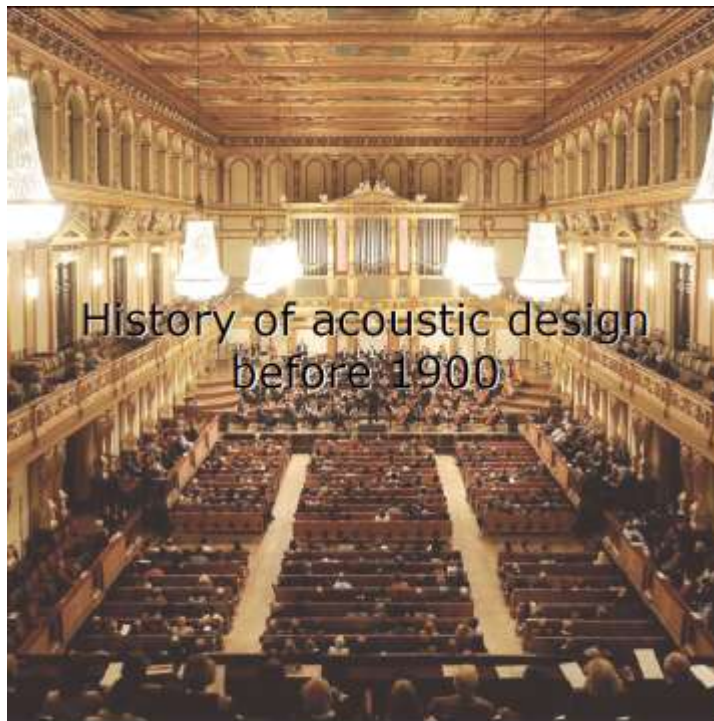
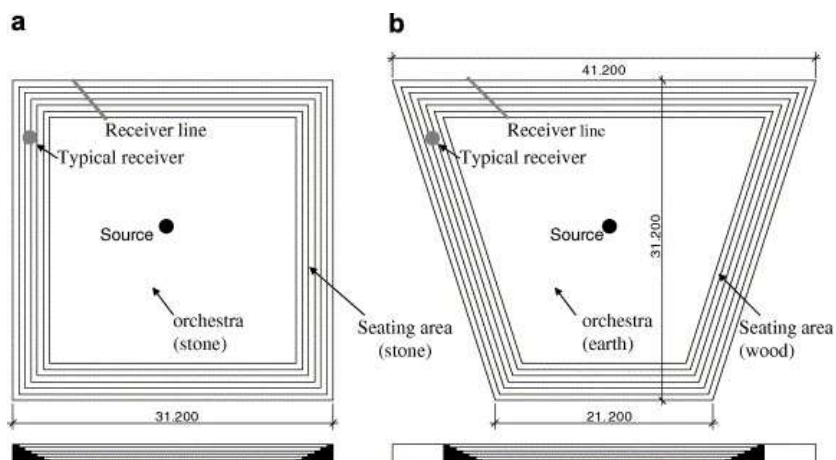


Acoustic design History



History of acoustic design
before 1900

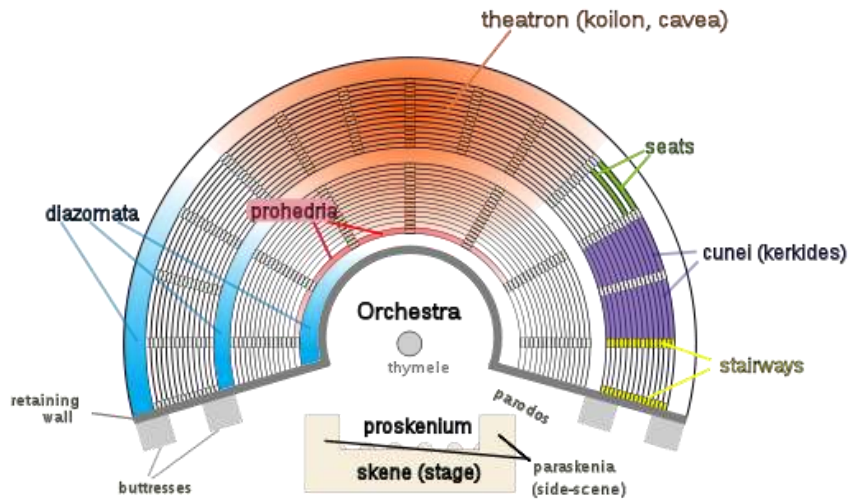
ANCIENT THEATERS



Open-air Greek and Roman theaters (constructed about 2000 years ago) most often had good listening conditions for drama and instrumental recitals by small groups.

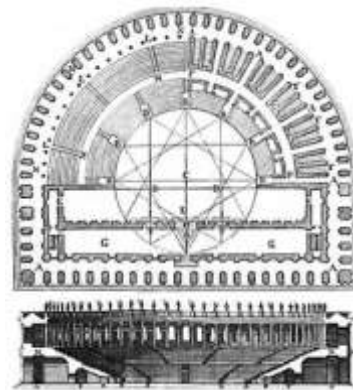


Greek Theater

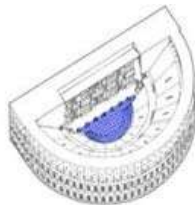


ANCIENT GREEK THEATRE

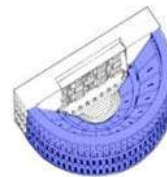
Roman theater



Scaenae

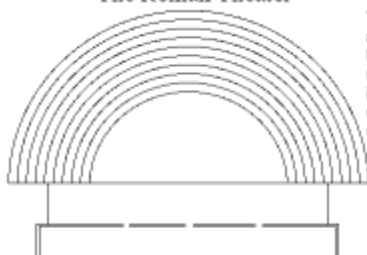


Orchestra



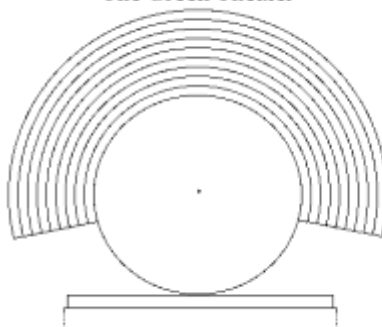
Cavea

The Roman Theater

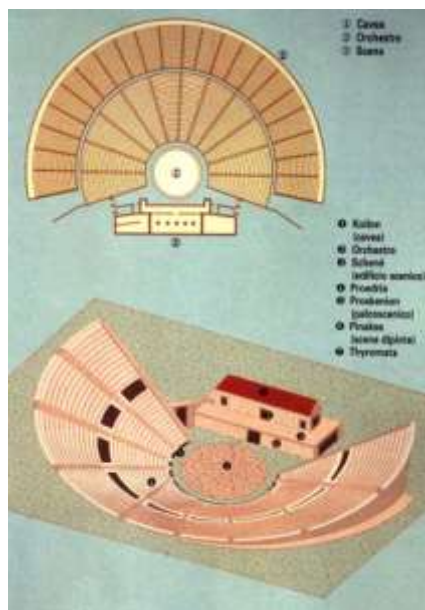
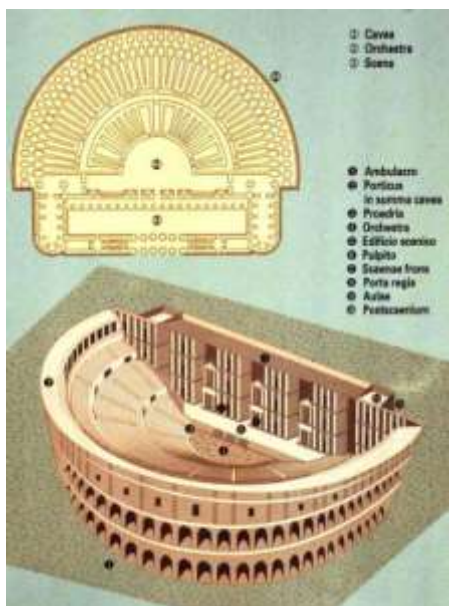


The Roman theater has a much smaller orchestra, being half a circle rather than a whole circle. This is partially due to the fact that Roman dramas did not use choruses. The stage is also larger and there are three entrances in the back wall.

The Greek Theater

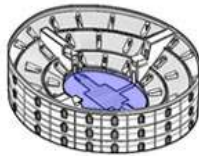
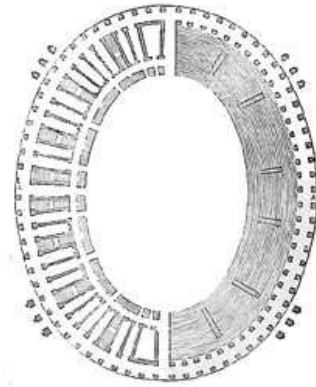


The Greek theater has a circular orchestra, or "dancing area" for the chorus to sing and dance in.

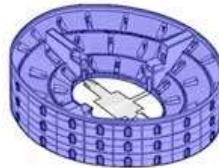


The Greek theaters usually were located on steep hillsides in quiet rural locations

Roman amphitheatre



The arena

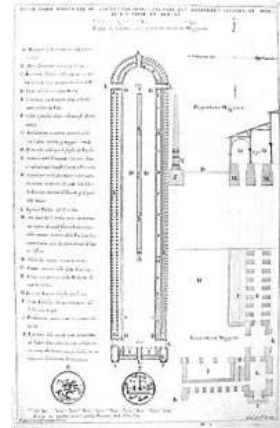


The cavea

Roman amphitheatre

- In contrast to the Roman theater, which evolved from Greek models, the amphitheater had no architectural precedent in the Greek world.
- An amphitheater is circular (or sometimes oval), with the stage in the middle. A theater is half-moon shaped, with the stage in the middle of the straight side

Roman Circus



The cavea or maemiana

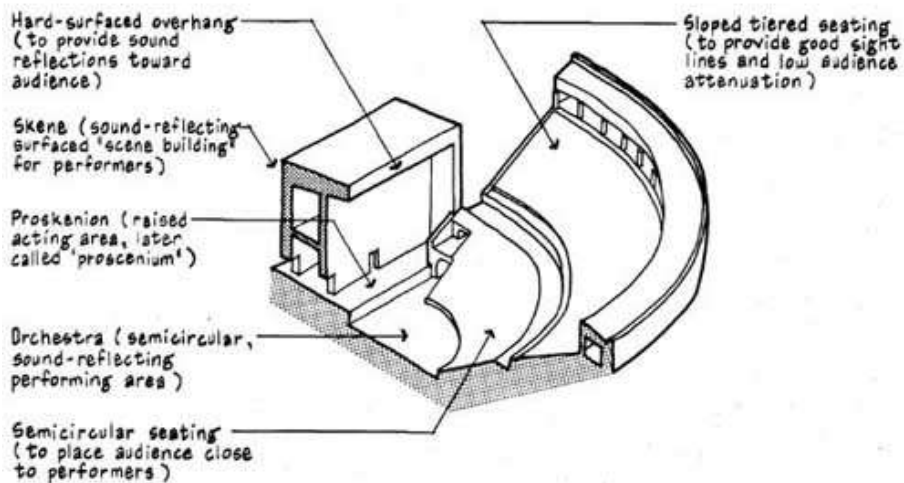


The arena.



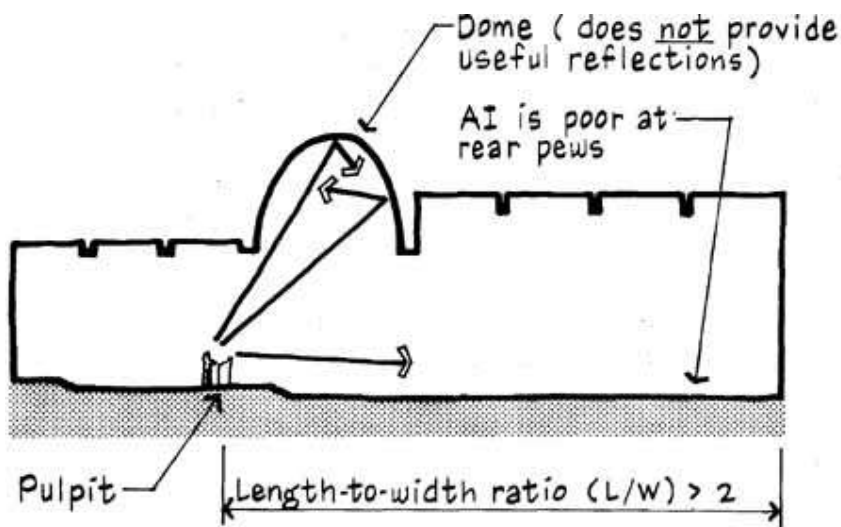
The Spina

Acoustics in theater



- Seating layouts were semicircular so the audience would be close to the stage, thus reducing sound energy loss by distance
- The tiers were constructed with a steep rise to provide good sight lines, permit reflected sound energy from the orchestra floor, and reduce attenuation caused by the seated audience
- Stage raised
- Made of stone
- Back wall made of stone
- Overhang to enhance reflection
- actors wore masks which exaggerated their expressions and reinforced their voices

Mosque acoustics



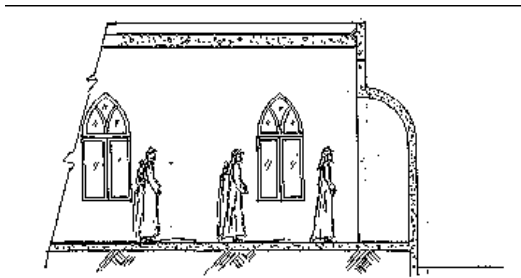


Figure 1: Prayer Mode in Mosques

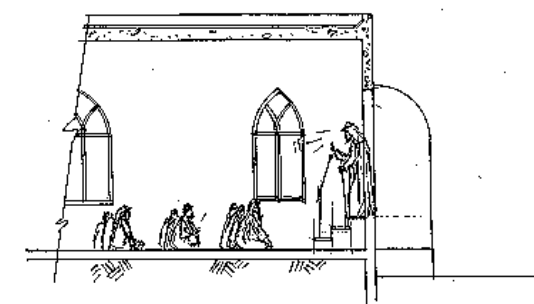


Figure 2: Preaching Modes in Mosques

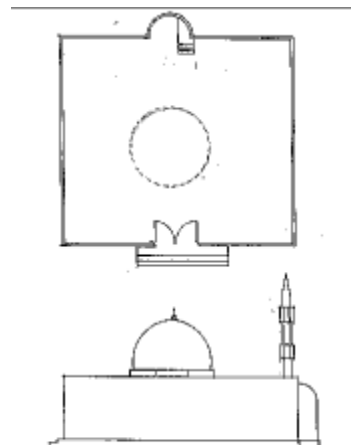
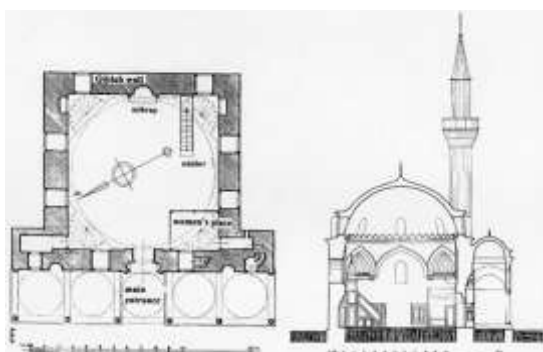
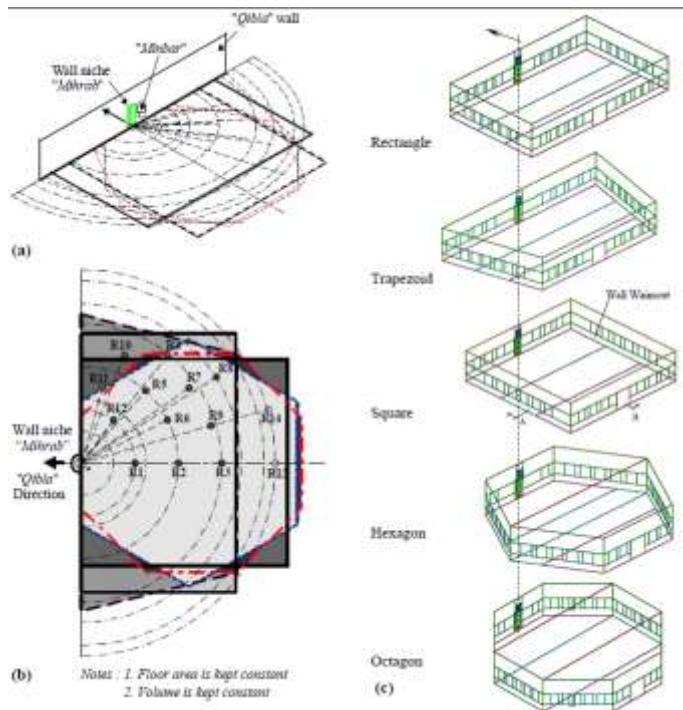
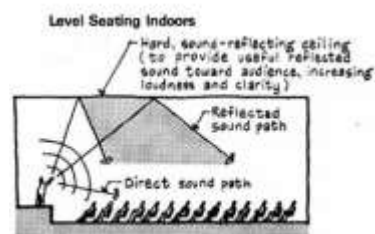
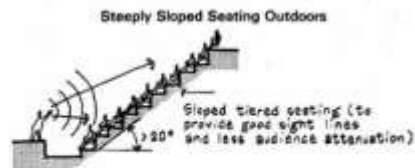
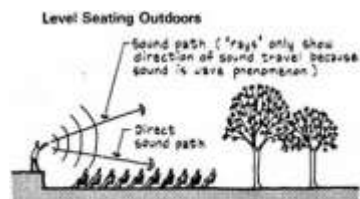


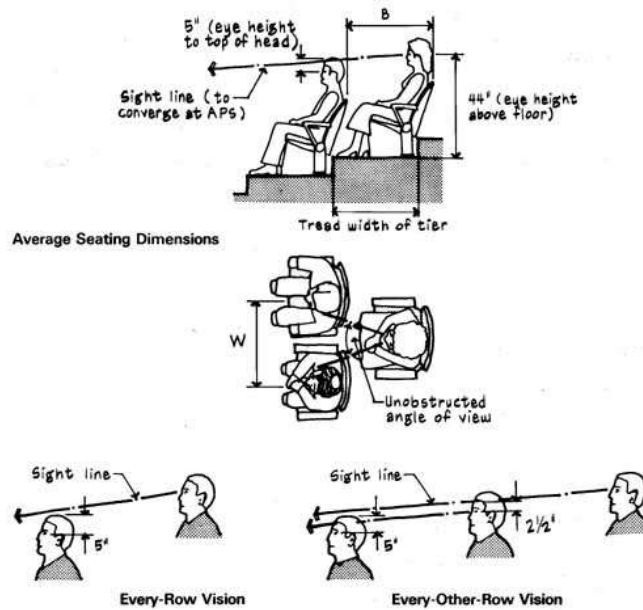
Figure 3: Basic Elements of Mosques



AUDIENCE SEATING



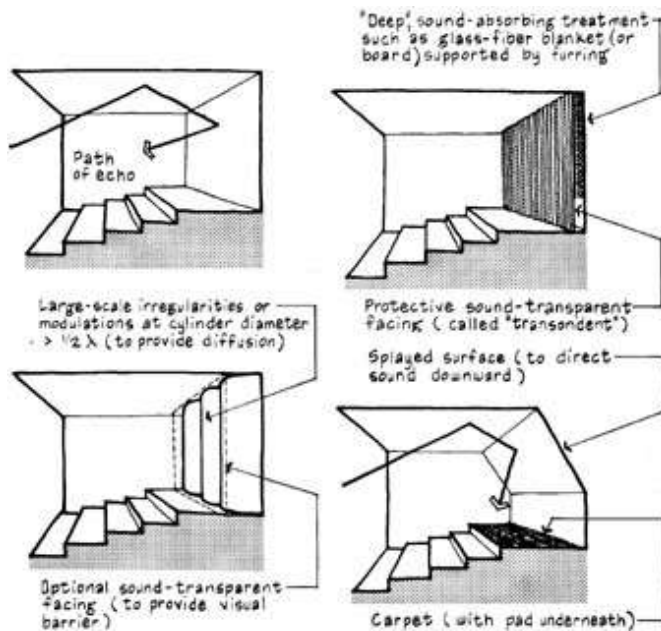
SIGHT LINE BASICS



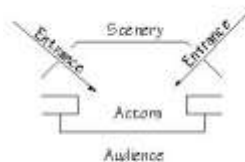
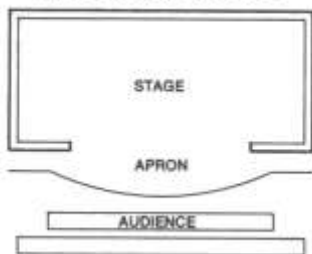
Space height

- $H=20T$
- where H = ceiling height (ft)
- T = mid-frequency reverberation time (s)

Echo control



Proscenium Theatre



Thrust Stage

