Speyer Cathedral

Speyer Cathedral I 1024-61; Speyer II 1080-1106

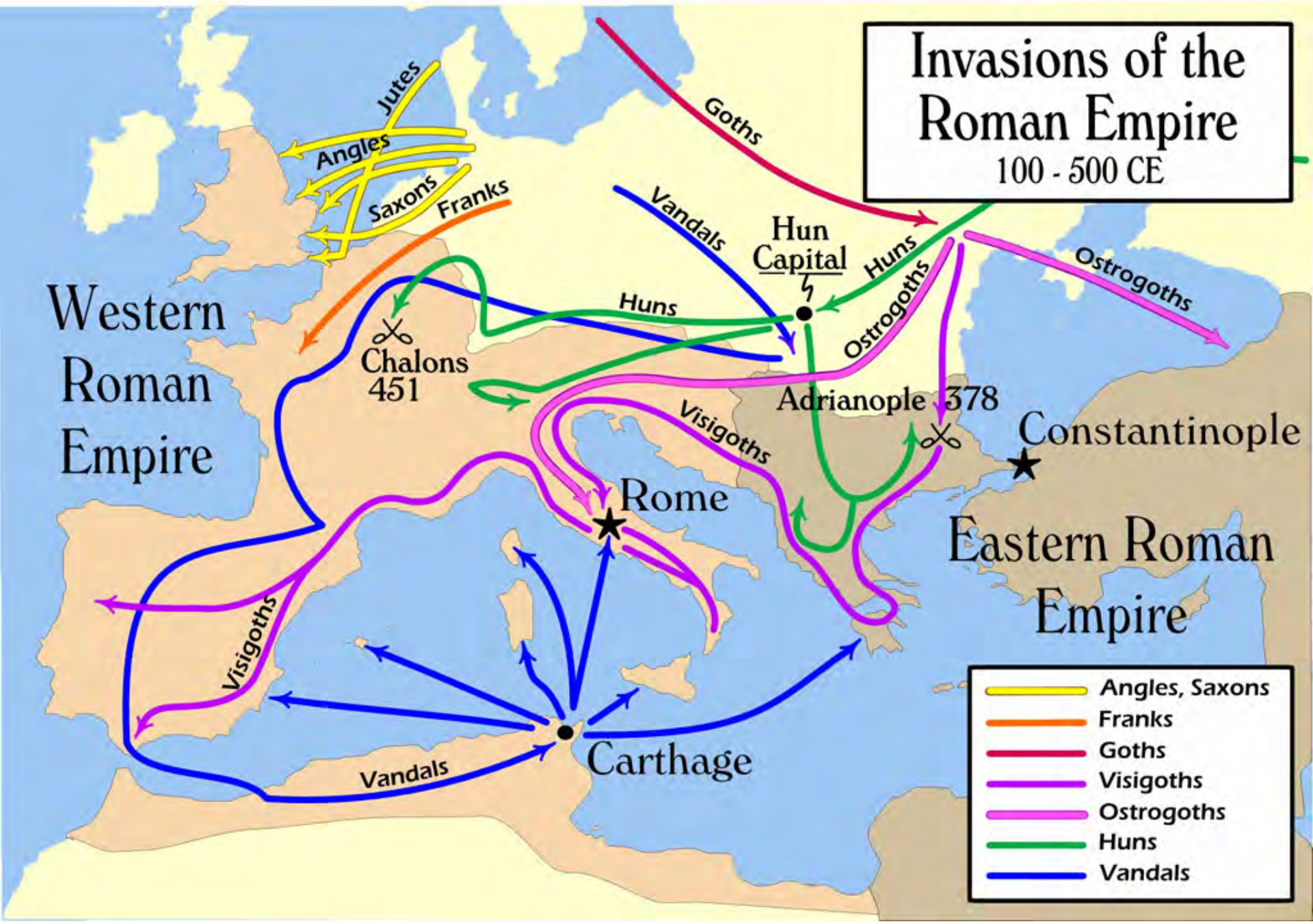
Chronology of construction: construction as continuous re-design

- Speyer I (two phases)
- Speyer II

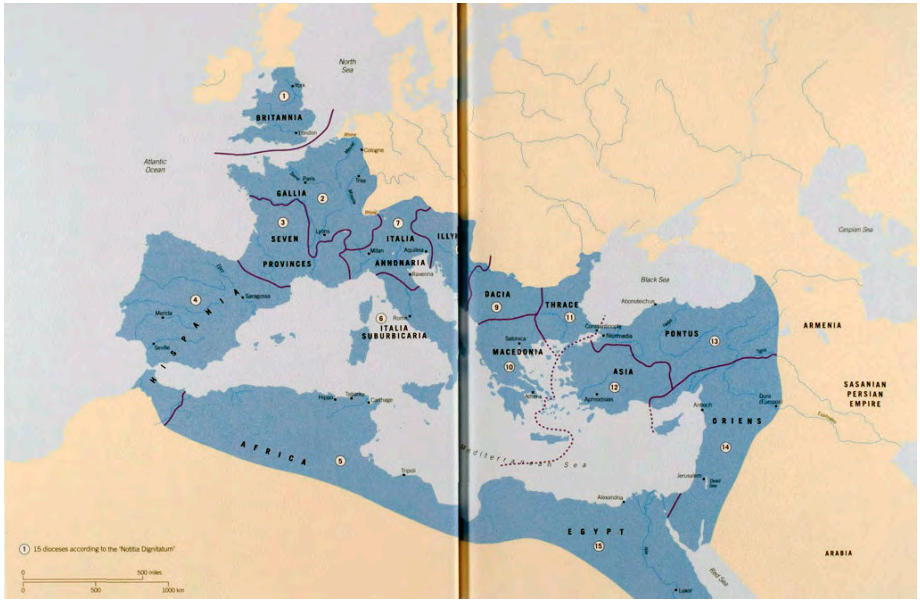
Romanesque style (ca. 1000-1250): post-classical and pre-Gothic

Vaulting: arched ceilings

- Cloister vaults
- Barrel vaults
- Groin and ribbed groin vaults


Invasions of the Roman Empire
100 - 500 CE
Jutes
Angles
Saxons
Franks
Goths
Vandals
Hun Capital
Huns
Ostrogoths
Western Roman Empire
Chalons 451
Adrianople 378
Constantinople
Visigoths
Rome
Eastern Roman Empire
Carthage
Angles, Saxons
Franks
Goths
Visigoths
Ostrogoths
Huns
Vandals

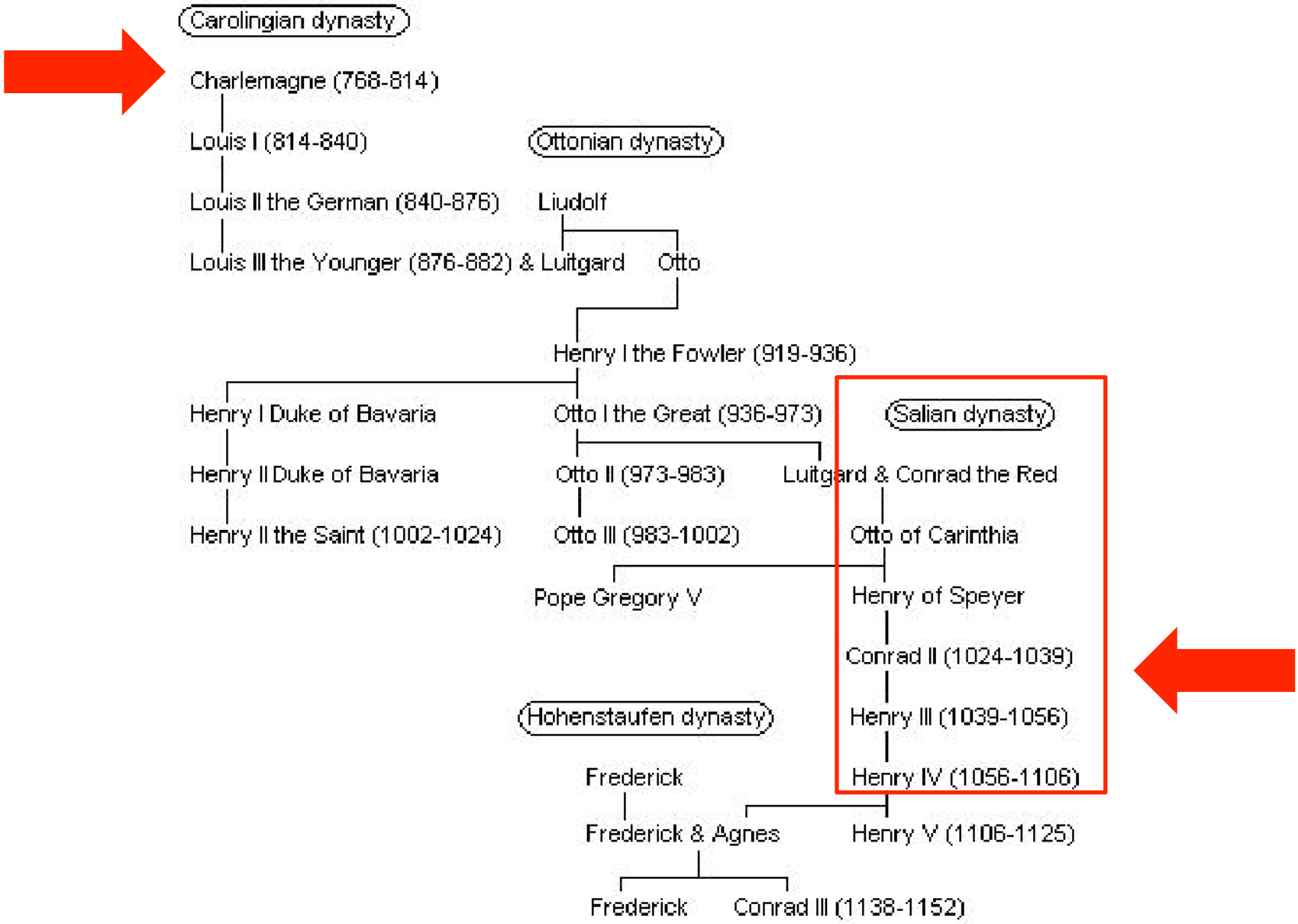
Roman Empire in 337



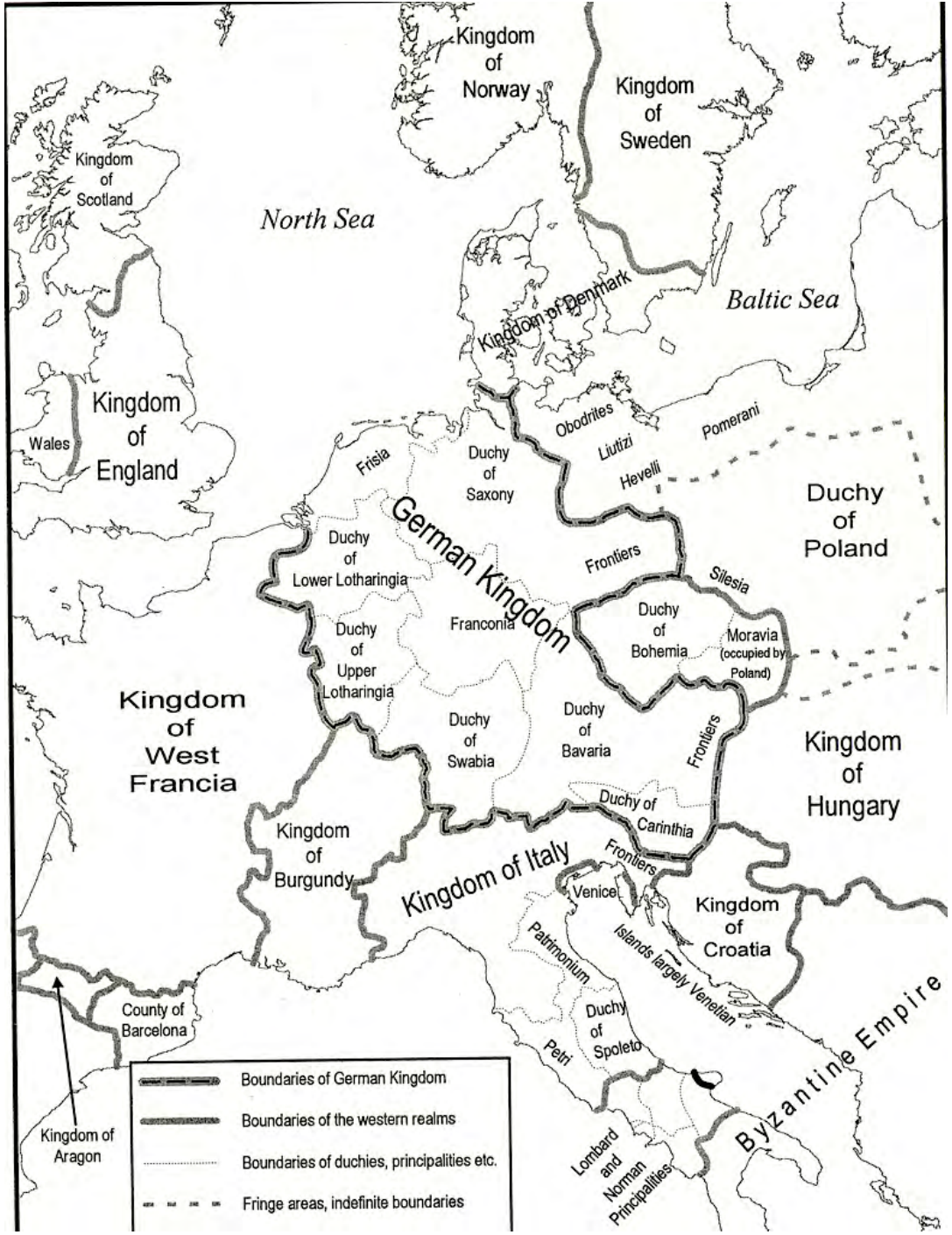
Roman Empire in 568 (yellow)

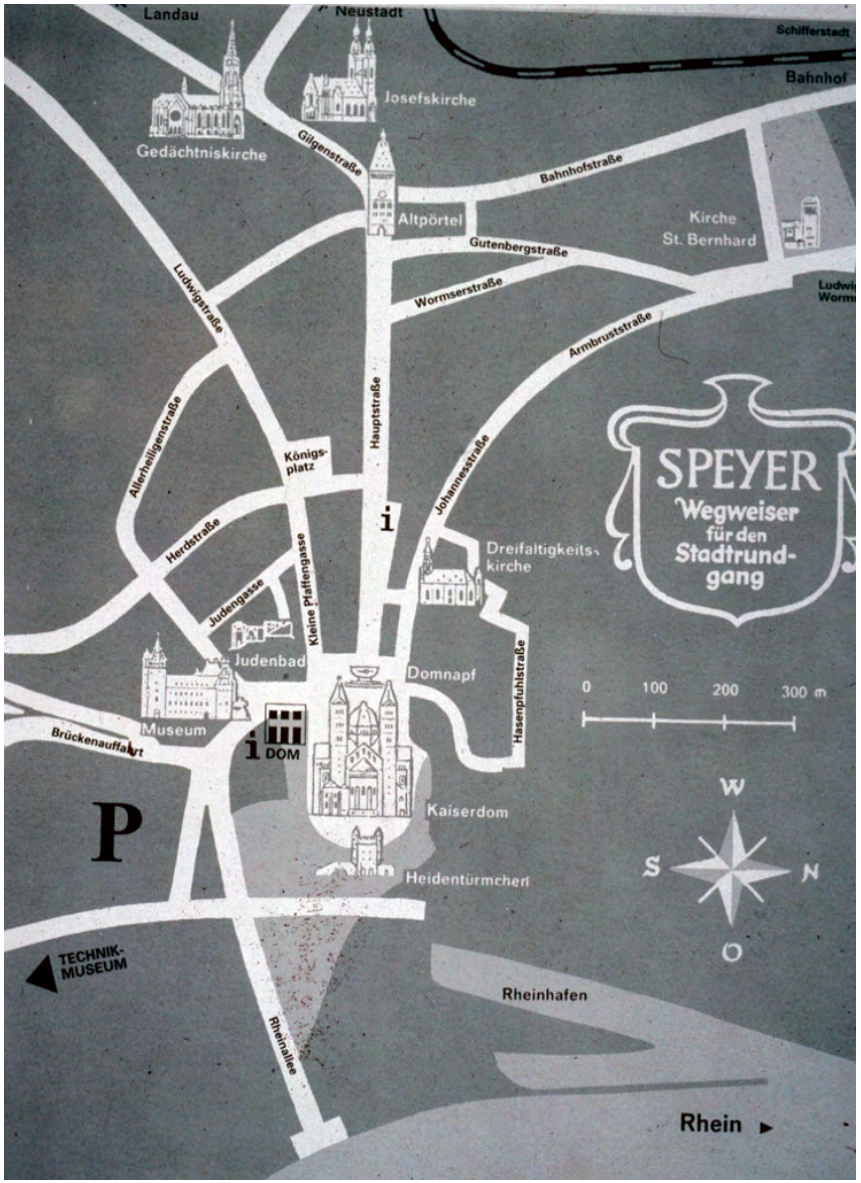

Islamic Empire ca. 750
Wearmouth-Jarrow
Seville
Rome
Constantinople
Alexandria
Tigris
Euphrates
Nile
= Islamic Empire
= Roman Empire
= Kingdom of the Franks

Charlemagne, King of the Franks, 767-814; Emperor of Rome, 800-814


Carolingian dynasty
Charlemagne (768-814)
Louis I (814-840)
Louis II the German (840-876)
Louis III the Younger (876-882) & Luitgard
Ottonian dynasty
Liudolf
Otto
Henry I the Fowler (919-936)
Henry I Duke of Bavaria
Henry II Duke of Bavaria
Henry II the Saint (1002-1024)
Otto I the Great (936-973)
Otto II (973-983)
Otto III (983-1002)
Pope Gregory V
Salian dynasty
Luitgard & Conrad the Red
Otto of Carinthia
Henry of Speyer
Conrad II (1024-1039)
Henry III (1039-1056)
Henry IV (1056-1106)
Hohenstaufen dynasty
Frederick
Frederick & Agnes
Henry V (1106-1125)
Frederick
Conrad III (1138-1152)

Political divisions of Europe, 1024





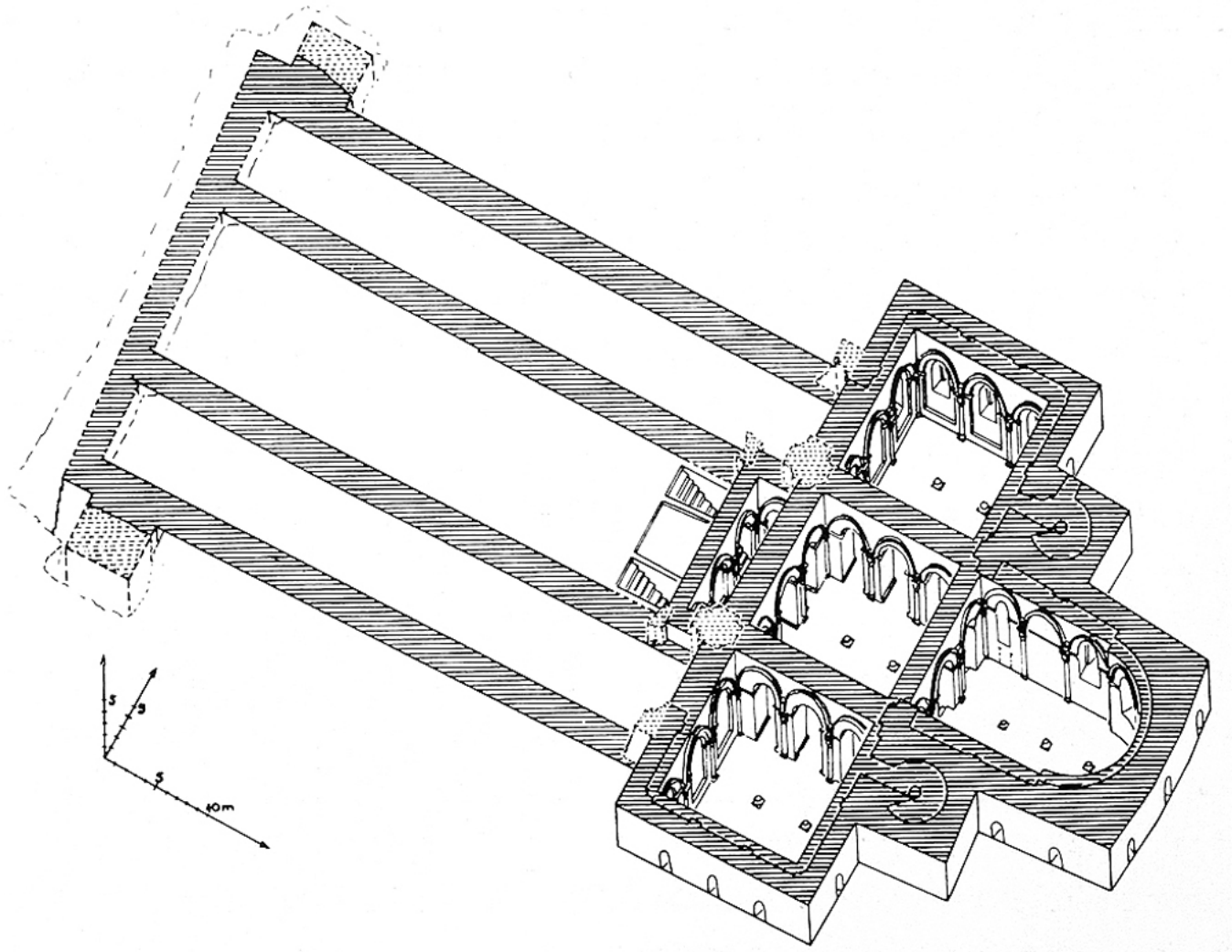
Speyer town plan

Speyer

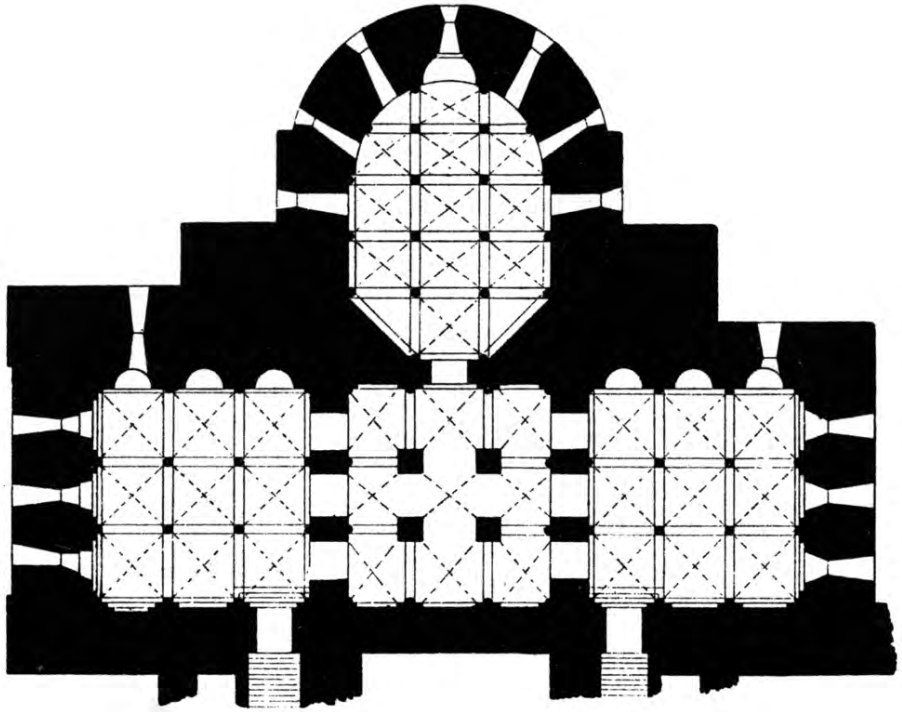
Holy Roman Empire (red) in 1000

Speyer, walls at top of crypt level

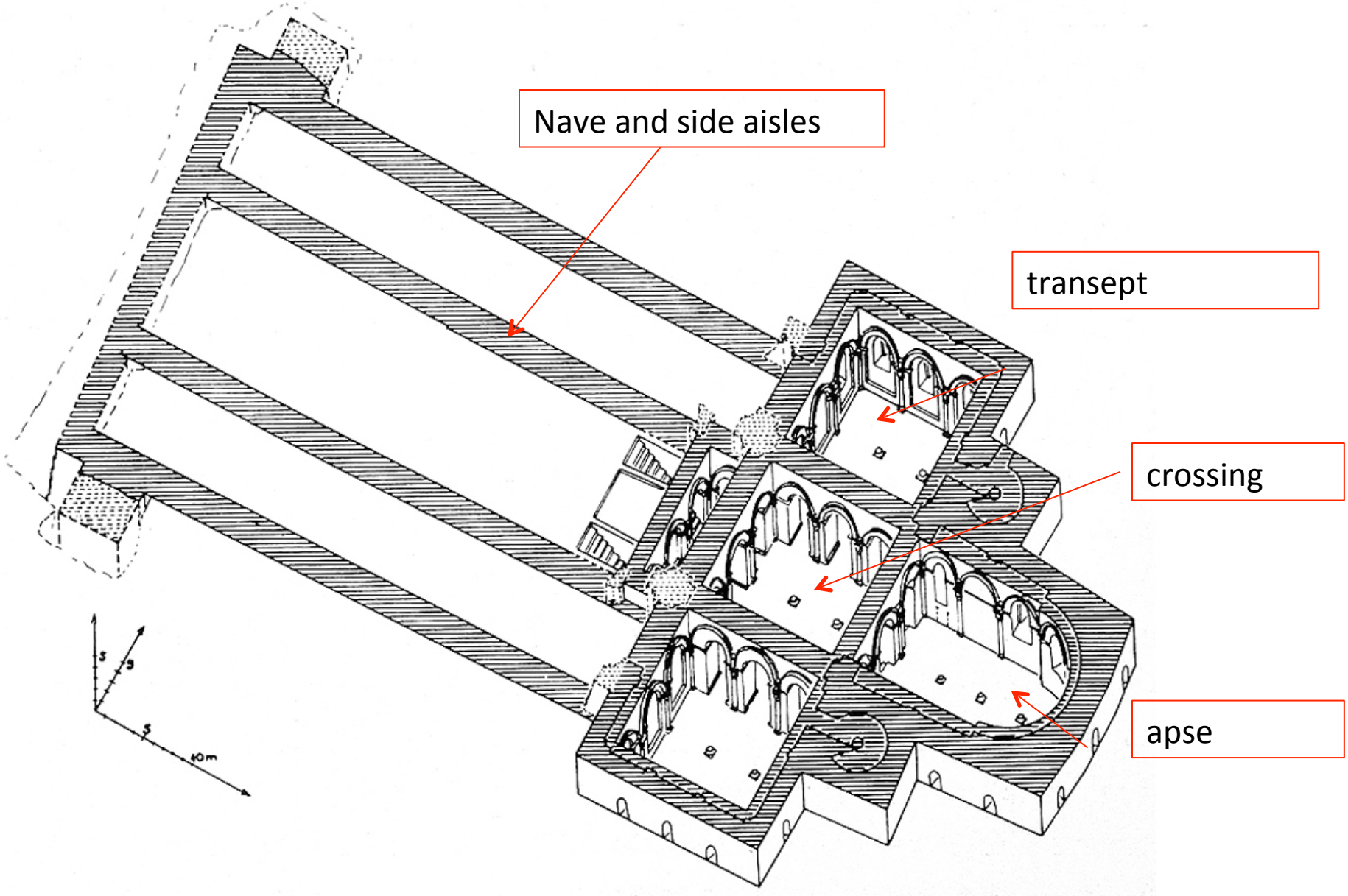
hall crypt = underground or partly underground space of uniform height divided by columns



Speyer I, hall crypt

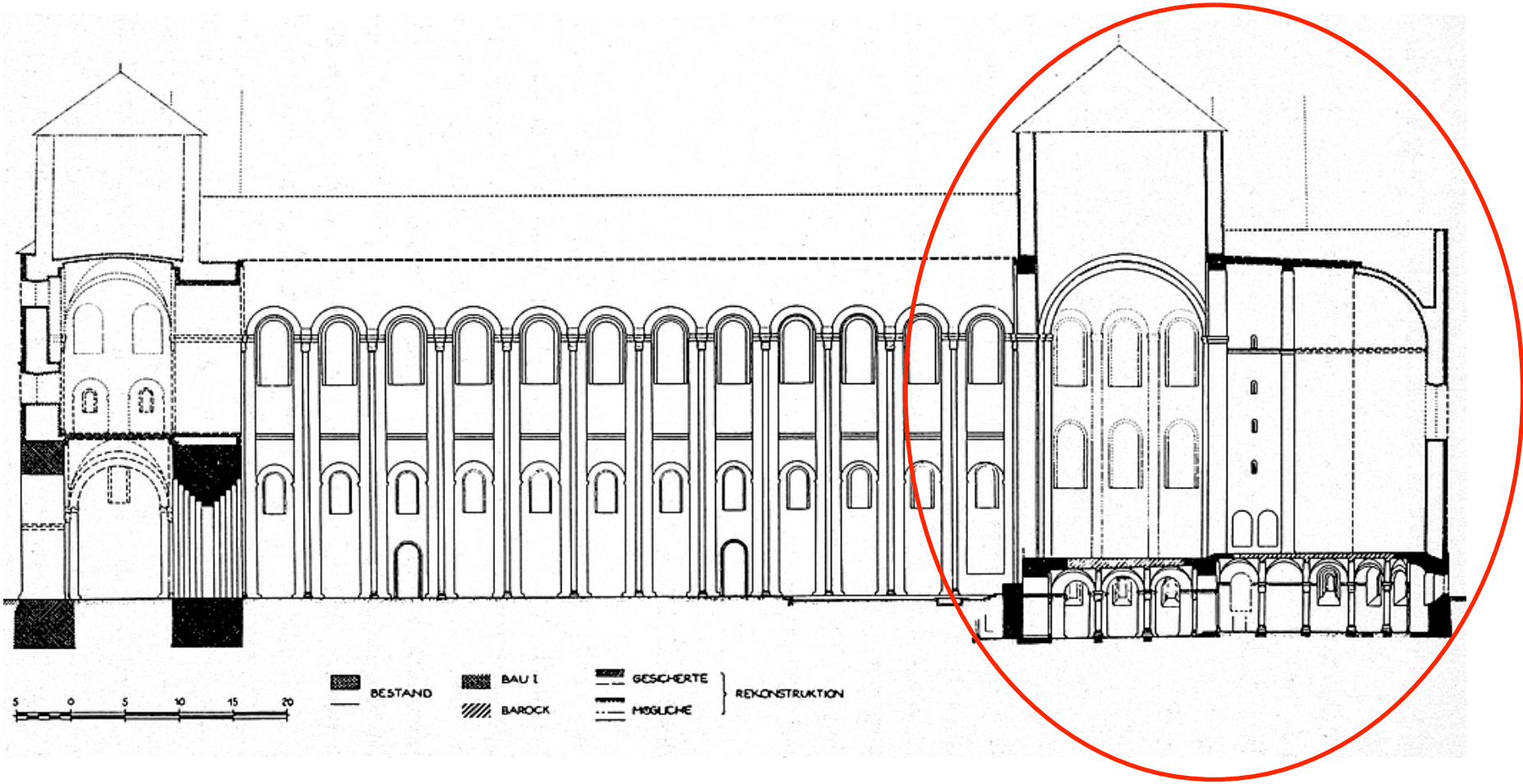


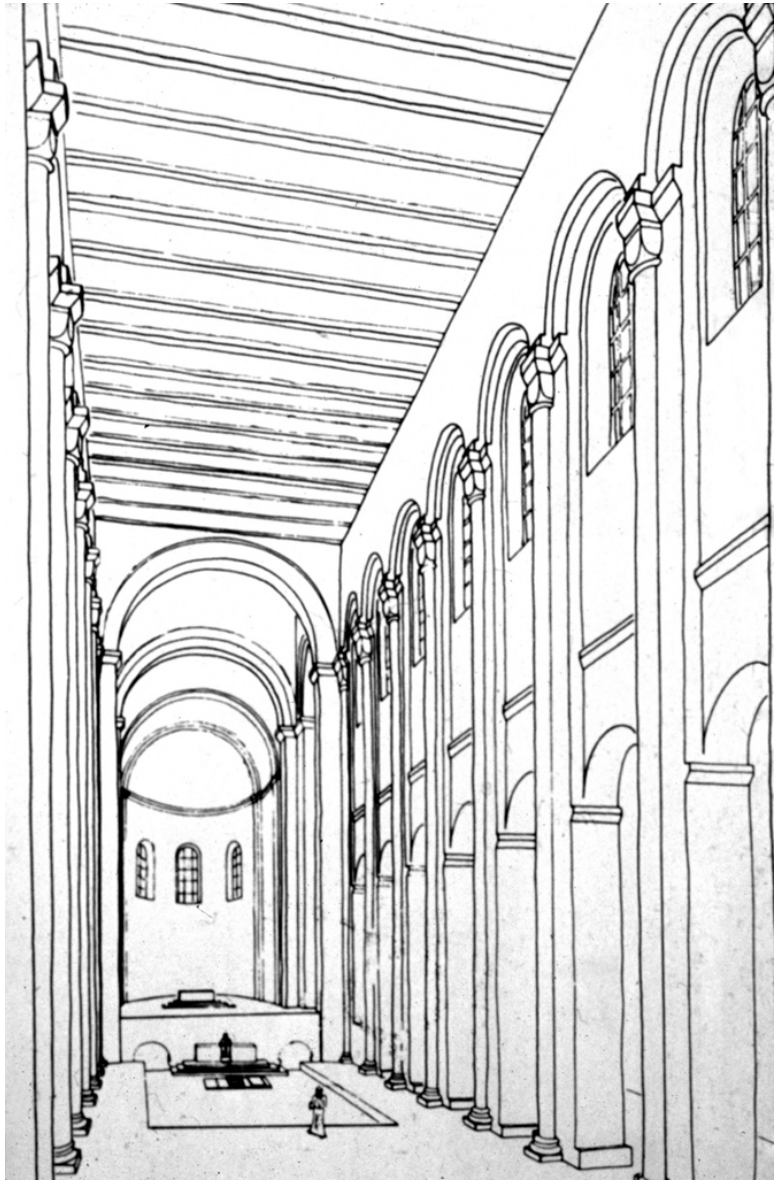
cushion or shield capital


Nave and side aisles
transept
crossing
apse
5
5
10m

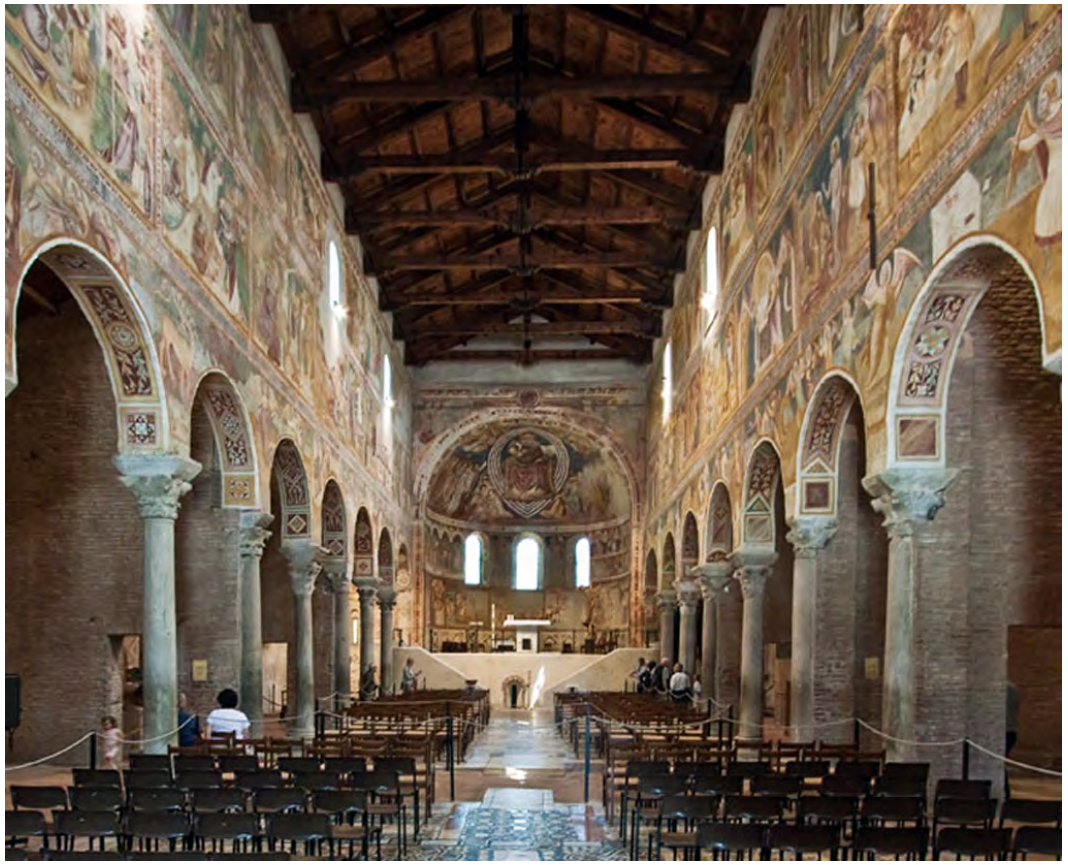
Speyer I, longitudinal section showing raised choir over crypt

(represents a vertical plane cut through the building, on its longitudinal axis)



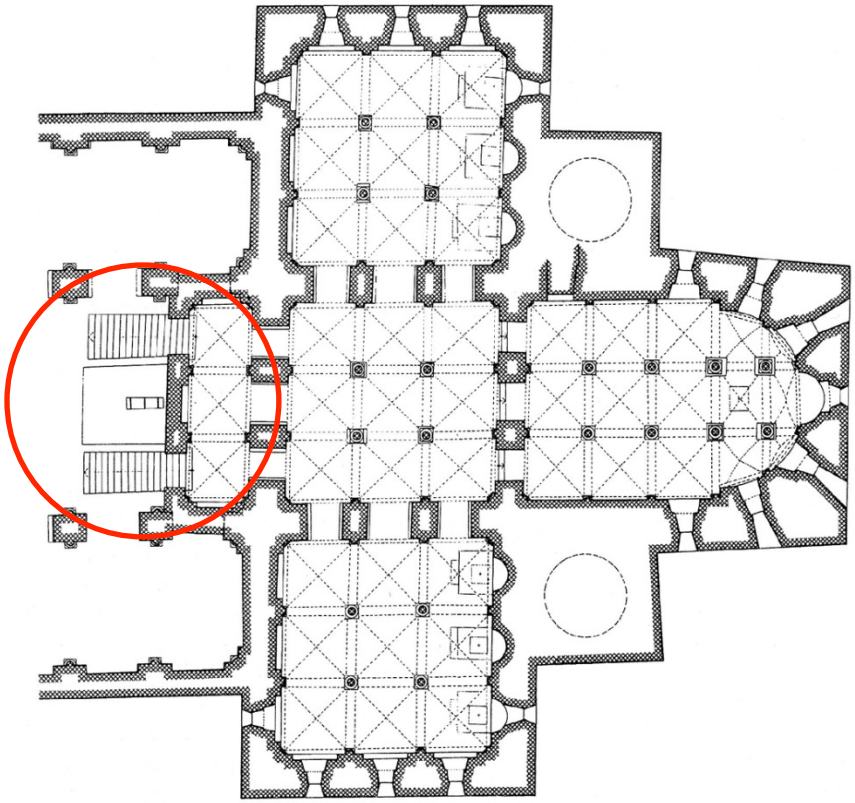


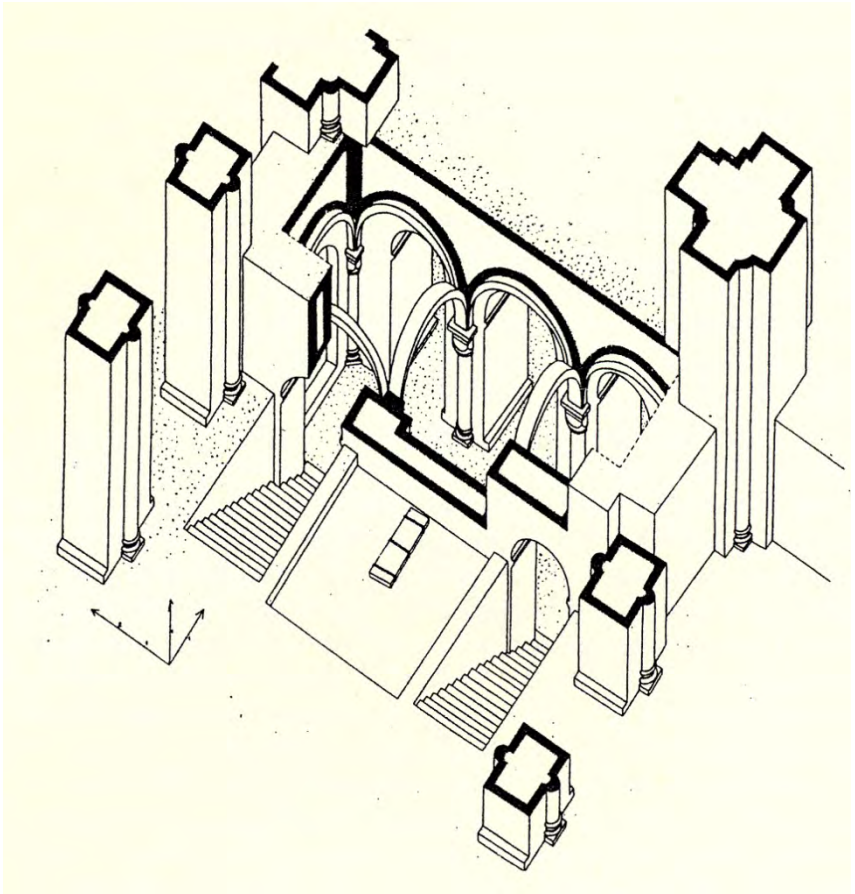
Speyer I, raised choir at east end



Pomposa Abbey, 6th c, raised choir

Tomb of Conrad II at the foot of the raised choir

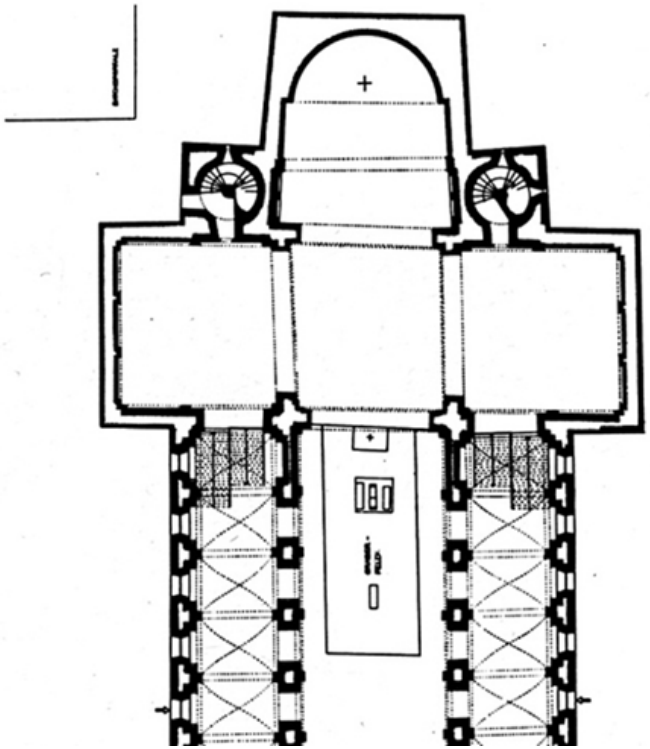


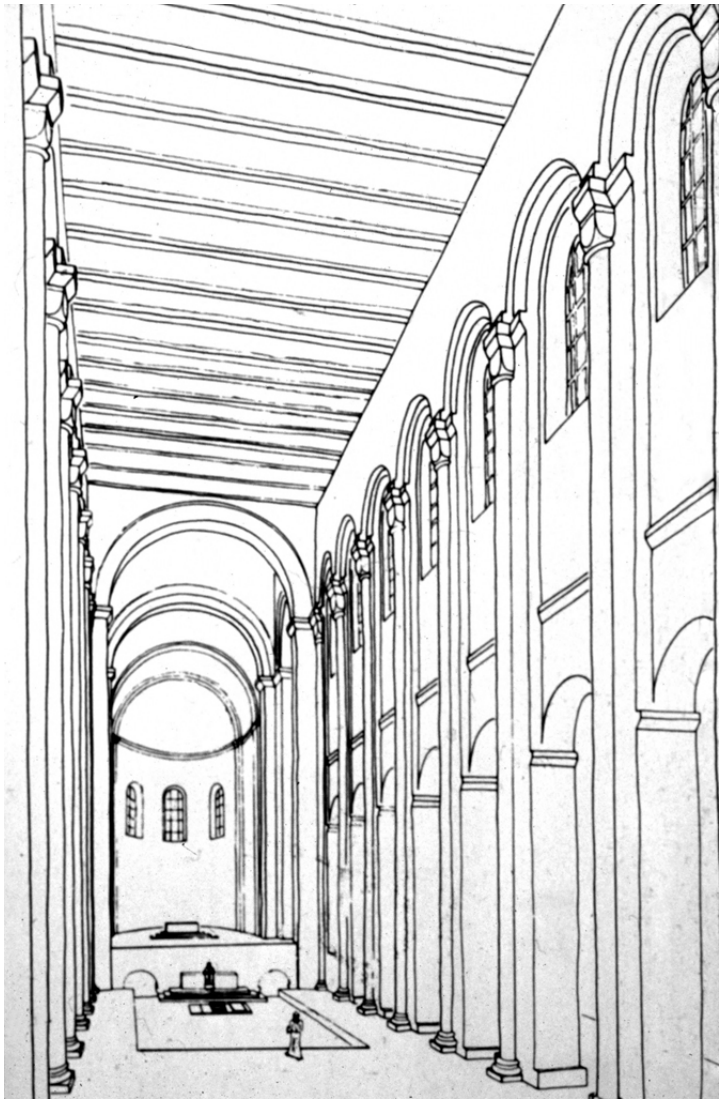


Speyer. Grave crown of Conrad II. 1039

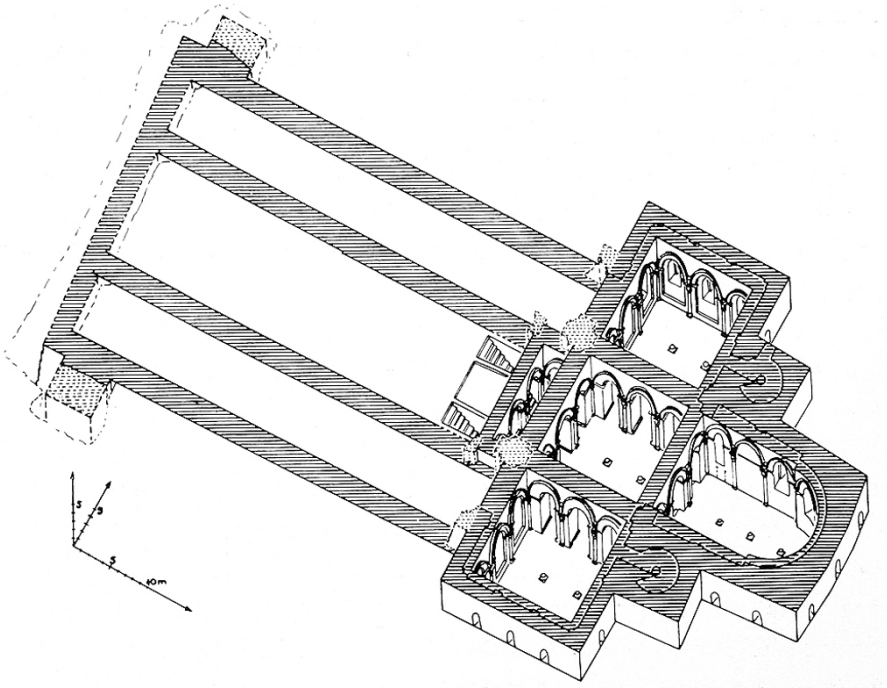
Speyer. Crowns of Conrad II (d.1039), Henry III(d.1056) and Henry IV (d.1106)

Speyer I, plan in 1039 and reconstructed elevation

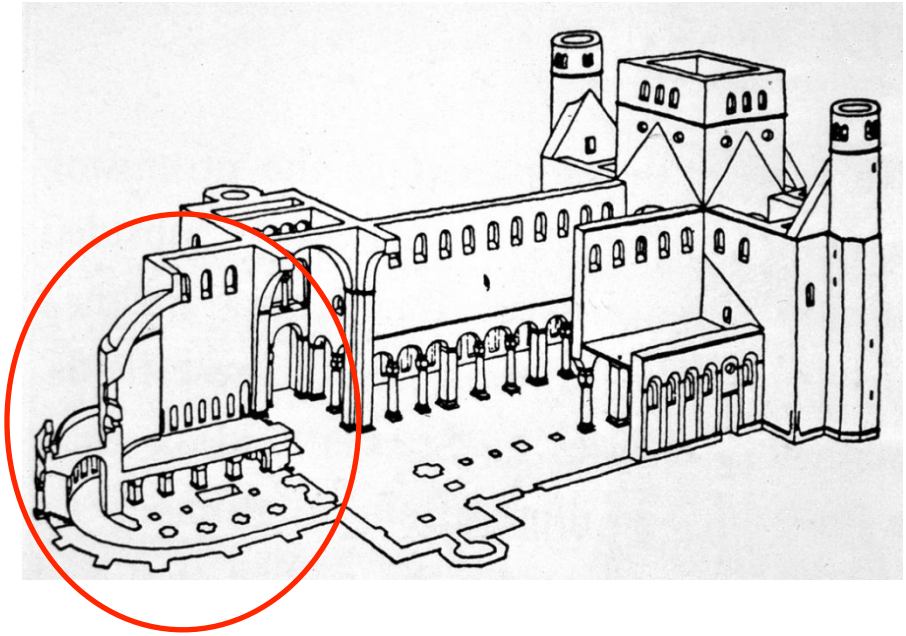




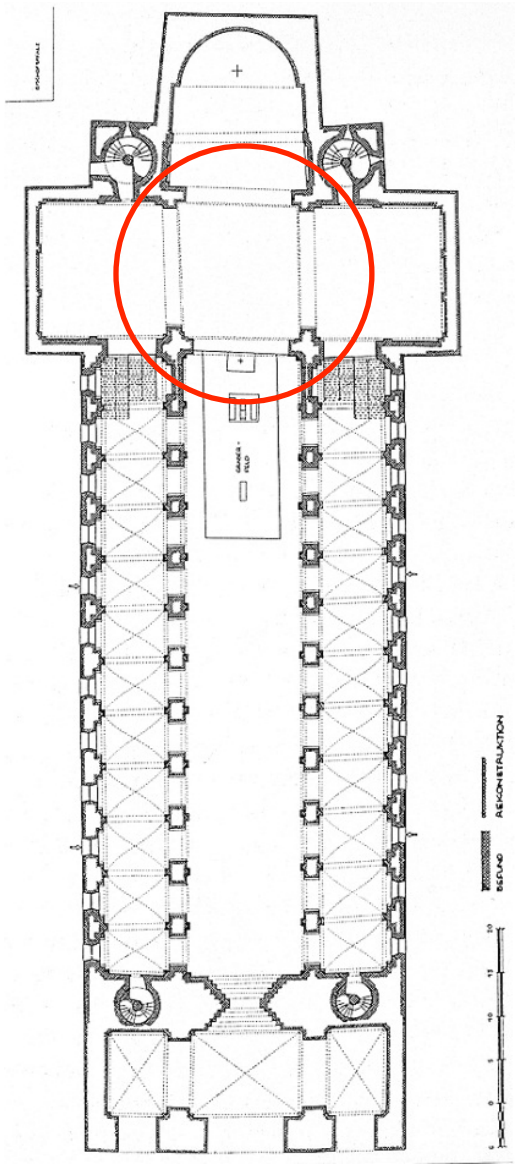
Speyer



Hildesheim, St. Michael's, ca. 1000

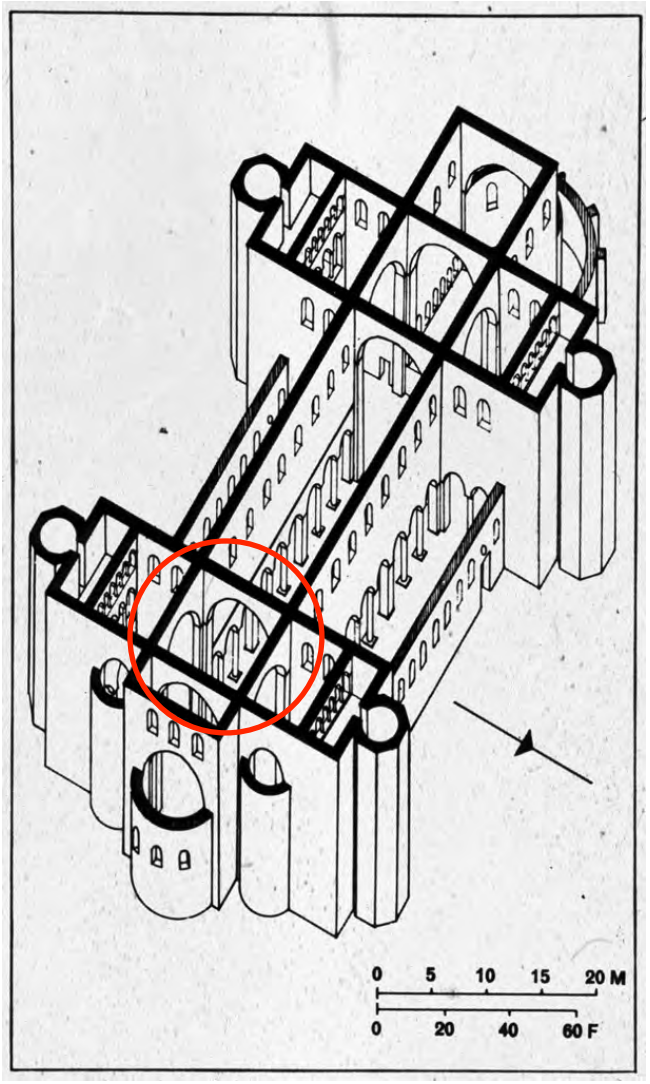


Speyer I. the crossing square is a module

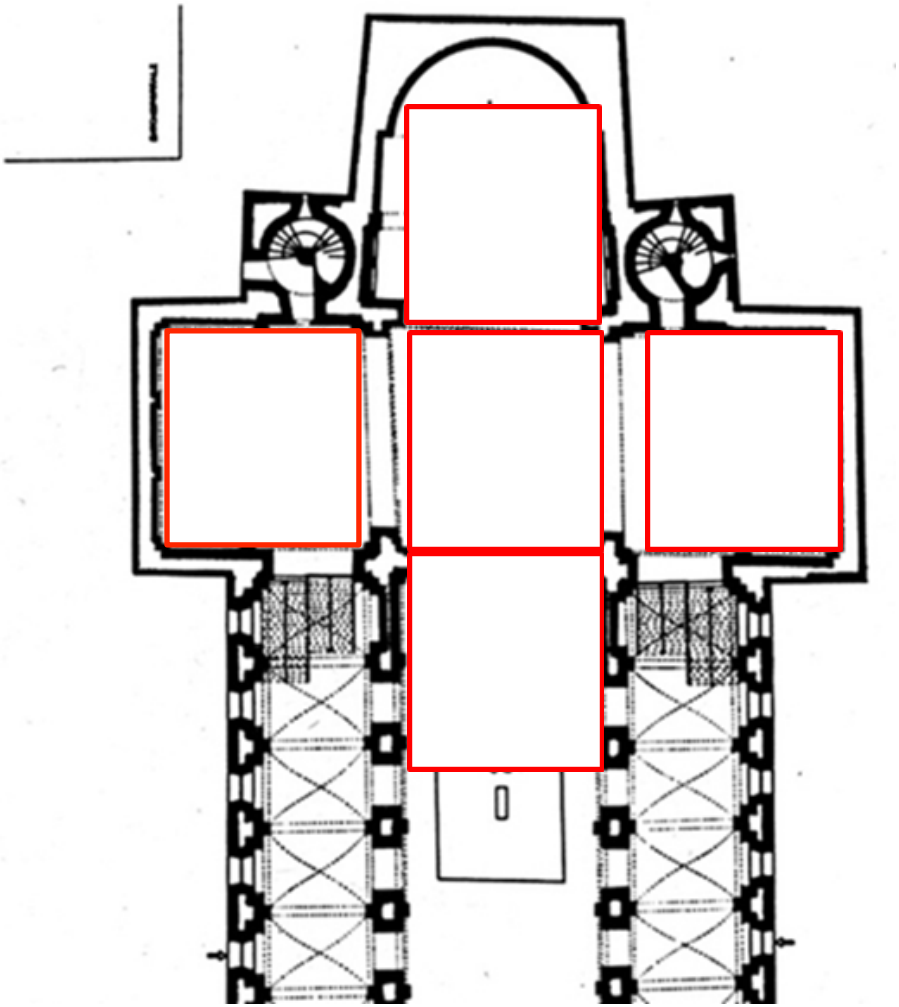


Hildesheim, axonometric

(axonometric = verticals projected vertically on a plan rotated 45 degrees)

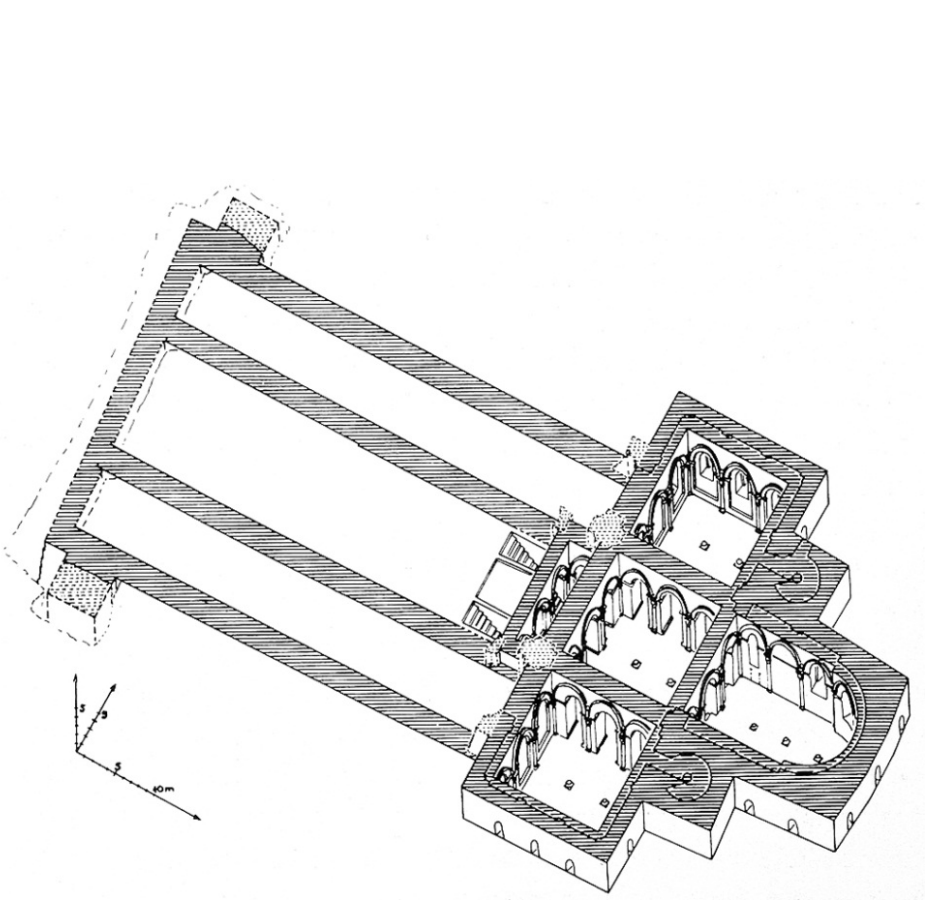


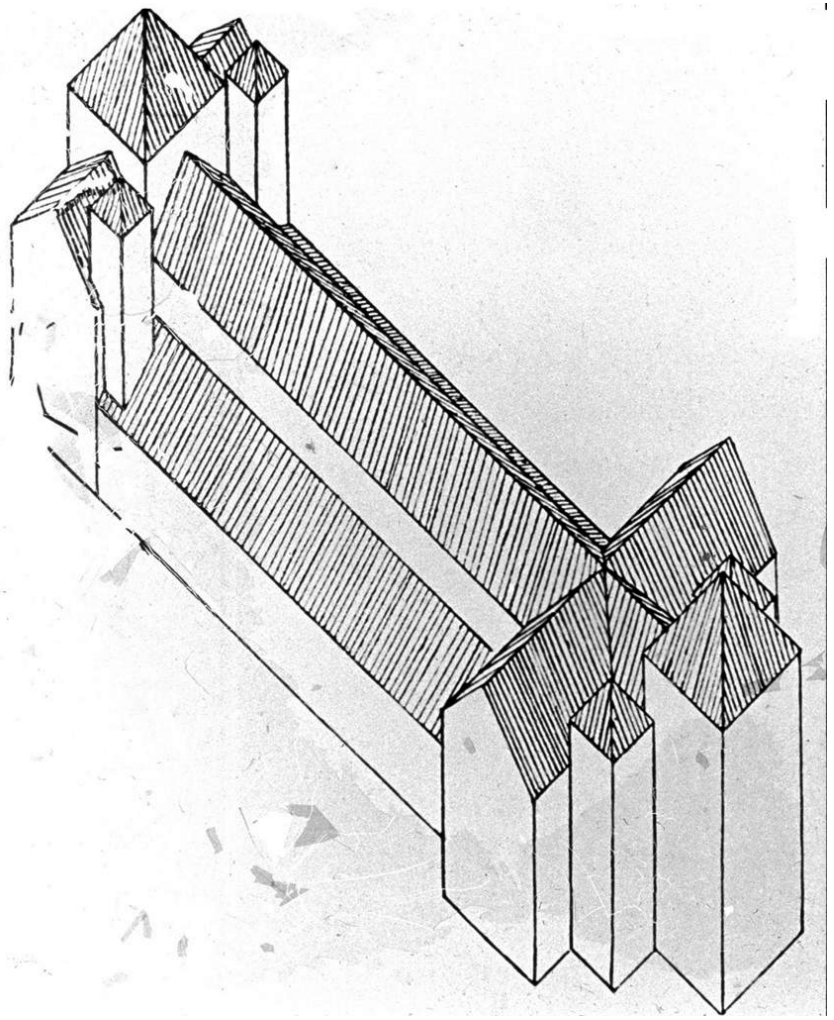
Ad quadratum, quadratura



Limburg an der Haardt, abbey founded by Conrad II, 1024

Speyer I at pavement level and extruded in elevation



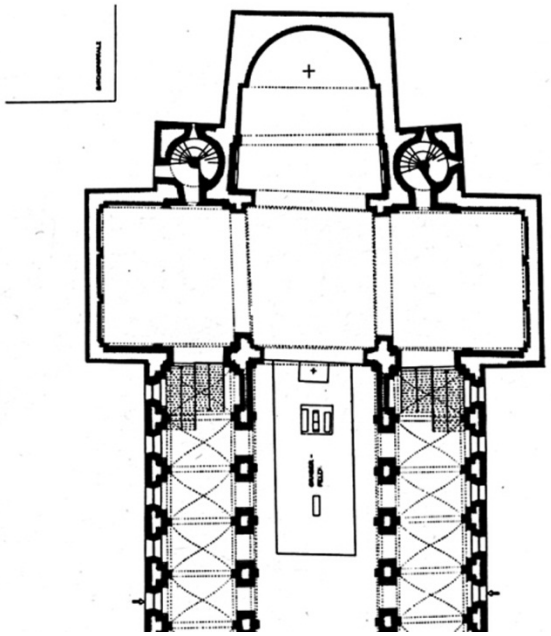


Speyer Cathedral

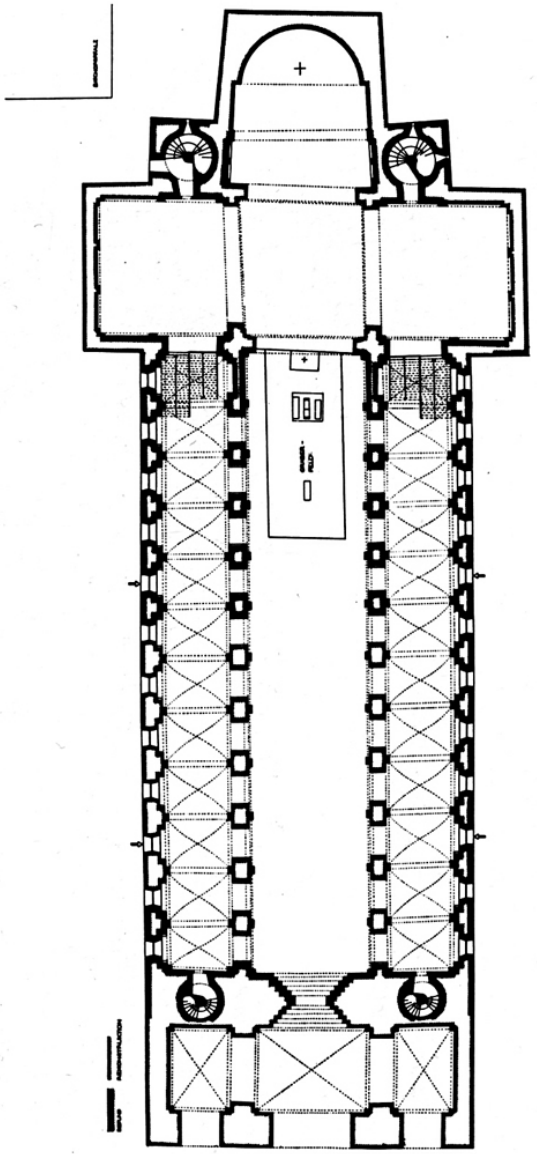
Speyer

Hildesheim

Speyer 1 as begun by Conrad II, 1024-1039

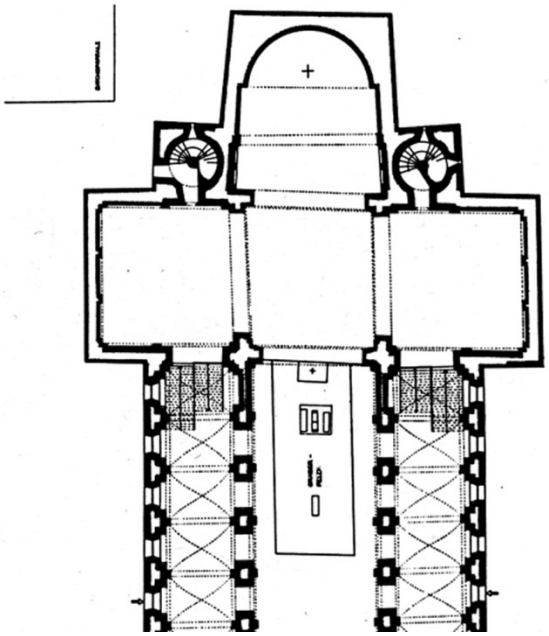


Speyer I as completed by Henry III, 1039-1061

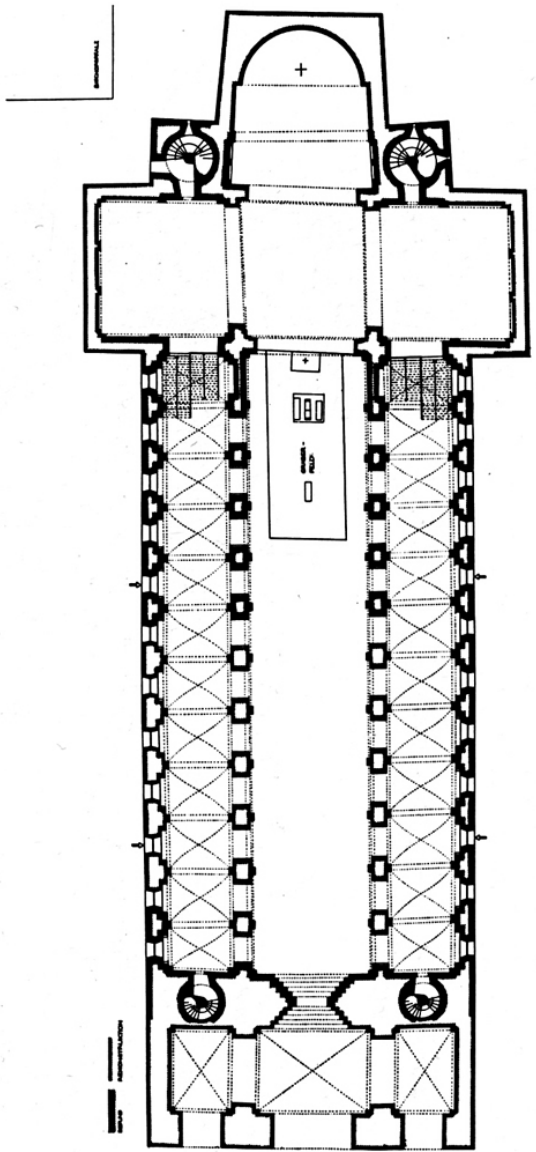


Henry III, “the peace-king loved by Christ”
emperor 1039-1056

Speyer 1 as begun by Conrad II



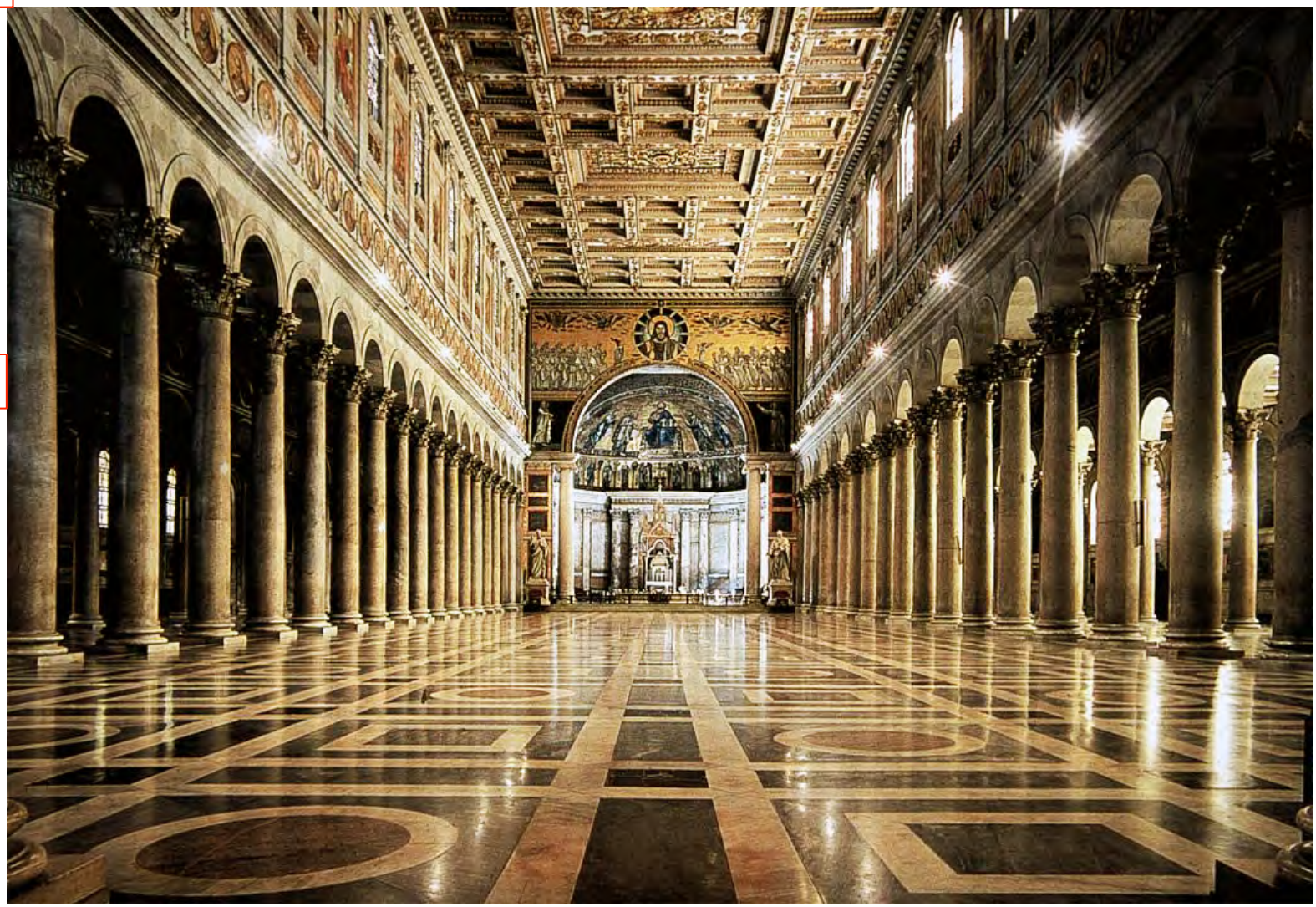
Speyer I as completed by Henry III



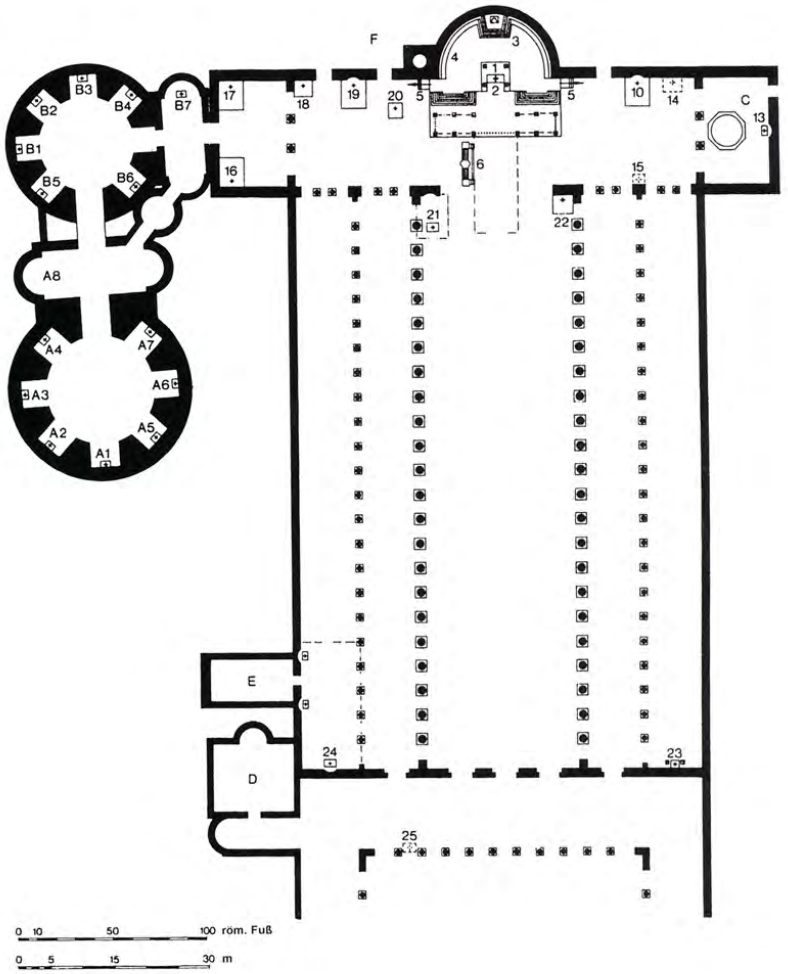
St. Paul's outside the walls, Rome, 4th c. Early Christian basilica

Clerestory wall

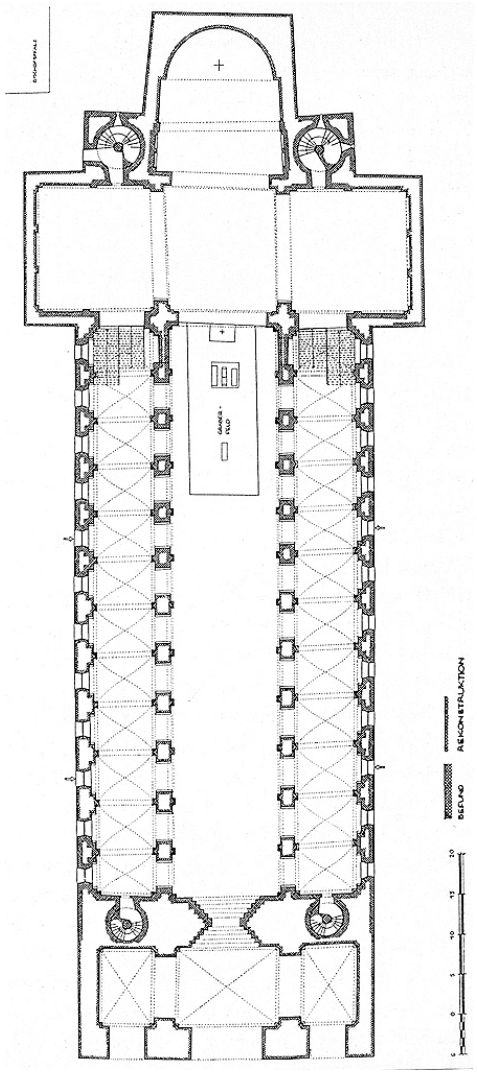
Nave arcade

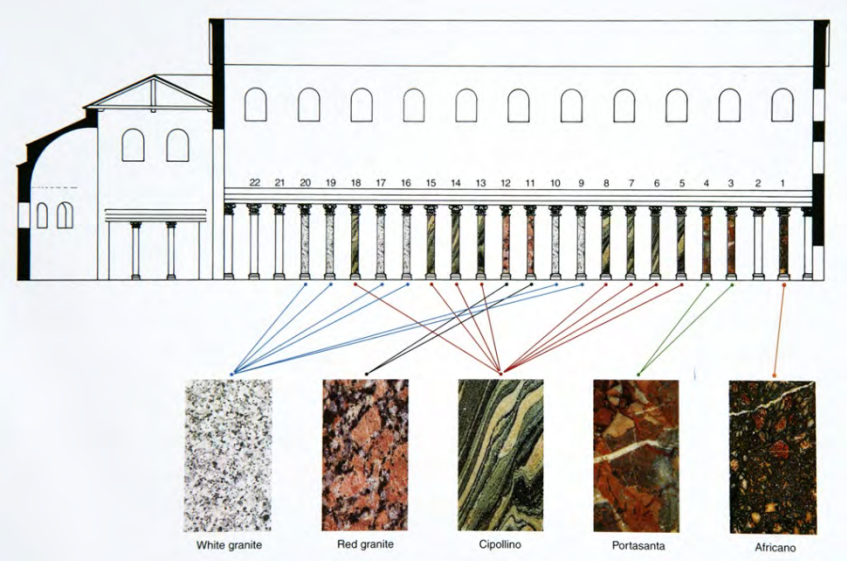


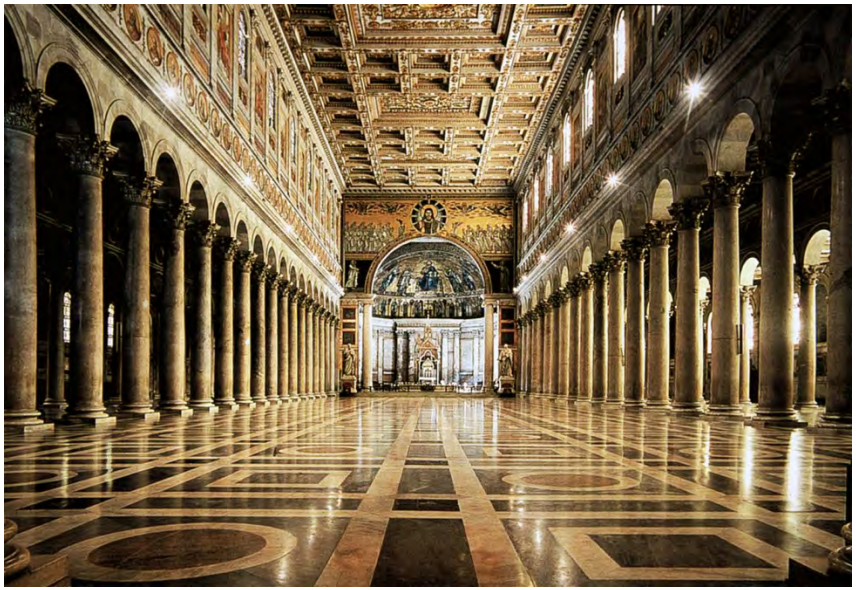
St. Peter's , 4th c. Early Christian basilica



Speyer I

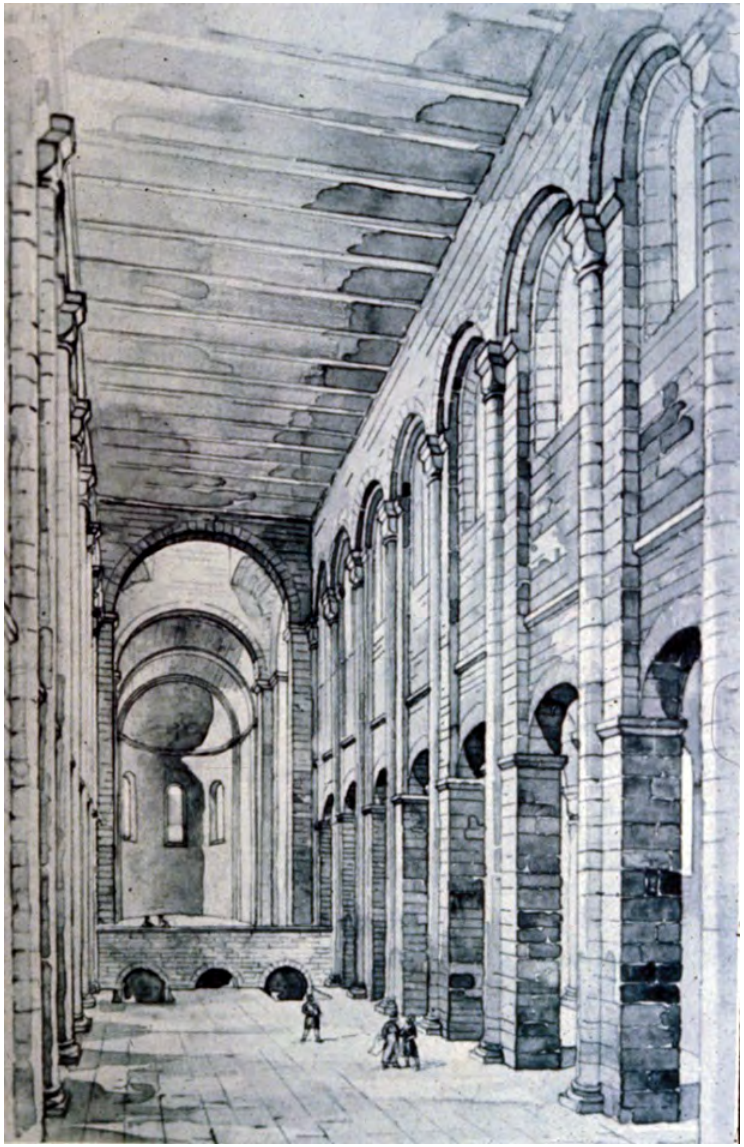



22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
White granite
Red granite
Cipollino
Portasanta
Africano



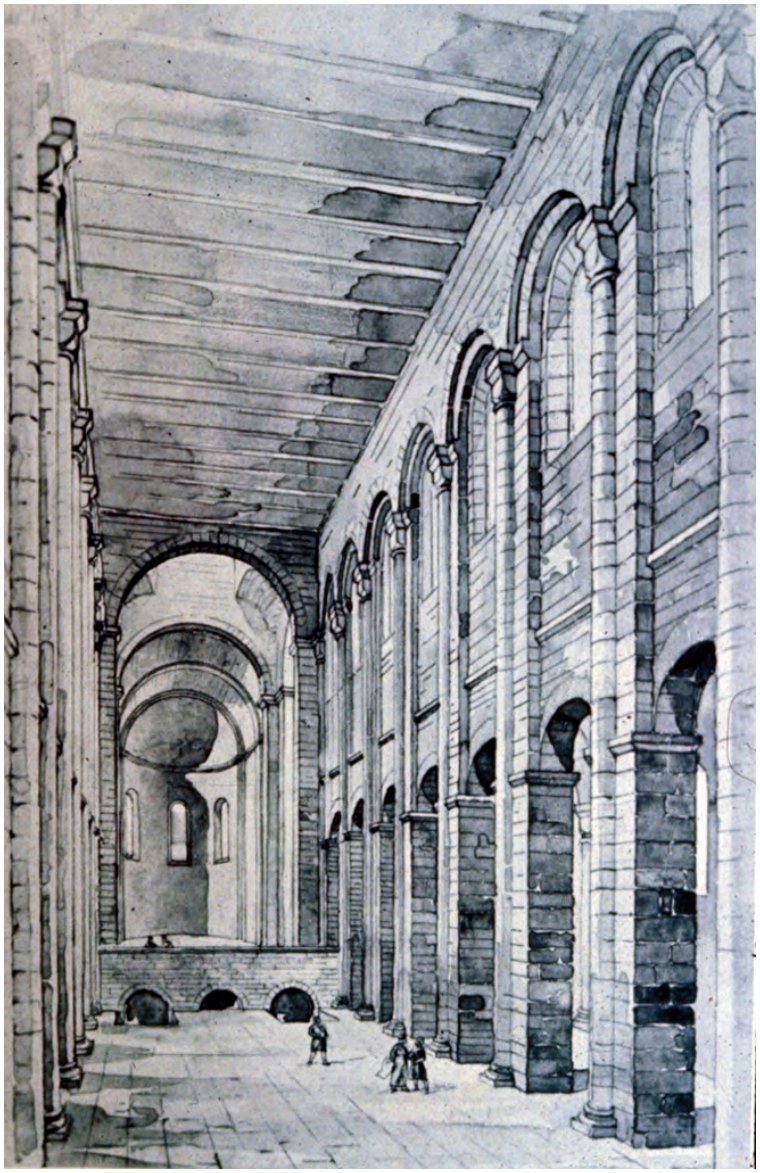
Speyer I – rectangular piers

Piers = upright masonry supports



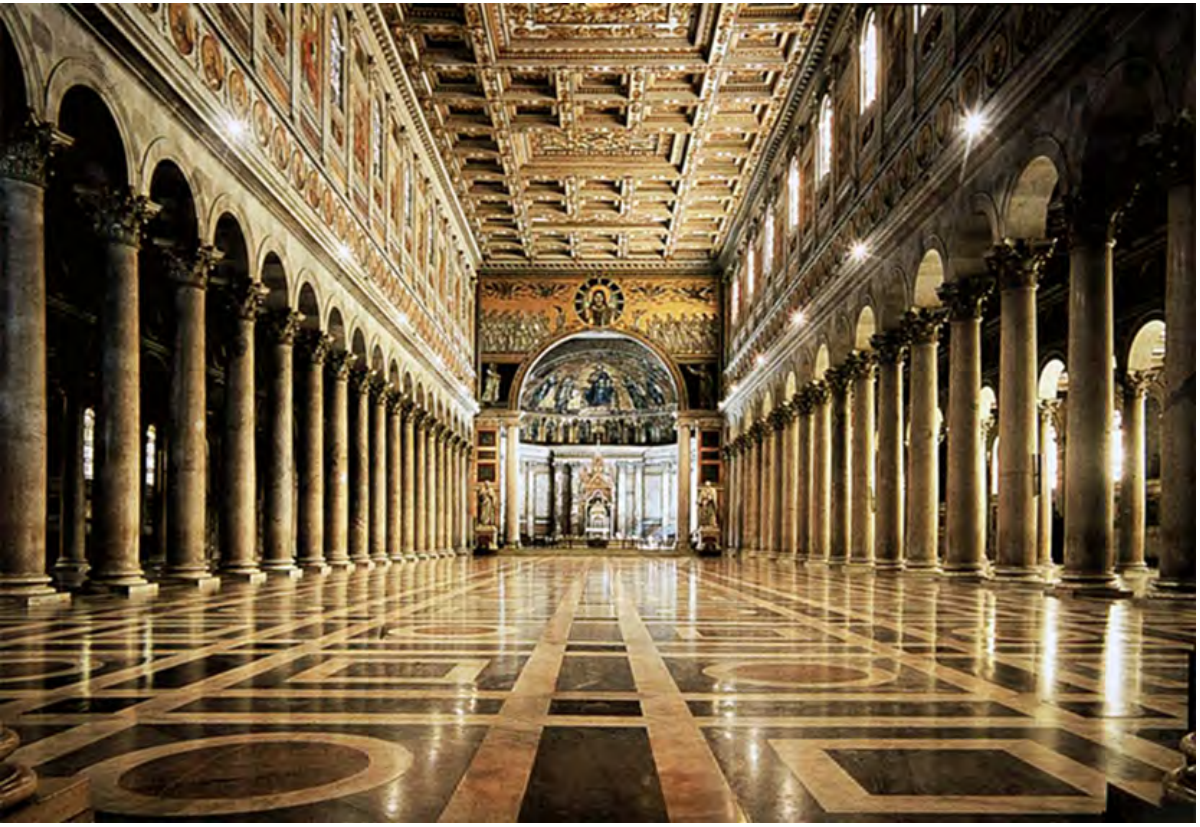
San Paolo- columnar basilica

Speyer I

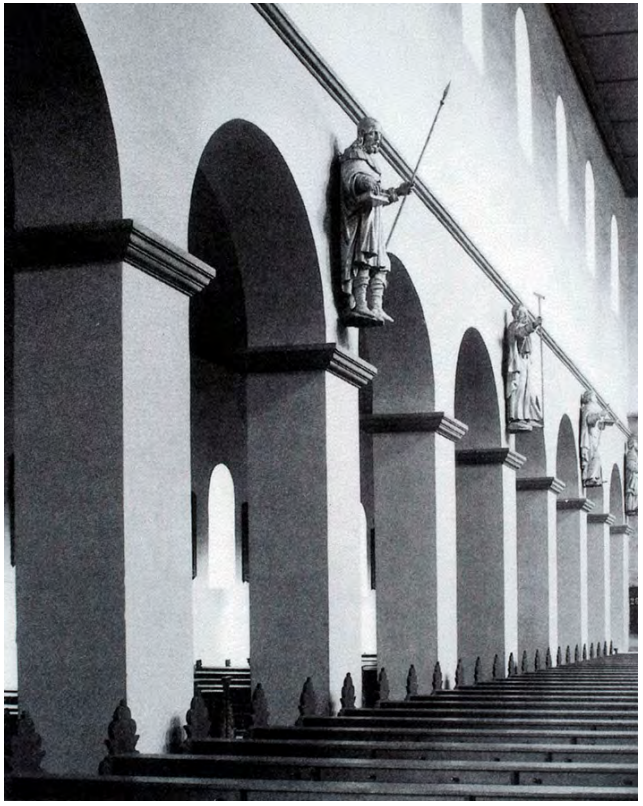


Seligenstadt, 831 – Carolingian pier basilica

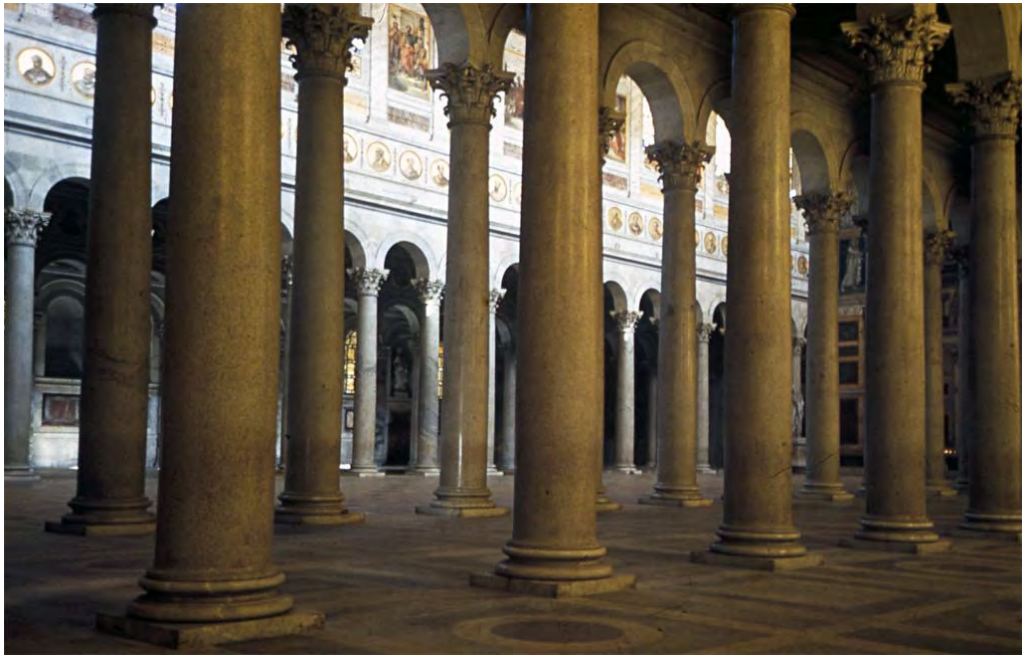
St. Paul's –columnar basilica



Seligenstadt, 831, –Carolingian pier basilica

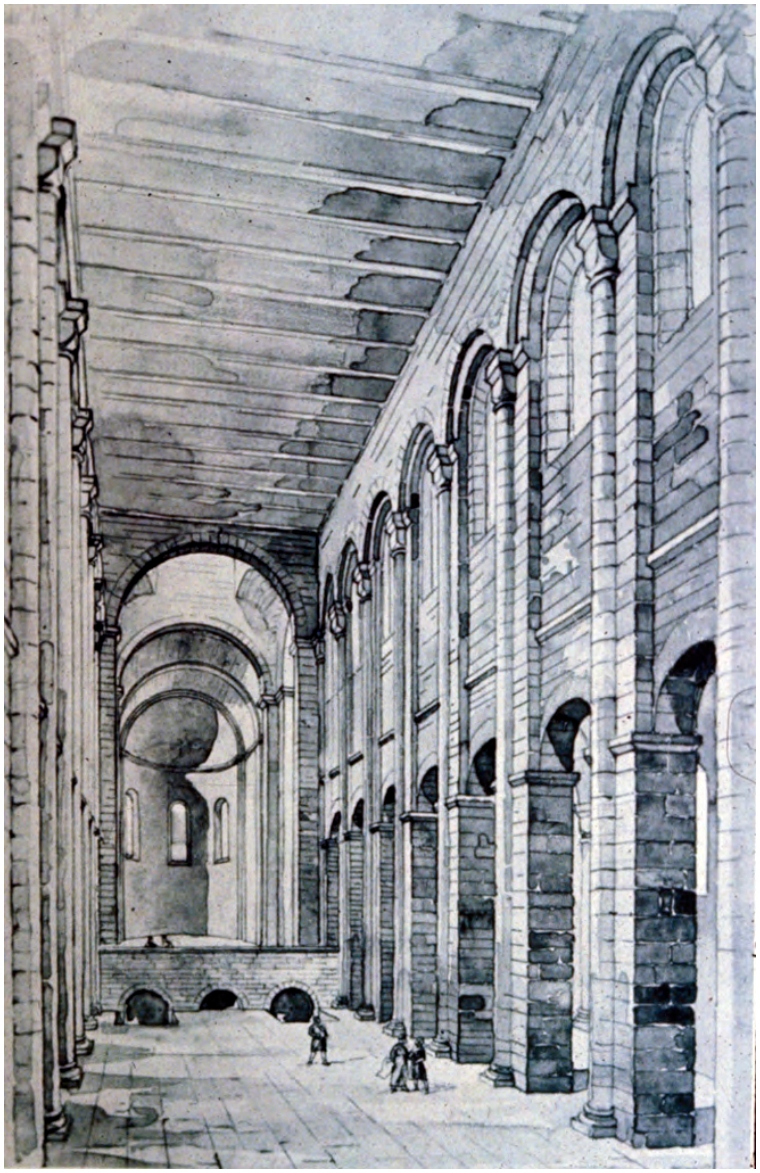


Speyer– axial piers, frontality

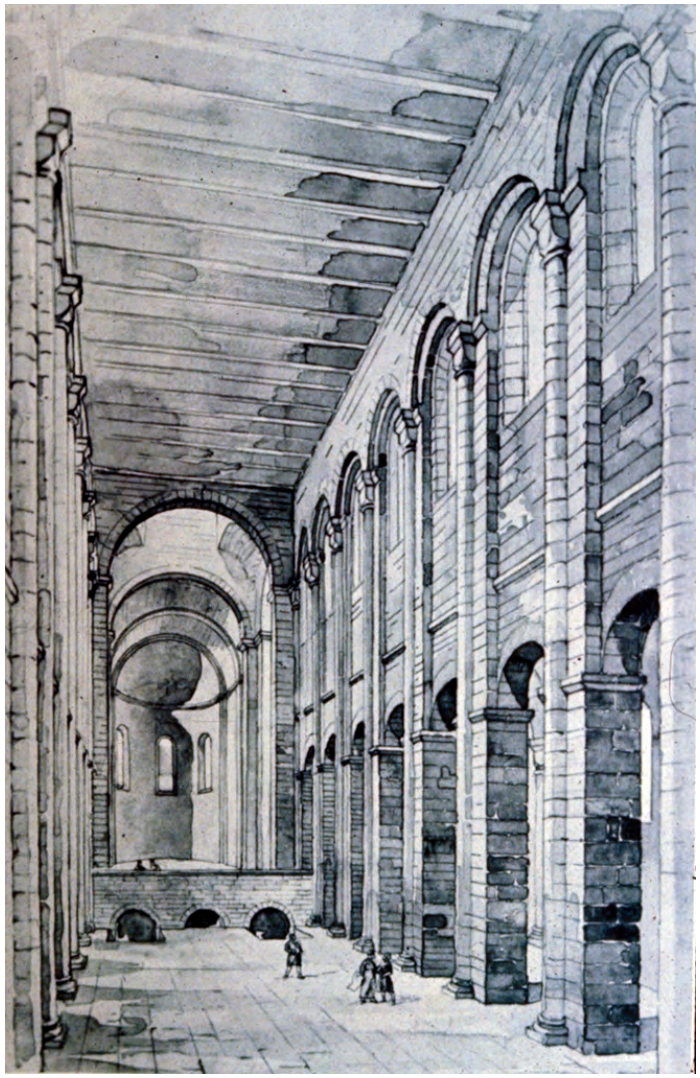


St.Paul’s, side aisles – non-axial columns

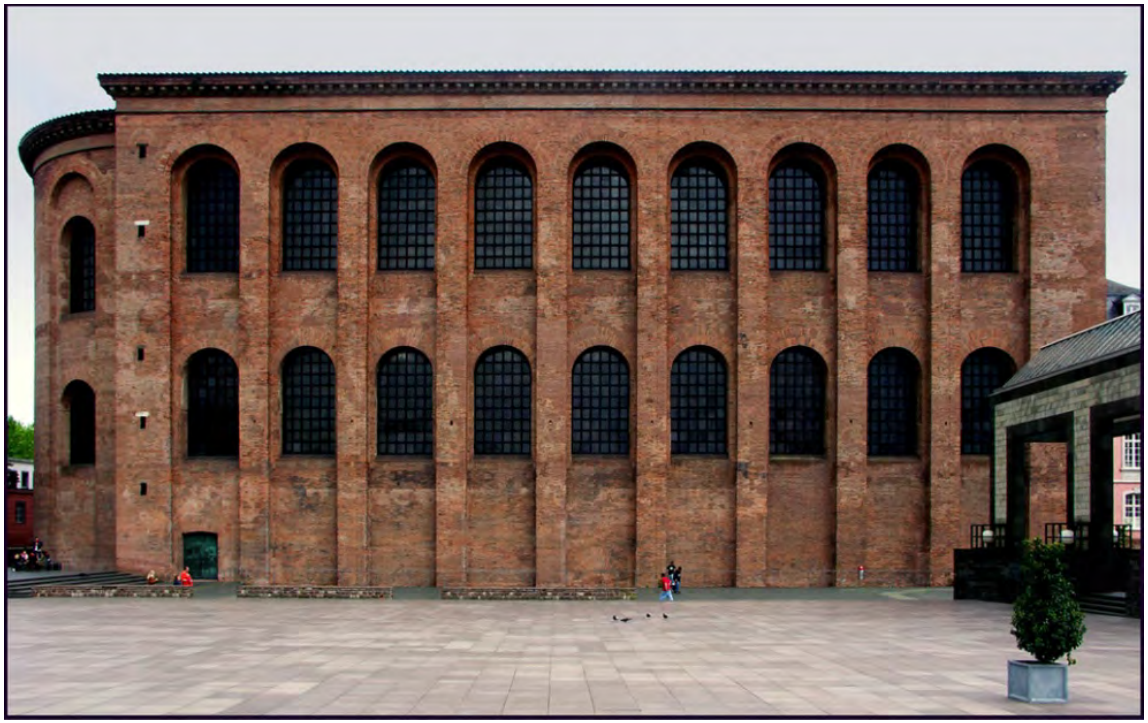
Speyer – rectangular piers have engaged responds terminating beneath a blind arcade



Seligenstadt, 831 – Carolingian pier basilica



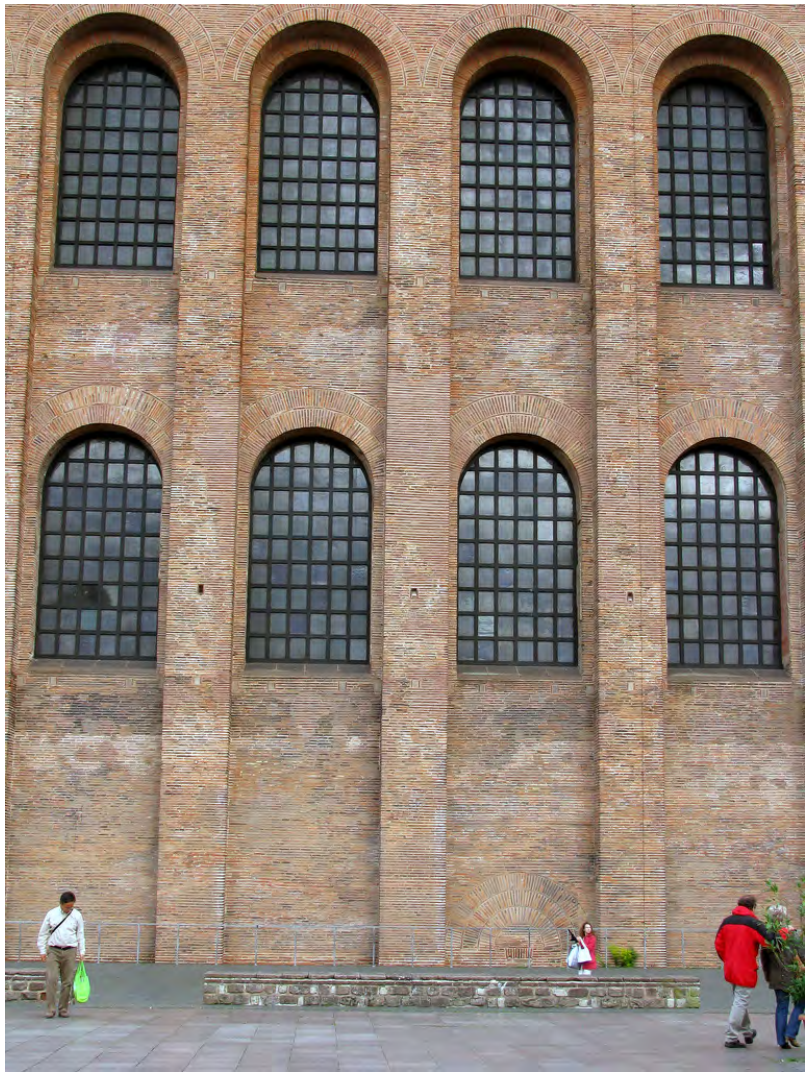
Speyer I,



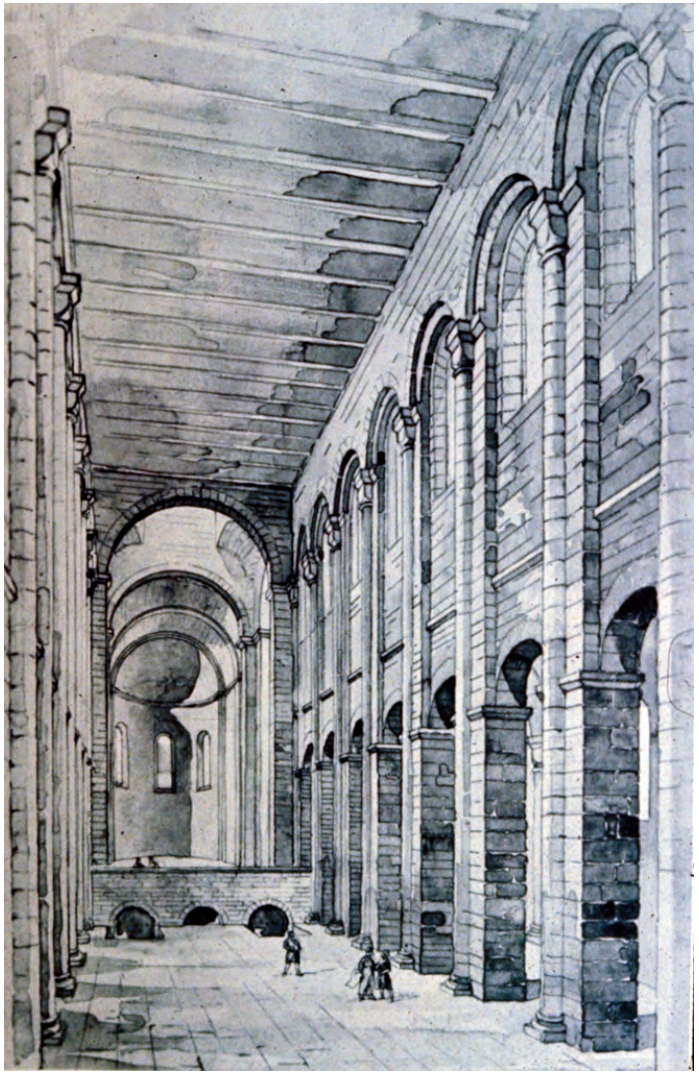
Trier Aula Palatina, ca. 300 A.D.

Speyer, blind arcades in nave

Trier, Aula Palatina

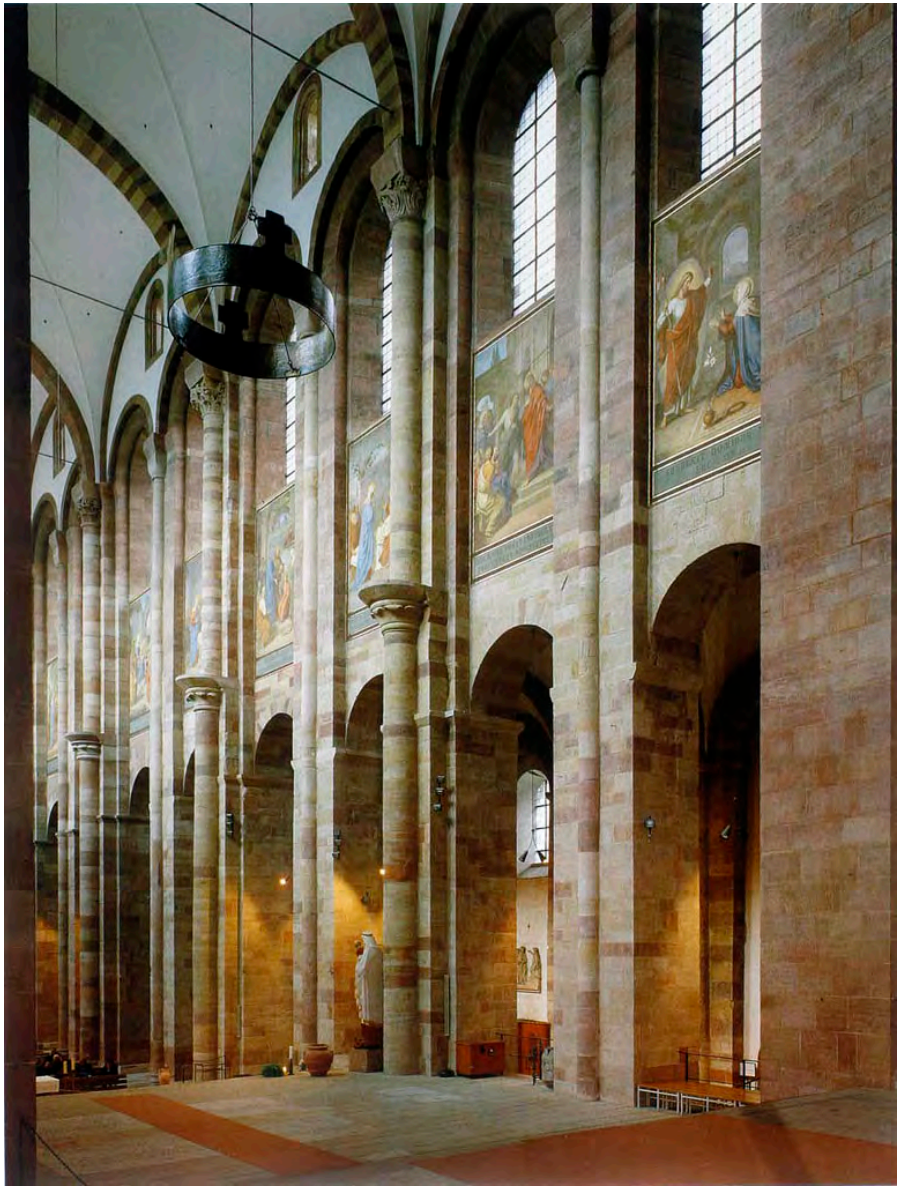


Speyer

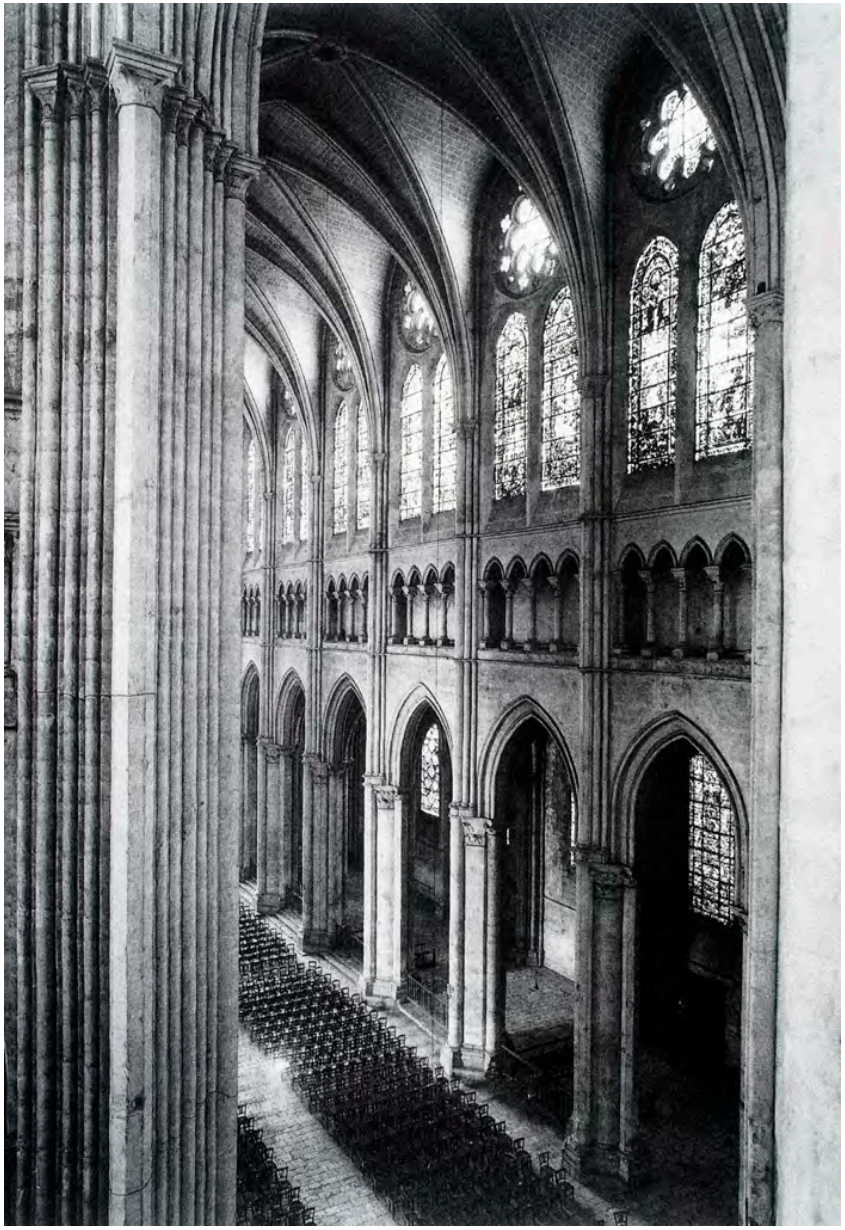


Porta Nigra, Trier, ca. 300 A.D.

Speyer, purple and yellow sandstone coursed ashlar masonry on interior, uncoursed rubble masonry on exterior

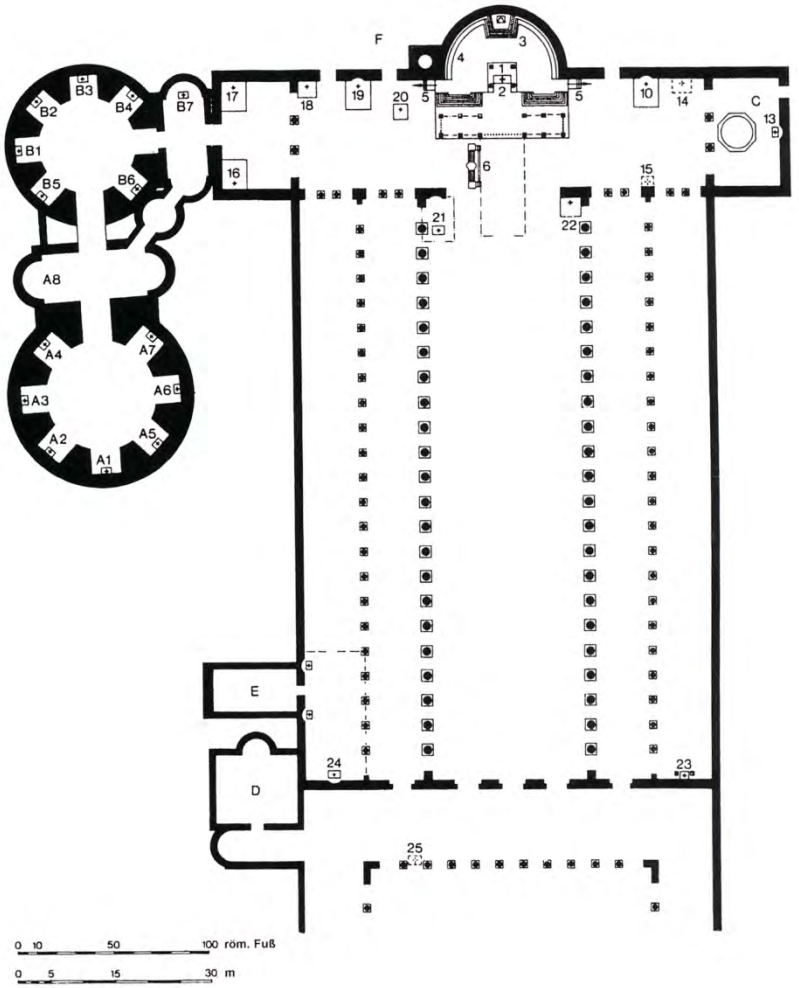


Speyer, nave about 45 feet wide and 110 high

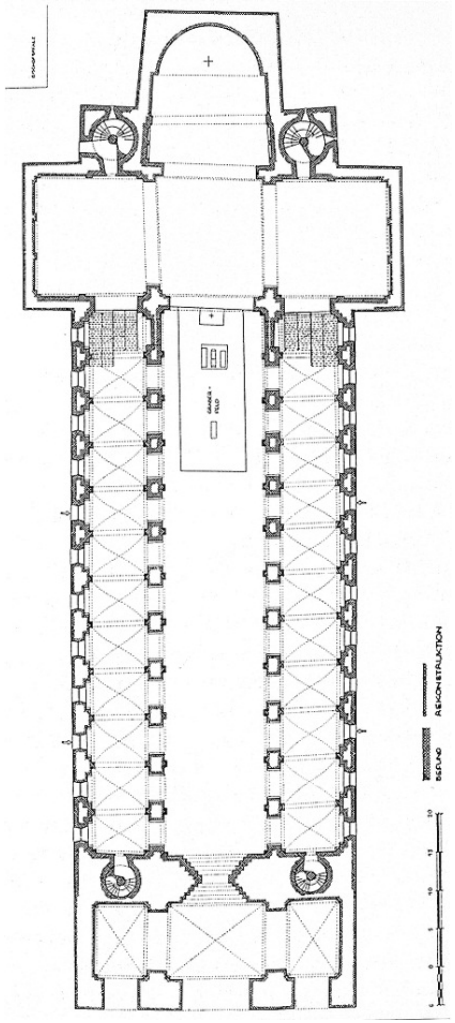


Chartres, nave about 41 feet wide and 120 feet high

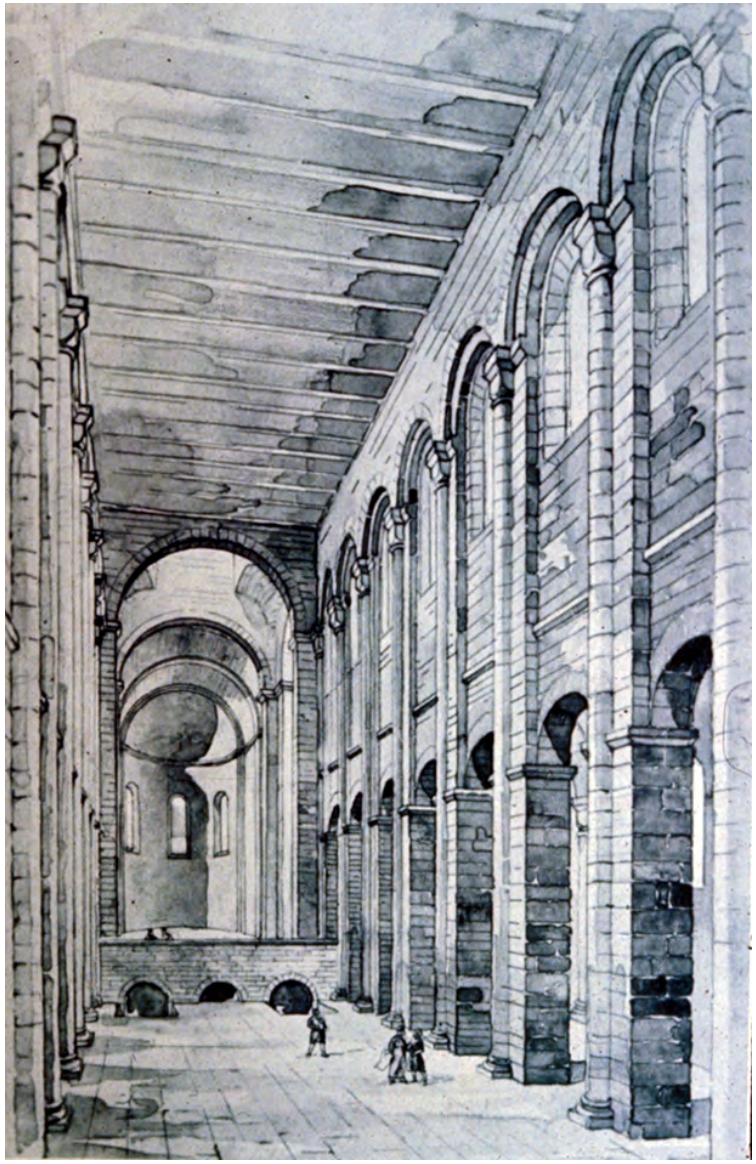
St. Peter's, Rome, ca. 400 feet long



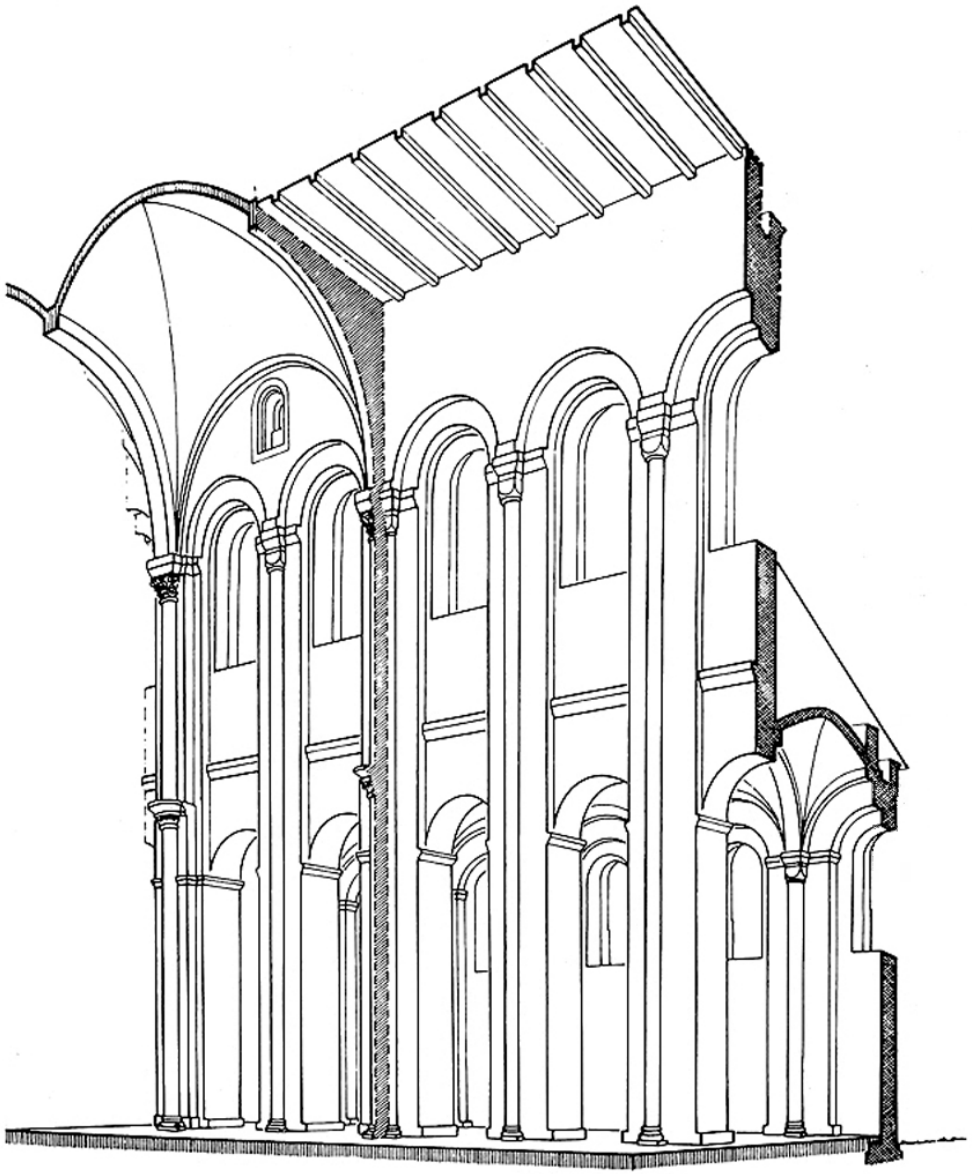
Speyer, 435 feet long



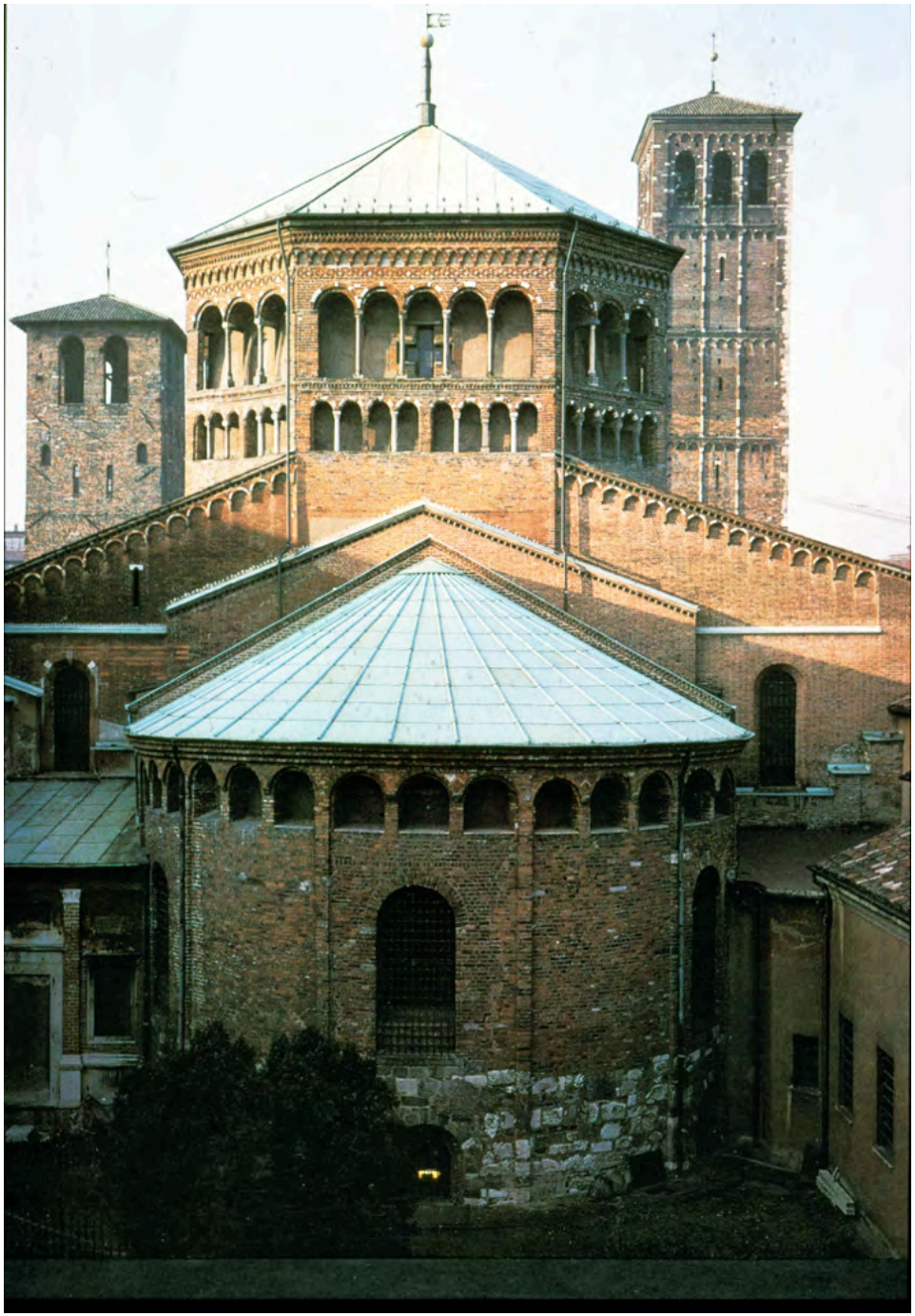
Speyer I (1030-1061) and Speyer II (1080-1106)



Speyer I (right) 1030-61 and Speyer II (left) 1080-1106



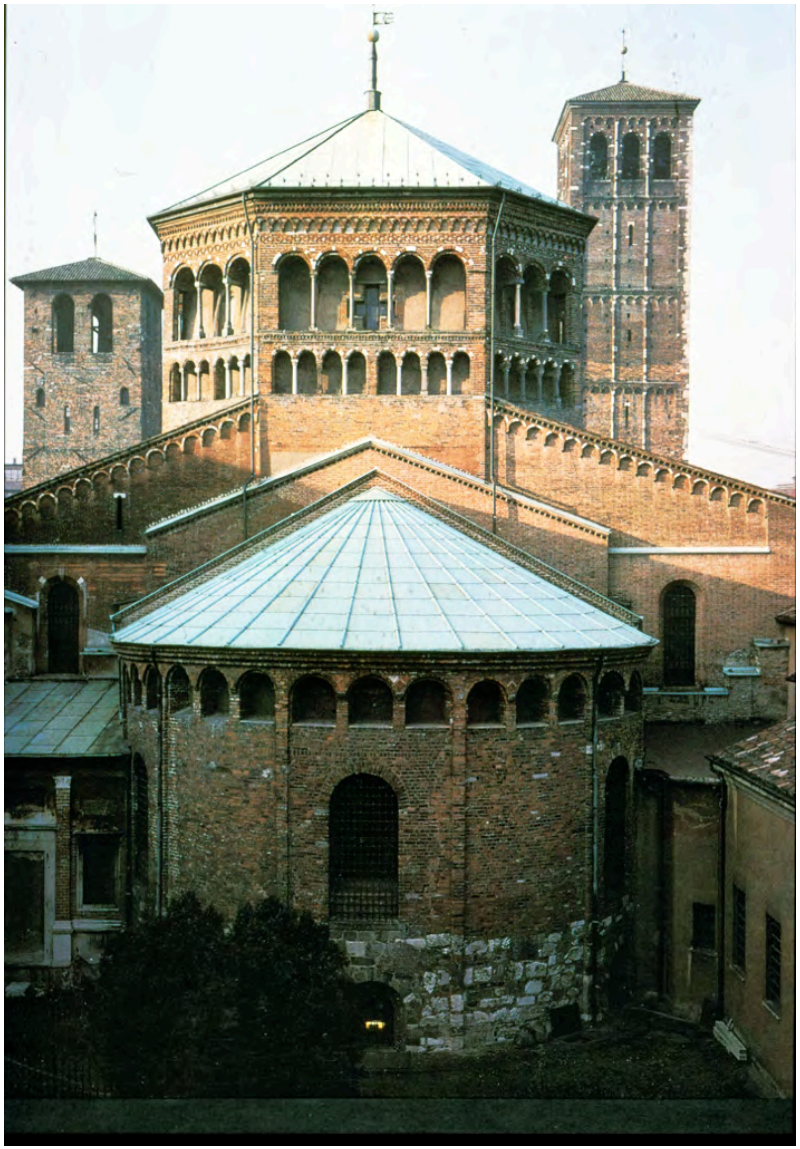
Henry IV 1050-1106



Sant'Ambrogio, Milan, , 4th c, rebuilt 1080-1128.

Apse with wall strips and dwarf gallery; Lombard tribune or tegurio with dwarf galleries, corbel table

Milan, Sant'Ambrogio



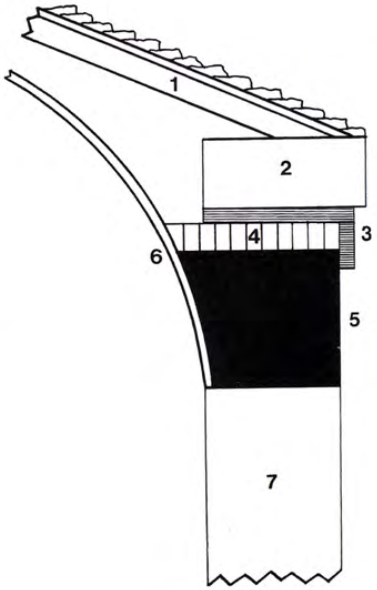
Speyer II

Speyer II, dwarf gallery

a series of arches with radially laid bricks usually buttressing a vault

Dwarf gallery

55. Milan, Sant'Eustorgio, exterior, apse.



Drawing 4. Cross section of Milanese early eleventh-century apse: (1) roof beams, (2) wall with decorative string-courses, (3) corbel table with bricks laid length-wise (stretchers), (4) arches with radially laid bricks, (5) open niches, (6) half dome, (7) wall.

Speyer, dwarf gallery

Speyer, Lombard housing with wall strips, corbel table and dwarf gallery.

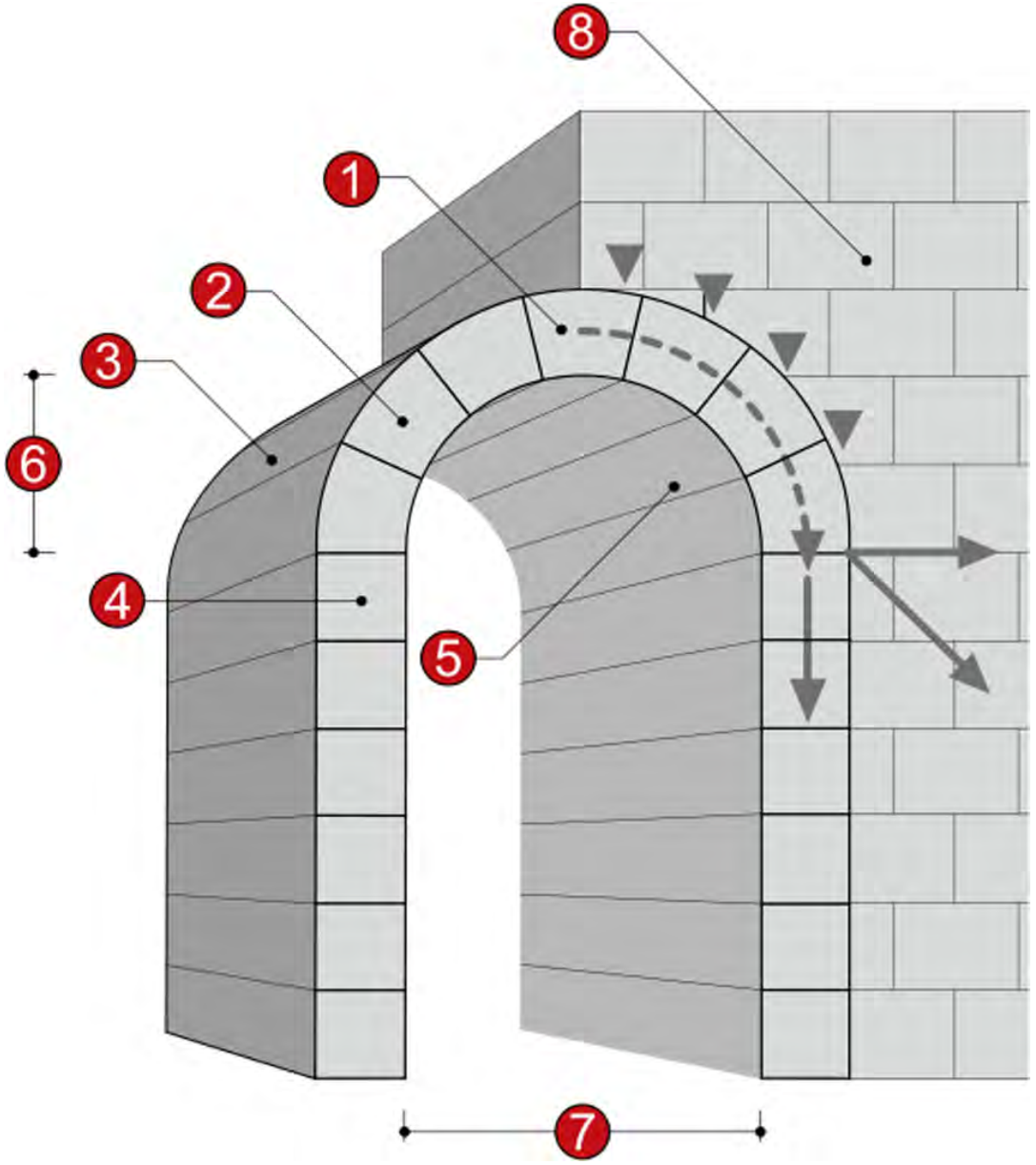
(Lead roofing not original)

Speyer, octagonal cloister vault

Curved segments rise to a central point above a square or octagonal base

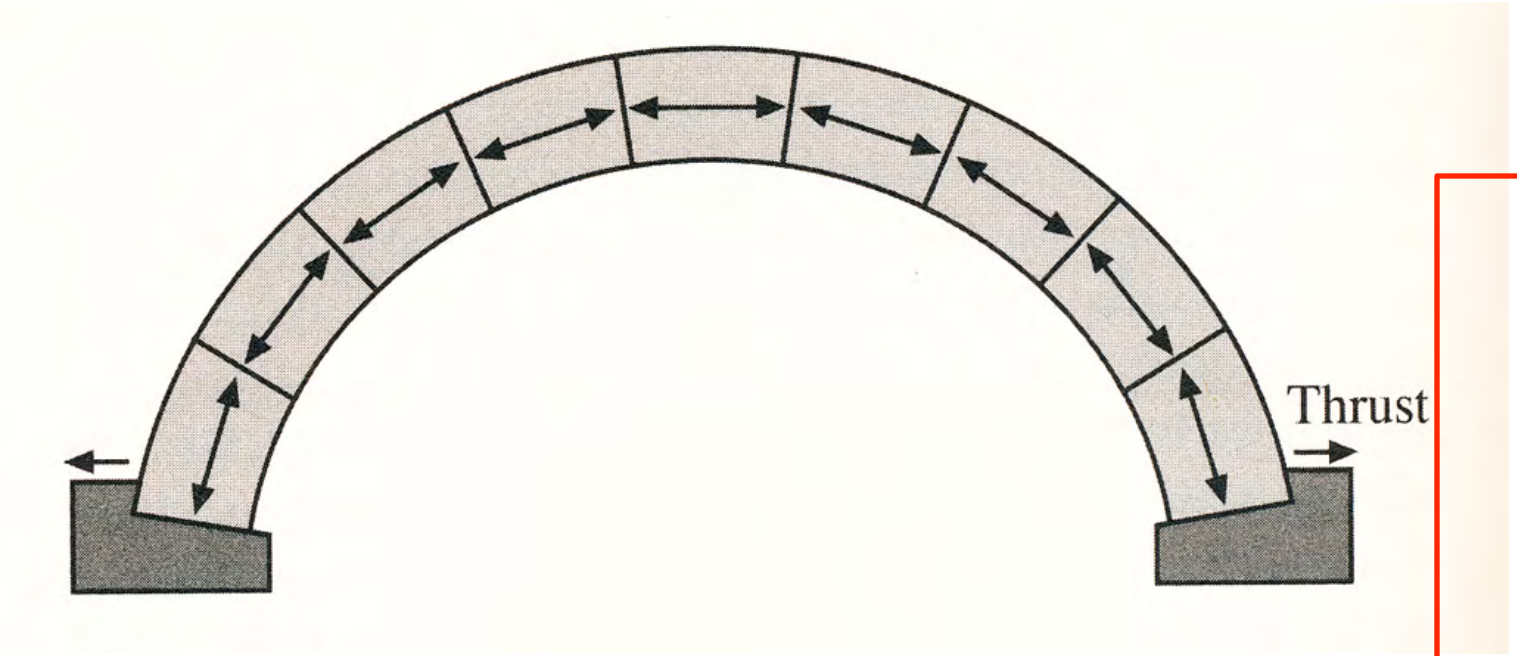
Vertical loads

1.Keystone
2.voussoir
3.extrados
4.impost
5.intrados
6.rise or springing
7.clear span
8.abutment

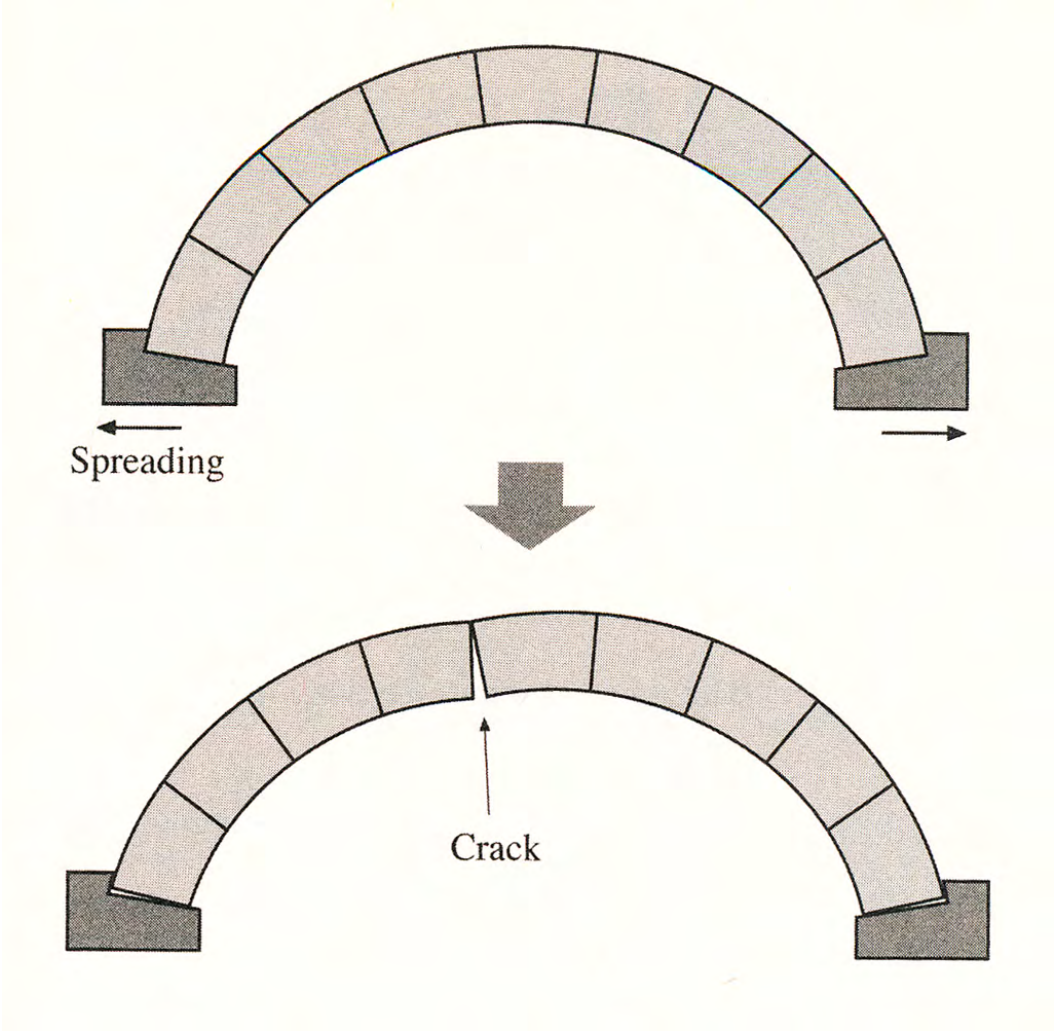


1.Keystone
2.voussoir
3.extrados
4.impost
5.intrados
6.rise or springing
7.clear span
8.abutment

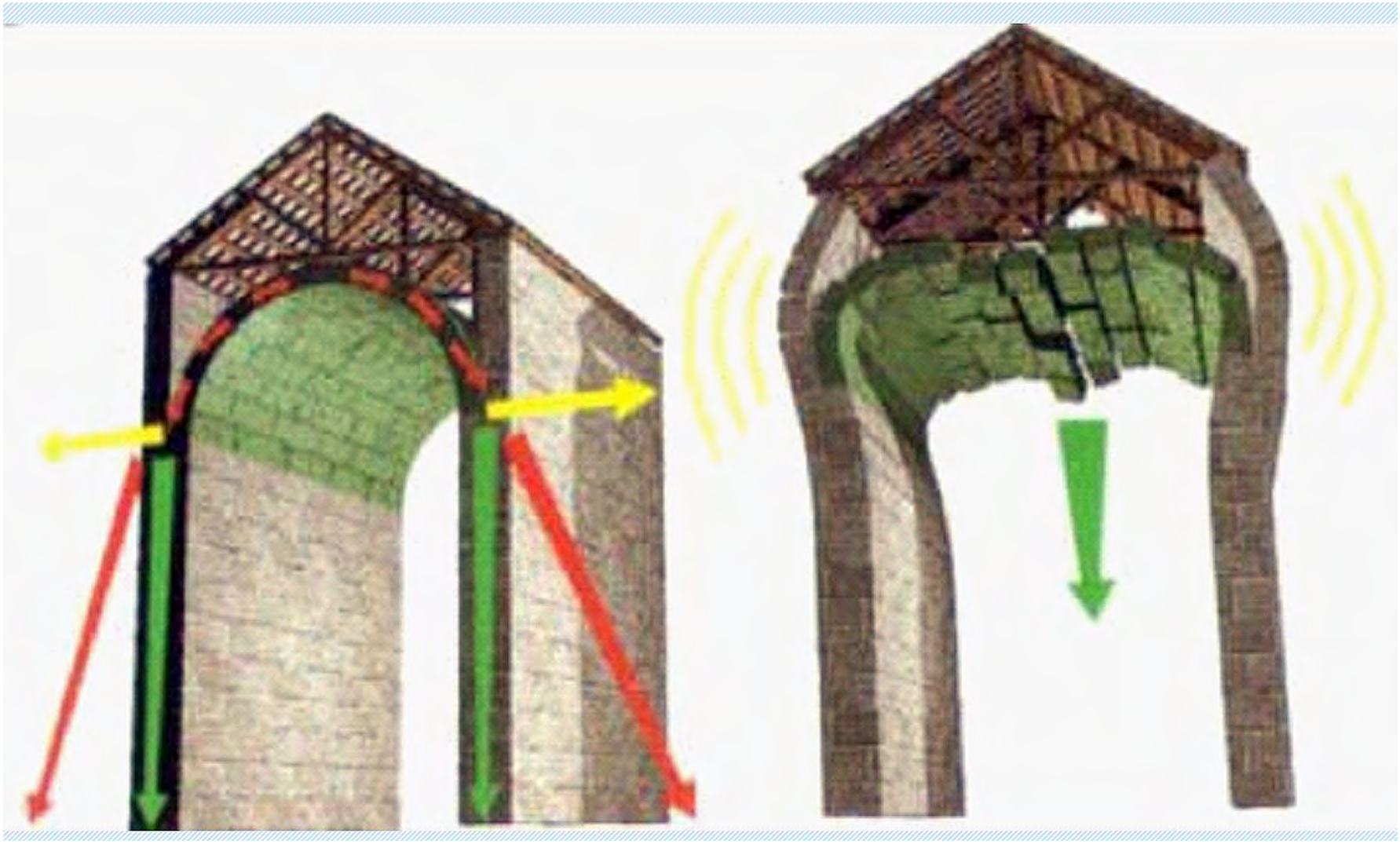
Arches exert lateral, vertical, and diagonal thrust which requires abutment



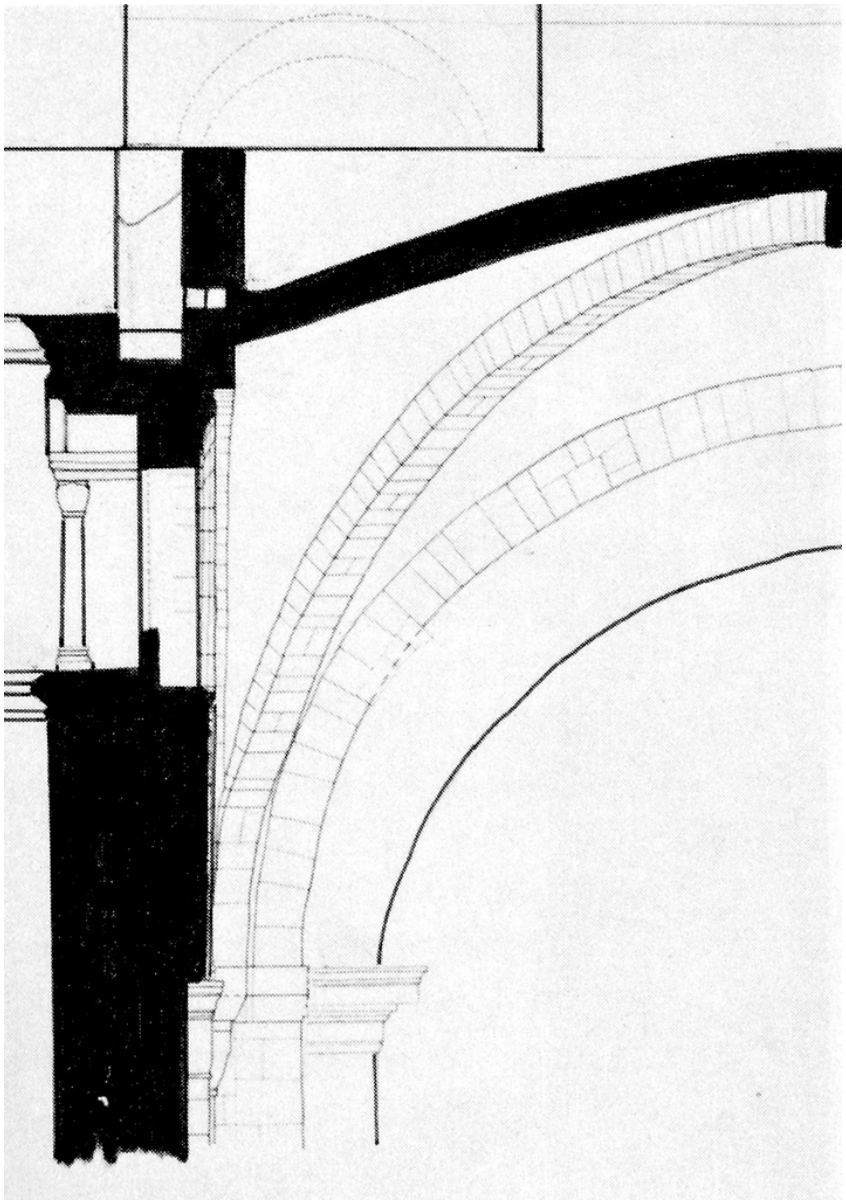
Failure because of spreading



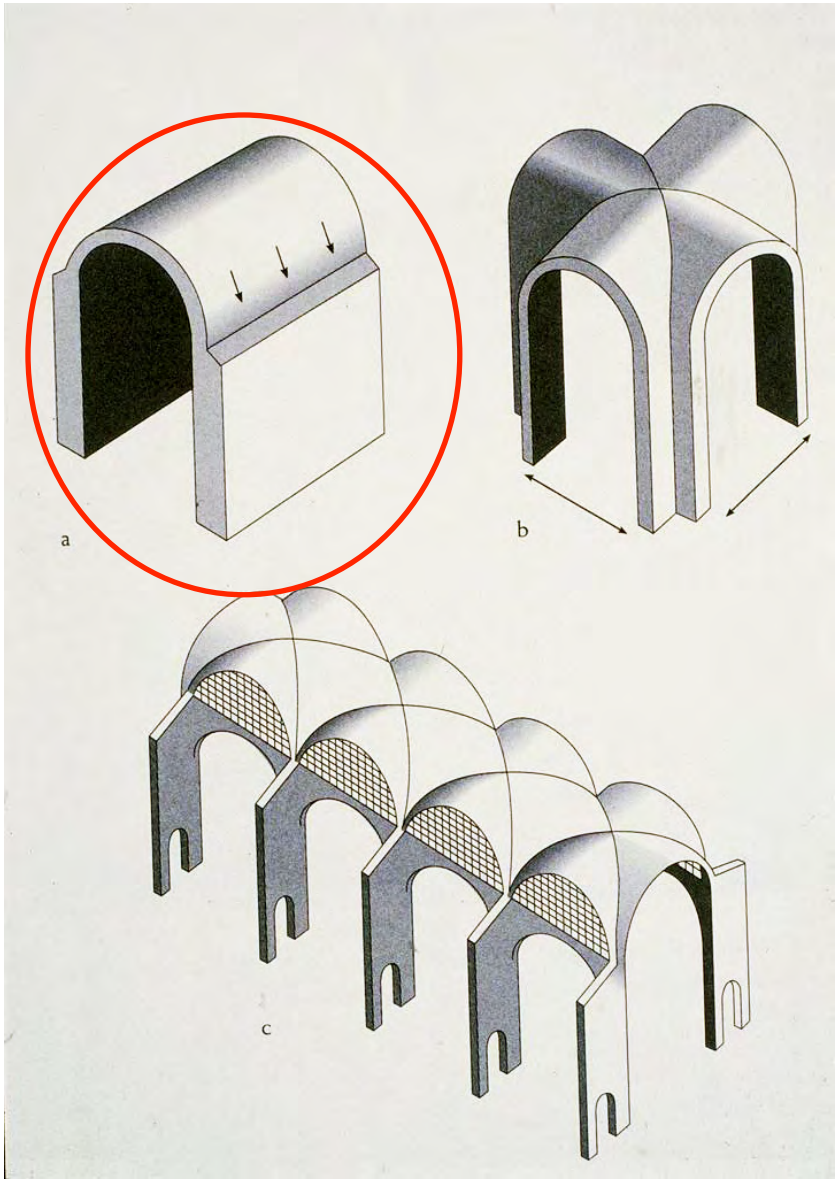
Vault failure because lateral and diagonal thrusts of the arch were not buttressed



Speyer, transverse section showing how dwarf gallery buttresses vault

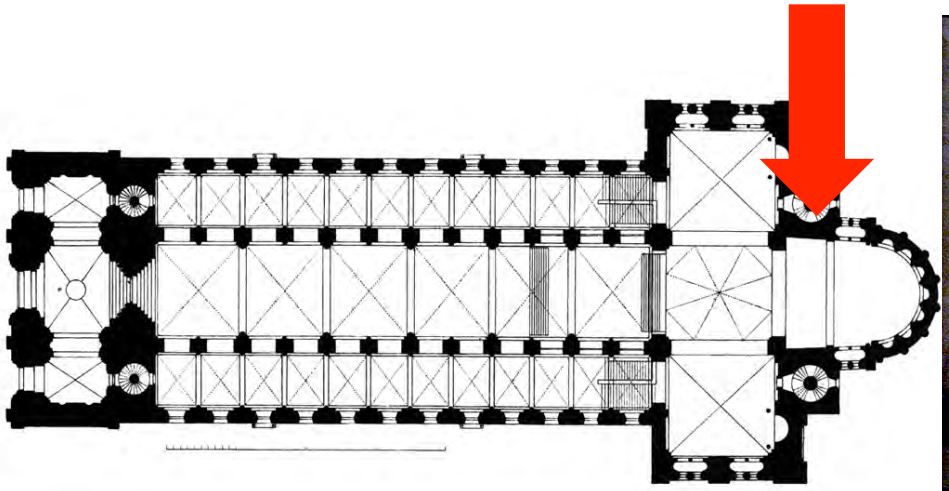


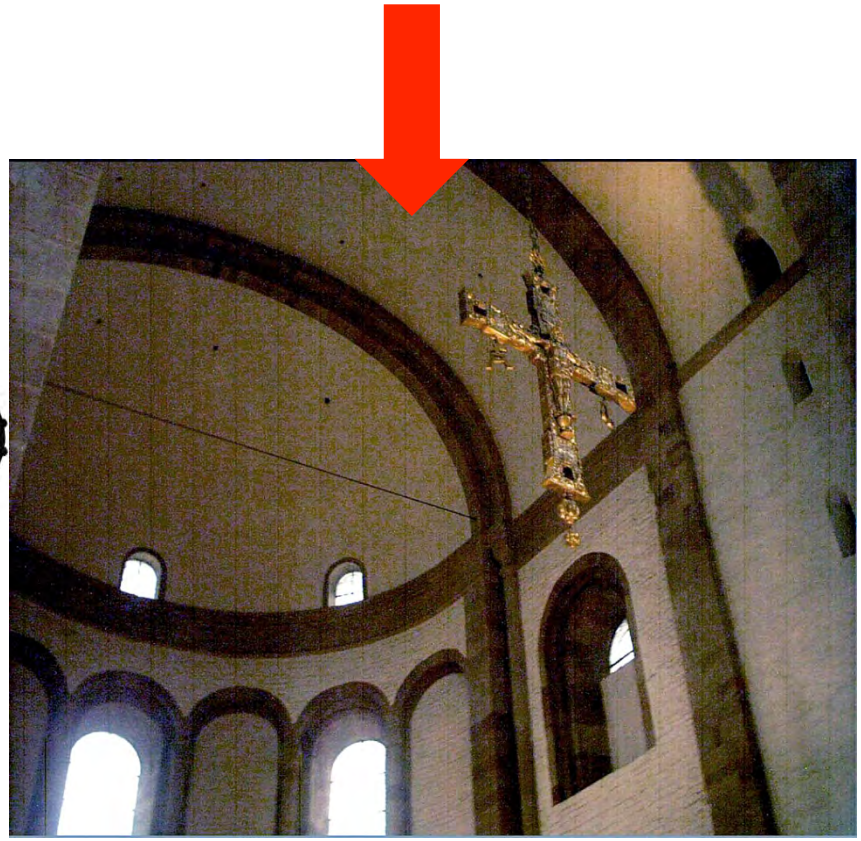
Milan, Sant' Aquilino, 4th c., cloister vault and dwarf gallery



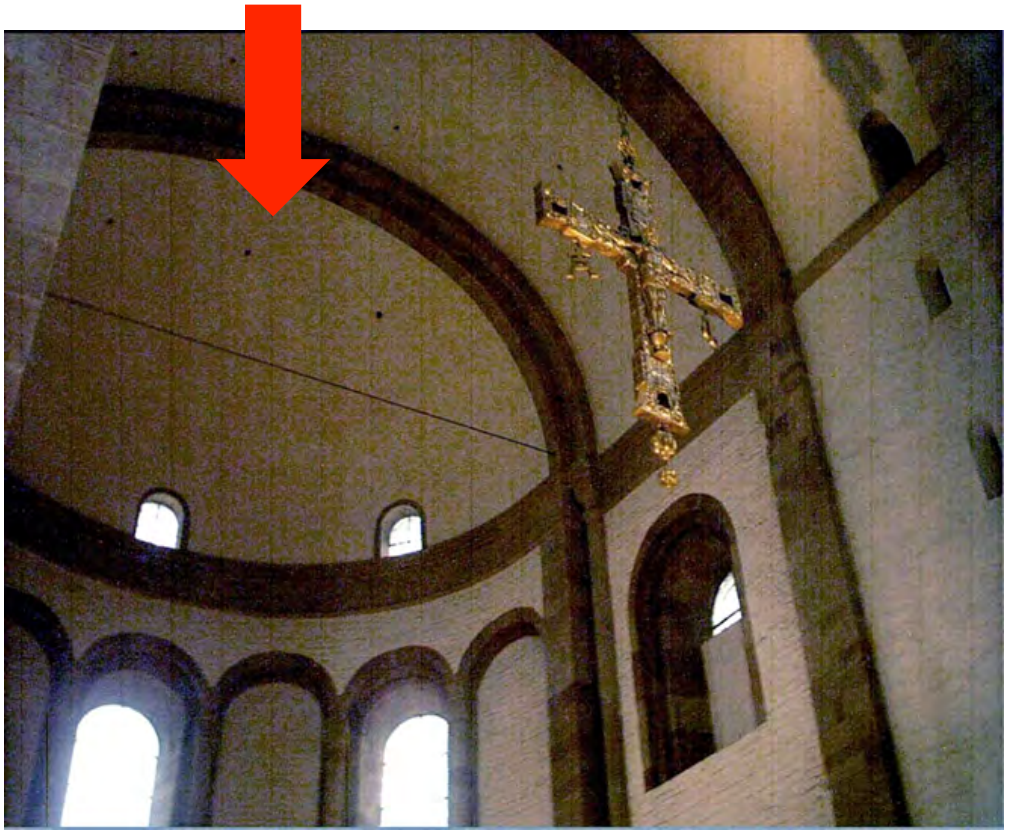
Barrel vault
A continuous series of semicircular arches

Arch of Janus, Rome, 4th c., Barrel vault



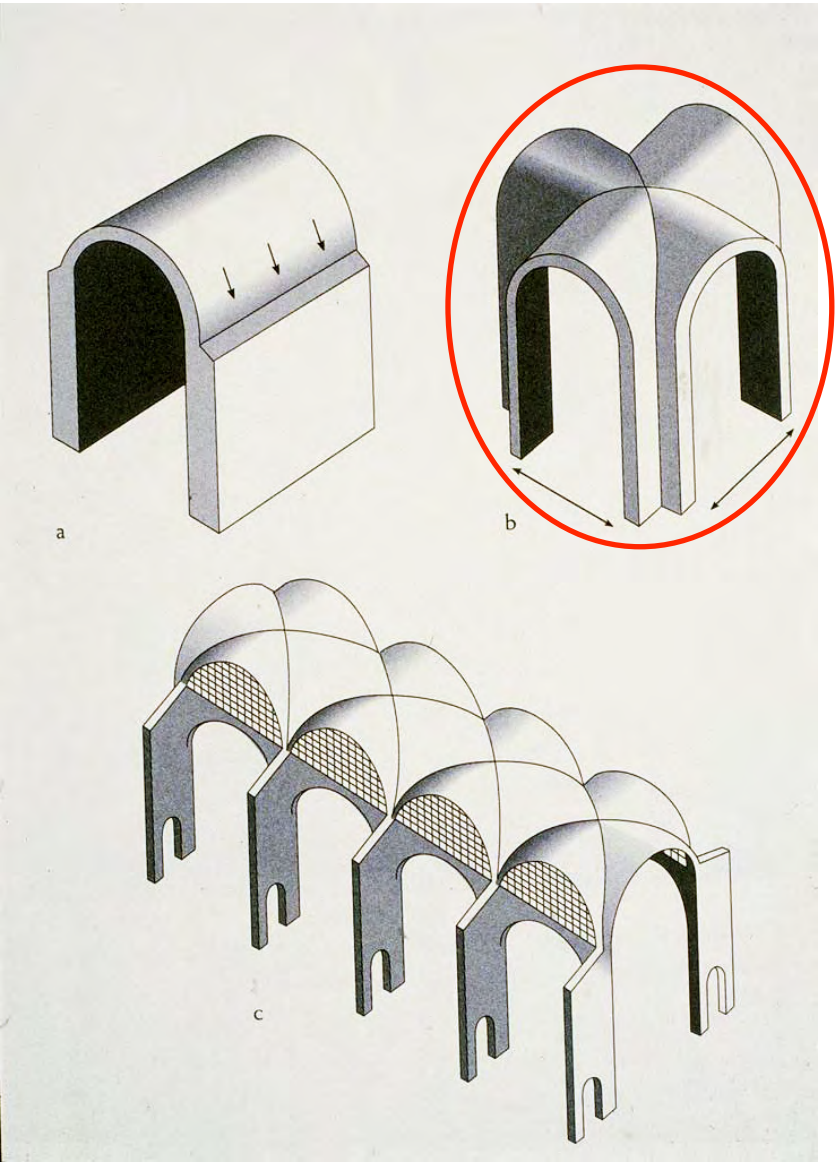


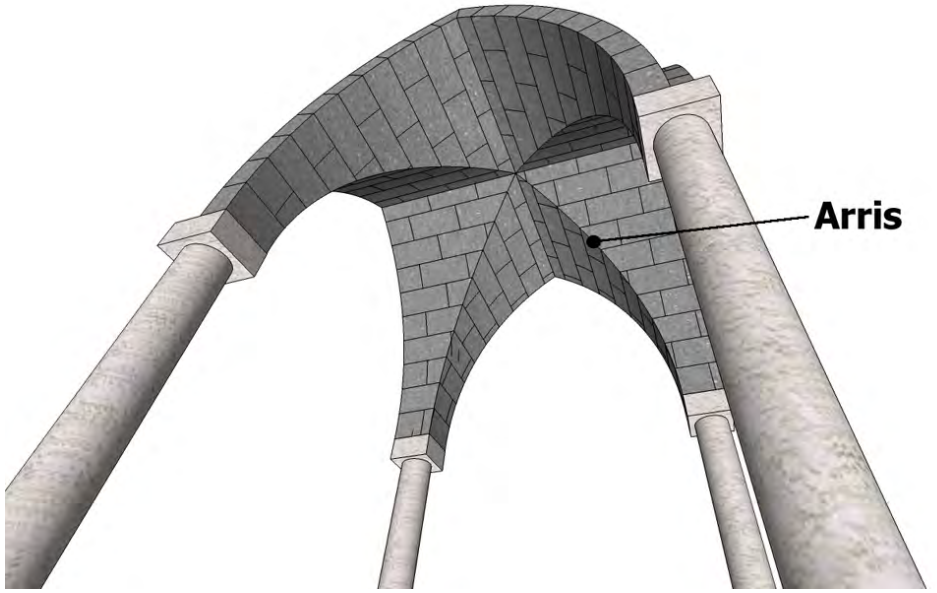
Dwarf gallery buttressing semi-dome (conch) of apse



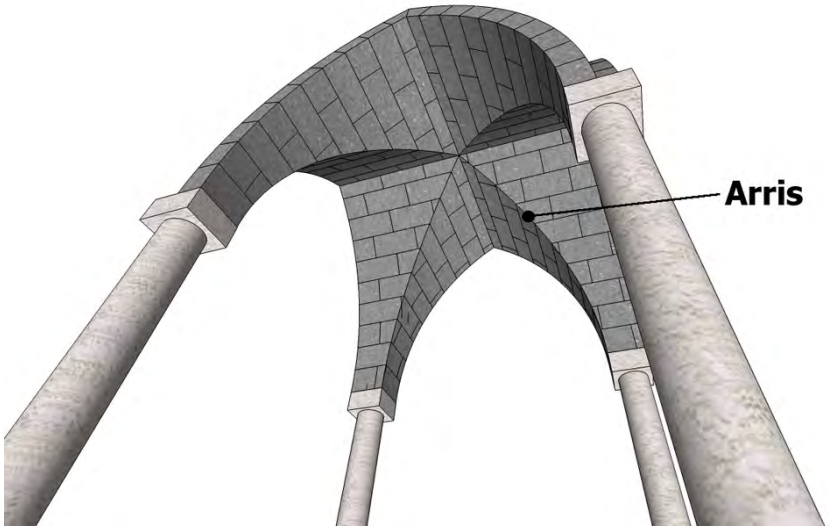
Groin or cross vault with groins or arrises

The intersection at right angles of two barrel vaults



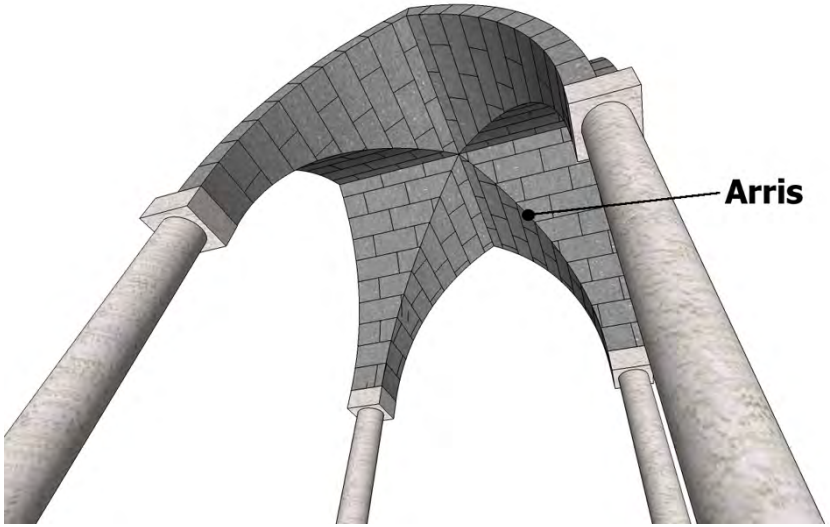


Groin or cross vault

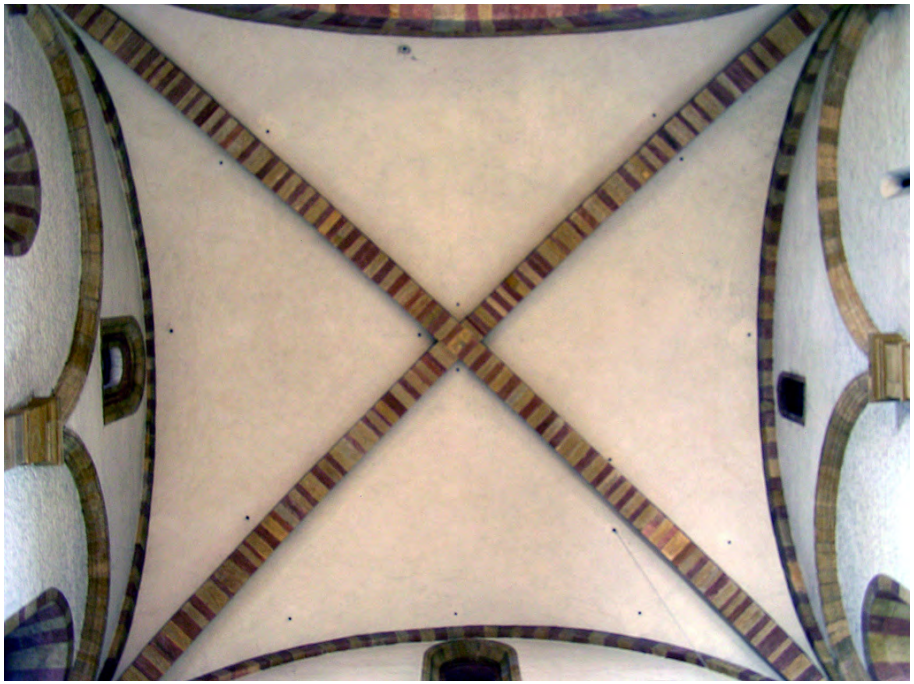


Arch of Janus, groin vault

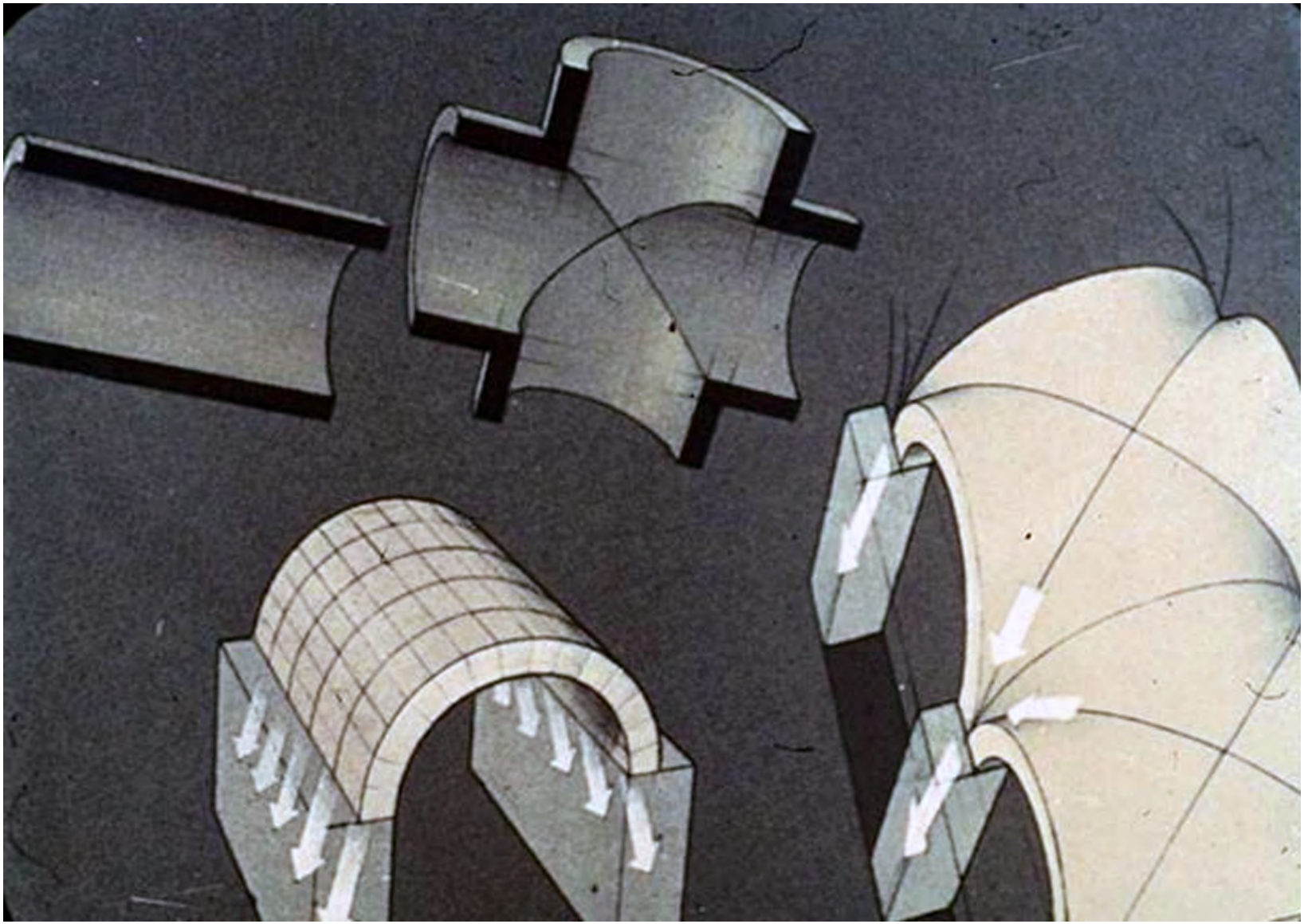
Groin vault



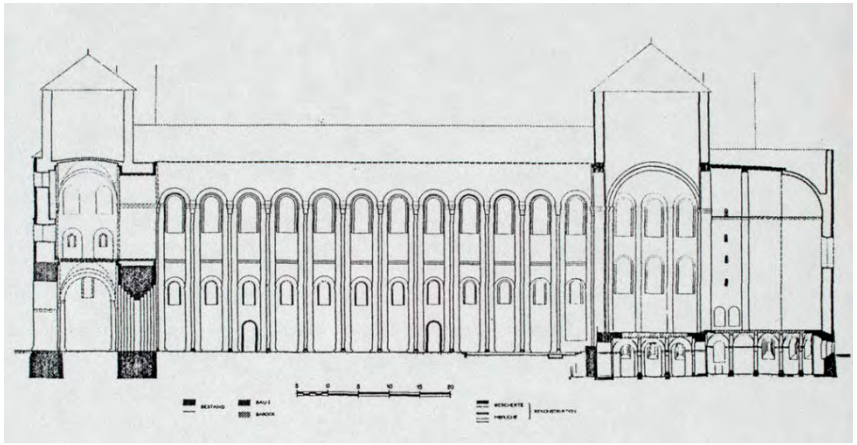
Ribbed groin vault or rib vault



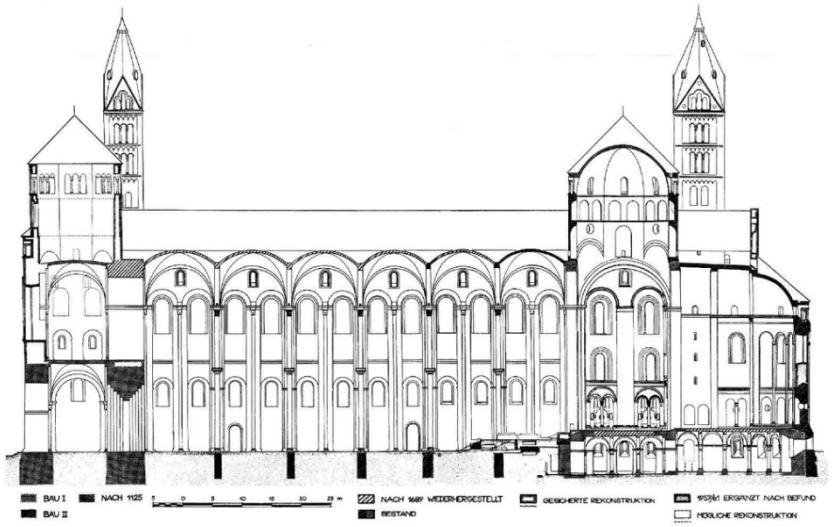
Thrust of barrel vault and groin vault



Speyer I

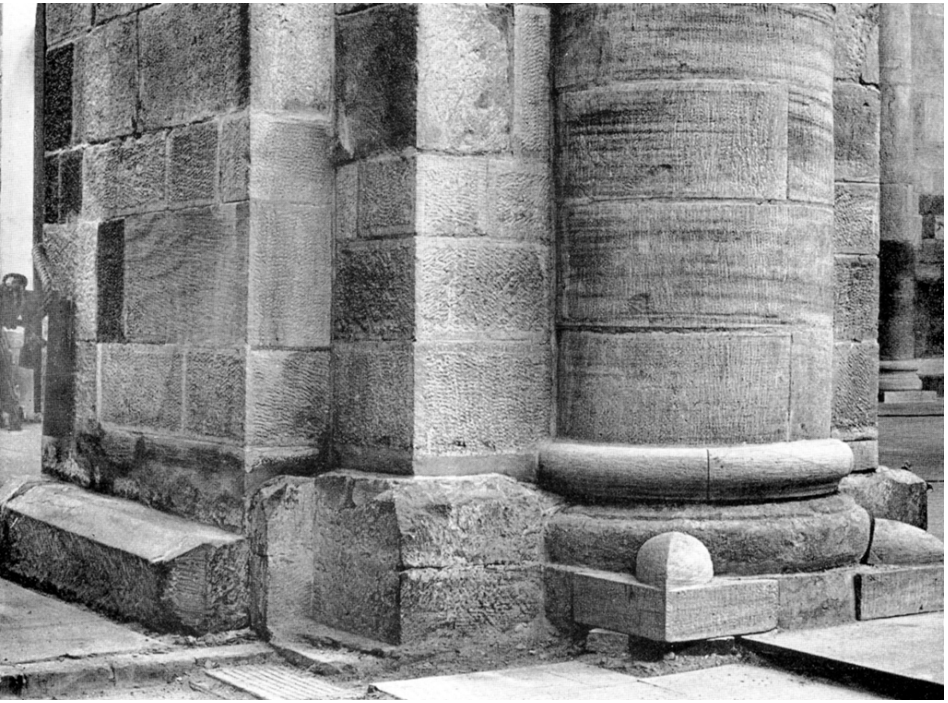


Speyer II



Speyer II, nave elevation
alternating supports with major and minor piers

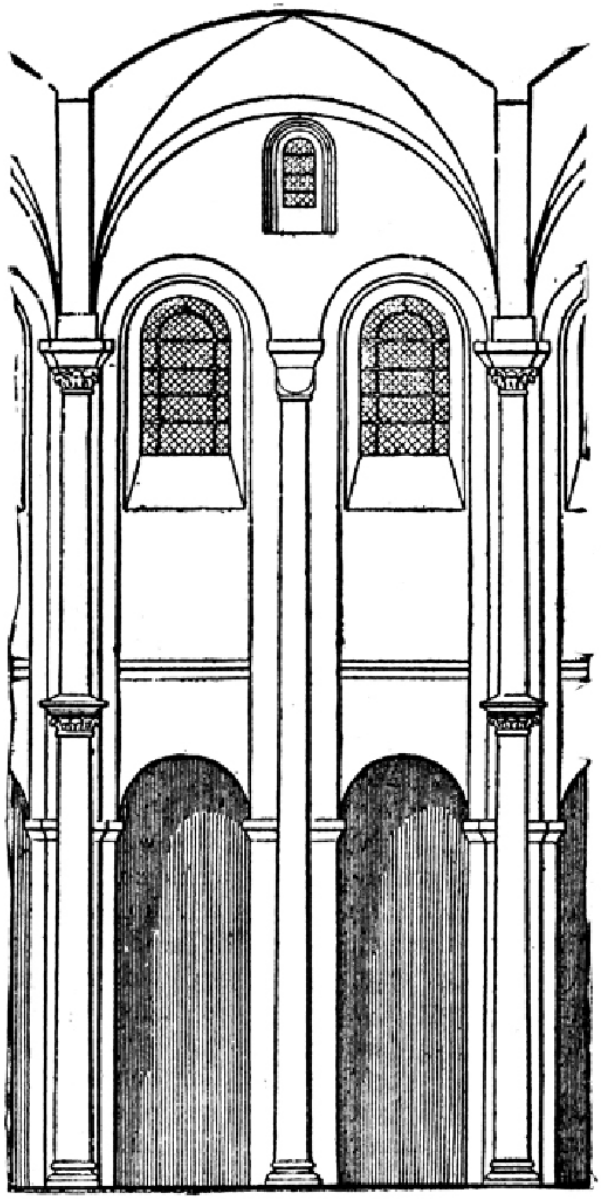
Major pier: rectangular core with wall strip and engaged half column.



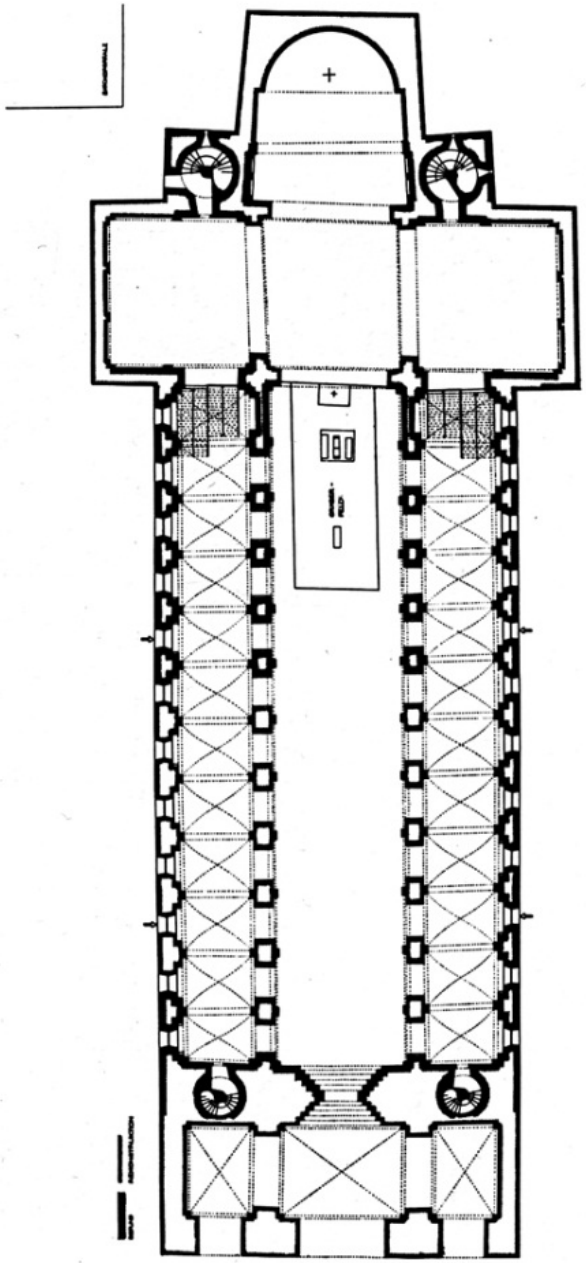
Major pier supports transverse arch and two wall ribs

Transverse arches mark edges of groin vaulted bays

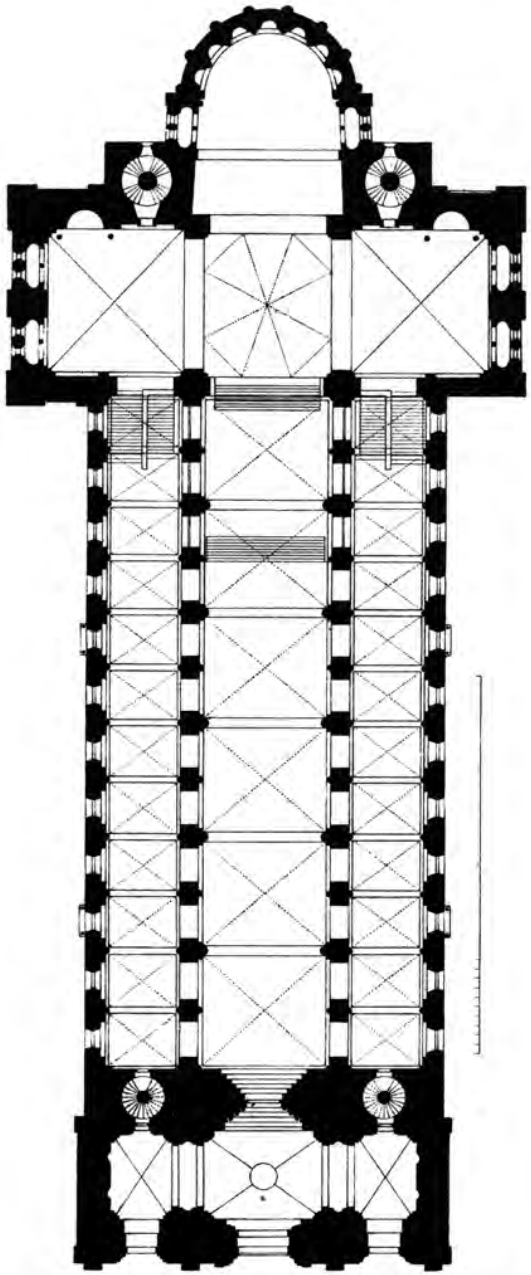
Speyer II, bay unit



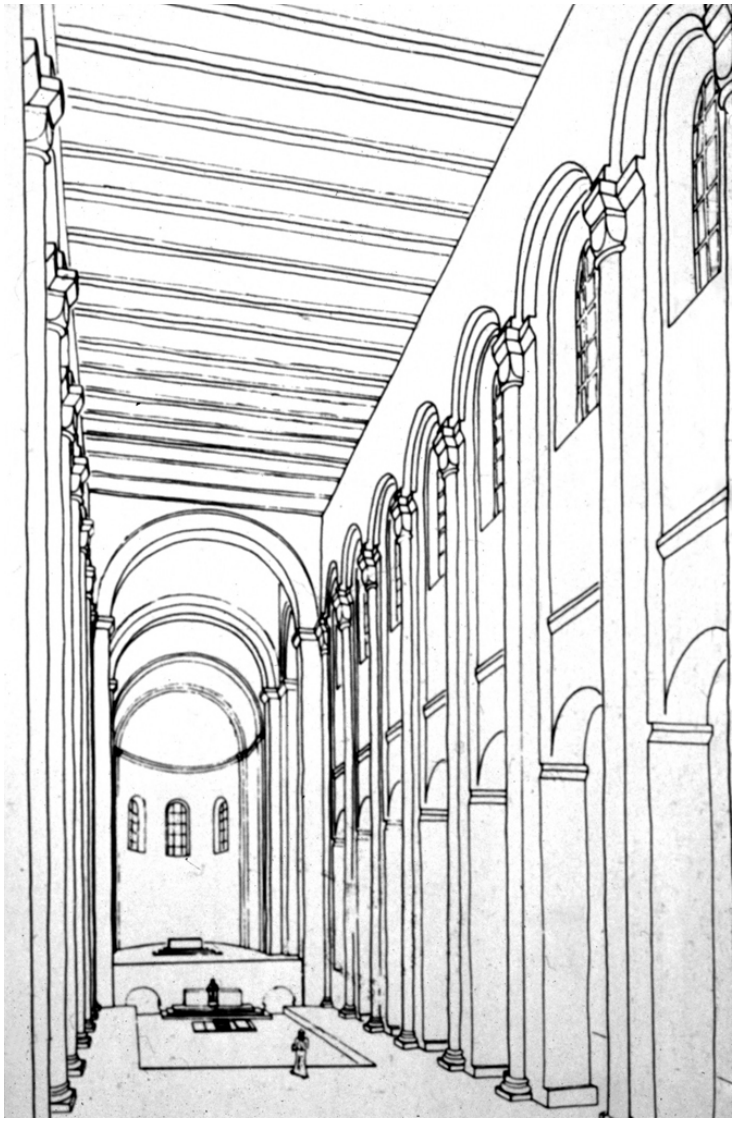
Speyer I



Speyer II



Speyer I



Speyer II

Conrad II: local recent German buildings

Henry III: local Classical, Carolingian, and Roman Early Christian models

Henry IV: North Italian recent buildings that revive local Classical techniques

Speyer I:

first phase: geometry, massing, modularity, stone construction

second phase: frontality, piers, sculptural treatment of the wall

Speyer II:

vaulting, bay division, alternating supports, compound piers, horizontal and vertical articulation and overall unity of the elevation