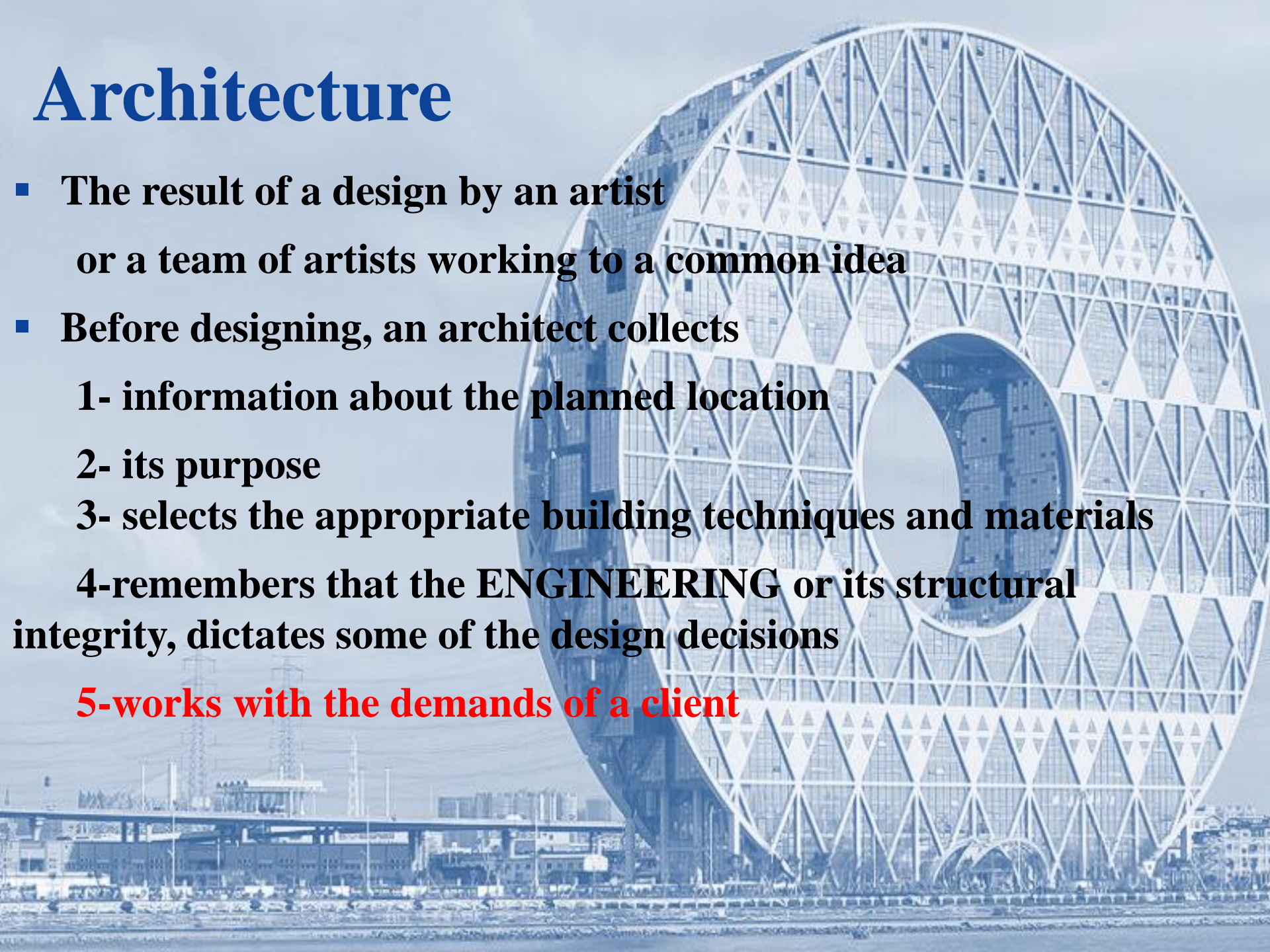


Architecture

- The result of a design by an artist or a team of artists working to a common idea
- Before designing, an architect collects
 - 1- information about the planned location
 - 2- its purpose
 - 3- selects the appropriate building techniques and materials
 - 4-remembers that the **ENGINEERING** or its structural integrity, dictates some of the design decisions
 - 5-works with the demands of a client



Buildings made of adobe brick reflects the character derived from the available materials, the abundance of **sand and clay**
Takes into account weather demands and the community's traditional standards - the building methods/ styles of the native people and Spanish settlers



Taos Pueblo, New Mexico, pre-1500



Takes into account housing demands

The Engineering and Science of Architecture

- Engineers must understand and control the forces pushing or pulling the structure of the building
 - ◆ When stresses pull, they create **tension**, which lengthens and stretches the materials of the building
 - ◆ When stresses push, they create **compression**, which can squash and shorten the same materials
- Architectural engineers work to create balance between tension and compression so that the amount stays even
- They measure the strength of the material and must consider that into the equation

Basic **Load-Bearing** Construction

- The most direct way to build something is to make a pile
- That said-The ancient Egyptians' ability to move and place such large stones, with the few tools available at the time, has always been a cause of wonder

**Maya pyramids
primarily served as
platforms for temples**

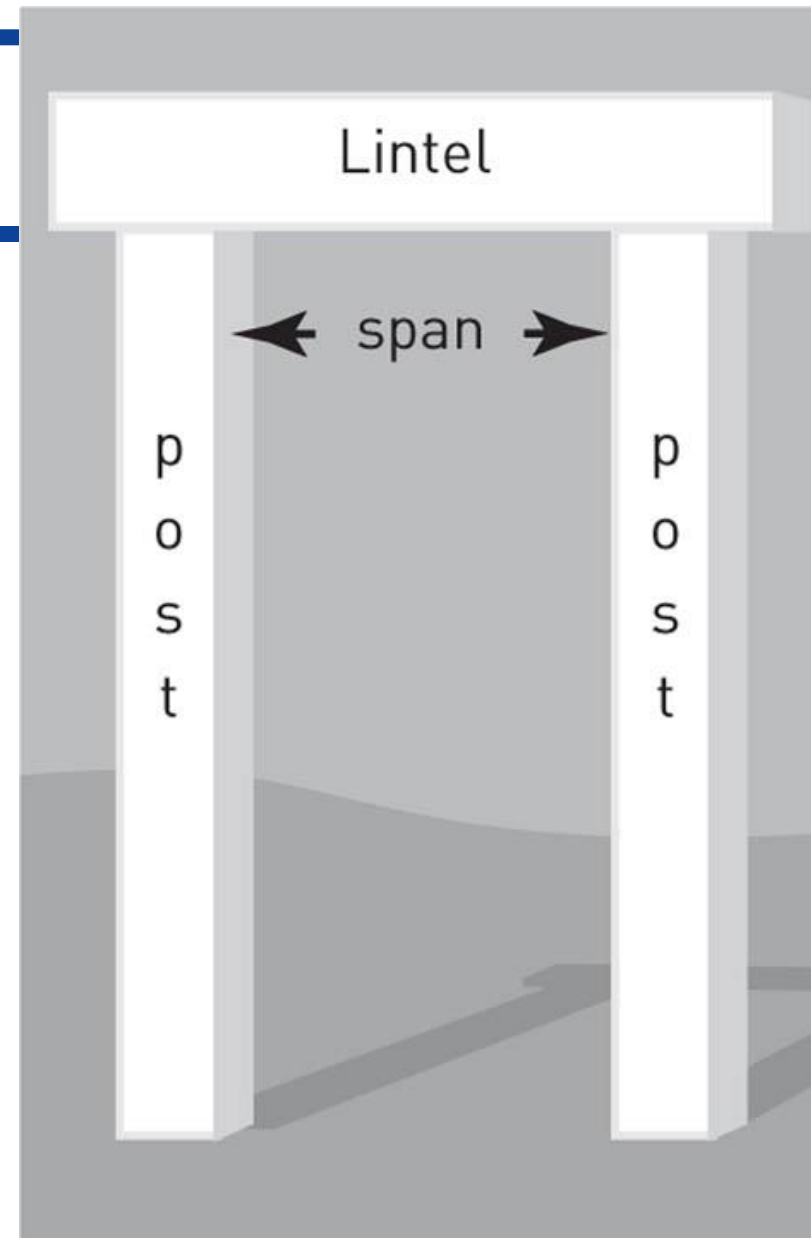
Gateways to the gods



Temple I in the Great Plaza,
Maya, c. 300–900 CE, Tikal,
Guatemala

Post-and-Lintel Construction

- In order to create an interior space, an architect must create a span (distance) between two supports in a structure





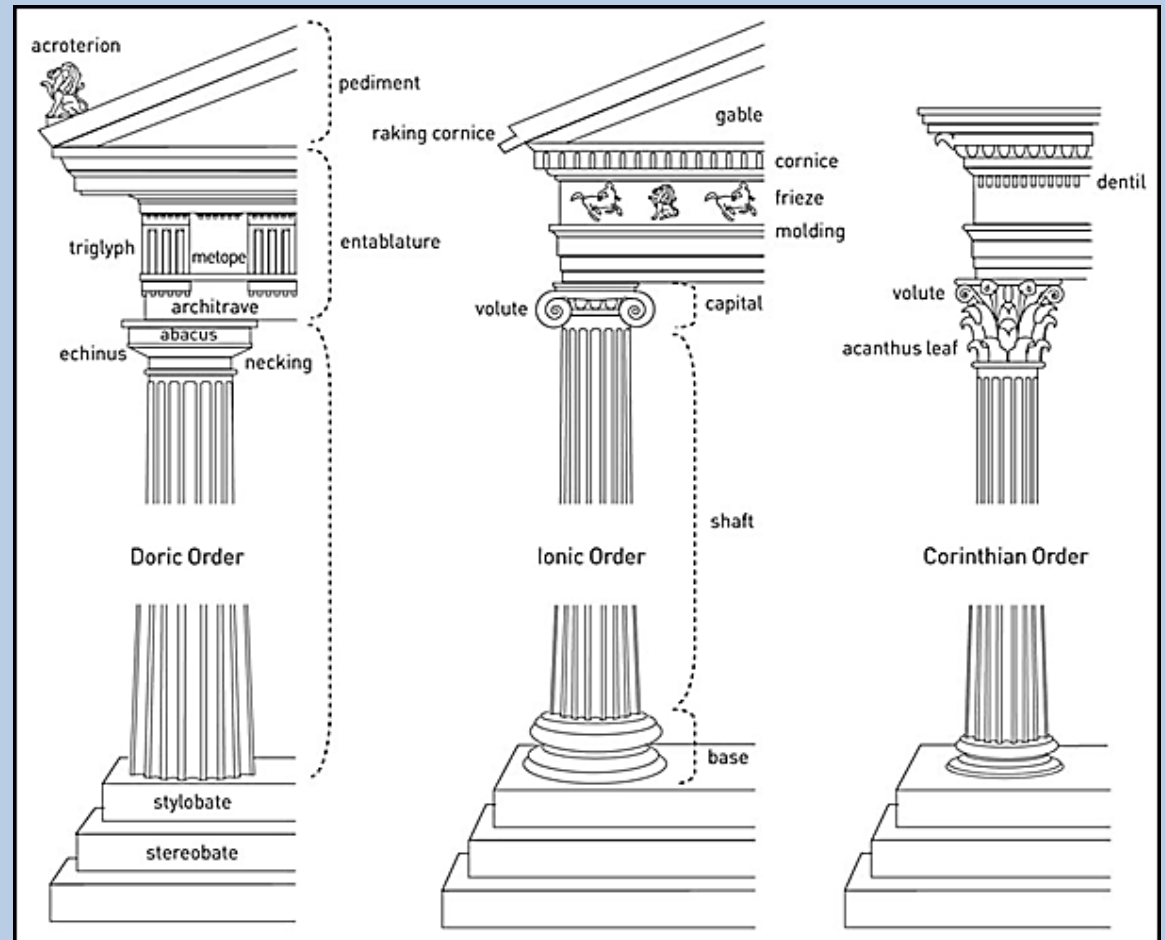
STONEHENGE, ENGAND, 3100-1600 BCE STONE



Kallikrates, Temple of Athena Nike, 427–424 BCE, Acropolis, Athens, Greece



Kallikrates, Temple of Athena Nike



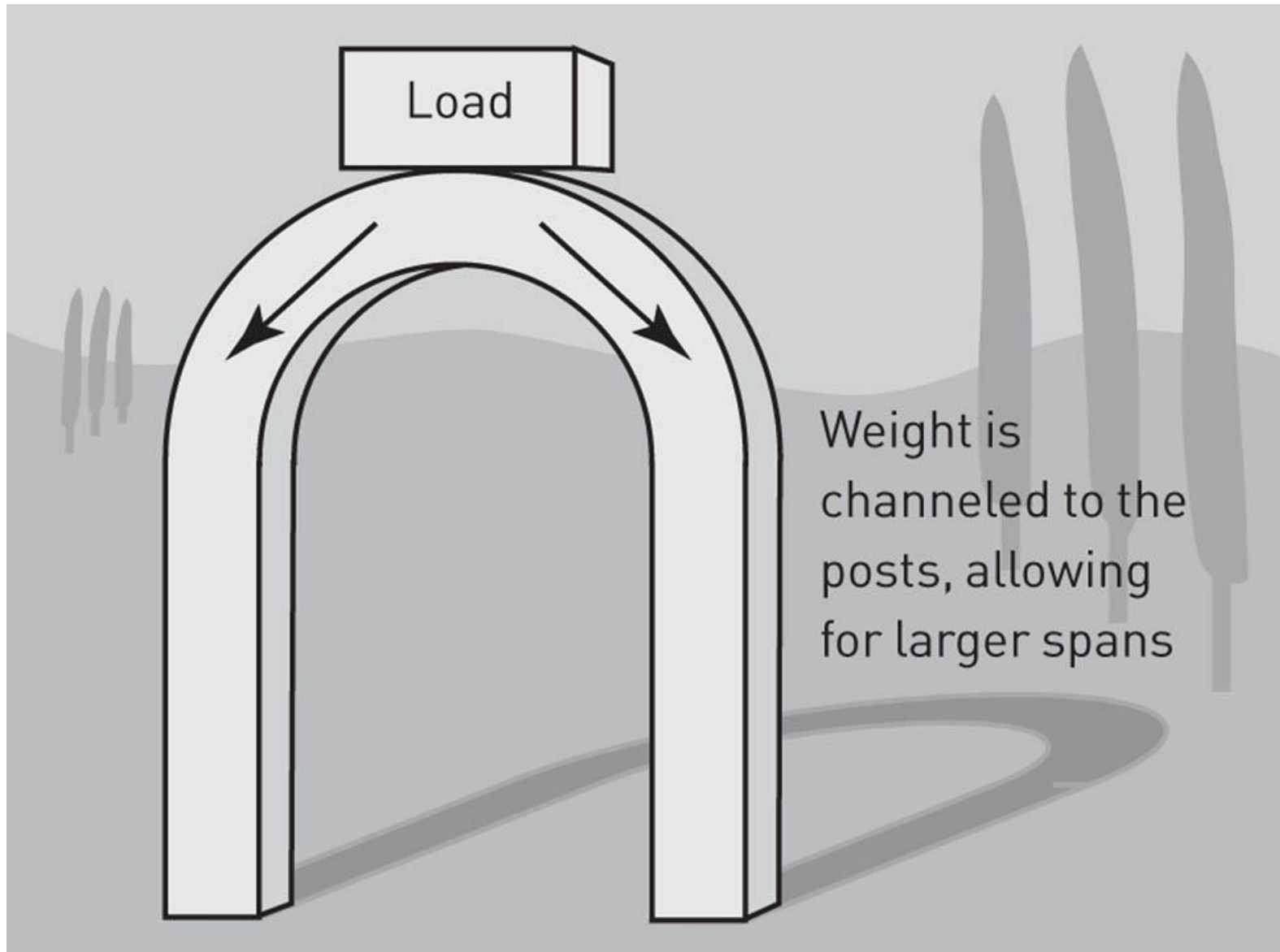
Greece became some of the world's great practitioners of post-and-lintel construction and The Temple of Athena Nike employs a type of the **Ionic column** (**Doric and Corinthian** are the two other orders)

Arches, Vaults, and Domes

- **Babylonians in Mesopotamia and the early Greeks the arch as a solution to spanning wider spaces**
- **The Romans perfected the rounded arch, which was a more efficient way of distributing compressive stress over the whole of the structure**
- **A vault is a ceiling based on the structural principles of the arch**
- **Structurally, a dome is like an arch rotated 360 degrees on its vertical axis**

PART 2

MEDIA AND PROCESSES



Arch Construction

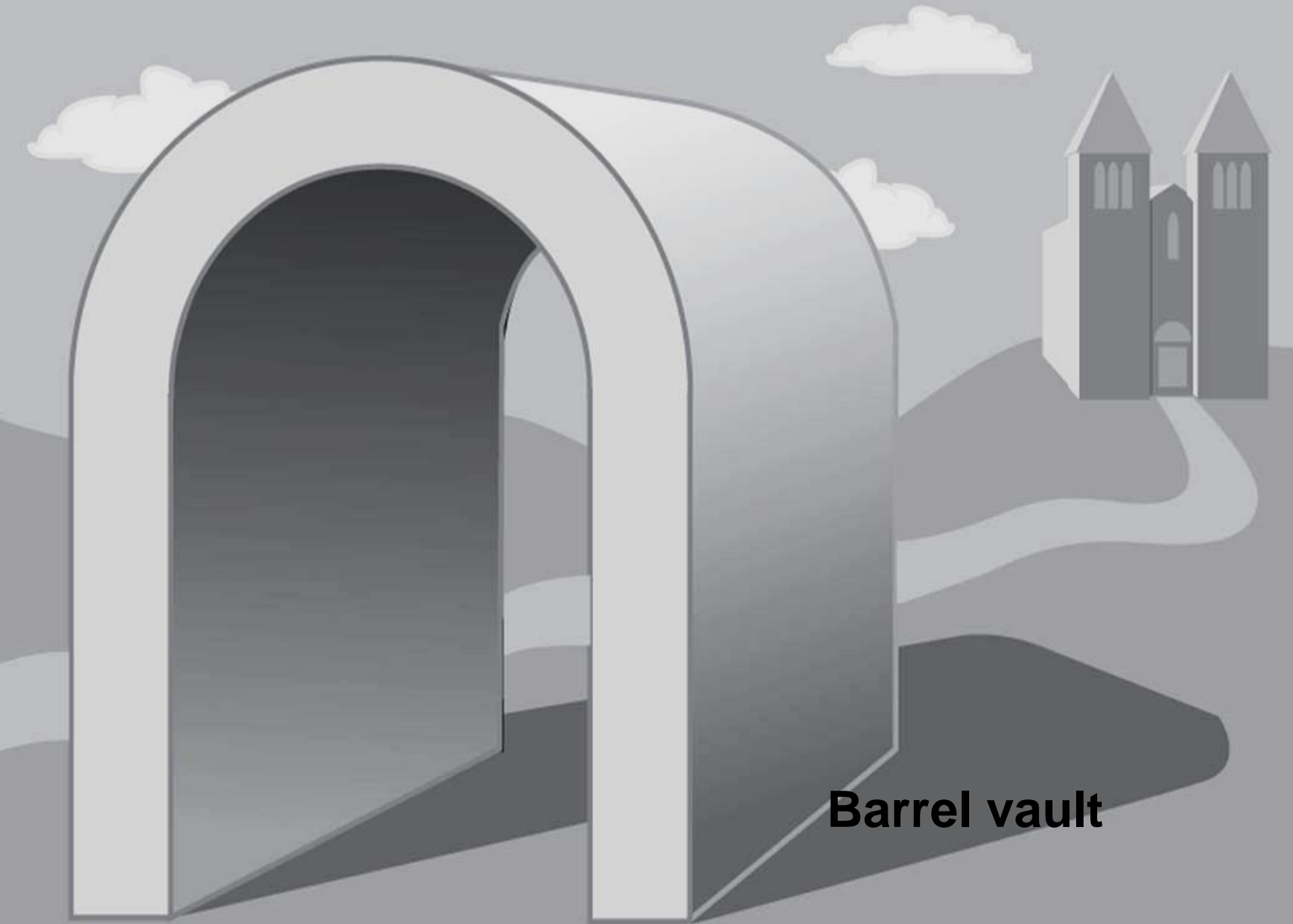


Pont du Gard, first century CE, Nîmes, France



Pont du Gard, Nîmes

- Moved fresh water from mountain springs 30 miles away to the populated territories-one as far as 60 miles
- The Romans made this impressive structure without any mortar holding the stones together, so perfectly were they cut to fit
- These structures benefited the local community, projected Roman imperial power, and enabled the army to move quickly across its new territory
- They could supply 265 gallons of water a day to each Roman.



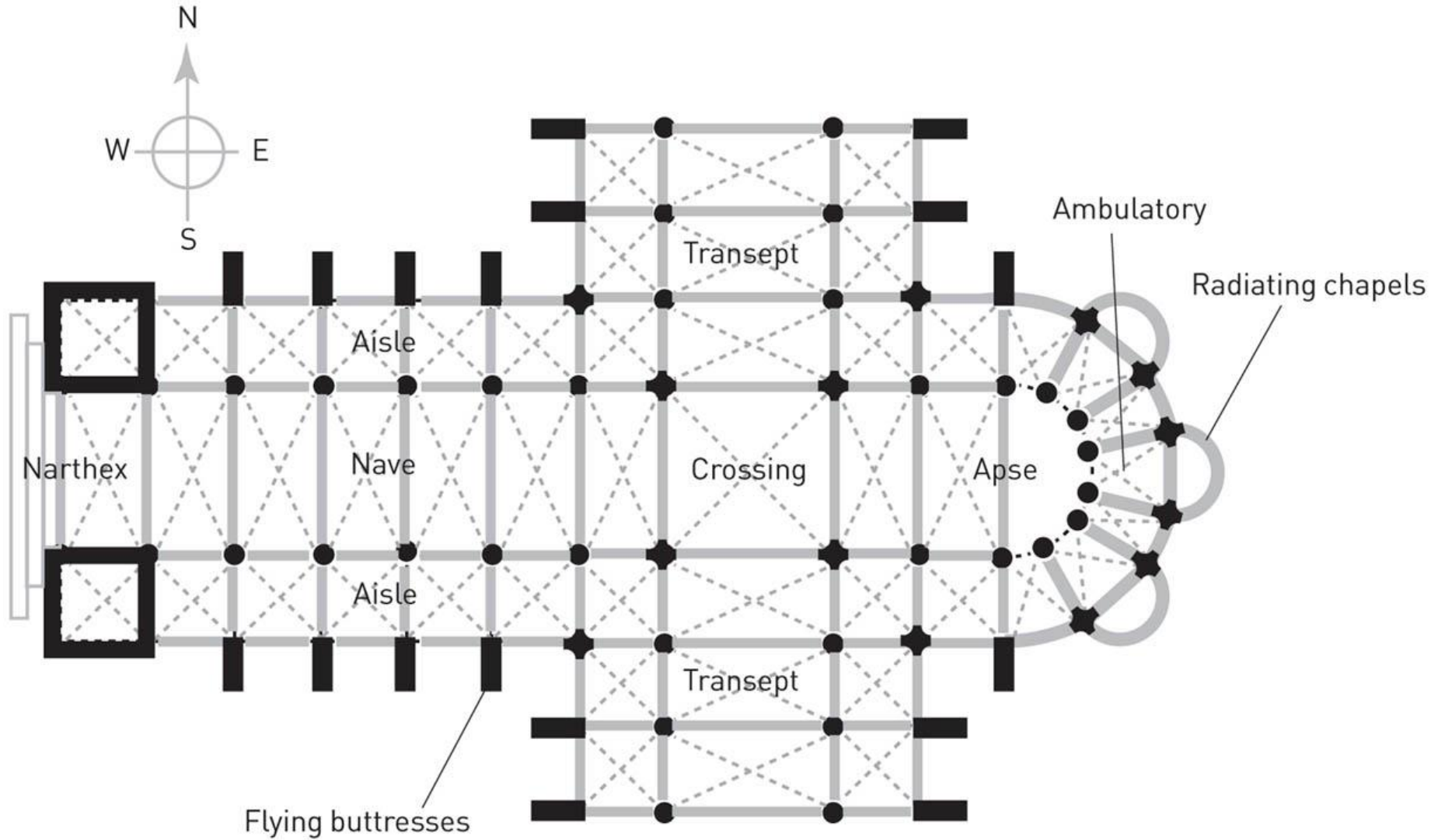
Barrel vault



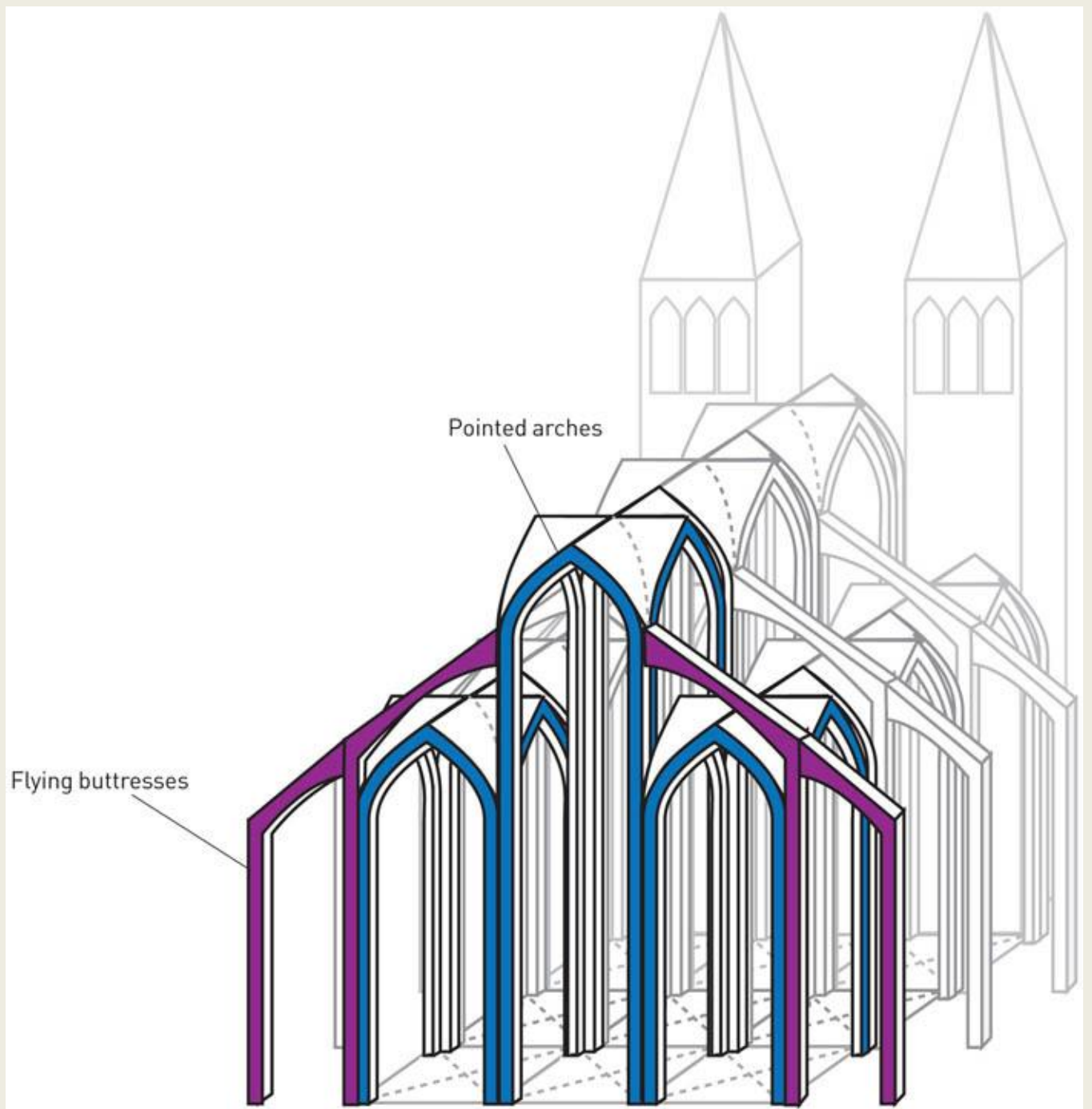
Clerestory
Windows

Sainte-Foy nave of Romanesque Cathedral

- The weight of the vault thrusts outward
 - ◆ The walls supporting it must be massive to not collapse
- Even though Romanesque churches are large, the thick walls have only small windows, creating dark and gloomy interior spaces



Gothic architectural features





Notre Dame 1160-1240-one of the first cathedrals to use exterior arched supports called *flying buttresses*

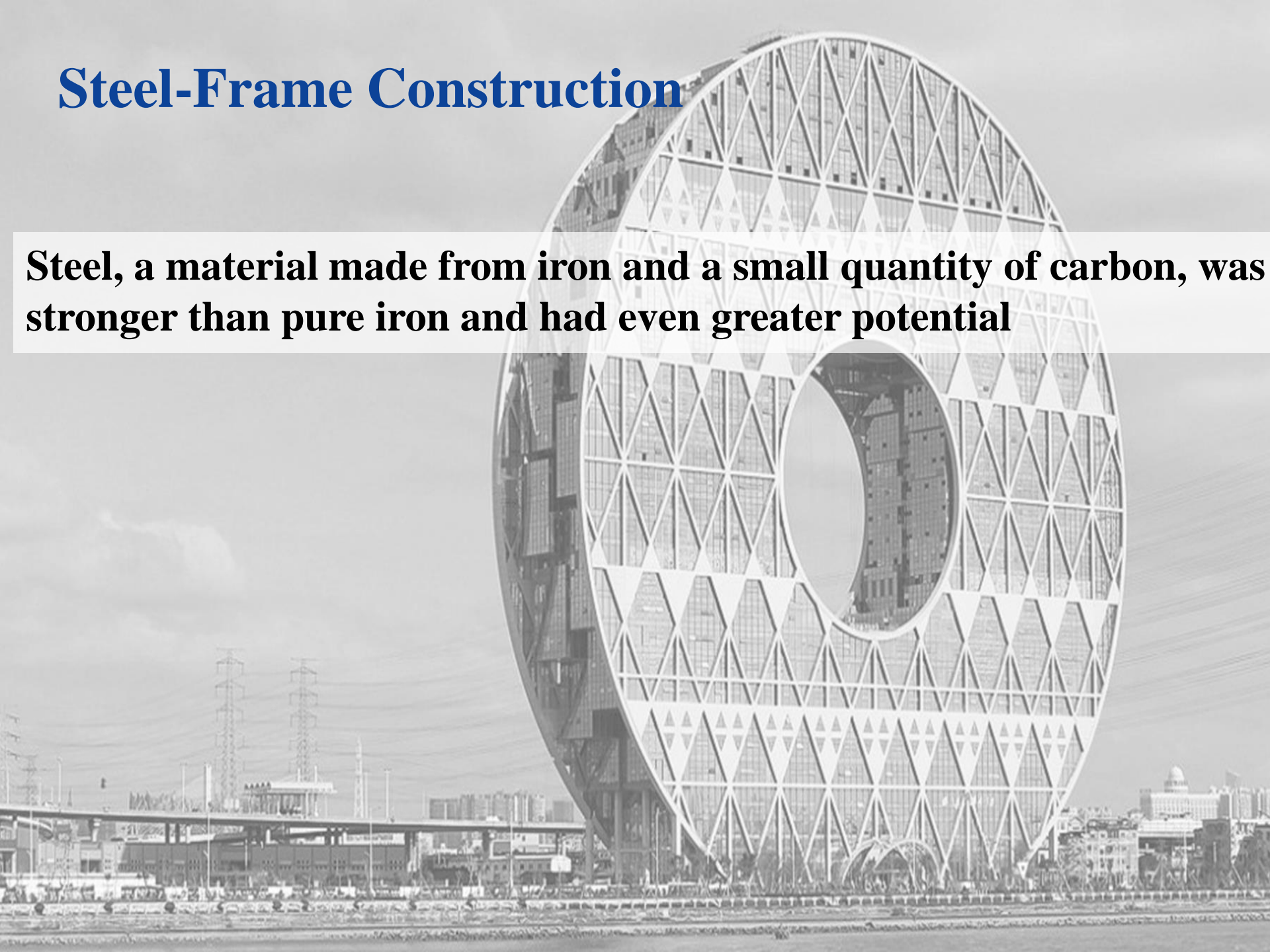
<http://www.youtube.com/watch?v=A71pk7HGKPE>

The Emergence of Modern Materials and Modern Architecture

- **In the nineteenth century, iron, steel, and concrete became both less costly, more widely available, and so came into common architectural use**
- **Buildings could be built taller and in different configurations**
- **New types of building emerged, and new materials made buildings look radically different**

Steel-Frame Construction

Steel, a material made from iron and a small quantity of carbon, was stronger than pure iron and had even greater potential





Louis Sullivan, Wainwright Building, 1890–91, St. Louis, Missouri



Louis Sullivan, Wainwright Building

- **The Wainwright Building is one of the world's oldest skyscrapers**
- **Sullivan obeys his famous phrase “form follows function” by providing versatile interior space**
- **Because the steel frame supports the building, and because it is mostly located at its outer edges, the space of the interior can easily be reconfigured to meet the specific needs of the user**
- **The Wainwright Building reflects the elements of a column (base, shaft, capital) in the organization of the exterior**



Mies van der Rohe, Neue Nationalgalerie, 1968, Berlin, Germany



Mies van der Rohe, Neue Nationalgalerie

- Mies van der Rohe proclaimed “less is more” Bauhaus aesthetic
- Because steel frames carry the load of the building, many Modernist architects realized there was no need to use a facing material, such as stone or brick; the entire side of the building could be sheathed in glass





Villa Savoye - Le Corbusier 1928-31

MAX '97

<https://www.youtube.com/watch?v=CFS2WBtcyE>

Villa Savoye Tour



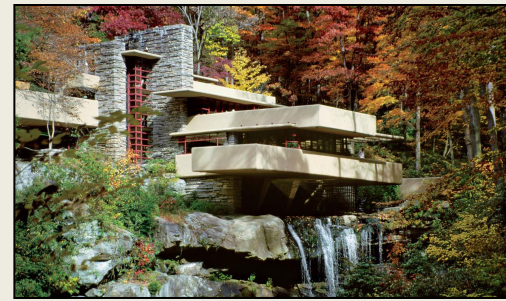
Frank Lloyd Wright,
Falling Water,
1939
Bear Run, Pa.

<http://www.youtube.com/watch?v=HuZ0x5Qkgzg>

Falling water video



Contrasting Ideas in Modern Architecture: Le Corbusier's *Villa Savoye* and Frank Lloyd Wright's *Fallingwater*



- Two buildings constructed about the same time, yet are based on radically different ideas about architecture
- Le Corbusier's architectural designs were part of the **International Style** that was promoted as a universal aesthetic form that could be built in any geographical or cultural environment relatively inexpensively
 - ◆ Saw architecture as a “machine for living”
- Wright did not think that a house should be a machine
 - ◆ He believed the design of a house should respond organically to its location

Reinforced Concrete

Architects use reinforced concrete as a way of avoiding the hard right-angled edges of buildings made from blocks or bricks

Concrete is a mixture of cement and ground stone

It is reinforced through the use of either a fibrous material or steel rods called rebars





Jørn Utzon, Sydney Opera House, 1973, Sydney, Australia

https://www.youtube.com/watch?v=35Jom_dGS0I



Jørn Utzon, Sydney Opera House

- **The structure is a testament to the expressive character of reinforced concrete**
- **The rooflines resemble billowing sails, a reference to the building's harbor location**
- **The “sails” were created over precast ribs and then set into place, allowing the architect more freedom in the creation of the design**