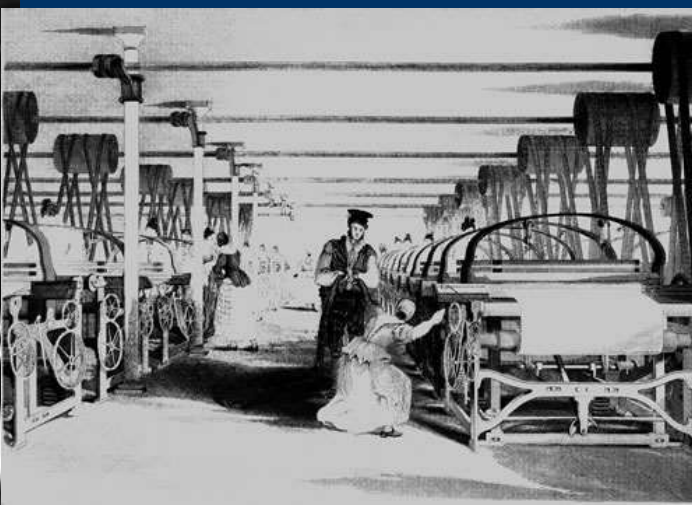


## The Industrial Revolution: 18-19th c.

Displaced from their farms by technological developments, the industrial laborers - many of them women and children – suffered miserable living and working conditions.



# Romanticism: late 18<sup>th</sup> c. - mid. 19<sup>th</sup> c.

During the Industrial Revolution an intellectual and artistic hostility towards the new industrialization developed. This was known as the Romantic movement. The movement stressed the importance of nature in art and language, in contrast to machines and factories.

- Interest in folk culture, national and ethnic cultural origins, and the medieval era; and a predilection for the exotic, the remote and the mysterious.



**CASPAR DAVID FRIEDRICH** *Abbey  
in the Oak Forest*, 1810.

# The English Landscape Garden

Henry Flitcroft and Henry Hoare. **The Park at Stourhead.** 1743-1765. Wiltshire, England



***William Kent.***  
***Chiswick House***  
***Garden.*** 1724-9

The architectural set-pieces, each in a Picturesque location, include a Temple of Apollo, a Temple of Flora, a Pantheon, and a Palladian bridge.



André Le Nôtre. *The gardens of Versailles*. 1661-1785

Henry Flitcroft and Henry Hoare. *The Park at Stourhead*. 1743-1765.  
Wiltshire, England



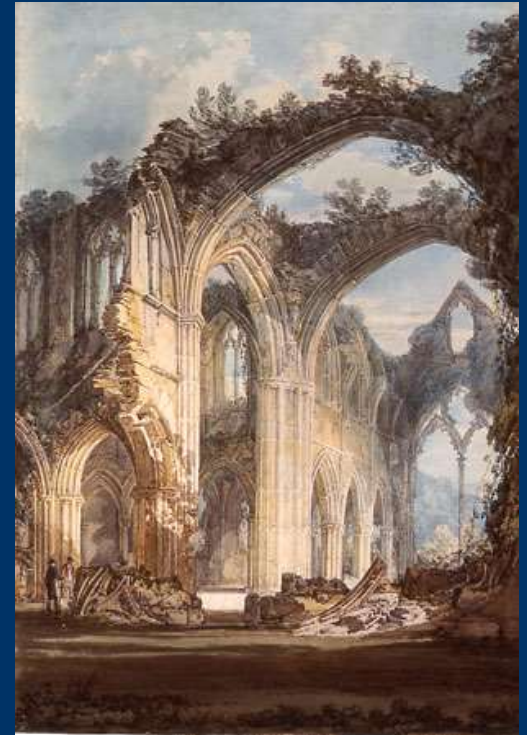


**CASPAR DAVID  
FRIEDRICH, *Abbey  
in the Oak Forest*,  
1810.**

## Gothic Revival

Architectural movement most commonly associated with Romanticism. It drew its inspiration from medieval architecture and competed with the Neoclassical revival

**TURNER, *The Chancel  
and Crossing of Tintern  
Abbey*. 1794.**



Horace Walpole by  
Joshua Reynolds, 1756



**Horace Walpole** (1717-97), English politician, writer, architectural innovator and collector.

In 1747 he bought a small villa that he transformed into a pseudo-Gothic showplace called *Strawberry Hill*; it was the inspiration for the Gothic Revival in English domestic architecture.

In 1764, he anonymously published the first **Gothic Novel** (Novel which combines elements of both horror and romance) *The Castle of Otranto*, setting a literary trend to go with the architecture.



PENGUIN CLASSICS

HORACE WALPOLE

*The Castle of Otranto*

<http://www.youtube.com/watch?v=IXDgZ-pOslc>



Horace Walpole and others, *Strawberry Hill*, Twickenham, England, 1749-79

battlement



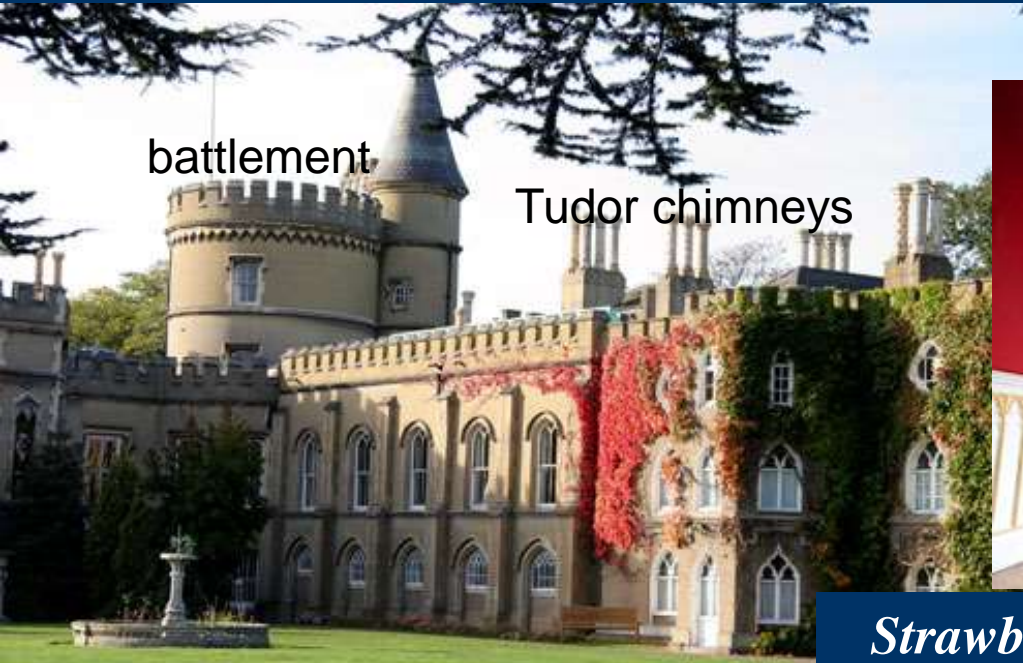
*Comparison: Bodiam Castle, 14<sup>th</sup> c. East Sussex, England*

*Comparison: Late Gothic: Kings College, fan vaulting of chapel ceiling. Cambridge. 1446-1515*



battlement

Tudor chimneys



*Strawberry Hill, 1749-79*





## Nationalism


Loyalty and devotion to one's nation or country, especially as above loyalty to other groups or to individual interests.

Modern Nationalism emerged in the 1700s. Before that time most people were not emotionally connected to the state in which they lived. Instead they were subjects who were ruled by a monarch anointed by God. The primary allegiance of most people was to their immediate locality or religious group.

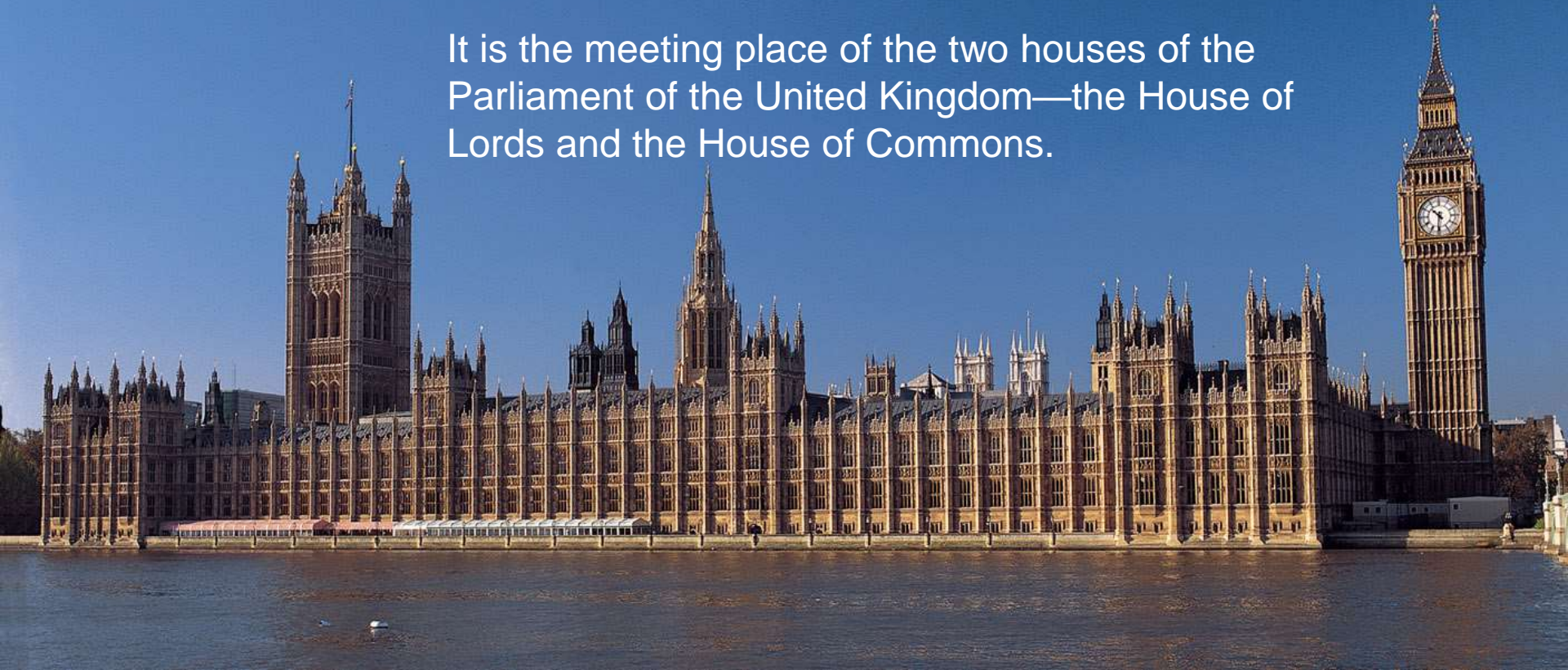
# 19th Century Architecture



- In the nineteenth century, each nation came to value its past as evidence of the validity of its ambitions and claims to greatness. Art and architecture of the remote past came to be regarded as products of cultural and national genius.
- Neoclassical, Gothic, Baroque, Renaissance revivals, as well as eclectic style which combines different elements from various historical styles.

- Additionally, new building materials - iron and glass, lead to new architectural forms.
- 

It is the meeting place of the two houses of the Parliament of the United Kingdom—the House of Lords and the House of Commons.



**Charles Barry and A. W. N. Pugin, *Houses of Parliament*, London, England, designed 1835.**

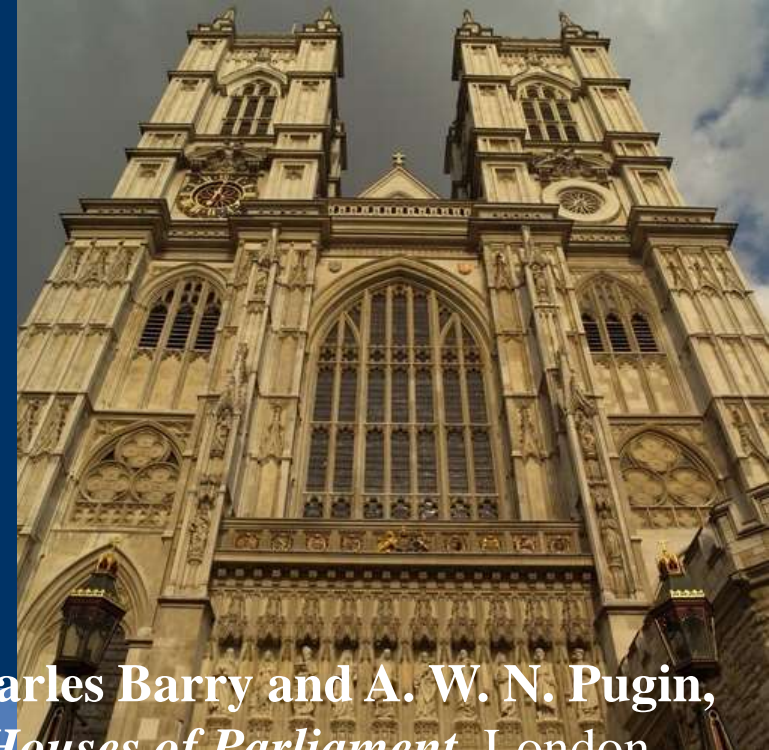
After a fire in 1834, the present Houses of Parliament were built over the next 30 years.





**Charles Barry and A. W. N. Pugin, *Houses of Parliament*, London, England, designed 1835.**





**Charles Barry and A. W. N. Pugin,**  
*Houses of Parliament, London,*  
England, designed 1835.

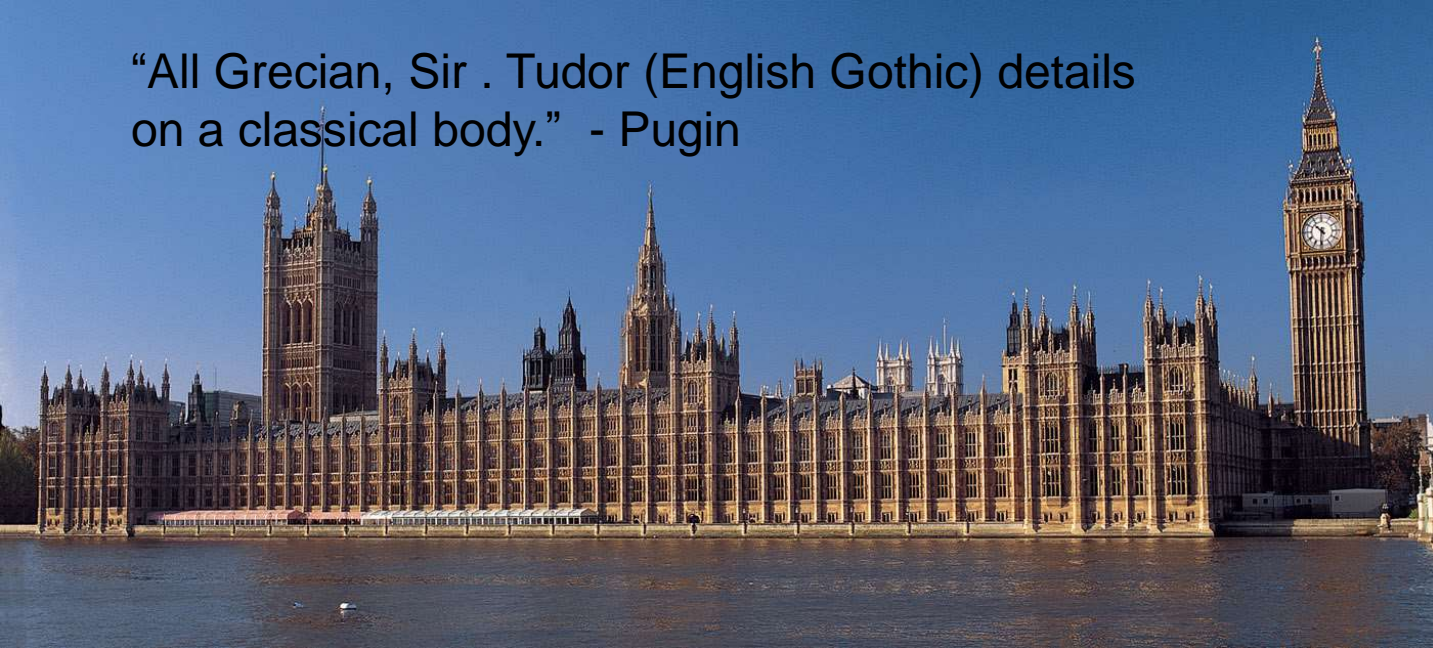


**TURNER, *The Chancel and Crossing of Tintern Abbey*. 1794. Pencil and watercolor on paper. 358 x 255 mm**

***Houses of Parliament, Victoria Tower*  
London, England, designed 1835.**



“All Grecian, Sir . Tudor (English Gothic) details  
on a classical body.” - Pugin



**Charles Barry and A. W. N. Pugin,**  
*Houses of Parliament*, London,  
England, designed 1835.

**Comparison: Neo Classical:**  
**Jacques-Germain Soufflot,**  
*Panthéon* (Church of Sainte-  
Geneviève), Paris, France, 1755-92





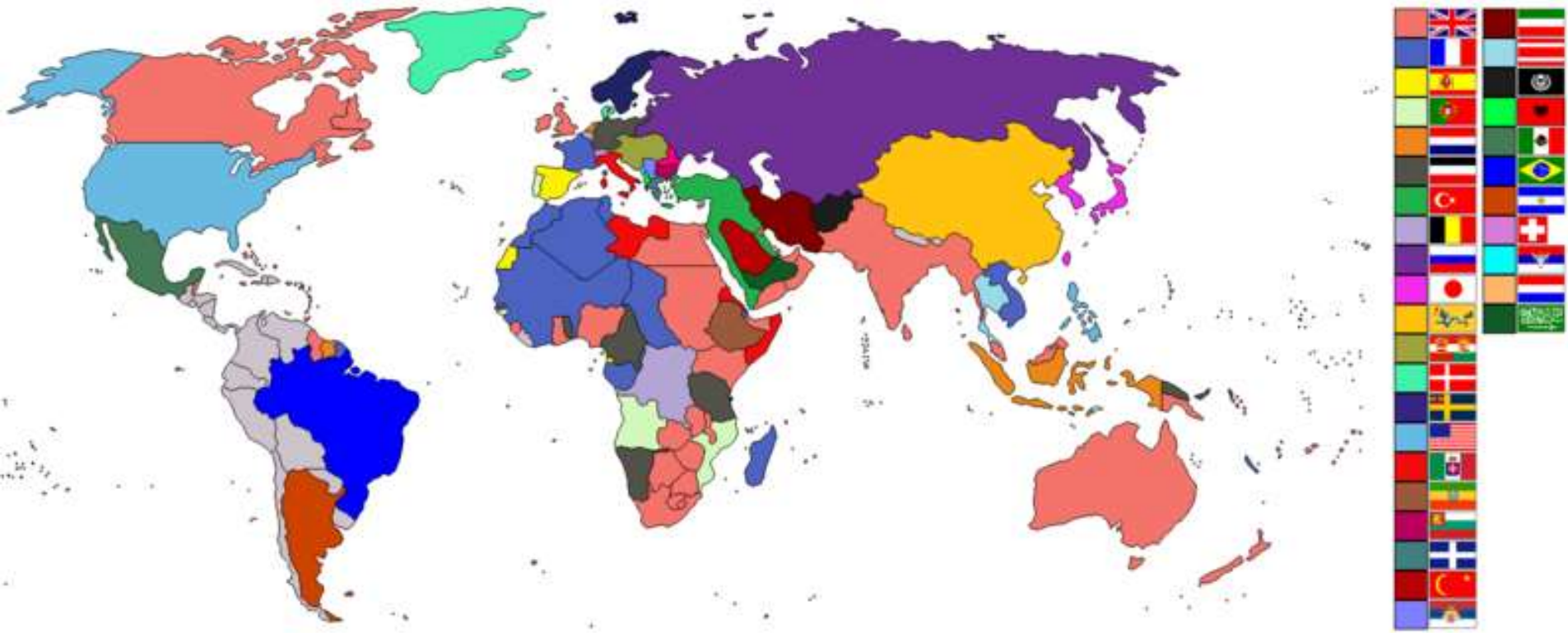


**Lewis P. Hobart. *Grace Cathedral* SF. 1928-1964**



**Notre Dame Cathedral, Paris. 1163-1270s**

# Non-Western Influences



Map of the World c. 1900

## Colonialism

Control by one power over a dependent area or people. The most active practitioners were European countries; in the years 1500 – 1900, Europe colonized all of North and South America and Australia, most of Africa, and much of Asia.



**John Nash, *Royal Pavilion*, Brighton, England, 1815-1818.**

**Exterior - Islamic/Indian  
domes, minarets and screens.**

**Interior - Influences from India  
and China. (By 1856, most of  
India was under the control of  
the British East India Company.)**



**JOHN NASH, *Royal Pavilion*, Brighton, England, 1815-1818. Built as a  
seaside retreat for the prince regent (later King George IV)**

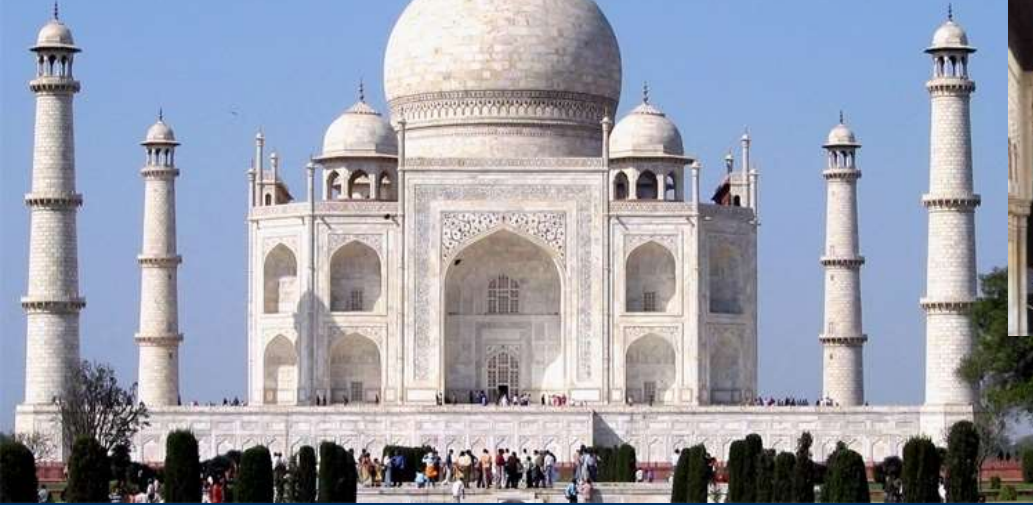


The Banqueting Room at the Royal Pavilion in Brighton from John Nash's *Views of the Royal Pavilion* (1826).

Maria Fitzherbert was the first woman with whom the future George IV undertook a wedding ceremony. However the marriage was invalid under English civil laws and she never became queen.



The Taj Mahal is a mausoleum located in Agra, India, that was built in 1648 under Mughal Emperor Shah Jahan



The Court of the Lions in Alhambra, (Moorish citadel), Granada, Spain. 1362-1391.



JOHN NASH, *Royal Pavilion*, Brighton, England, 1815-1818.

Russian ambassadress Princess Lieven described her experiences of the Music Room:

'I do not believe that since the days of the Heliogabalus, there has been such magnificence and such luxury. There is something effeminate in it which is disgusting. One spends the evening half-lying on the cushions: the lights are dazzling: there are perfumes, music, liqueurs.'



**JOHN NASH, *Royal Pavilion*, Music Room. Brighton, England, 1815-1818.**



Eugène Delacroix, *Lion Hunt*, 1861, Oil on canvas



*Leighton House , Arab Hall, circa 1879*

Ingres, *Odalisque with a Slave*, 1840



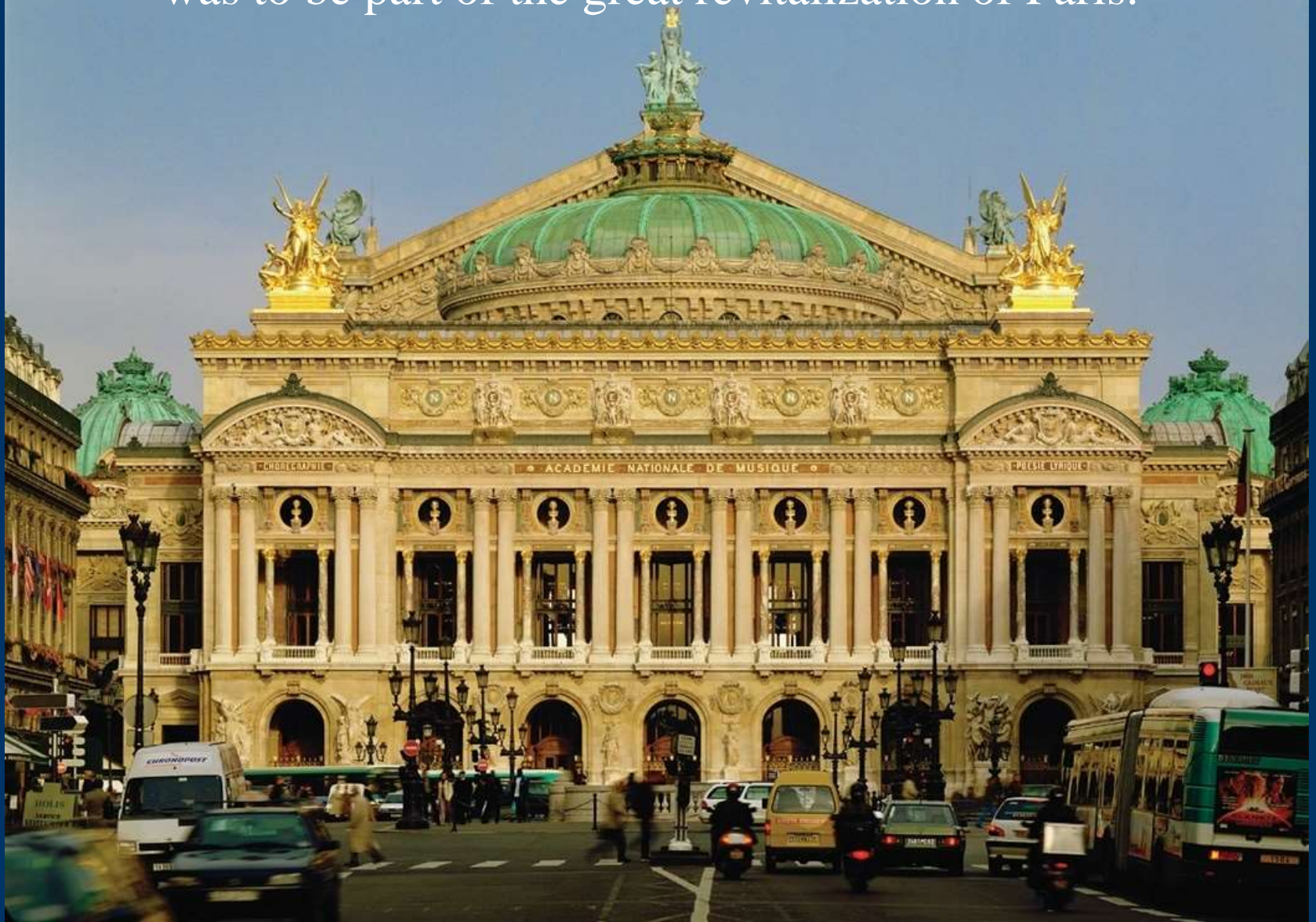
**JOHN NASH, *Royal Pavilion*, Brighton, England, 1815-1818.**



# Neo-Baroque/Beaux-Arts style

A grandiose architectural style as taught at the Ecole des Beaux Arts in Paris, widely applied to large public buildings. Beaux-Arts buildings are typically massive; have a symmetrical plan, and rich decoration.

The Opera House was built by Garnier for Napoleon the III. It was to be part of the great revitalization of Paris.



Charles Garnier, *The Opera House*, Paris. 1861-74

**CARLO MADERNO**, *facade of Saint Peter's*, commissioned by Pope Paul V, Vatican City, Rome, Italy, 1606-1612.



**Charles Garnier**, *The Opera House*, Paris.  
1861-74

The style is monumental, with multicolored marbles and lavish statuary.

**Charles Garnier, *The Opera House*, Paris.  
1861-74**



ACADEMIE NATIONALE



belvustang

Bronze busts of Beethoven and Mozart on the front façade



Apollo, Poetry and Music roof sculpture by Aimé Millet

**It is elaborately decorated with galleries, statues and columns; gilded decoration and lavish mix of expensive polychromed materials.**

**Garnier's design reflected the aspirations of the Second Empire with its rich coloring and decoration.**



**The Grand Escalier in the main hall**





**Comparison: French Baroque**  
**HARDOUIN-MANSART** and  
**LE BRUN**, *Galerie des Glaces*  
(*Hall of Mirrors*), palace of  
Versailles, Versailles, France, ca.  
1680.

**Charles Garnier**, *The Opera House*,  
The Grand Foyer, Paris. 1861-74

The 54m long Grand Foyer features a  
mosaic covered ceiling and a large  
number of chandeliers.



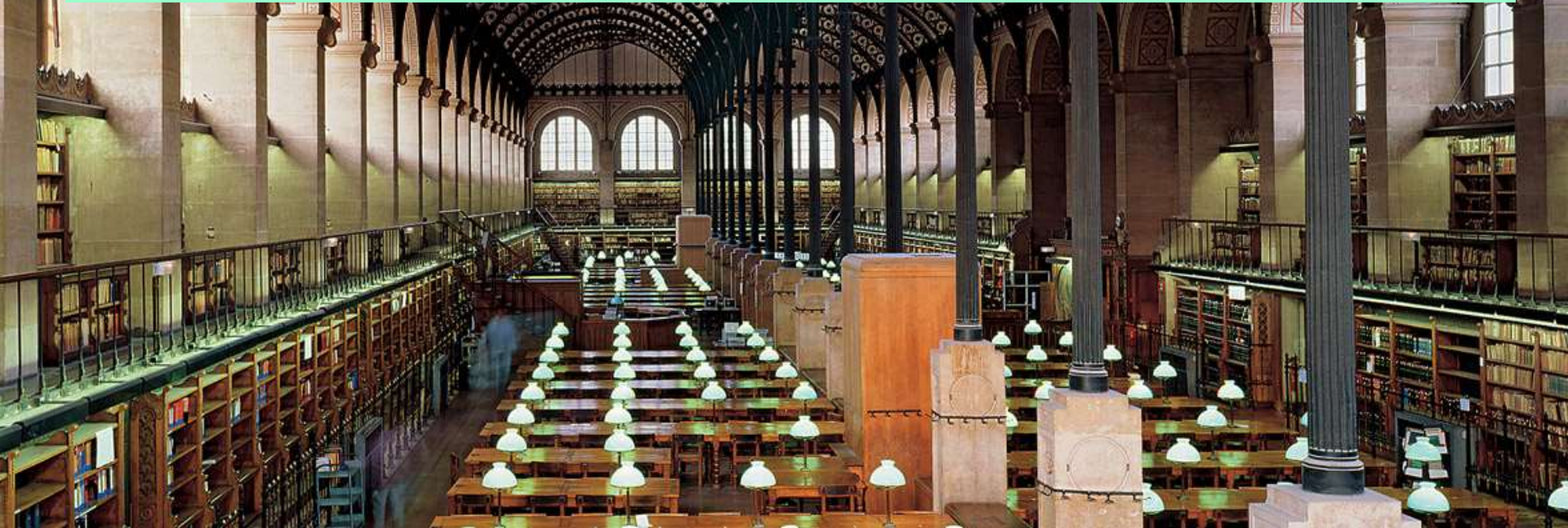
# **Palaces of Iron and Glass:**

## **Industrialization and the new building materials**



**Abraham Darby III and Thomas F. Pritchard, *Cast Iron Bridge at Coalbrookdale*, England (first use of iron in bridge design. Strong and light material), 1776-79. 100' span.**

**A changed societal structure required new types of buildings: government offices, banks, hospitals, theaters, libraries, educational institutions, museums, railroad stations, factories, warehouses, commercial buildings such as department stores and more.**



**Henri Labrouste, Reading Room, *Sainte-Geneviève Library*, 1843-50**



**Henri Labrouste, Reading Room, *Sainte-Geneviève Library*, 1843-50**

Slender cast iron Corinthian columns support two barrel vaults. The metal skeleton is exposed.

**Giant glass-and-iron exhibition hall that housed the Great Exhibition of 1851. It was one of the first prefabricated buildings and one of the first buildings with large expanses of glass wall.**

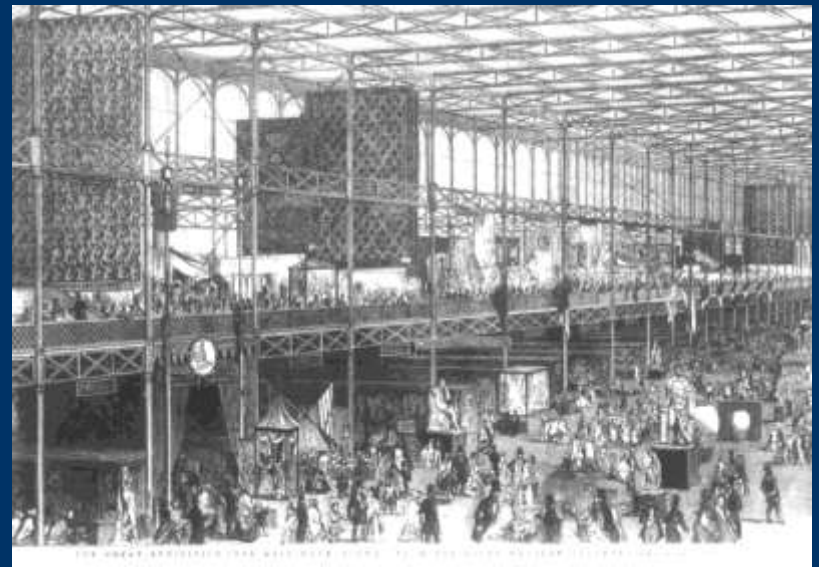
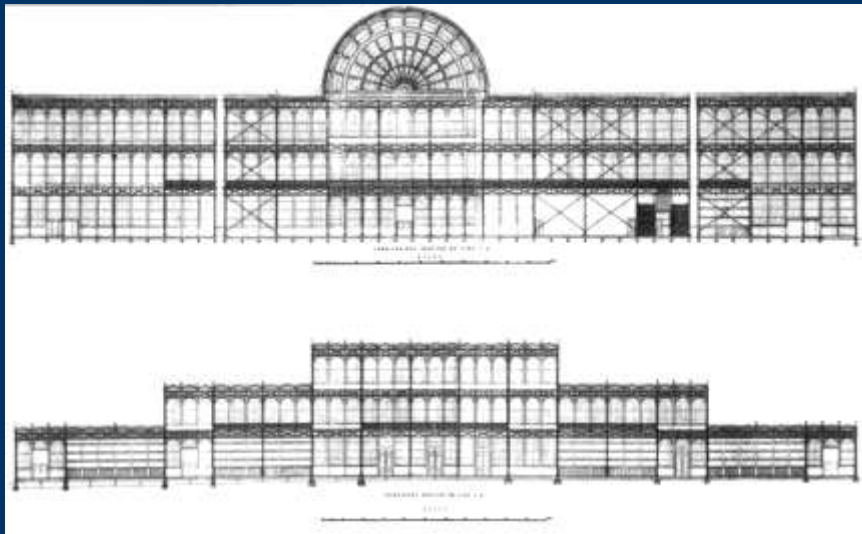
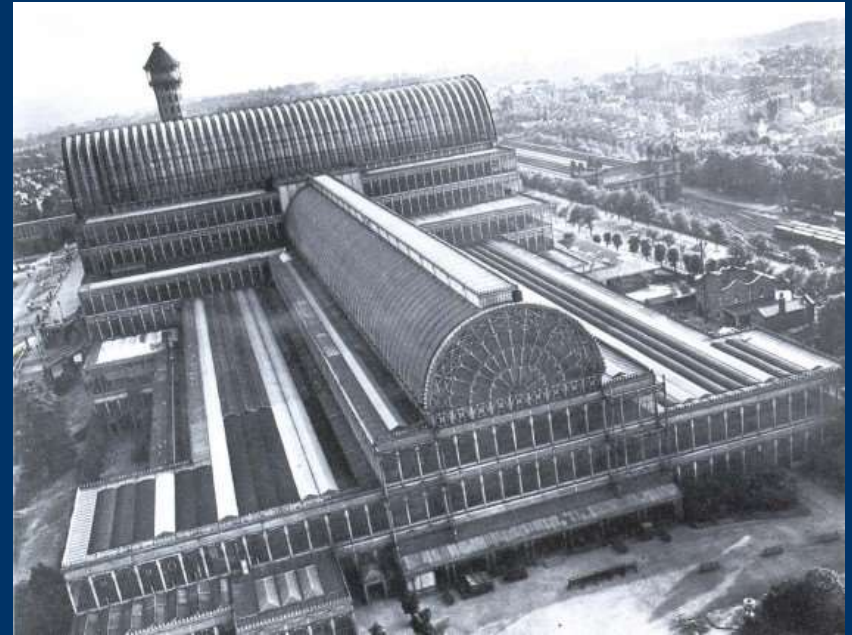
**It had the largest space ever enclosed up to this time - covering more than 18 acres (as long as 18 football fields and as wide as 8). The structure was completed in just over 6 months.**

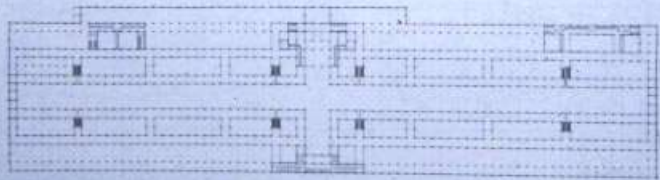
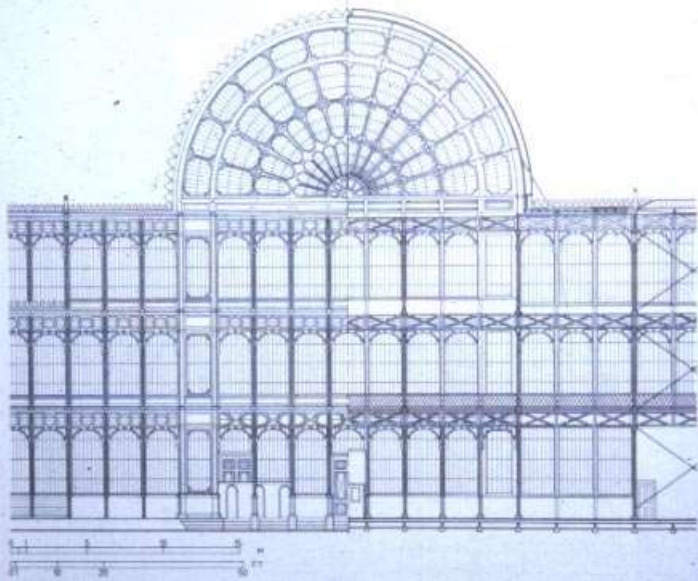


**JOSEPH PAXTON, *Crystal Palace*, London, England, 1850 (destroyed by fire in 1936)**

The Crystal palace was built to showcase the achievements of Great Britain during the Industrial Revolution.

Over 13,000 exhibits were displayed and viewed by over 6,200,000 visitors to the exhibition.







## Gustave Eiffel (1832-1923)

- French engineer. A noted constructor of bridges, he also designed the Eiffel Tower and the internal structure of the Statue of Liberty.
- He was initially charged with corruption in the 1888 scandal of the failed Panama Canal project, but was cleared of all wrongdoing by a French appeals court. Nonetheless, he withdrew from commercial life and spent the rest of his years studying aerodynamics.

<https://youtu.be/VRdcV15-LWM>  
Eiffel Tower - The Monumental  
Project - 14:40



When built it was the highest bridge in the world

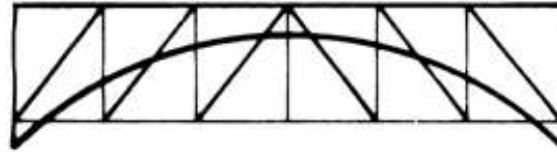


**Gustave Eiffel. *Garabit viaduct.*** France 1880- 1884. Wrought iron  
It is a railway arch bridge spanning the Truyere river. It is 565 m (1,854 ft)  
in length and has a principal arch of 165 m (541 ft) span

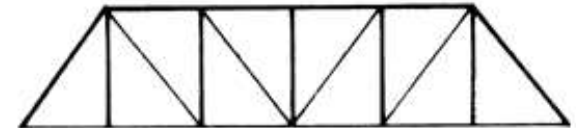
## Nineteenth-century patented truss designs.

**Truss:** truss is a structure comprising one or more triangular units.

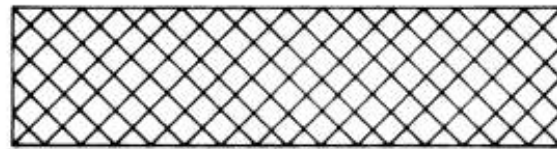
Trusses are used for large spans and heavy loads, especially in bridges and roofs.



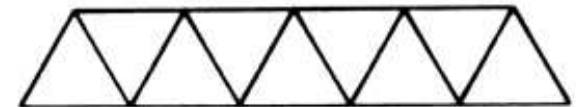
Burr Arch-Truss 1804



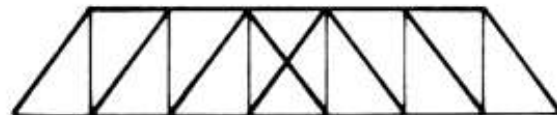
Pratt Truss 1844



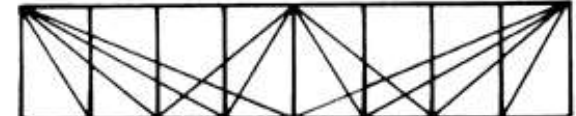
Town Lattice Truss 1820



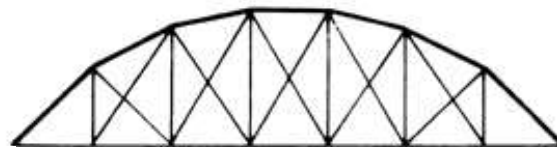
Warren Truss 1848



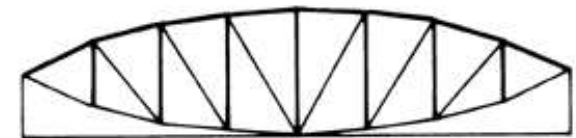
Howe Truss 1840



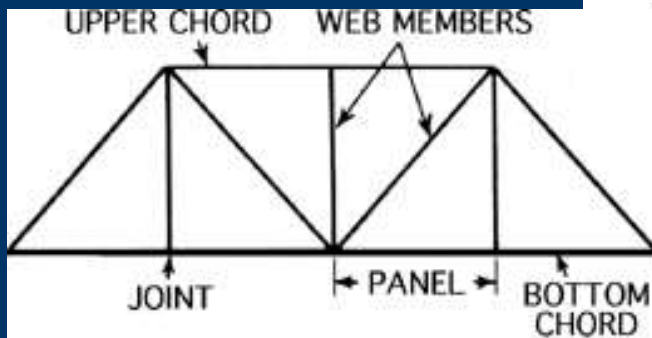
Fink Truss 1851



Whipple Bowstring 1840



Lenticular Truss 1878



## Truss Types

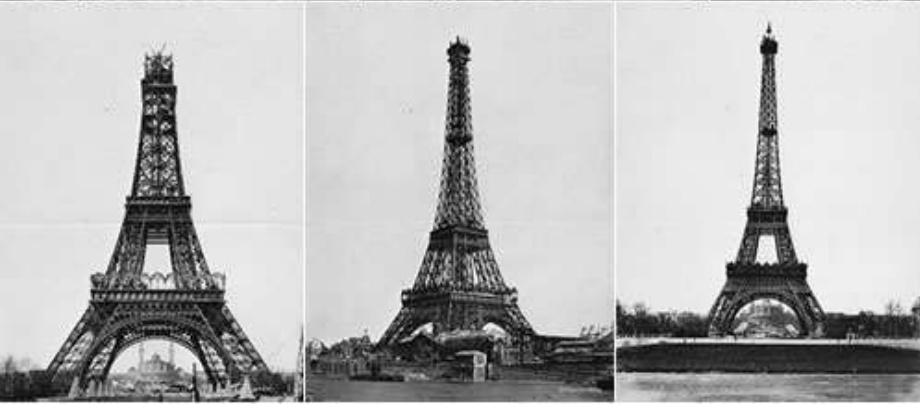
The *Eiffel Tower* was built for the entrance to the International Exposition of 1889, which celebrated the 100th anniversary of the French Revolution..

It was the world's tallest tower from 1889-1931

More than 200,000,000 people visited it since its construction

**Gustave Eiffel, *Eiffel Tower*, Paris, France. 1889. 984-foot (300-meter), Iron.**





**The pieces of the tower were prefabricated and it was assembled at the site in 17 months by only 150 workers.**



**The curvature of the uprights is mathematically determined to offer the most efficient wind resistance possible.**





**Once every seven years the Eiffel Tower is re-painted by hand.**

**On the top of the tower are a meteorological station, a wireless station, and a television transmission antenna.**



# Developments in Steel

**Steel** is a strong metal of iron alloyed with carbon and other materials.

From 1875 onward steel began to replace iron because its compressive and tensile strengths exceeded those of iron. It is also more rust and fire resistant.



# Suspension Bridge

A bridge having the roadway suspended from cables that are anchored at either end and usually supported at intervals by towers.



**John A and Washington A. Roebling. *The Brooklyn Bridge.***  
NY. 1600'. 1869-83

- It was the longest suspension bridge in the world from its opening until 1903

<http://youtu.be/Tsi95z1Nmhg>

- This is the first steel-cable suspension bridge. Here each cable contains over 5000 strands of wire.
- Steel cable is flexible, allowing the roadway to sway in response to weather conditions.



**John A and Washington A. Roebling. *The Brooklyn Bridge.*  
NY. 1600'. 1869-83**

# The First Skyscrapers



## *The Great Chicago Fire*

*On October 8, 1871, a fire broke out on the southwest side of Chicago, Illinois. For more than 24 hours, the fire burned through the heart of Chicago, killing 300 people, destroying 17,500 buildings and leaving one-third of the city's population homeless. Even the so-called "fireproof" buildings had gone down; the fire had melted exposed cast-iron, which in turn spread the fire.*



Birds Eye View Of The Great Chicago Fire Oct. 8 -10 1871

## Chicago School / The Commercial Style

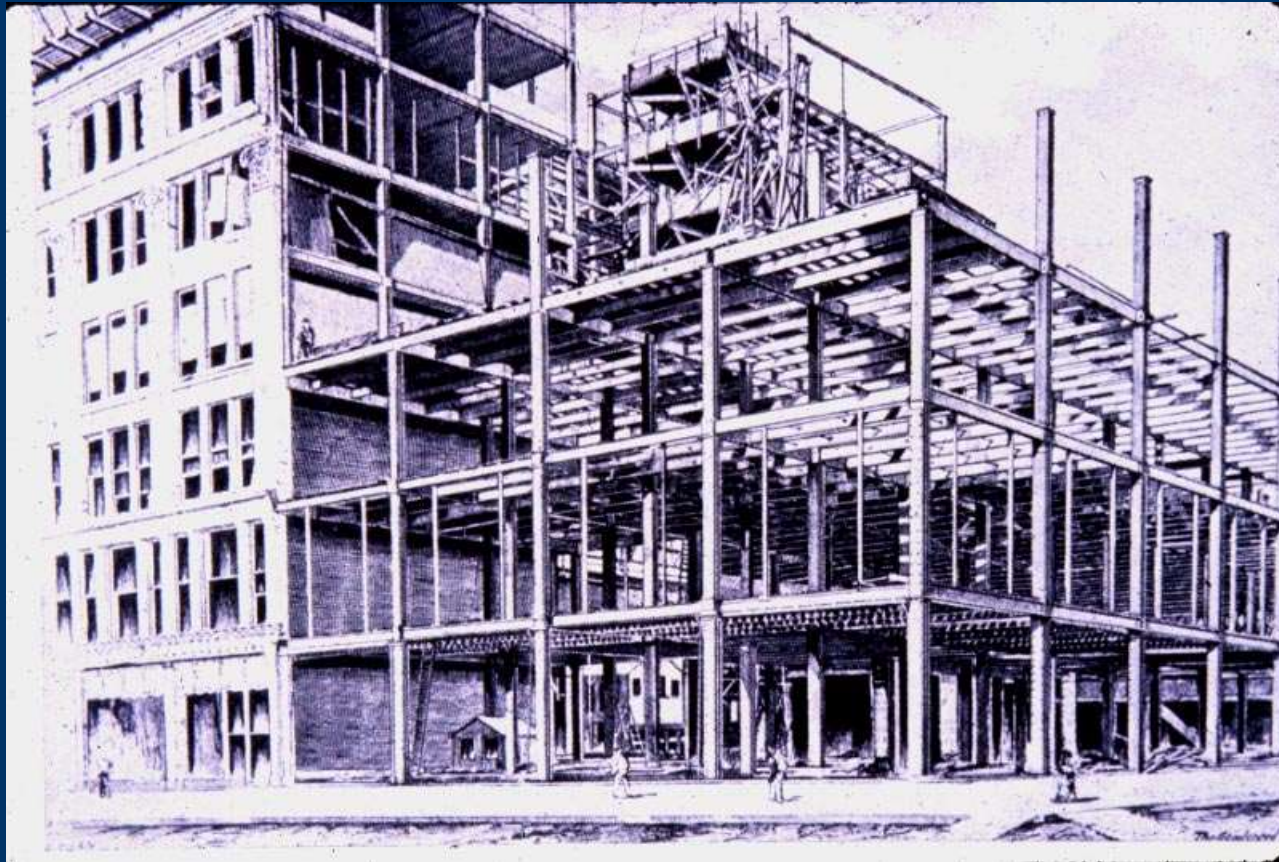
A group of U.S. architects of the late 19th to early 20th century, including William Le Baron Jenney and Louis Sullivan, noted for their utilitarian designs and their use of steel framing as a skeleton for multistory buildings.

- Use of steel-frame buildings with masonry cladding (usually terra cotta).
- Large plate-glass window areas.
- Limiting the amount of exterior ornamentation.
- Sometimes elements of neoclassical architecture are used.

**William Le Baron Jenney, *Home Insurance Building*, Chicago, 1884-85, demolished 1929.** It had 10 stories and rose to a height of 42 m (138 feet). In 1890, two additional floors were added.

- Considered the world's first skyscraper due to its unique architecture, but was never the tallest in the world.
- The internal metal skeleton carried the weight of the external masonry shell. This invention, together with the invention of the elevator (1853) permitted buildings to rise to great heights.





## Jenney's method of Steel frame construction

It was the first building to use steel in its frame, but the majority of its structure was composed of iron.

# “Form Follows Function”

A principle associated with Modern architecture and industrial design in the 20th Century, which states that the shape of a building or object should be based on its intended purpose.

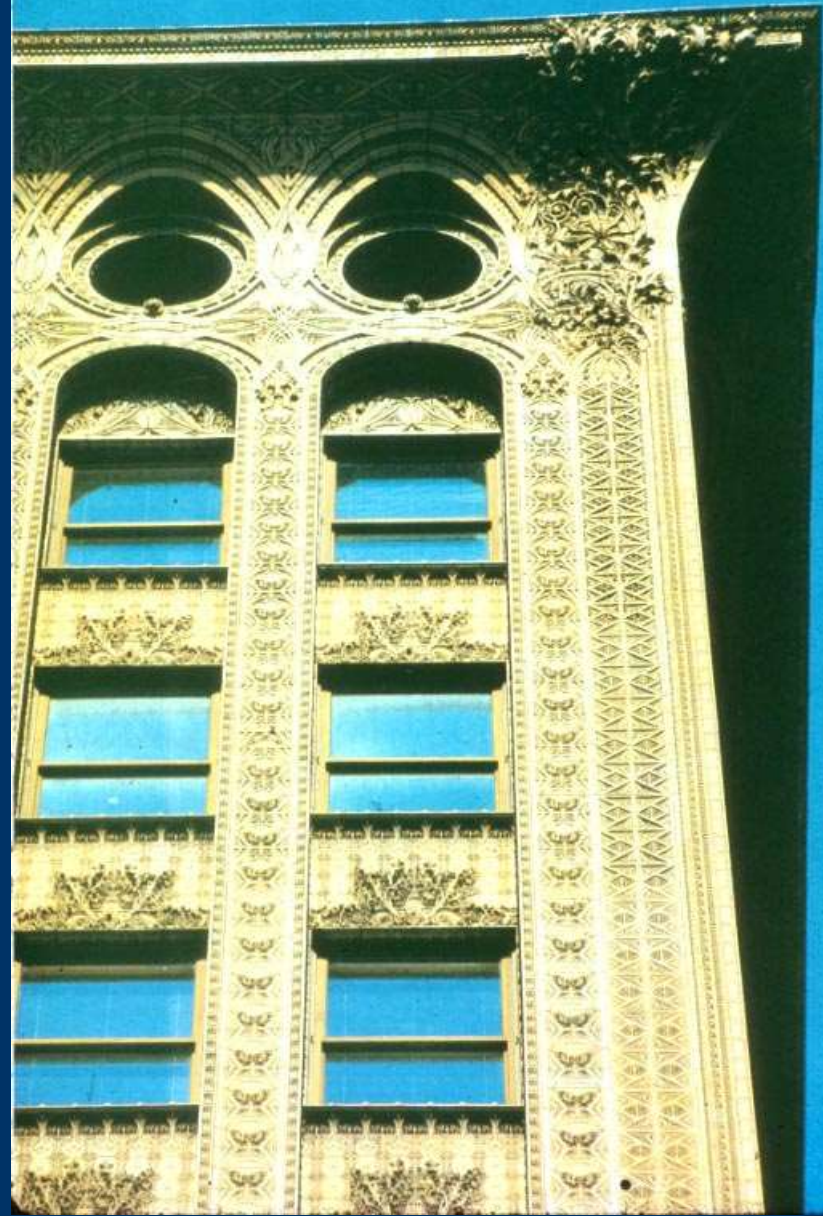
**Dankmar Adler and Louis Sullivan,  
*Guaranty (Prudential) Building,*  
Buffalo, NY, 1894-1896.**







The division of the façade; base, piers, and attic is similar to classical columns.



Accentuated the horizontal layers with ornamented bands.

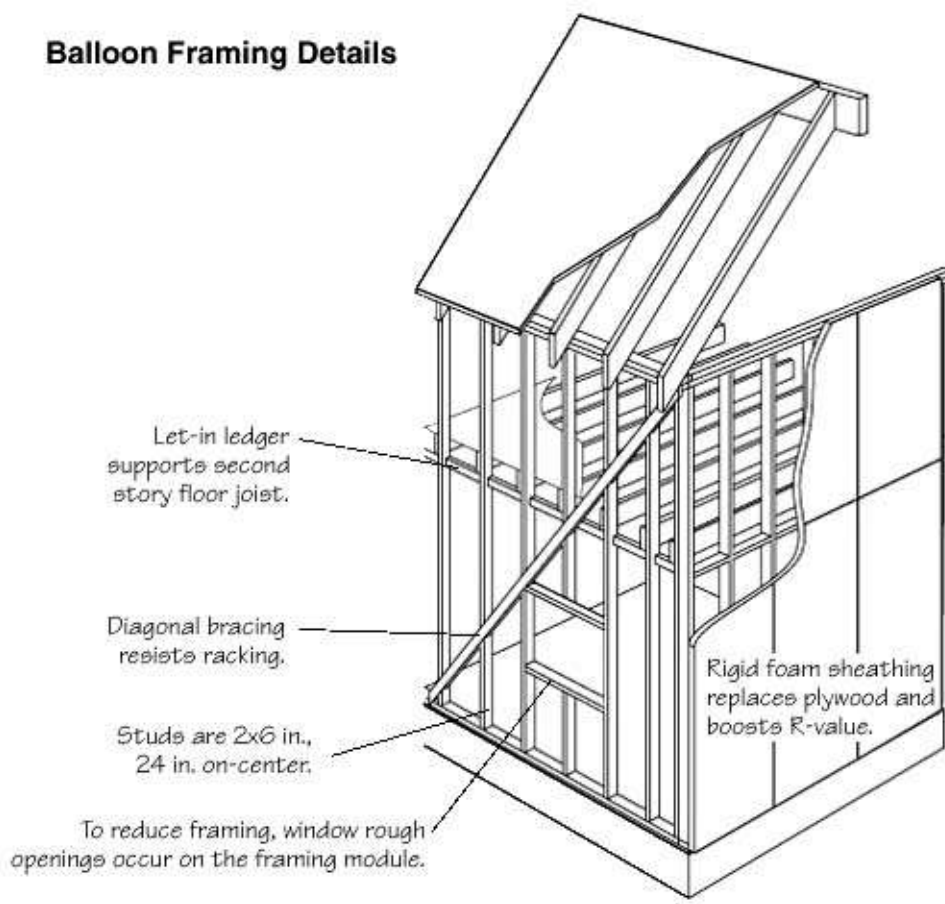
Louis Sullivan, *Guaranty (Prudential) Building*, Buffalo, NY, 1894-1896.



Charles Garnier, *The Opera House*, Paris. 1861-74

# Skeletal Construction in Concrete and Wood

## Balloon Framing Details



## Balloon framing

Factory cut studs are mass produced and assembled at the site using thousand of factory produced metal nails.

Several light pieces of wood replace the heavy timber of the traditional wood frame construction in which the timbers were pieced together with wooden pegs.

All vertical structural elements of the exterior bearing walls and partitions consist of single studs which extend the full height of the frame, from the top of the sole-plate to the roof plate.

Eventually evolved into platform framing, in which the studs are only one story high

## Reinforced concrete/ferroconcrete

Concrete in which steel is embedded in such a manner that the two materials act together in resisting forces.

### Advantages:

- The steel rods increase the tensile strength of concrete (Tensile strength: the material resists a force that tends to pull it or stretch it).
- Concrete prevents the steel from rusting.
- Can span greater distance than stone.
- supports more weight than steel.
- Capacity to take on natural curved shapes that would be unthinkable in steel or concrete alone.



## **Cantor Center for Visual Arts. Stanford University. 1894**

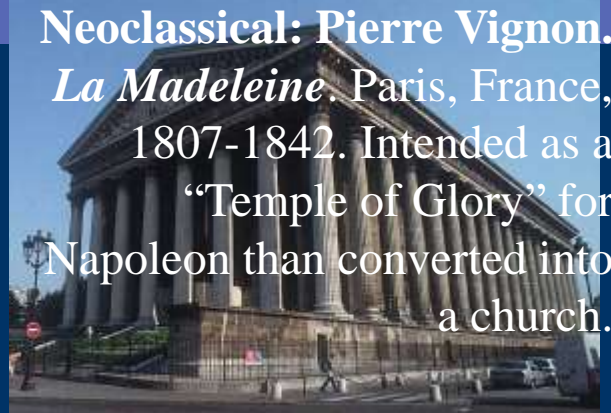
- **One of the first entirely reinforced concrete structures on the West Coast.**

## 19<sup>th</sup> c. Architecture: Discussion Question

Describe the dominant styles and developments in 19<sup>th</sup> c. architecture. Discuss the Neoclassical style; the Gothic and Baroque revivals; Non-Western influences and the emergence of new materials and forms. Bring specific examples and explain the reasons behind those architectural trends and their eclectic spirit.



**William Le Baron Jenney, *Home Insurance Building*, Chicago, 1884-85, demolished 1929.**

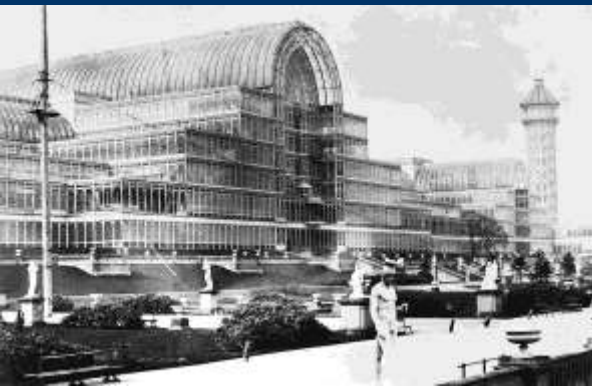


**Neoclassical: Pierre Vignon, *La Madeleine*, Paris, France, 1807-1842. Intended as a “Temple of Glory” for Napoleon than converted into a church.**



**Neo Baroque: Charles Garnier, *The Opera House*, Paris, 1861-74**

**Joseph Paxton, *Crystal Palace*, London, 1850**



**John Nash, *Royal Pavilion*, Brighton, England, 1815-1818**

**Neo Gothic: Charles Barry and A. W. N. Pugin, *Houses of Parliament*, London, England, designed 1835.**

