

Breaking with the Past, Beholden to the Past: 19th-c. Roots of a 20th-c. Architecture

Though not our main subject, industrialization and modernization provide an important background to the architecture of the 20th century. The pre-industrial era of absolute rule by monarchs and aristocratic court society, the idyllic landscape as metaphor for pre-industrial good life (view of Dresden circa 1700). Great Britain as home of industrial revolution. Age of the carriage gives way to age of the railway. *The industrial revolution* as an economic and technological phenomenon, beginning in Britain in late 17th and early 18th centuries. New process of iron refining using coke fuel in blast furnace developed at Coalbrookdale, Shropshire, England, by **Abraham Darby**, 1709, provides the ultimate source of the availability of iron for building. **James Watt** and invention of low pressure steam engine in 1780s; **Newcastle** on Tyne river, an early hearth of industrial mining and development. The industrial revolution as a process that transforms the physical world, economic organization, social relations, and political power. Rise of the manufacturing, merchant, and professional middle class presents a challenge to traditional aristocratic/monarchical rule.

Modernity: a condition; Modernization: a process; Modernism: a set of responses (aesthetic, intellectual, and cultural) to the *experience* of modernity and the shocks of modernization.

Reformation of the landscape – from Nature to human or “cultural landscape” (= sum total of buildings & physical interventions in a given landscape or city, plus the guiding concepts and interpretive structures that have both prompted the physical changes and given them meaning over time) Example of the railroad “cutting” the land: transformation of landscape, but also of perceptions. Railroad’s comparative “annihilation of space and time,” allowing rapid movement between cities and across a landscape that one no longer experienced directly, as one had with walking, horseback, or coach. Increasing industrialization of everyday life through inventions like steam power, machine manufactured nails, balloon framing, all of which accelerate pace of construction and production generally

Increasing differentiation of architect and engineer as one symptom of modernization, in opposition to dominance of the great **École des Beaux Arts** (1819-1968). Charles Garnier, **Paris Opera**, completed 1861-1875: the apotheosis of the Ecole des Beaux Arts? More than 60,000 drawings completed during the planning and construction of this mammoth monument to culture and display in 19th-century Parisian society. Enormous influence of Ecole in America: Richard Morris Hunt façade of **Metropolitan Museum of Art**, NYC 1900, shows deference to Roman architecture and to East façade of Louvre by Claude Perrault, 1670; Reed and Stern, **Grand Central Station**, NYC, 1910. Classical monumentality concealing, not revealing, complex modern urban infrastructure. In part these buildings respect achievements of Napoleon III and his “Prefect of the Seine,” the planner Eugene Haussmann, who transformed the dense streets of medieval Paris by ramming through miles of new boulevards, punctuated by monumental new buildings like Garnier’s Opera House. Paris is a beacon influencing cities like Vienna in the planning of its “Ringstrasse,” or ring boulevard, between 1869-1890.

New French schools accommodate modernization: the **École Polytechnique, Paris**, founded 1795 as school for architects and engineers; school grows out of older French military-engineer’s School of Road and Bridge Construction (École des Ponts et Chaussées, fdd. 1747). **Charles Louis Mary** (1791-1870), teacher of architects like William Le Baron Jenney of Chicago and Gustave Eiffel of Paris, and others. Mary taught for 30 years, from 1833 – 1865, publishing his *Cours d’Architecture [A Course in Architecture]* in 1853, which emphasized the “art of execution,” also evident in works of his students. Example from *A Course in Architecture*: **Project for a domed building**, architect’s and engineer’s drawings. Durand’s and Mary’s courses at the Ecole Polytechnique exemplify increasing 18th- and 19th-century efforts to understand structural characteristics of materials scientifically, and to explore spatial characteristics and volumetric possibilities of structures as well. The philosophy of the two main French schools inspires Eugene Emmanuel Viollet-le-Duc to attempt to bridge architecture and engineering. He is the first theorist to set out to create a totally new system of architectural forms independent of antiquity. In his book *Entretiens sur l’architecture* (lecture 1, p.29), he states that “what we call taste is but an involuntary process of reasoning whose steps elude our observation”. Among other assertions he stated: “Authority has no value if its grounds are not explained” (p. 458). “A column is a support, not a decoration, like a frieze or an arabesque; if then you have no occasion for columns, I cannot understand why you furnish your facades with them.” “A cornice is intended to keep the water from the face of the wall: if therefore you put a projecting cornice in an interior, I cannot but say that it is unmeaning.” See his **Projects for a Concert Hall and Market Hall**, 1866, in which iron is made to do the work of stone. New system of structural ornamentation in iron anticipates the Art Nouveau. Among architects he influences are: Calvert Vaux, example of **Central Park footbridge**, circa 1875; Gustave Eiffel, **Eiffel Tower**, Paris, 1889. John Roebling, **Brooklyn Bridge**, 1869-1883, is a creative thinker like Viollet-le-Duc, but Roebling, before coming to the U.S. was a student of the philosopher Georg Hegel in Berlin, studying engineering later on.

Lessons of iron in structure: Eiffel Tower, Crystal Palace: **cast iron**, which can bear weight in structural compression, but not in tension (cannot stretch); Brooklyn Bridge: **wrought iron**, which can bear weight in tension (hanging, for example, or suspending), but not as well in compression

The London Great Exhibition of 1851. The first international exposition (World’s Fair) reflecting increased pace of industrial production and international trade, dawning age of mass consumer culture. **The Crystal Palace**, Joseph Paxton (1803-1865): the first monumental building to be built through systematized production and assembly of factory produced parts. 1,851’ long, enclosing 18 acres (incl. mature trees), built in 9 months using 6,000+ cast-iron columns and 1,200+ wrought-iron girders, Clear spans: train sheds. **St. Pancras station**, London, architect George Gilbert Scott; W. H. Barlow & R. M. Ordish, engineers, 1863-67: employment of “Ruskinian gothic” in hotel and station, and engineered train-shed left unadorned behind this civic “screen” of acceptable, cultured monumental towers and decorated stone walls.