

Influence of the Industrial Revolution on

Western Architecture



Class

Name

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Architecture in the Western world over the past 200 years has gone through drastic changes in design and aesthetic. Important moments in history shape and dictate the way buildings are approached to fit the environment of their time. The Industrial Revolution was an influential era that shifted the way architects designed their structures throughout the Nineteenth Century. This century saw a revival of old architectural forms such as Gothic, Renaissance, and Classical designs. However, it was unique in that the Industrial Revolution architects began innovating new designs with materials newly available to them. The Industrial Revolution and the new materials that emerged from it served as a pivot point in western architecture from focusing on reviving the aesthetic of the past to innovating and accommodating the growing future.

The beginning of the Nineteenth Century can architecturally be described as a celebration and revival of past structural designs. Countries in Europe built their structures to model ancient Greek, Neo-Renaissance, and Gothic-styled architecture. Historicism was an important influence on a return to the European past, hence the eclectic explosion of aesthetics. Intellectual Greek culture influenced the designs of many of Europe's college and educational institutions. Writers like Victor Hugo, James Ruskin, and Horace Walpole romanticized the past and inspired such gothic revivals (Borden 325). Hugo's work *Notre-Dame de Paris* (1831) glorified the Gothic aesthetic as a national and Catholic style of architecture ("Western Architecture"). James Ruskin's work glorified medieval designs believing it reflected on a superior way of life and wished to return to a similar time ("Gothic Revival"). As a result, architectural aesthetics began to adopt this revival of the past and reflected in their designs.

An example of the Gothic revival movement is the UK Parliament building. This government structure was designed in the midst of the Victorian era and was designed by Sir

Charles Barry between 1839-60. With a heightened sense of nationalism in the Nineteenth Century, countries like Britain yearned to display their pride and prestige through architectural elegance. The House of Parliament building fuses the combination of Gothic, Greek, and Italian Neo-Renaissance designs embodying the nationalistic ideals of Britain. The Royal Commission considered a neo-classical design but felt that it would be similar to the U.S. White House and represented the ideals of the American Revolution. They agreed that a Gothic theme would showcase the conservative values that the Commission sought after (“Western Architecture”). The palace’s main material consists of sand-colored limestone (*Parliament.uk*), a stone that emulated many of its predecessor’s Gothic designs. Barry focused heavily on ensuring balance on both a vertical and horizontal level in the design of the building. The turrets that are at the end of the walls possess a greater height that also mimicked old medieval designs. The interior furnishings, wallpapers, carvings, and stained glass characterize the Gothic façade and illustrate the popularity of this design in the mid-nineteenth century. The result presents an aura of power and regality over the river Thames and throughout Westminster. Buildings like the House of Parliament would serve as inspiration for similar aesthetic designs throughout England and Europe.

The U.S. sought after a neo-classical sensibility in their architectural designs. Monticello, Thomas Jefferson’s home in Virginia, and the University of Virginia is a building that was inspired from classical Greek origins. Jefferson, though an architectural amateur himself, drafted early designs for his plantation home of Monticello. Jefferson spent time as the American Minister in France and was inspired by the Neo-classical designs that dominated France at the end of the Eighteenth Century. Monticello reflects those ideals through its prominent use of columns in the front entrance of home – a clear inspiration to Greek column designs. The

octagonal dome that is a focal point of Monticello's design derives from the ancient Roman villas and creates a need for symmetry and balance within the home. Jefferson's other architectural contribution, the University of Virginia, also was inspired by a revival of classical forms. Jefferson's vision for the university was to create an academic environment modeling itself after the Roman pantheons ("Western Architecture"). Jefferson accomplished this by designing a library in an open grass space and connected itself to other pavilions through colonnades – a clear influence from ancient Greek and Roman architecture. Jefferson wanted the neo-classical form to create an identity for a young America, which was formed with the classical ideals of the Enlightenment.

While a resurgence of old architectural designs was becoming a popular trend the materials that were being heavily produced during the Industrial Revolution effectively changed the design process for architects throughout the Nineteenth Century. The revolution transitioned many of the nation's economies from an agrarian and handcrafted economy, to industrial machine manufacturing ("Industrial Revolution"). The shift to machine manufacturing stemmed from the implementation of new and powerful energy sources like coal and steam. With a powerful energy source powering nations of the Western world, new industrious materials were being produced at alarmingly fast rates. As a result of such a fast growing economy cities began to expand to accommodate the booming industries. This required architects to begin designing new ways of housing such an expansive population and economy. Materials like cast iron, glass, and steel were the main materials that architects began to work with. These materials, especially glass and steel, became the life-blood of a structure's designs in the industrial age and slowly began to shape the architectural landscape through the Nineteenth Century.

The steel frame is one of the most important structural innovations to be developed as a result of the Industrial Revolution. After a massive fire ravaged Chicago in 1871, architects of the First Chicago School began to search for new ways to develop buildings outside the limitations of wood and stone structures. Steel, as refined iron, proved to be very sturdy, flexible, and resistant to fires. Brick and stone buildings had issues with its flexibility due to the limitations of the load-bearing wall design. This limited the structural height of a building and how many stories it could contain. The steel skeleton frame, however, could handle immense heights paving the way for the first skyscraper designs. Subsequently the informal school has been called the “birthplace of modern architecture” (“First Chicago School”). With the population and economy growing, developers began to build upwards with the limited space allotted to them.

Daniel Burnham’s Flatiron Building in New York City is a structure that utilizes the steel frame. Developed between 1901-1903, Daniel Burnham use of the steel frame successfully erected the 29-story and 391-foot skyscraper to overlook New York City (“Flatiron Building”). One characteristic difference of the Flatiron Building to other buildings erected in this era is its ability to free-stand without a strong block-base to support its foundation. The steel frame effectively presented this feature and its durability is evident in the building’s presence today, even with its unique triangular shape. The limestone façade of the Flatiron Building was inspired by the Beaux-Arts style stemming from French and Italian Renaissance designs (“Flatiron Building”). Even in the industrial age of design architects still pay homage to their predecessors in the Nineteenth Century through their influences of Neo-Renaissance, Neo-Classical, and Gothic designs that dominated the early to mid part of the Nineteenth Century.

With the steel frame, however, buildings could elevate to new standards that previous structural designs could not bear.

Industrial architecture reflected a growing world economy not only with the development of skyscrapers, but through regal public buildings like Britain's Crystal Palace. The Crystal Palace served as a convention center in 1851 for the Great Exhibition. Commissioned by Prince Albert and designed by Sir Joseph Paxton, the building reflected the new materials readily available as a result of the Industrial Revolution: cast-iron and glass. The building was created with iron rod frames that held large pieces of glasses to create the walls and ceilings. The regality of the Crystal Palace differed from the House of Parliament as its use of industrial materials presented an innovative and novel approach to displaying the beauty of Britain as a nation. Not only did the Crystal Palace succeed in its innovative design but also displayed the industrial supremacy that Britain possessed by the mid-Nineteenth Century due to its use of the iron frame. With 14,000 exhibitors participating in the fair many other countries witnessed this structure and inspired the designs of other glass conservatories for future exhibitions. The Crystal Palace's influence can still be witnessed with the modern designs of today's convention centers and many of their glass-wall designs.

The structure and foundation of industrial architecture brought out an emerging artistic movement named Art Nouveau, or "new art" in French. This movement reflected on the expanded use of iron, glass, and steel in architectural design and it sought to create a specific ornamental aesthetic with the materials available from the Industrial Revolution. Art Nouveau focused on developing an organic relationship between ornament and structure as the materials in the industrial age were used simultaneously to fulfill both facets of architecture. The designs of this movement were not concerned with the structural need for and clarity and reason like its

neo-gothic and neo-classical counterparts (“Art Nouveau,” *Britannica Academic*). Hector Guimard’s Paris Metro is an example of the artistic manipulation of iron. The iron frame is curvilinear in design and is outfitted with glass to compliment its curved designs. The materials of the industrial age transcended not just structural design of a building but how it was ornamented and decorated.

The Industrial Revolution provided an abundance of new materials for industrialized countries to work with in their architecture. In the Nineteenth Century architects were inspired to bring upon a renewed age of Gothic, Neo-Classical, and Neo-Renaissance designs. Inspired by the romanticism of the medieval past, countries like England and France sought to display their chivalrous roots. The Parliament building in Britain achieved that goal by representing the Gothic revival of the Nineteenth Century, inspiring a generation of architects. The United States adopted a neo-classical aesthetic to compliment their Enlightenment driven beliefs in the early Nineteenth Century as evidenced with Monticello. With the growing availability of cast iron, glass and steel, architects began to focus their efforts on creating innovatively novel design to fit the need for larger buildings in a growing economy. Architects of the First School of Chicago laid the groundwork for the durable steel frame that would be ultimate design to sustain skyscrapers. Daniel Burnham’s Flatiron Building is a testament to the steel frame design and serves as a predecessor to many of today’s skyscraper designs. The architectural skyline of the modern city is still experiencing the effects of the Industrial Revolution. The industrial age of the Nineteenth Century brought upon a growing economy for industrialized countries and therefore a higher demand for work and homes forcing cities to expand upwards. Today buildings like the Sears Tower or the One World Trade Center are descendents from the early skyscraper design and still utilize the steel frame today just as Burnham’s original works did.

Building Images



Figure 1. House of Parliament



Figure 2. Monticello



Figure 3. Flatiron Building



Figure 4. Crystal Palace



Figure 5. Paris Metro

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