

# 4

## The Origins of Modern Architecture and Design

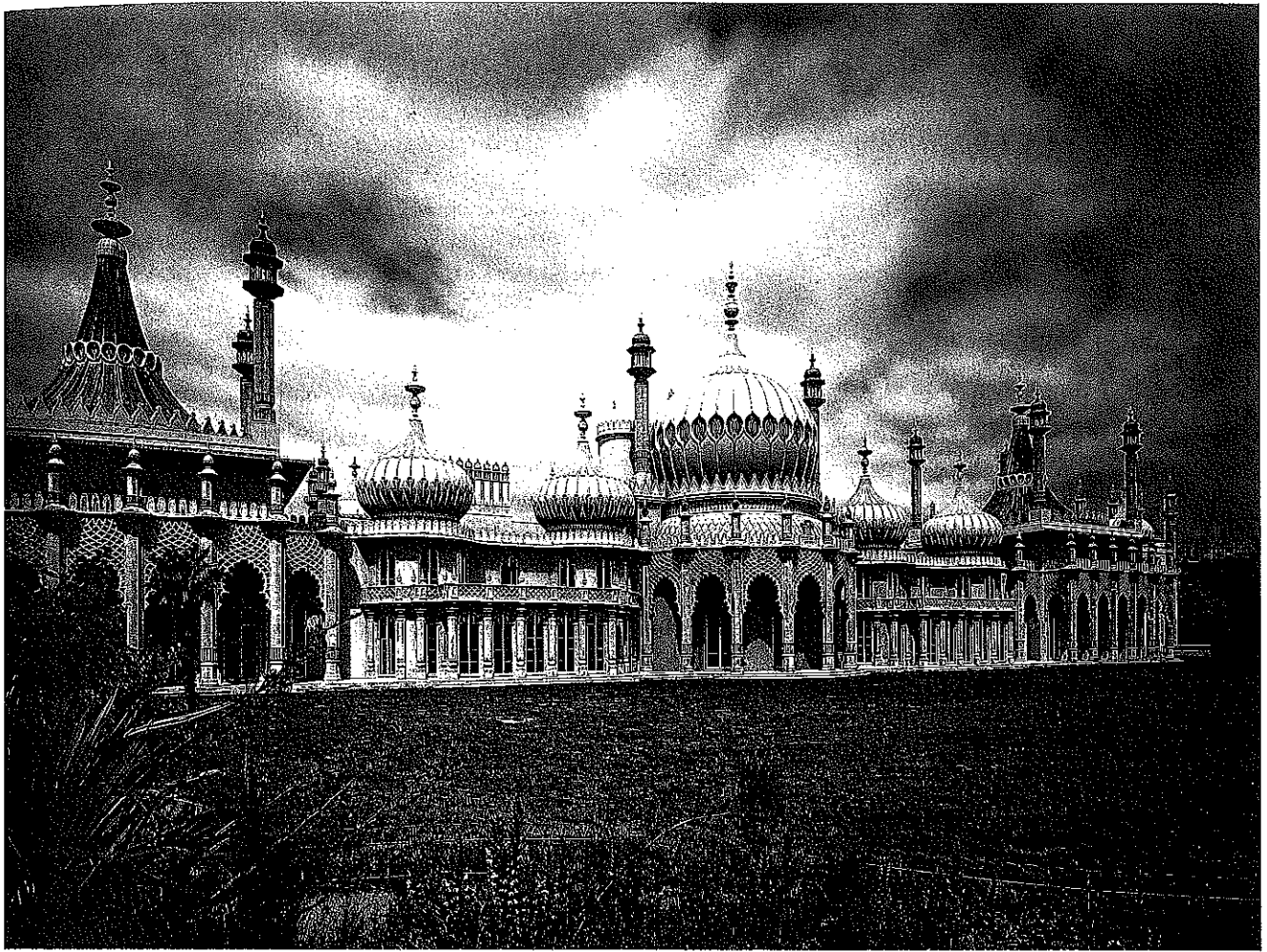
In architecture, a pattern of stylistic revivals had predominated in Europe since the fifteenth century and in the Americas since the sixteenth century, when early settlers brought with them the architectural styles and traditions of different European regions. Throughout the nineteenth century, architects continued to expand this tendency. By the first decades of the nineteenth century, the Neoclassical movement was well established in both Europe and America as the dominant style. In America, this Neoclassical style, or classical revival, coincided with the aims of a young republic that regarded itself as the new Arcadia. The Neoclassical style in architecture, which consisted of endless recombinations of ancient Greek and Roman motifs, symbolized the ideal public virtues of democracy, liberty, and reason. During the later eighteenth century, particularly in England, an opposing trend, the Gothic Revival, had also gained considerable momentum and continued to make headway during the first half of the nineteenth; it was accompanied by revivals of Renaissance and Baroque classicism. All these movements, which were stylistically backward-looking, produced much of the monumental civic architecture of the late nineteenth century and the early twentieth. Modern styles and concepts, by contrast, took root more quickly in commercial, industrial, and residential architecture.

### Palaces of Iron and Glass: The Influence of Industry

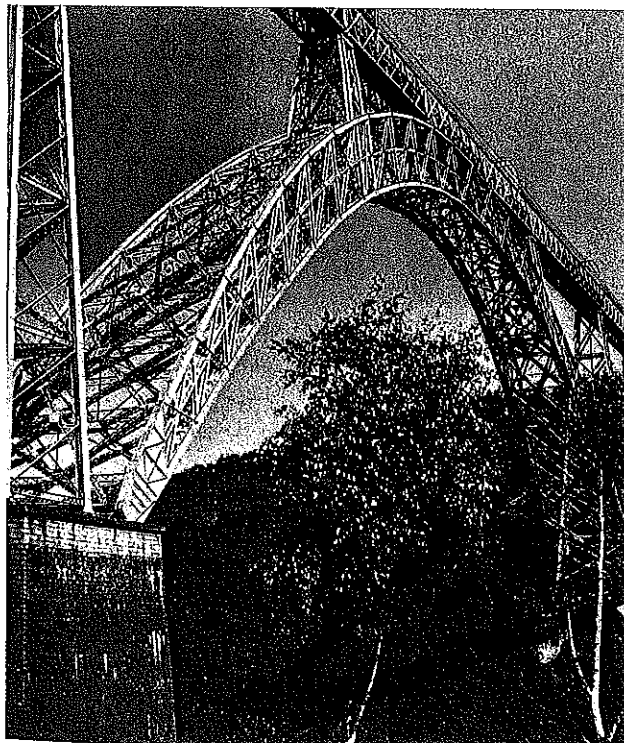
New ideas in architecture emerged during the nineteenth century in the context of engineering, with the spread of industrialization and the use of novel building materials, notably iron, glass, and hollow ceramic tile. The use of iron for structural elements became fairly common in English industrial building only after 1800, although there are sporadic instances during the eighteenth century. These new materials—developed or improved during the Industrial Revolution—permitted greater flexibility and experimentation in design, as well as larger scale since iron could be

used to span far larger spaces than was possible in stone or wood construction. During the first half of the nineteenth century, a concealed iron-skeleton structure was used in buildings of all types, and exposed columns and decorative ironwork appeared, particularly in nontraditional structures and notably in the Royal Pavilion at Brighton (fig. 4.1), designed by **John Nash** (1752–1835). Iron was also used extensively in the many new railway bridges built throughout Europe, as the railway system expanded (fig. 4.2). **Gustave Eiffel** (1832–1923) built his famous 984-foot (300 m) tower for the Paris Exposition Universelle of 1889. It was the most dramatic demonstration of the possibilities of exposed-metal construction and used iron in a variety of ways. Roofs of iron and glass over commercial galleries or bazaars became popular and ambitious in design at this time, especially in Paris. In greenhouses, iron gradually replaced wood as a frame for glass panes, with a consequent enlargement of scale. The Jardin d'Hiver (Winter Garden) in Paris, designed by Hector Horeau in 1847 and since destroyed, measured 300 by 180 feet (91 by 55 m) in floor plan and rose to a height of 60 feet (18 m)—a quite remarkable size at the time. Works such as this gave rise to the concept of the monumental glass-and-metal structure, of which the Crystal Palace, created for the Great Exhibition in London in 1851 by **Sir Joseph Paxton** (1801–65), was the most famous example (fig. 4.3). The Crystal Palace was erected through modern building methods that are today taken for granted—prefabricated modules that allow for easy assembly. Paxton developed the ridge-and-furrow roof construction while designing greenhouses. Yet the building, an airy barrel-vaulted gallery, also recalls the space and shape of a gigantic, secular cathedral. The Crystal Palace was dismantled and reassembled in Sydenham, in south London, where it remained until it was destroyed by fire in 1936.

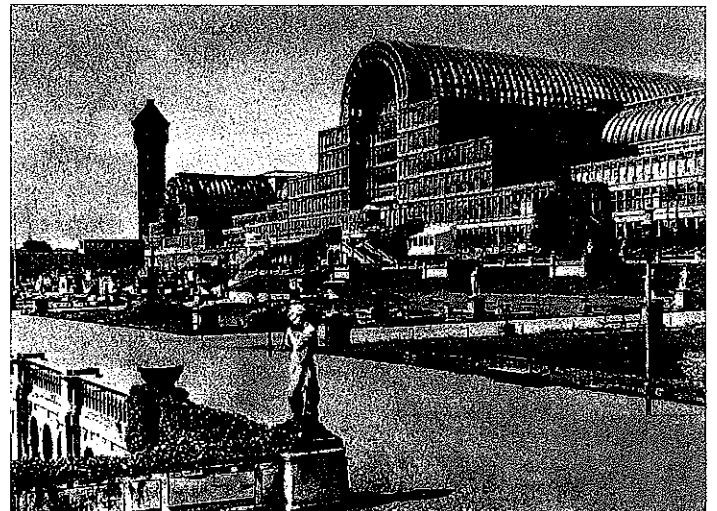
The sheds of the new railway stations, precisely because they were structures without tradition, provided some of the most daring and experimental buildings in iron and glass. The Gare Saint-Lazare in Paris supplied the



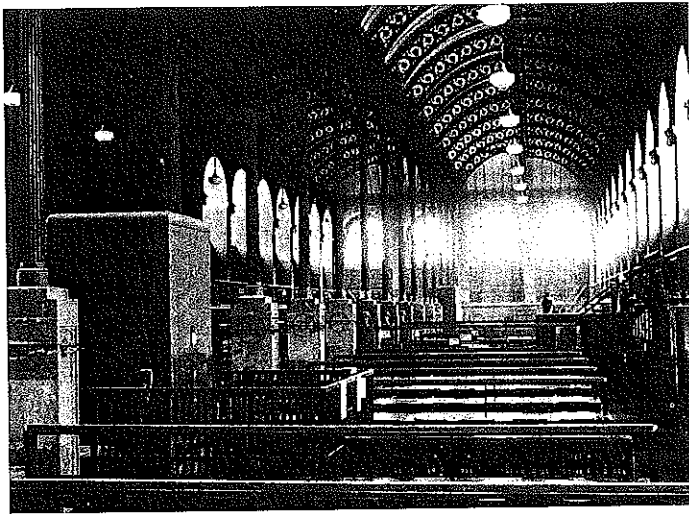
4.1 John Nash, Royal Pavilion, Brighton; England. 1815–23, as remodeled.



4.2 Gustave Eiffel, Truyère Bridge, Garabit, France. 1880–84.



4.3 Sir Joseph Paxton, Crystal Palace, London. 1851.

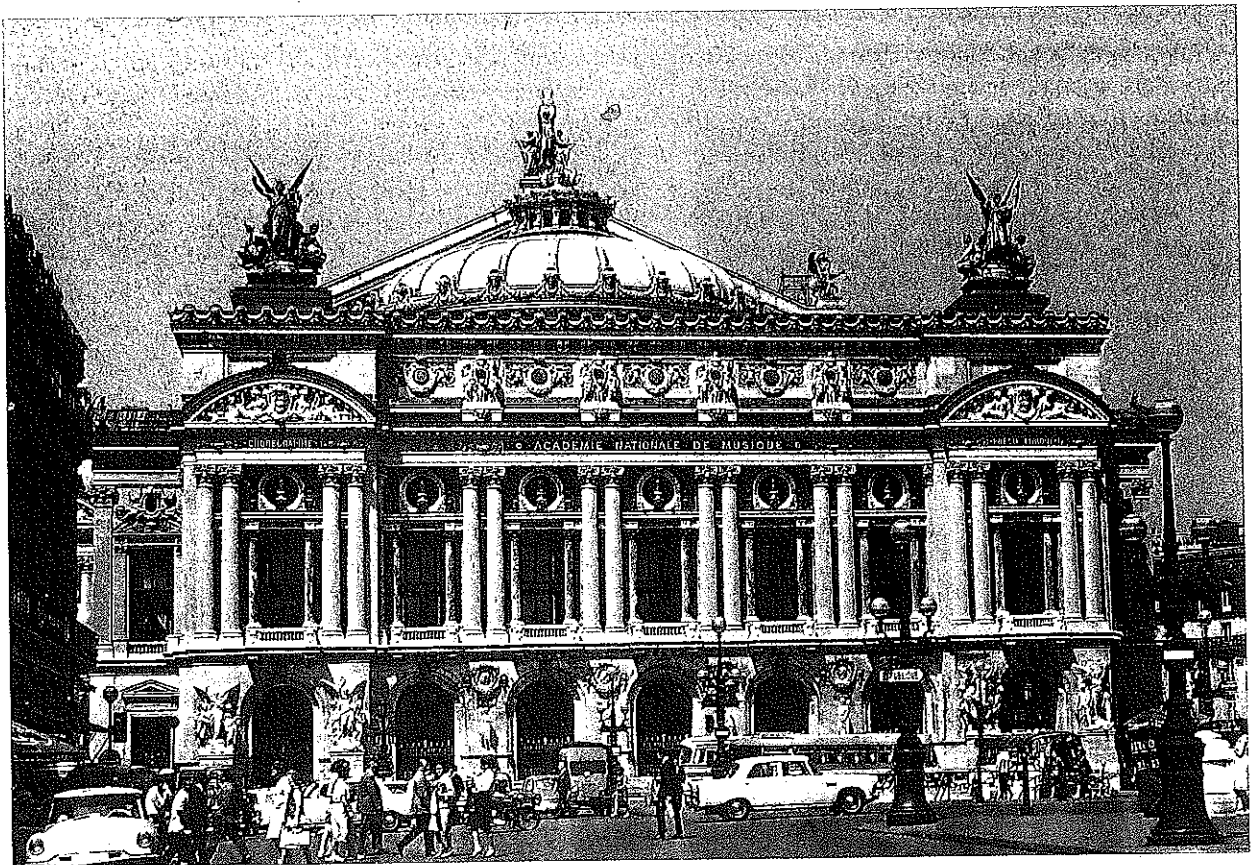


4.4 Henri Labrouste, Reading room, Bibliothèque Sainte-Geneviève, Paris. 1843–50.

painter Monet with a new experience in light, space, and movement, which he painted several times. Exposed iron columns supporting iron-and-glass arches were employed even in some traditional structures, such as the Bibliothèque Sainte-Geneviève (fig. 4.4) by **Henri Labrouste** (1801–75). Stamped, cast-iron details were very popular, and a substantial industry in their prefabrication developed before 1850. For decades thereafter, however, the structural and decorative use of cast iron declined, largely because of the conservative tastes of revival-oriented theorists in architec-

ture. Only at the very end of the nineteenth century, with the new Art Nouveau style (see chapter 5), did metal emerge once more as the architectural element on which much of twentieth-century architecture was based.

In architecture, as in the decorative arts, the latter half of the nineteenth century was a highly eclectic period. The classical and Gothic revivals of the early century had been largely superseded by elaborate buildings in the Renaissance- and Baroque-revival styles. Of these the Paris Opera (fig. 4.5), designed by **Charles Garnier** (1825–98), is perhaps the supreme example. These remained, far into the twentieth century, the official styles for public and monumental buildings. At the turn of the century, America, with its growing population, burgeoning cities, and expanding economy, was emerging as a world power. The expression of this in public buildings showed a heightened consciousness of historical revivalism, which could encompass Gothic, classical, or colonial styles, among others. More and more American architects received their training at the *École des Beaux-Arts* in Paris, the international heart of academicism in architecture. For American banks, civic monuments, libraries, capitols, and other public buildings coast to coast, the preferred mode was academic classicism on a grandiose scale. For example, the enormous central mall in Washington, D.C., which runs between the Capitol and the Lincoln Memorial, and which is lined with mostly classical façades, was a product of this period.



4.5 Charles Garnier, The Opera, Paris. 1861–74.

## "A Return to Simplicity": The Arts and Crafts Movement and Experimental Architecture

The tremendous expansion of machine production during the nineteenth century led to the development of mass consumption of new, more cheaply manufactured products. This growing mass market put the emphasis on products' cheapness rather than their quality or beauty. Thus there arose early in the nineteenth century the profession of modern advertising, which followed the principle that the most ornate, unoriginal products sell best. By the time of the Great Exhibition of 1851, the vast array of manufactured objects exhibited in Paxton's daring glass-and-metal Crystal Palace represented and even flaunted the degeneration of quality brought about by the emergence of a machine economy.

To a Romantic, progressive nineteenth-century thinker and artist like William Morris, friend and collaborator of the Pre-Raphaelites (see chapter 2), the machine was destroying the values of individual craftsmanship on which the high level of past artistic achievement had rested. Poet, painter, designer, and social reformer, Morris fought against the rising tide of what he saw as commercial vulgarization, for he passionately believed that the industrial worker was alienated both from the customer and the craft itself and was held hostage to the dictates of fashion and profit. Morris founded an artists' cooperative, called the Firm, which made furniture, fabrics, and wallpapers (see fig. 5.1). He turned to the Middle Ages for design inspiration as well as for the medieval model of guild organization for skilled laborers. His friend, the artist and designer Walter Crane, summarized their common goals by calling for "a return to simplicity, to sincerity; to good materials and sound workmanship; to rich and suggestive surface decoration, and simple constructive forms." Morris's designs were intended to raise the dignity of craftsperson and owner alike and to enhance the beauty of ordinary homes. The Firm's progeny was the Arts and Crafts movement in the British Isles, which exerted tremendous influence in the United States, especially on the oak Mission Style furniture of Gustav Stickley.

Morris asked the architect **Philip Webb** (1831–1915) to design his own home, called the Red House, in Kent, in 1859 (fig. 4.6). In accordance with Morris's desires, Red House was generally Gothic in design, but Webb interpreted his commission freely. Into a simplified, traditional, red-brick Tudor Gothic manor house, with a steeply pitched roof, he introduced exterior details of classic Queen Anne windows and oculi. The effect of the exterior is of harmony and compact unity, despite the disparate elements. The plan is an open L-shape with commodious, well-lit rooms arranged in an easy and efficient asymmetrical pattern. The interior, from the furniture and stained-glass windows down to the fire irons, was designed by Webb and Morris in collaboration with Morris's wife, Jane, and the Pre-Raphaelite artists Rossetti and Edward Burne-

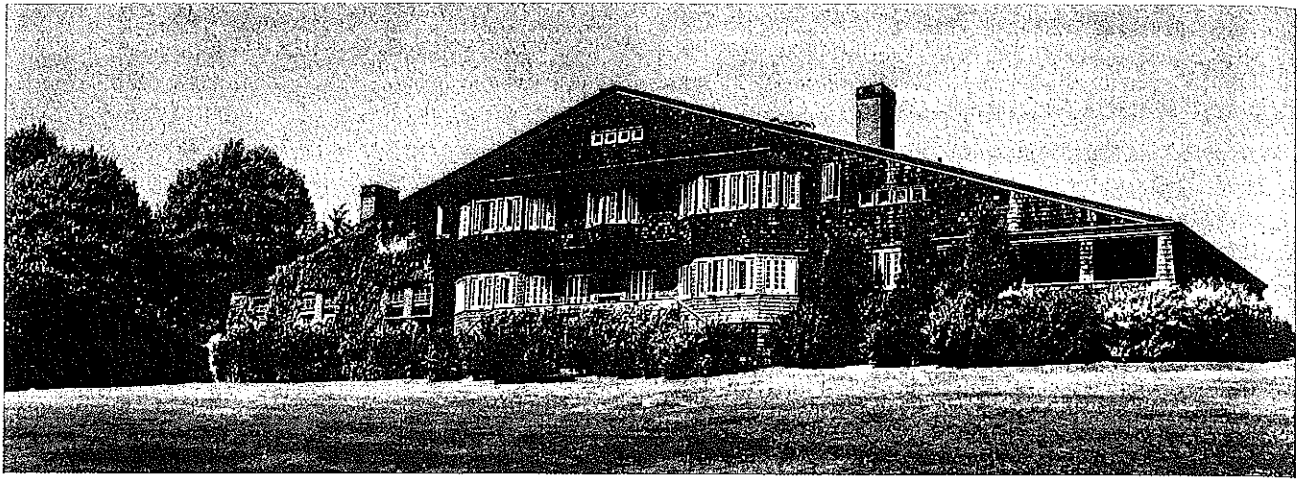


4.6 Philip Webb and William Morris, Red House, Bexley Heath, Kent, England. 1859–60.

Jones. Aware of such English experiments, the influential American architect Henry Hobson Richardson (see below) developed his own style of domestic architecture, which fused American traditions with those of medieval Europe. The Stoughton House, in Cambridge, Massachusetts, is one of his most familiar structures in the shingle style (named for the wooden tiles or shingles used as wall cladding) then rising to prominence on the eastern seaboard. The main outlines recall Romanesque- and Gothic-revival traditions, but these are architecturally less significant than the spacious, screened entry and the extensive windows, which suggest his concern with the livability of the interior. The shingled exterior wraps around the structure of the house to create a sense of simplicity and unity.

While the firm of **McKim, Mead & White** was in some degree responsible for the hold that academic classicism had on American public architecture for half a century, the firm's historicism was based less on generic Greek and Roman prototypes than on American eighteenth-century architecture. These prolific architects produced some of the most successful classical public buildings in America, including the Boston Public Library, New York's magnificent Pennsylvania Railroad Station (see fig. 12.7), sadly demolished in 1966, and the influential Rhode Island State Capitol in Providence, which established the model for many state capitols in the early years of the twentieth century. In their domestic architecture, McKim, Mead & White drew on the qualities of American colonial building and, like Webb and Morris, were able to select the historical or geographic style that best suited a particular site or commission. The William G. Low House of 1886–87 (fig. 4.7), a superb example of the shingle style in Bristol, Rhode Island, is revolutionary when viewed in contrast to the enormous mansions in revivalist styles that were then fashionable in nearby, wealthy Newport. The shingle-covered structure, with its bay windows and extended side porch, is formed of a single triangular gable, and has a striking geometric integrity.

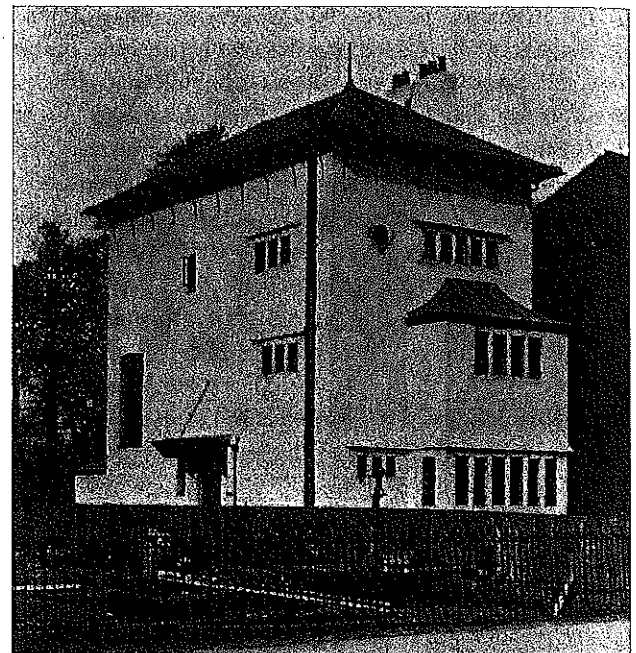




4.7 McKim, Mead & White, William G. Low House, Bristol, Rhode Island. 1886–87. Demolished 1960s.

Twentieth-century architecture is rooted in nineteenth-century technological advances and in the invention of new types of structures—railway stations, department stores, and exhibition halls, buildings without tradition that lent themselves to experimental design. However, many of modern architecture's most revolutionary concepts—attention to utility and comfort, the notion of beauty in undecorated forms, and of forms that follow function—were first conceived in modest individual houses and small industrial buildings. The pioneer efforts of Webb in England and of Richardson and McKim, Mead & White in the United States were followed by the important experimental housing of Charles F. Voysey, Arthur H. Mackmurdo, and Charles Rennie Mackintosh in the British Isles, and in the United States by the revolutionary house designs of Frank Lloyd Wright.

Charles F. Voysey (1857–1941), through his wallpapers and textiles, had an even more immediate influence on European Art Nouveau than did the Arts and Crafts movement of William Morris. The furniture he designed had a rectangular, medievalizing form with a simplicity of decoration and a lightness of proportion that some historians have claimed anticipated later Bauhaus furniture, though Voysey was perplexed by such assertions. Voysey's architecture was greatly influenced by Arthur H. Mackmurdo (1851–1942), who, in structures such as his own house and his Liverpool exhibition hall, went beyond Webb in the creation of a style that eliminated almost all reminiscences of English eighteenth-century architecture. A house by Voysey in Bedford Park, London, dated 1891 (fig. 4.8), is astonishingly original in its rhythmic groups of windows and door openings against broad white areas of unadorned, starkly vertical walls. While Voysey was a product of the English Gothic Revival, he looked not to the great cathedrals for inspiration, but to the domestic architecture of rural cottages. In his later country houses he returned, perhaps at the insistence of clients, to suggestions of more traditional Tudor and Georgian forms. He continued to treat these, however, in a ruggedly simple manner



4.8 Charles F. Voysey, Forster House, Bedford Park, London. 1891.

in which plain wall masses were lightened and refined by articulated rows of windows.

Largely as a result of the work of Charles Rennie Mackintosh (1868–1928), Glasgow was one of the most remarkable centers of architectural experiment at the end of the nineteenth century. Mackintosh's most considerable work of architecture, created at the beginning of his career, is the Glasgow School of Art of 1898–99 and its library addition, built between 1907 and 1909 (fig. 4.9). The essence of this building is simplicity, clarity, monumentality, and, above all, an organization of interior space that is not only functional but also highly expressive of its function. The huge, rectangular studio windows are imbedded in the massive stone façade, creating a balance of solids and voids. The rectangular heaviness of the walls, softened only by an occasional curved masonry element, is lightened by

details of fantasy, particularly in the ironwork, that show a relationship to Art Nouveau, but derive in part from the curvilinear forms of medieval Scottish and Celtic art. The library addition is a large, high-ceilinged room with surrounding balconies. Rectangular beams and columns are used to create a series of views that become three-dimensional, geometric abstractions.

The same intricate play with interior vistas seen in this library is apparent in a series of four public tea rooms, also in Glasgow, commissioned by Catherine Cranston. For the last of these, the Willow Tea Rooms, Mackintosh was able to design the entire building. Most details of the interior design, furniture, and wall painting are the products of both Mackintosh and his wife, Margaret Macdonald. They shared with Morris and the followers of the Arts and Crafts movement the notion that all architectural elements, no matter how small, should be integrated into a total aesthetic experience. The stripped-down rectangular partitions and furniture, including Mackintosh's famous ladder-back chairs, and the curvilinear figure designs on the walls illustrate the contrasts that form the spirit of Art Nouveau. The decorations are close to those in paintings of Gustav Klimt and works of the Vienna Secession movement (see fig. 5.5), and in fact may have influenced them. Mackintosh exhibited with the Vienna Secession in 1900, and his architectural designs, furniture, glass, and enamels were received more favorably there than they had been in



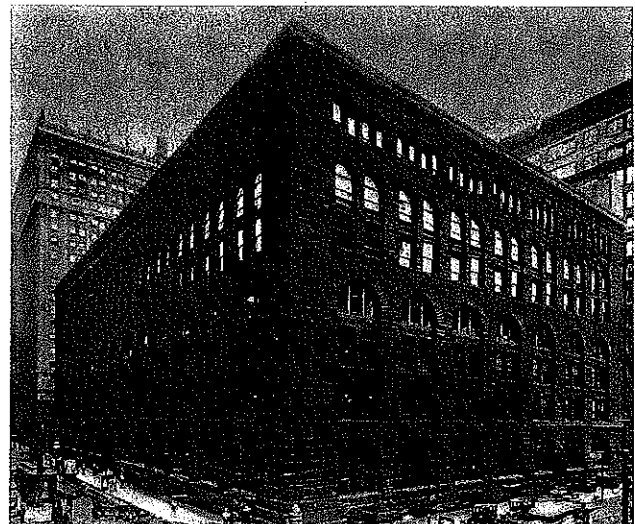
4.9 Charles Rennie Mackintosh, Library, Glasgow School of Art. 1907–9.

London. He died virtually penniless in 1928, and it was not until the sixties that his reputation was fully revived. Today his furniture and decorative arts are among the most coveted of the modern era.

After 1900, the architectural leadership that England had assumed, particularly through designs for houses and smaller public buildings by Webb, Voysey, and Mackintosh, declined rapidly. In the United States, Frank Lloyd Wright and a few followers carried on their spectacular experiments in detached domestic architecture. However, for many years even Wright himself was given almost no large-scale building commissions. The pioneer efforts of Louis Sullivan and the Chicago School of architects were challenged by the massive triumph of the Beaux-Arts tradition of academic eclecticism, which was to dominate American public building for the next thirty years.

### **“Form Follows Function”: The Chicago School and the Origins of the Skyscraper**

Modern architecture may be said to have emerged in the United States with the groundbreaking commercial buildings of Henry Hobson Richardson (1838–86), an architect who, though eclectic, did not turn to the conventional historicist styles of Gothic pastiche and classical revival. In his Marshall Field Wholesale Store in Chicago (fig. 4.10), now destroyed, Richardson achieved an effect of monumental mass and stability through the use of graduated rough blocks of reddish Massachusetts sandstone and Missouri granite in a heavily rusticated structure inspired by Romanesque architecture and fifteenth-century Italian Renaissance palaces. The windows, arranged in diminishing arcaded rows that mirror the gradual narrowing of the masonry wall from ground to roof, are integrated with the interior space rather than being simply holes punched at



4.10 Henry Hobson Richardson, Marshall Field Wholesale Store, Chicago. 1885–87. Demolished 1931.

intervals into the exterior wall. The landmark Marshall Field building was constructed with traditional load-bearing walls, columns, and girders (rather than the steel frames of later skyscrapers), but its elemental design, free of picturesque ornament, influenced the later work of the Chicago School, specifically that of Louis Sullivan and, ultimately (though he would never acknowledge it), Frank Lloyd Wright.

Throughout the nineteenth century, continual expansion and improvement in the production of structural iron and steel permitted raising the height of commercial buildings, a necessity born of growing urban congestion and rising real-estate costs. At the same time, there were sporadic experiments in increasing the scale of windows beyond the dictates of Renaissance palace façades. A vast proportion of Chicago was destroyed in the great fire of 1871—an event that cleared the way for a new type of metropolis fully utilizing the new architectural and urban-planning techniques and materials developed in Europe and America over the previous hundred years.

The Home Insurance Building in Chicago (fig. 4.11), designed and constructed between 1883 and 1885 by the architect William Le Baron Jenney (1832–1907), was only ten stories high, no higher than other proto-skyscrapers already built in New York (the illustration shown here includes the two stories that were added in



4.11 William Le Baron Jenney, Home Insurance Building, Chicago. 1884–85. Demolished 1929.

1890–91). Its importance rested in the fact that it embodied true skyscraper construction, in which the internal metal skeleton carried the weight of the external masonry shell. This innovation, which was not Jenney's alone, together with the development of the elevator, permitted buildings to rise to great heights and led to the creation of the modern urban landscape of skyscrapers. With metal-frame construction, architects could eliminate load-bearing walls and open up façades, so that a building became a glass box in which solid, supporting elements were reduced to a minimum. The concept of the twentieth-century skyscraper as a glass-encased shell framed in a metal grid was here stated for the first time.

Among the many architects attracted to Chicago from the East or from Europe by the opportunities engendered by the great fire was the Dane Dankmar Adler (1844–1900), an engineering specialist. He was joined in 1879 by a young Boston architect, Louis Sullivan (1856–1924), and in 1887 the firm of Adler and Sullivan hired a twenty-year-old draftsman, Frank Lloyd Wright. The 1889 dedication of the Adler and Sullivan Auditorium helped stimulate a resurgence of architecture in Chicago after the devastations of the fire. And, like Jenney's Home Insurance Building, it emerged under the influence of Richardson's Marshall Field store (see fig. 4.10). The Auditorium included offices, a hotel, and, most significantly, a spectacular new concert hall, then the largest in the country, with a highly successful acoustical system designed by Adler. Shallow concentric arches in the hall made for a majestic yet intimate space, and Sullivan's use of a sumptuous decoration of natural and geometric forms, richly colored mosaics, and painted panels proved that ornament was one of the architect's great strengths as a designer. By the late twenties, the Chicago Opera Company had moved to new quarters—fortunately, however, demolishing the Auditorium during the ensuing years of national depression proved too expensive to carry out.

Adler and Sullivan entered the field of skyscraper construction in 1890 with their Wainwright Building in St. Louis. Then, in the Guaranty Trust Building (now the Prudential Building) in Buffalo, New York, Sullivan designed the first masterpiece of the early skyscrapers (fig. 4.12). Here, as in the Wainwright Building, the architect attacked the problem of skyscraper design by emphasizing verticality, with the result that the piers separating the windows of the top ten stories are uninterrupted through most of the building's height. At the same time, he seemed well aware of the peculiar design problem involved in the skyscraper, which is basically a tall building consisting of a large number of superimposed horizontal layers. Thus, Sullivan accentuated the individual layers with ornamented bands under the windows, as well as throughout the attic story, and crowned the building with a projecting cornice that brings the structure back to the horizontal. This tripartite division of the façade—base, piers, and attic—has frequently been compared to the form of a classical column.



4.12 Louis Sullivan,  
Guaranty Trust Building  
(now Prudential Building),  
Buffalo. 1894-95.

When compared with the “stacked” effect of superimposed stories in Jenney’s Home Insurance Building, however, the vertical emphasis of Sullivan’s building has a fundamentally modern, antiacademic character. Meanwhile, the treatment of the columns on the ground floor emphasizes the openness of the interior space. Above them, the slender piers between the windows soar aloft and then join under the attic in graceful arches that tie the main façades together. The oval, recessed windows of the attic, being light and open, blend into the elegant curve of the summit cornice. Sullivan’s famed ornament covers the upper part of the structure in a light, overall pattern, helping to unify the façade while also emphasizing the nature of the terracotta sheathing over the metal skeleton as a weightless, decorative surface, rather than a weight-bearing element. “It must be every inch a proud and soaring thing,” said

Sullivan of the tall office building, “rising in sheer exaltation that from bottom to top as a unit without a single dissenting line.” In theory, Sullivan felt that a building’s interior function should determine its exterior form, hence his famous phrase, “form follows function.” But practical experience taught him that function and structure did not always generate the most appealing forms.

The progressive influence of Richardson’s proto-American architecture and the Chicago School was counteracted after Richardson’s death as more and more young American architects studied in Paris in the academic environment of the *École des Beaux-Arts* (where, in fact, Richardson had trained). The 1893 World’s Columbian Exposition in Chicago, a vast and highly organized example of quasi-Roman city planning (fig. 4.13), was a collaboration among many architects, including McKim,

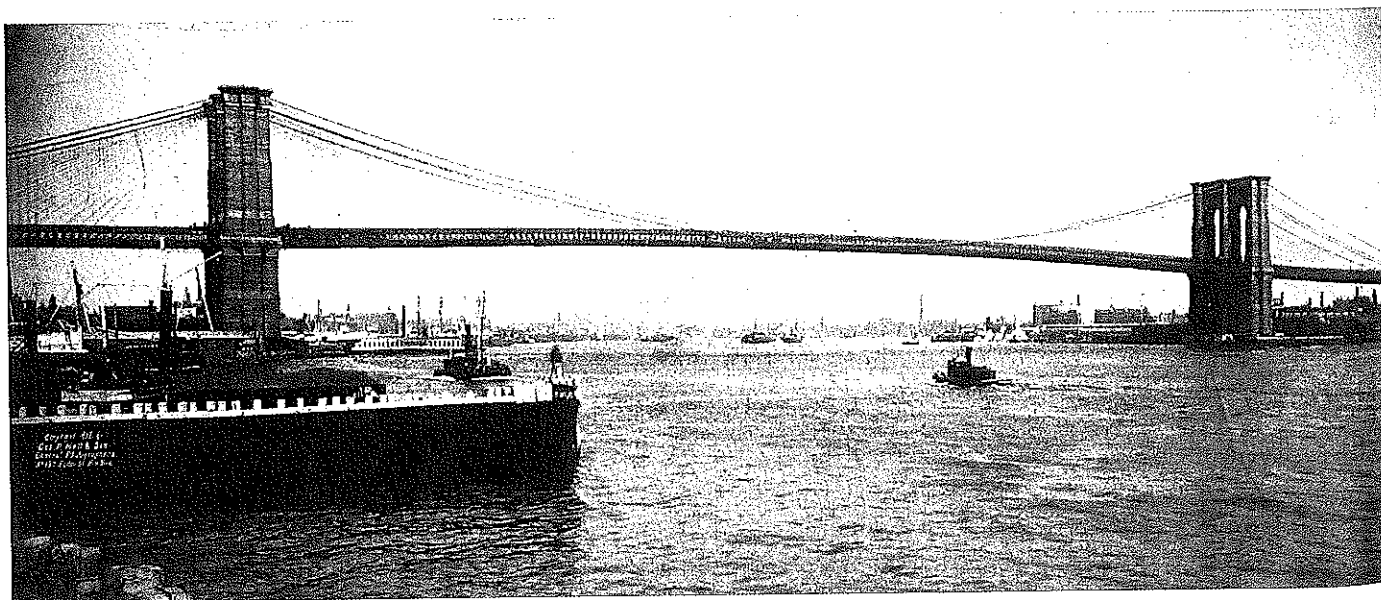




4.13 Richard Morris Hunt; McKim, Mead & White; Burnham and Root; and other architects, World's Columbian Exposition, Chicago. 1893. Demolished.

Mead & White, the Chicago firm of **Burnham and Root**, and **Richard Morris Hunt** (1827–95), the doyen of American academic architecture. This world's fair celebrated the four-hundredth anniversary of Columbus's voyage. Though modeled on European precedents, the Columbian Exposition set out to assert American ascendancy in industry and particularly the visual arts. Ironically,

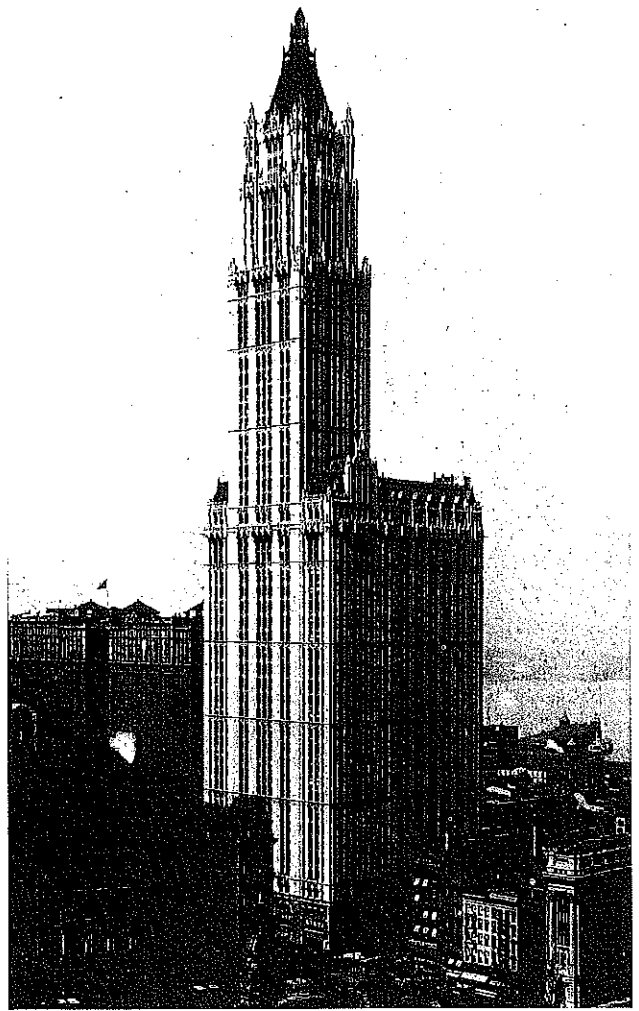
while international expositions in London and Paris had unveiled such futuristic architectural marvels as the Crystal Palace and the Eiffel Tower, America looked to the classical European past for inspiration. This resulted, in part, from an anxiety that pragmatic Chicago-style architecture might give a provincial appearance to America's first world's fair. The gleaming white colonnades of the



4.14 John Augustus Roebling, Brooklyn Bridge, New York. 1869–83.

buildings, conceived on an awesome scale and arranged around an immense reflecting pool, formed a model for the future American dream city, one that affected a generation of architects and their clients. Thus, although the Chicago School of architecture maintained its vitality into the first decade of the twentieth century, neoacademic eclecticism remained firmly established, with New York architects leading the way.

The Gothic Revival style could be applied to structures other than buildings, such as the Brooklyn Bridge (1869–83), which, as one of the country's most spectacular suspension bridges, represented a triumph of American technology (fig. 4.14). It was designed by **John Augustus Roebling** (1806–69), who barely lived to see work on the project begun (his son Washington completed the work with his wife, Emily). Before construction of the bridge, the East River was crossed by up to a thousand ferry trips a day. With its soaring Gothic towers and graceful steel suspension cables, the Brooklyn Bridge forms a dramatic gateway to New York City. No wonder numbers of American painters and photographers were drawn to its grandeur as a pictorial motif. By 1913 the Woolworth Building (fig. 4.15), designed by **Cass Gilbert** (1859–1934), loomed 792 feet (241 m) above the streets of New York—fifty-two stories of Late Gothic-style stone sheathing serving mainly to add weight, disguise the metal-case construction frame, and create a sense of soaring verticality. Until 1931, the Woolworth Building was New York's tallest building, a Gothic cathedral of the modern age and a shining symbol of American capitalism. It has since been overshadowed by later and taller buildings, but remains one of the most distinguished structures on the New York skyline.



4.15 Cass Gilbert, Woolworth Building, New York. 1911–13.