**Architecture**

Architecture - the art of building in which human requirements and construction materials are related so as to furnish practical use as well as an aesthetic solution, thus differing from the pure utility of engineering construction. As an art, architecture is essentially abstract and nonrepresentational and involves the manipulation of the relationships of spaces, volumes, planes, masses, and voids. Time is also an important factor in architecture, since a building is usually comprehended in a succession of experiences rather than all at once. In most architecture there is no one vantage point from which the whole structure can be understood. The use of light and shadow, as well as surface decoration, can greatly enhance a structure.

The analysis of building types provides an insight into past cultures and eras. Behind each of the greater styles lies not a casual trend nor a vogue, but a period of serious and urgent experimentation directed toward answering the needs of a specific way of life. Climate, methods of labor, available materials, and economy of means all impose their dictates. Each of the greater styles has been aided by the discovery of new construction methods. Once developed, a method survives tenaciously, giving way only when social changes or new building techniques have reduced it. That evolutionary process is exemplified by the history of modern architecture, which developed from the first uses of structural iron and steel in the mid-19th cent.

Until the 20th cent. there were three great developments in architectural construction—the post-and-lintel, or trabeated, system; the arch system, either the cohesive type, employing plastic materials hardening into a homogeneous mass, or the thrust type, in which the loads are received and counterbalanced at definite points; and the modern steel-skeleton system. In the 20th cent. new forms of building have been devised, with the use of reinforced concrete and the development of geodesic and stressed-skin (light material, reinforced) structures.

See also articles under countries, e.g., American architecture ; styles, e.g., baroque ; periods, e.g., Gothic architecture and art ; individual architects, e.g., Andrea Palladio ; individual stylistic and structural elements, e.g., tracery , orientation ; specific building types, e.g., pagoda , apartment house .

Architecture of the Ancient World

In Egyptian architecture, to which belong some of the earliest extant structures to be called architecture (erected by the Egyptians before 3000 BC), the post-and-lintel system was employed exclusively and produced the earliest stone columnar buildings in history. The architecture of W Asia from the same era employed the same system; however, arched construction was also known and used. The Chaldaeans and Assyrians, dependent upon clay as their chief material, built vaulted roofs of damp mud bricks that adhered to form a solid shell.

After generations of experimentation with buildings of limited variety the Greeks gave to the simple post-and-lintel system the purest, most perfect expression it was to attain (see Parthenon ; orders of architecture ). Roman architecture, borrowing and combining the columns of Greece and the arches of Asia, produced a wide variety of monumental buildings throughout the Western world. Their momentous invention of concrete enabled the imperial builders to exploit successfully the vault construction of W Asia and to cover vast unbroken floor spaces with great vaults and domes , as in the rebuilt Pantheon (2d cent. AD; see under pantheon ).

The Evolution of Styles in the Christian Era

The Romans and the early Christians also used the wooden truss for roofing the wide spans of their basilica halls. Neither Greek, Chinese, nor Japanese architecture used the vault system of construction. However, in the Asian division of the Roman Empire, vault development continued; Byzantine architects experimented with new principles and developed the pendentive , used brilliantly in the 6th cent. for the Church of Hagia Sophia in Constantinople.

The Romanesque architecture of the early Middle Ages was notable for strong, simple, massive forms and vaults executed in cut stone. In Lombard Romanesque (11th cent.) the Byzantine concentration of vault thrusts was improved by the device of ribs and of piers to support them. The idea of an organic supporting and buttressing skeleton of masonry (see buttress ), here appearing in embryo, became the vitalizing aim of the medieval builders. In 13th-century Gothic architecture it emerged in perfected form, as in the Amiens and Chartres cathedrals.

The birth of Renaissance architecture (15th cent.) inaugurated a period of several hundred years in Western architecture during which the multiple and complex buildings of the modern world began to emerge, while at the same time no new and compelling structural conceptions appeared. The forms and ornaments of Roman antiquity were resuscitated again and again and were ordered into numberless new combinations, and structure served chiefly as a convenient tool for attaining these effects. The complex, highly decorated baroque style was the chief manifestation of the 17th-century architectural aesthetic. The Georgian style was among architecture's notable 18th-century expressions (see Georgian architecture ). The first half of the 19th cent. was given over to the classic revival and the Gothic revival .

New World, New Architectures

The architects of the later 19th cent. found themselves in a world being reshaped by science, industry, and speed. A new eclecticism arose, such as the architecture based on the Ecole des Beaux-Arts , and what is commonly called Victorian architecture in Britain and the United States. The needs of a new society pressed them, while steel, reinforced concrete, and electricity were among the many new technical means at their disposal.

After more than a half-century of assimilation and experimentation, modern architecture , often called the International style , produced an astonishing variety of daring and original buildings, often steel substructures sheathed in glass. The Bauhaus was a strong influence on modern architecture. As the line between architecture and engineering became a shadow, 20th-century architecture often approached engineering, and modern works of engineering—airplane hangars, for example—often aimed at and achieved an undeniable beauty. More recently, postmodern architecture (see postmodernism ), which exploits and expands the technical innovations of modernism while often incorporating stylistic elements from other architectural styles or periods, has become an international movement.