

The evolution of the form and function of the window as a detail influencing historical architecture

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Abstract

Using the concept of the window, which is the interface between the interpenetrating interior and the exterior of a building, the article shows window joinery as an independent architectural detail with aesthetic value expressed in an artistic form. The author discusses the changing function of the wall opening and emphasises its timeless role: bringing light and air into the building. Analysing successively the design assumptions of creators from antiquity to modernism, the article illustrates the integrity of windows and the façade of buildings, which influence the visual perception of the development in a broader cultural, artistic and historical context.

Keywords: window joinery, architectural detail, historic architecture, façade

1. Introduction

Historic windows are symbolic elements that shape the composition of building façades with a centuries-old past (Taichman 1993: 8–9). Window joinery captures the essence of a bygone era, providing viewers with insight into the lifestyles, technologies and artistic sensibilities of the past. Understood as architectural details, windows are not just functional apertures, but living artefacts that tell stories about craftsmanship, culture and the evolution of architectural styles (Sims, Powter 2006). They have a profound effect not only on the building itself, but also on the appearance of the street and the surrounding area. The depth and thickness of the frames and sills, the width and visual weight of the sash elements and the materials, colour and pattern of the light reflecting off the glass all complement and emphasise the architectural style, texture and age of the building (Turner 2006). Exploring the evolution, significance and cultural context of historic windows from the ancient world to the modern era, examples of the craftsmanship and innovation of selected historic styles are analysed, along with the changing function of these openings. As an architectural detail, windows played a significant role in the creation of buildings, from their humble beginnings in the ancient world, through the elaborate stained-glass masterpieces of the mediaeval period and the embodiment of opulence in the Baroque and Rococo periods, to the testament to modernity of the Art Nouveau and Art Deco movements. The first half of the 20th century and Adolf Loos' legendary essay in response to changing realities, "Ornament and crime", brought architecture that was simple, austere, clear and devoid of detail (Loos 2013). Invariably, the windows in a modernist massing were one of the strongest means of artistic expression of a building's façade.

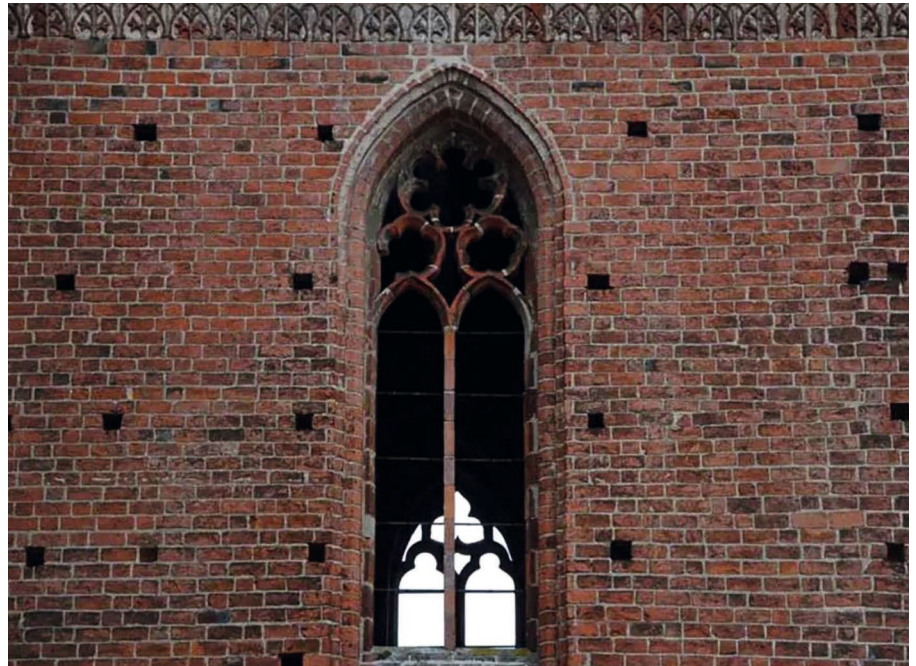
2. Functional evolution of windows

The origin of today's idea of a window can be traced back to the prehistoric beginnings of civilisation, when our ancestors, in poorly lit caves, struggled to gain access to natural light and fresh air and introduced the concept of an opening as a means of escape or defence.

In ancient civilisations such as Sumer and Egypt, rectangular window apertures were often simple slits in silt brick or stone walls, designed to provide minimal light and ventilation. The first windows remained small and brought paltry aesthetic value. In ancient Egypt, however, windows went beyond mere utility. The oculus, or round window, became a distinctive feature of temples and tombs. The Romans revolutionised window design by pioneering the concept of glazing. They created the world's first glass windows, similar in form to those of today, around the 1st century AD, using modestly sized panes of glass set in wooden frames. Glass windows significantly improved the illumination of interiors whilst protecting the occupants from the elements and external noise (Taichman 1990: 8–9).

The Gothic era ushered in a new approach to window design. Cathedrals, such as in Chartres in France, featured intricate stained-glass windows that told biblical stories in vibrant, luminous colours. These windows served both aesthetic and spiritual purposes, enhancing the artistry of the architecture. During the Renaissance, hallmarks of which were symmetrical divisions, circular arches and decorative window frames, used windows as frames for carefully composed views of the surrounding landscape. The Baroque ushered in a more vibrant and decorative style; window frames from this period were often decorated with ornate stucco, and the use of larger panes of glass allowed more natural light into the interior. The Palace of Versailles, with its great hall of mirrors, is a testament to the wealth of Baroque achievements (Koch 2020).

Fig. 1. Gothic window divided by tracery
(source: <https://dominatura.pl/2019/03/okno-gotyckie>)



The 19th century, marked by the industrial revolution, brought significant advances in window manufacturing. Cast iron window frames and larger panes of glass became more readily available, contributing to the rapid urbanisation and architectural development of cities around the world. One example of this trend is the Crystal Palace in London, designed by Joseph Paxton for the Great Exhibition of 1851. The 20th century introduced a new era of architectural minimalism. Modernist architects, adhering to the principle that “form follows function”, favoured large, ornament-free windows that emphasised the interplay between interior and exterior spaces.

Popular technology from the first decades of the 20th century, reinforced-concrete, mullion-beam-plate construction, broke down the traditional façade wall and replaced it with lightweight, flexible structures. This innovation paved the way for a new transparency between interiors and exteriors, which consequently led to a radical change in the construction of the frame and the concept of the opening itself. Moreover, this period coincided with the rapid growth of the glass industry – accelerated by the shopfront market, which demanded ever-larger and more transparent glazed surfaces – eventually transforming it into a standard, affordable product (Dyllak 2012). The horizontal

Fig. 2. Farnsworth House, Mies van der Rohe
(Photograph copyright by Mitchell Rocheleau)



window was pitted against the traditional porte-fenêtre. The main objective was to maximise access to natural light, but also to open up the landscape: the window became an optical device, a large screen. By removing the relationship between the openings and the supporting structure, reinforced concrete made it possible to build a façade entirely out of a continuous glass frame. This even more complex and radical proposal gave way to glass houses, which embody a different notion of interiority, maximising the visual relationship between the outside world and the curtain wall. This formal metamorphosis of buildings has led to a gradual loss of the window's autonomy, transforming it into the skin of the façade. Buildings such as Mies van der Rohe's Farnsworth House and Le Corbusier's Villa Savoye became icons of international style, using windows as a key design element.

3. Aesthetic value: form of the window detail

The history of windows can be traced back to ancient civilisations, where small openings were primarily intended to provide an efficient exchange of interior and exterior air and light to rooms. The Greeks, known for their architectural skills, introduced windows as an integral part of their designs. The tripartite division with lintels and columns exemplified the classical elegance that became a hallmark of their architecture. However, it was during the mediaeval period that windows began to acquire more decorative elements. Gothic architecture introduced elaborate masonry, stained glass and pointed arches, creating windows that were not only functional but also impressive works of art in their own right.

With the Renaissance came a turn towards symmetry and proportion in architecture, influencing the design of window joinery. Classical elements such as pilasters, pediments and muntins became prominent features, as can be seen in the elegant windows of Renaissance palaces (Koch 2020). One of the characteristic features of Renaissance windows was the emphasis on harmony and proportion. Architects studied classical texts and applied the principles of symmetry and mathematical ratios, achieving a sense of balance and order in their compositions. The Palladian window became a classic motif of Renaissance architecture and was widely adopted in the design of palaces and stately residences. The Baroque and Rococo periods took the elements to a new level of artistic expression. Baroque windows were decorated with intricate stucco and sculptural details. Decorative elements were commonly used to add an extravagant, almost theatrical feel to the architecture. The 19th century was a period of tremendous change and innovation in architecture. Windows played an important role in this architectural diversity, serving as an expression of the eclectic tastes of the time (Darecka 2016).

Art Nouveau, which blossomed around 1905, was the result of a desire to liberate building form from pure imitation of past eras. Architects who were active during this period were keen to turn against the standardisation and simplification of buildings and building materials, drawing inspiration from the soft, organic forms of nature and traditional building techniques. Art Nouveau windows often take on organic shapes and are filled with stained glass with decorative motifs inspired by nature (Sienicki 1962).

In the 1930s, modern building construction meant that windows were often designed as large openings with subdivisions. Corner windows appeared to emphasise the folds or characteristic curves of the walls. Strip windows arranged horizontally along the entire length of the façade, vertical staircase windows called "thermometers", bay windows and round windows or portholes were designed (Koch 2020: 388–389). The constructional elements, e.g. the structure and layout of the divisions, as well as the functional elements, e.g. the fittings, handles, hinges and closing mechanisms, have primarily come to characterise the ornamentation of modernist windows. These small elements, even if mass-

-produced, were carefully designed, and their form often referred to the stylistic features of the building and the trend as a whole. Another characteristic element of modernist windows was wide internal sills of great aesthetic value. Most often the wooden joinery used a traditional box structure, i.e. double windows with space between the sashes, guaranteeing not only the characteristic spatial appearance of the windows, but also adequate thermal insulation and natural air circulation in the rooms. Windows of various sizes, shapes and divisions were usually set in the traditional manner, almost flush with the face of the façade. This had a significant effect on the overall appearance and harmonious composition of a building's façade. The exception was bay windows, which were set in a reinforced concrete frame extending beyond the façade. Thanks to this modern construction, a considerable distance was achieved between the external and internal glazing planes, creating a wide parapet that could serve, for example, as a mini orangery (Taichman 1990: 31–38).

Modernist windows prove that the role of detailing therefore does not end with decoration, despite the colloquial association with historical style. Detailing can also be an aspect of construction, emphasising a building's structure, its spatial and structural elements or accentuating places of special importance. These are elements that build on a building's unique style, historic context and overall appeal to create a sense of place and emphasise the building's significance. The modernist detailing of window openings in "sculptural" concrete façades proves that even in a Brutalist style there is room for nuance, and that structural elements can be both decorative and a recognisable element of the massing (Cymer 2020).



Fig. 3. Pavilion of the NOT Mining Club in Tychy, Marek Dziekoński (Photography copyright by Zygmunt Kubski)

4. Conclusions

Windows are an example of a detail that contributes significantly to the aesthetics, functionality and character of a building. They serve both practical and decorative purposes, and their appearance varies depending on the era (Sanchez Vidiella 2010). The history of windows in architecture bears witness to the ever-changing relationship between form and function. From the original rectangular window openings to the innovative glass structures of the modern era, windows play a key role in our built environment. Performing a function intrinsic to the life of a building, they are the artistic manifesto of their time and reflect the thought of the era. In summary, the window, understood as an architectural detail, has evolved functionally and aesthetically over the centuries, and has not disappeared in the face of formal minimalism; only the nature of its impact on the viewer has changed. Smart glass is becoming popular nowadays, influencing energy efficiency, privacy control aesthetics, amount of natural light, security of the building.. Looking to the future, the role of windows in architecture will continue to change, shaping the way we live, work and experience the world around us.



Fig. 4. Hong Kong University buildings design by RMJM Architects (Photography copyright Edmon Leongi)

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