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Architectural Detail in Sustainable Architecture: Formal and Aesthetic Connotations

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Abstract: Contemporary architecture is shaped by the paradigm of sustainability and is characteristic of many solutions determined by a relevant set of principles related to shaping the environment based on the ecology of systems focused on the flow of energy. These design principles concern gaining energy from renewable resources, protection against the loss of thermal energy from buildings, protection against the excess of thermal energy in buildings, and proper distribution of thermal energy in buildings. This paper presents a proposal for a method to analyze some building components used as sustainability-related elements given their formal similarity to historic architectural details or some artworks integrated with buildings. It aims to emphasize the potential of a different perspective from which to perceive and assess buildings, and specifically their architectural details, given their spatial and aesthetic values associated with sustainable technical solutions. This study is based on a few differentiated examples. It proves the relations mentioned above true, given the sustainability paradigm epitomized in technical solutions to contemporary buildings and the related aesthetic features characterizing the relevant architectural detailing. Such a perception of buildings is intended to promote unconventional viewing and assessment of them by the public and professionals in the area of architecture and art. It would make them discover new types of aesthetic values, which are usually invisible.

Keywords: sustainability; architectural detail; energy; design strategies; aesthetic connotations; formal similarities

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1. Introduction

Contemporary architecture is shaped by the paradigm of sustainability, and it is characteristic of many solutions to be determined by a relevant set of principles related to shaping the environment based on the ecology of systems with a focus on the flow of energy [1]. Design methods in architecture are primarily subjected to energy-related factors as the basic determinants of the design. This decidedly impacts the spatial character of present-day architecture. However, as some authors have claimed, considerations of energy alone can never determine a building's form [2]. The most important characteristic element of a building's form is its façade, which is "the calling card of a house and its designer" [3]. Building façades allow one to surmise a building`s purpose through its external appearance [4], and they can arouse emotional reactions among people. Today, technology has brought technical functions to the fore as key factors in façade design. Architectural façades were sites of intensive experimentation and innovation throughout the 20th century, and this is a phenomenon that still continues to this day [5].

A building's envelope occupies a special position within the strategies of sustainable design [6]. It defines not only the formal aspects of constructed buildings, but also their details. An architectural detail is considered a building detail, which is a more general term. Despite fulfilling primarily technical functions, such a detail can be additionally or solely an

aesthetic component of a building's structure. A conventional architectural detail is a decorative or technical element of a building's façade and is a functional and spatial entity.

The degree of sustainability of buildings and the details in their design strategies are determined by many features. The paradigm of sustainability has been realized in architecture through strategies that encompass a few basic guidelines related to energy in buildings.

They concern the following actions:

- Energy gained from renewable resources;
- Protection against losses of thermal energy from buildings;
- Protection against excesses of thermal energy in buildings;
- Proper distribution of thermal energy in buildings.

These guidelines bear on the thermal energy in buildings, but this type of energy is frequently accompanied by other forms of energy, such as acoustic or wind energy. There are some regularities in the case of building details that are formed according to energy-related factors. In this work, we consider only exterior details, that is, the details of façades. In this regard, the most important detail is their orientation and that of related details integrated with them. It is evident that the most privileged in terms of energy is the south-oriented elevation because it is subject to the most intensive insolation. The energy factor in architecture causes some imbalances in the treatment of particular façades and their details [7]. Solar effects on façades can be substantially compromised by different spatial elements of a building's surroundings or even by some components of the building itself [8].

In most cases, architectural details are analyzed and assessed according to their usability and the roles that they play in the technical aspects related to the above-mentioned forms of energy in buildings. Because they usually determine the spatial character of contemporary buildings, and appear in different ways on façades, it is necessary to analyze them not only from a purely technical perspective, but also from an aesthetic perspective. Sustainable buildings also need to be beautiful and exciting [9], as should conventional objects. In the majority of cases, buildings are considered works of art with diverse aesthetic characters and values because architecture belongs to the sub-group of "formative arts" [10]. Therefore, their details should also be analyzed in this regard. What differentiates architectural details from other works of art is their utility, similar to the buildings themselves. Unlike art, architecture must serve a function, economy, durability, and context in addition to providing meaning, significance, and delight [11].

If buildings function well, they will be beautiful and, therefore, have spiritual value [12]. Contemporary architecture is a convincing example of the integration of art and technology. Due to well-known classic statements, there are three notions—named the Vitruvian Triad—that determine an architectonic artifact: venustas, utilitas, and firmitas, that is, beauty, function, and structure, which can be translated as art, humanistic, and technology. It might seem paradoxical to discuss the concepts of aesthetics and sustainability together [13] but we are currently witnessing the formation of a new aesthetic ethos negotiating through the terms of sustainability [13]. This results from the increasing interest of scholars and aestheticians in the relations between these two terms, as well as from a good deal of relevant publications. However, these relations can be debatable because some scholars claim that, in some sense, contemporary aesthetics do not really exist or are some sort of illusion [14]. Still, another academic source sees aesthetics as an "intellectual network" that includes and connects very different instances of aesthetics and that evolves over time [15].

The system of cognitive perception allows classifying new objects "in terms of concepts that group a new object with others that have been previously encountered" [16] (p. 43). In addition, cognitive perception considers the assessment of the similarity between new and old objects. Similarity, which is a psychological notion, involves the comparison of finite object representations. The featural account proposes that similarity is determined by

matching an object's features. Similarity can be better understood by considering transformational relationships in some contexts. It is a function of "the properties that two objects have in common", that is, it is the degree to which two objects share "things" [17]. Umberto Eco emphasizes the role of a sign in the assessment of architectural unit or object, and indicates that "communicative aspect predominates over the functional aspect, and precedes it" [18] (p. 213). The semiotic approach to the study of communication has had a profound influence on design methodology [19]. Papanek claims that design must be meaningful. "Meaningful" replaces such semantically loaded expressions as "beautiful" or "ugly" [20]. In architecture, "meaningful" denotes an architectural work that is, in some ways, unusual and distinguished. The public can intuitively recognize such objects. This perceptive process tends to make a building's image into a simplified sign and evokes associations with other similar signs that represent artworks. Therefore, the analyzed connotations come about more readily in the case of meaningful architecture and its relevant details.

The approach to the problem presented here is another proposal based on a different perspective that analyzes it based on the indirect linkage between the sustainability paradigm epitomized in contemporary buildings and related aesthetic features that characterize architectural detailing. However, we do not intend to resort to aesthetic judgments, but to explore and find some striking similarities between traditional and new aesthetic values of technical details of present-day architecture that are usually underestimated—if not completely ignored—not only by the general public, but even by individuals who practice so-called "everyday aesthetics" [21].

Finding similarities between two or more objects is a complex process. It should be noted that this study is not about beauty, but it intends to promote a new and positive perception of contemporary architecture by raising the awareness of the traditionally thinking part of the population that is unjustifiably cautious in their aesthetic judgments, especially those concerning abstract art.

2. Materials and Methods

The graphic materials used in this study are photographs taken by the authors and further examined because of their suitability for the envisaged analyses. The first group of illustrations refers to architectural details that are valued for their sustainability-related characteristics. The second group of photographs is a set of examples of artworks that were selected for analysis based on their similarity to particular objects represented in the first group.

The method applied in this study is comparative. It consists of searching for visual formal similarities between exterior architectural details or components of selected buildings and suitable contemporary or historical works of art. Such comparisons, and assessments, sometimes encounter difficulties due to the different nature of every art discipline, also architecture. This method is based on analytic induction, which begins by studying a small number of cases of the phenomenon to be explained while searching for similarities that could point to common factors.

The works of art selected in this study are ceramic works, such as stained glass, mosaics, sculptures, reliefs, and even some objects of industrial design. Modern architectural details are, in some cases, compared to historical architectural details, which we also consider works of art. This comparative method reveals some perceptible relations between the above-mentioned works of art, which are sometimes creatively transformed, and contemporary architectural details that are suitable for fulfilling technical roles in sustainable buildings. They were undoubtedly an inspiration for architects in their form-finding design processes.

The method adopted in this study assumes a discussion based on the implementation of the Vitruvian Triad in the analysis of the considered relations. This allows a systematized approach to the problem. The term utilitas is assigned to the functional roles of building details as particular elements of energy strategy. Firmitas bears on specific technical and material solutions used in details that are related to a given energy strategy. Venustas

encompasses the formal associations that are revealed between the selected architectural details and some specific works of art, and they can testify to the tight links between details and art in terms of formal resemblance. This term relates to similitudes in the form, graphics, color, relief, etc. These associations also influence the forms of architectural details that feature characteristic traits, which themselves can be considered as having very high artistic value.

Figure 1 shows the three above-mentioned notions, which are assigned to the energy-related features that were previously indicated as postulates of sustainable strategies for energy in buildings. It indicates that most of the details exhibiting such characteristics can be found in cases related to systems for gaining renewable energy, which is considered the primary objective within the sustainability strategy. Somewhat fewer are details that enhance the systems for preventing heat loss from buildings, as well as the systems for preventing excesses of heat energy in building objects. Only sporadically can details be found related to heat distribution; however, in many cases, they appear as the most conspicuous and bulky technical elements that are exposed on the exteriors of a building's enclosures. The cases presented and analyzed here quantitively correspond to the above-mentioned proportions.

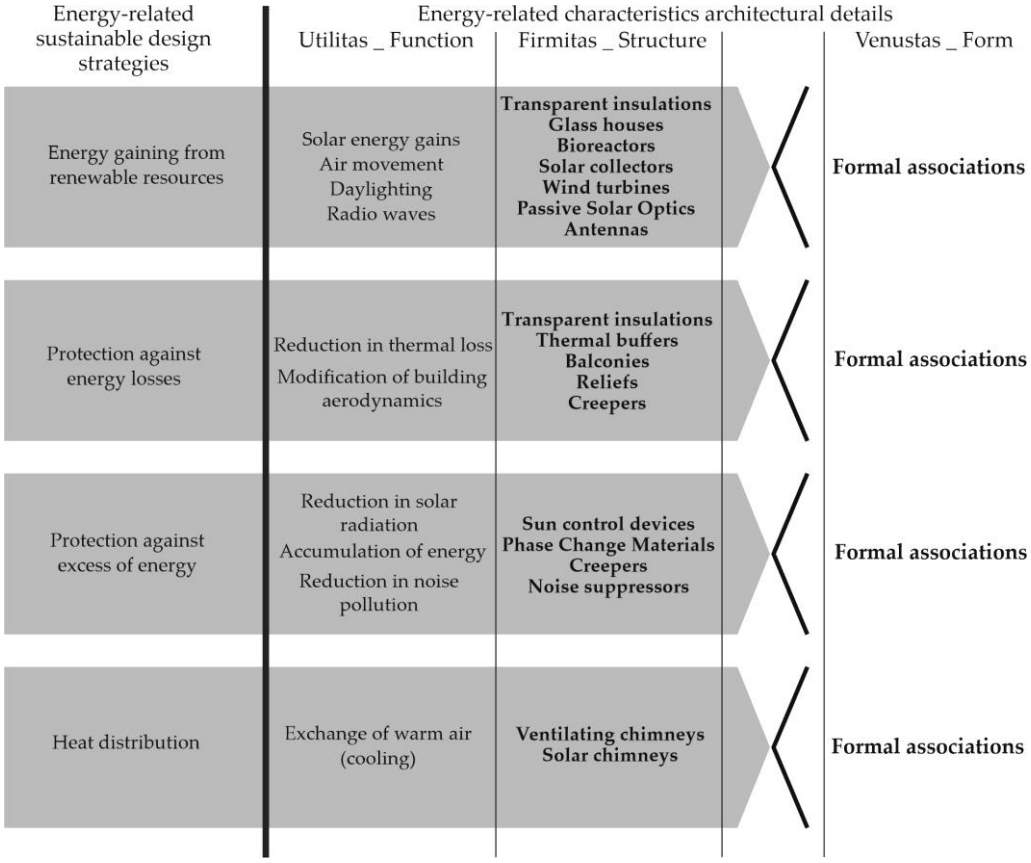


Figure 1. Energy-related strategies, functions, and technical solutions for architectural details and their formal associations with artworks. Source: Authors' archive.

3. Energy-Related Sustainable Design Strategies and Associations of Architectural Details and Art

In terms of aesthetics, the authority of sustainability is now such that the formal attributes of particular active and passive design strategies are generating influential aesthetic trajectories [22]. It is widely known that the formal aspects of sustainable architecture are determined as never before by energy and the climate, as one of the most basic human activities that is linked to the climate is building [23]. The emphasis on energy in construction made its spectacular appearance only in the last decade. This approach

results from rational thinking and economic factors. Thomas Herzog claimed that careful integration of technologies for the use of renewable energies offers the chance to generate new forms of architectural expression that are closely linked to local traditions [24], but also to historical buildings and their details. The multitude of architectural details related to the function of gaining renewable energy in buildings results from the importance of this strategy in contemporary architectural design. The necessity of the thermal protection of buildings has been present in architecture from the very beginning of the construction of shelters. However, modern architecture has gained a much more visible impetus than ever before, and this finds its expression on façades in various ways.

Even more spectacular are the clearly demonstrated technical solutions for the reduction in excessive thermal energy in buildings, and these are integrated with buildings' elevations. The distribution of thermal energy in buildings is sometimes even more strikingly revealed in different forms on building envelopes. Innovative methods and building technologies feature diverse forms and materials that give building façades characteristic spatial and aesthetic properties. It is very characteristic of building façades that the main trait of their composition is the principle of articulation, which allows diversification in terms of aesthetic solutions that are applied to flat orthogonal elevations. As Schulz claimed, it is a paradox of architectural development that Wright's "destruction of the box" led to the functional principle of separation of the technical structure from functionally determined space-defining elements [25].

Contemporary architectural details, as clearly indicated in the presented examples, are evidence of this feature. Architectural details representative of these strategies are frequently found to have very convincing associations with works of figurative or abstract art executed with various materials. For the examined examples of architectural details, assigned to the above-mentioned strategies, relevant artworks can be relatively easily found.

3.1. Energy Gains: Formal and Aesthetic Associations of Architectural Details

A good example of a building detail that features distinct associations with artistic compositions is the case of a bioreactor on a façade, with panels containing algae as a medium in a water solution that is supplemented with nutritious substrates and CO_2. This can be compared with the stained glass illustrated in Figure 2. Similarities can be found in terms of the materials (glass), color, and formal aspects. Both compositions use round elements (i.e., bubbles and circles) and are translucent.

Active methods of gaining energy in the form of polycrystalline varicolored photovoltaic panels that generate electrical energy can create intentional or accidental color patterns for which it is easy to find similarities with other compositions of a purely impractical character, such as colored ceramic reliefs (Figure 3).

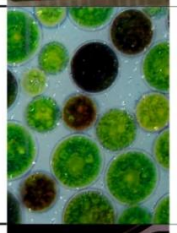
Sustainable design strategy	Energy gaining from renewable resources
Sustainable design technique	Facade cladding with photo-bioreactor and composition of stained glass modules
Architectural object	 BIQ (Bio Intelligent Quotient) residential building, facade cladding with algae bioreactor, Hafen City, Hamburg, Germany, 2013 Architects: SPLITTERWERK **a**
Architectural detail	 Detail of facade module in glass containing water solution with algae **b**
Work of art.	 Decorative stained glass panel module Casa Battlo, Barcelone, Spain, 1907 **c**
Similarity features	Formal appearance; Colour composition; Building material - glass

Figure 2. Formal associations between a system for gaining renewable energy with a bioreactor on a façade and a stained-glass composition. Photos by M. Celadyn (**a**,**b**) (2015), and by T. Hisgett (**c**). Source: https://commons.wikimedia.org/w/index.php?curid=18656944 (accessed on 3 March 2023), Licensed under the terms of cc-by-2.0.

Sustainable design strategy	Energy gaining from renewable resources
Sustainable design technique	Facade cladding with polycrystalline photovoltaic cells
Architectural object	 home+, Solar Decathlon Europe pavilion, Stuttgart University of Applied Sciences, Stuttgart, Germany, 2010 Project director arch. Jan Cremers **a**
Architectural detail	 Integrated PV modules as cladding of south facade of home+ **b**
Work of art.	 Decorative ceramic mosaic at Sutaungpyai Mandalay Hill, Thailand **c**
Similarity features	Formal appearance - rhytm, order, chequered composition; Colour; Building material of glossy finishing

Figure 3. Formal associations between a system for gaining renewable energy by way of polycrystalline photovoltaic cells on a façade and a ceramic mosaic. Photos by M. Celadyn (2012) (**a**,**b**), and

by Photo Darma and Sadao, Thailand (**c**). Source: https://commons.wikimedia.org/wiki/File:015_Decorative_Mosaic_at_Sutaungpyai,_Mandalay_Hill_(8910934843).jpg (accessed on 10 March 2023), Licensed under the terms of CC-BY-SA-2.0.

In recent years, wind generation in urban environments has increased in scale and provides significant potential, but mounting turbines on buildings presents some technical and aesthetic challenges. This type of installation may be used as a visual signifier of sustainability; however, they are frequently considered controversial. The meaning of the cautious exposure and integration of technical equipment with architectural object underlines Sharpe, who maintains that the appearance of the technology-related and energy-oriented devices occupies the central position in the shaping of the urban environment [26].

These devices are often the most visible details on building façades or roofs. They bestow a specific technical and aesthetic character upon buildings. This debatable effect is frequently questioned, as it contradicts the classical formal compositions of façades. However, the implementation of wind turbines that are integrated with building roofs can evoke steel or cast-iron roof-décor elements, as depicted in Figure 4. Thus, the negative perceptions and critical opinions concerning these devices that are pervasive in architecture can be mitigated, offering them a chance to be accepted by the public. In such cases, the analyzed connotations are very legible and conspicuous.

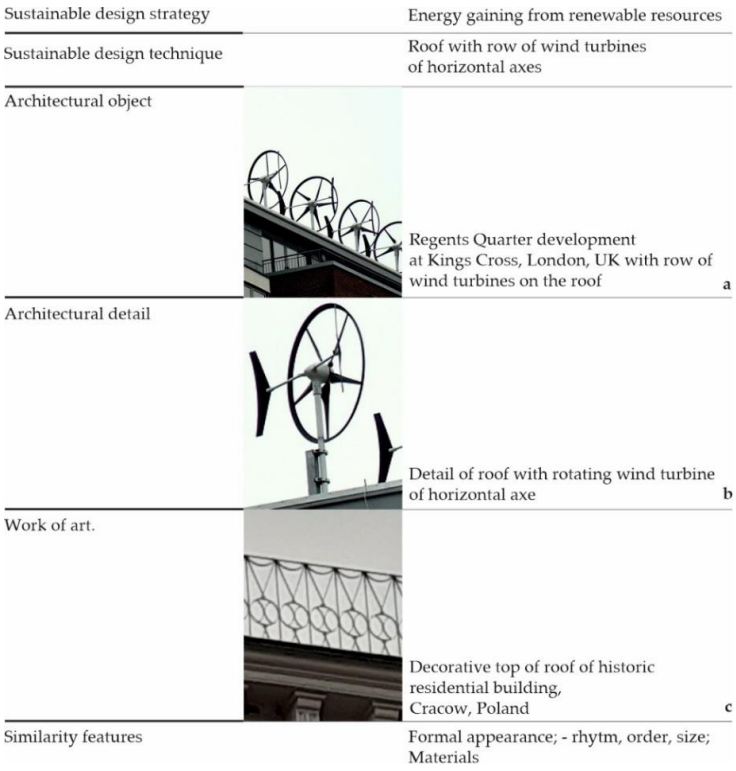


Figure 4. Formal associations between wind turbines on a contemporary office building for accomplishing the postulate of gaining energy from renewable resources and the architectural details of the roof of a historic building. Photos by Judith (**a**,**b**) (2008). Source: https://commons.wikimedia.org/wiki/File:Regent%27s_Quarter_Kings_Cross_2167081596.jpg (accessed on 19 February 2023), Licensed under the terms of the CC-BY-SA-2.0, and by M. Celadyn (**c**) (2020).

Energy gains in buildings bear not only on thermal and electrical energy systems, as indicated previously, but the energy of electromagnetic waves transmitted by radios is also considered. In some cases, the sets of receiving aerials mounted on buildings' roofs frequently evoke negative associations with industrial devices. However, in many cases, the shaping and selection of such elements can be found, and these can be easily visually associated with the detailing of some historical buildings.

3.2. Heat Loss Protection: Formal and Aesthetic Associations of Architectural Details

The second meaningful group of architectural details is related to the energy strategy for the protection of buildings against thermal losses. Although typical thermo-modernization work is aimed at the enhancement of façade insulation by way of relevant traditional methods, there has been an increasing tendency to create thermal buffers integrated with building envelope systems for some time. Such buffers are made through the installation of additional—usually glazed—closing partitions that are located before the façade, thus creating an insulating air space for reducing the heat loss.

Such solutions have been implemented more frequently in modern buildings, especially in the case of office buildings with double façades [27]. These systems also fulfill other more complex technical roles, such as forming systems for solar gains through the greenhouse effect, as well as acoustic screens that reduce the intensity of sound waves transmitted to buildings from outside. In the presented example, clear associations between the solution of a double façade with an exterior's skin featuring a transparent ETFE membrane and the transparent exterior three-dimensional sculptural composition of a series of pyramidal forms integrated with a historical building can be seen (Figure 5).

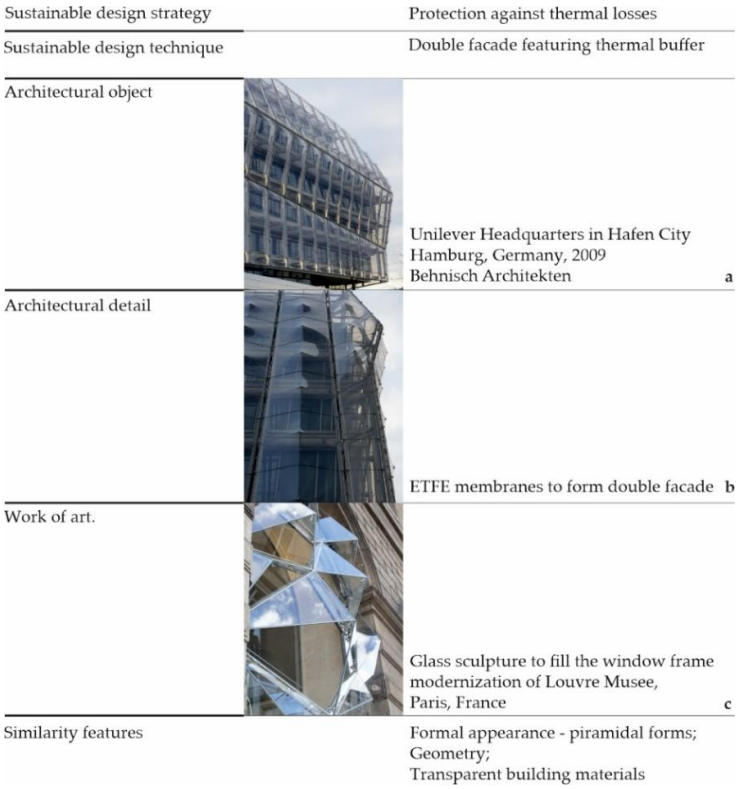


Figure 5. Formal associations between thermal buffers on a contemporary office building and a sculpture for filling window framing in a historic building façade that underwent modernization. Photos (**a**–**c**) by M. Celadyn (2015, 2017).

The spatial formation of exterior walls allows the reduction in thermal losses in buildings by slowing down the velocity of flowing air that sweeps along the "rough" façade and creates a stagnating air layer clinging to its surface. This technical function is also fulfilled by creepers installed on façades, which are sometimes modeled as artificial structures following specific graphic patterns and are fixed to elevations.

3.3. Protection against Excessive Energy Gains: Formal and Aesthetic Associations of Architectural Details

The third type of energy strategy is protection against excessive thermal energy gains. This has become an increasingly important problem due to the overheating of

buildings—mainly offices. The related details give buildings a visually specific technical character. The details or components that serve this purpose are formally and technically the most diverse sets of devices mounted on buildings.

According to certain formal assumptions, these details can be considered as elements of exterior equipment analogous to the exterior decorative accessories of historical buildings, although they are different in terms of their functional, spatial, and aesthetic traits. If, in the latter case, they were usually decorative components, such as cornices or mouldings, in contemporary architecture, they are purely practical and technical details. In both cases, however, they are meaningful compositional elements of façades, roofs, and other exterior building components.

Sometimes, one can perceive the process of substitution or supplementation of façades with the elements of energy-related technical equipment in the case of modernized historic buildings [7]. A good example of the result of such operations can be seen in the following set of photographs (Figure 6). They indicate visible functional and formal associations between the cornices of two buildings—one historical and the other contemporary. In the latter case, they take over the role of horizontal elements for solar protection. In both presented examples, the obvious care taken by the architects in the aesthetic forming of these modern details can be seen, as they formally refer to the historical cornice. But this perception through the lens of formal associations requires a well-developed exceptional imaginative capacity from the public.

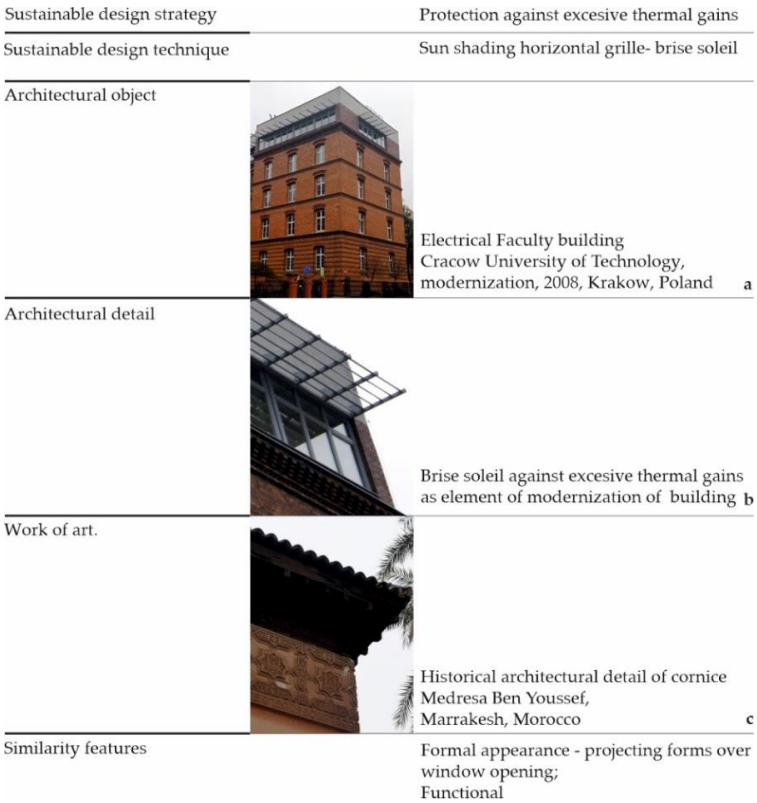


Figure 6. Formal associations between a contemporary cornice as a solar screen and the cornice of a historical building. Photos (**a**–**c**) by M. Celadyn (2015, 2019).

3.4. Heat Distribution in Buildings: Formal and Aesthetic Associations of Architectural Details

The last strategy, which concerns the heat distribution in buildings, introduces technical elements that substantially modify forms of buildings, as they are frequently very strongly exposed on façades or roofs. In the majority of contemporary buildings, the heating systems cooperate with ventilation systems that appear on façades and roofs in the form of purely technical sets of mechanical equipment. The sustainability paradigm

encourages the implementation of natural systems like gravity ventilation. In the case of large-size buildings, specially formed external elements sometimes become a striving feature of architectural expression.

The formal aesthetic associations in such cases are not only with standard artworks, such as paintings or sculptures, but also include aesthetically valuable works of industrial design, such as elements that are characteristic of aviation, e.g., airplane wings (Figure 7). In this case, the similarities consist primarily in the purpose for which they are used, as well as related to the curved longitudinal shapes of both.

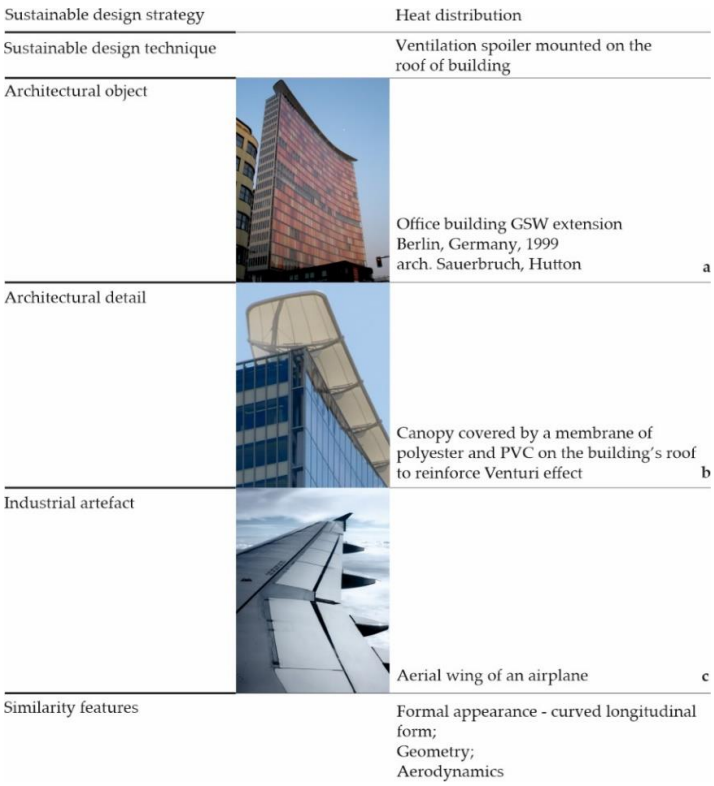


Figure 7. Formal and functional associations between the topping of the double façade of an office building and the industrial form of an aerial wing. Photos by M. Celadyn (**a**,**c**) (2015, 2018), and by J.-P. Dalbéra (**b**). Source: https://commons.wikimedia.org/wiki/File:Immeuble_du_GSW_%28Berlin%29%282712043512%29.jpg (accessed on 20 February 2023). Licensed under the terms of cc-by-2.0.

Architectural details and components shaped under the energy-oriented sustainable design strategy give the relevant objects unusual spatial traits, which strongly characterize architecture. These specific details were present in this form in the past, since "technical building services (installations) have been integrated into the external walls as functionally important elements" [28] (p. 13). Historical or vernacular buildings recognized as works of art are frequently of exceptional spatial and aesthetic value. Works of present-day architecture can also be similarly qualified and inspired by them, despite the disparate environmental conditions in which they are constructed.

4. Discussion

The issue of similarity in the present context requires some deeper insights. Comparing the new with the old entails specific perceptive mechanisms.

In this study, various architectural details or components—the semiotic aspects of which are analyzed in this way—are compared. Semiotics is a theory and methodology that can be applied to buildings [29], their details, and artworks, which can be viewed as signs. This perspective enables the perception of details and artworks as specifically relevant signs and facilitates the revelation of similarities between couples of both analyzed

artifacts. Many examples in which architectural detailing is associated with symbolic meaning can be pointed out. Symbolism is often present in façade design through the use of metamorphic, referential, or analogical devices. Technical details can, in many ways, be associated with such an approach.

Within the epistemological realm, semiotic analyses of details concern the relationship between signs and their meanings based on knowledge. Umberto Eco's model of semiotics represents the denotations and connotations that signs have in various circumstances and under various conditions. Their meanings are altered during their interactions with receivers [30]. Therefore, the analyzed connotations can be seen, comprehended, and defined in various ways, depending on specific visual features being properly defined. Tversky and Gati claim that "the notion of similarity appears under such different names as proximity, resemblance, communality or representativeness" [31] (p. 79).

Similarities have been found based on such characteristic features as proportions and scales, which are basic parameters for comparisons in architecture [32]. However, it is not only about visual similarity. Comparisons should also take the understanding of the entities in question into account. Each architectural detail has its meaning. New meaning is constructed when patterns that are already stored within the brain are combined with patterns constructed from external information. This information stems from relevant works of art. This requires the pattern-finding capabilities of the brain, that is, information structures must be turned into a pattern [33]. As Carlson claims, "the aesthetic appreciation of architecture poses certain challenges not typically present in the appreciation of other arts" [34] (p. 179).

The compositional information of visual elements in an image plays a crucial role in assessing an image's aesthetics. The visual elements in an image never stand alone, but are, rather, mutually dependent on each other and collectively manifest the aesthetic property of the whole image [35]. Sustainability, as the principal guideline in contemporary architectural design, should be linked to the artistic shaping of forms and their details, considering that "architecture is only sustainable if it is also beautiful" [36] (p. 19). The analysis of the relations between sustainability-oriented and technology-related architectural details and some specific works of art delivers a good opportunity for relevant discussions on the appreciation of their formal and aesthetic connotations, examined in the context of the environmental sustainability issue. This question of similarity between architectural details, which occurred partially as a result of the accomplishment of the sustainability-based and energy-oriented design strategies, and works of art, can evoke aesthetic appreciation conditioned by the observer's active engagement. The latter involves the "cognitive and emotional interaction" [34] that is built between the onlooker and the object of his observation.

It takes a strong imagination to indicate and competently translate the nature and character of these relations between the architectural object–work of art, as they are often difficult to be directly perceived. This type of perception frequently requires deep insight into the essence of the compared works of technology and art, and it depends on one's artistic sensitivity, emotional state, as well as prior personal experience [37]. When analyzing a given architectural object, observers usually try to discover the meaning of its technic- and technology-derived details, forms, colors, structure, etc. It is only then that they are able to find any associations with works of pure art recalled from their experience. Therefore, the emotional reaction of the observers "reflects personal associations and meanings, which are projected onto the object" [38] (p. 79). They try to reveal the identity between the compared artifacts—the architectural detail and work of art. It should be said that some degrees of similarity that are found between these two aspects can be a reason for pure satisfaction and contribute to an onlooker's higher self-esteem.

Special artistic treatment of designed architectural details seems obvious, and this approach is coherent with the consideration of architecture as an artistic discipline. The comparisons carried out in this study were based on similarities of forms, textures, and colors. In the case of historical architectural details, they are usually architectural ornaments that can be compared with contemporary technical equipment (Figure 8), being the visual representation of the employed technical systems within a building to assure its high performance.

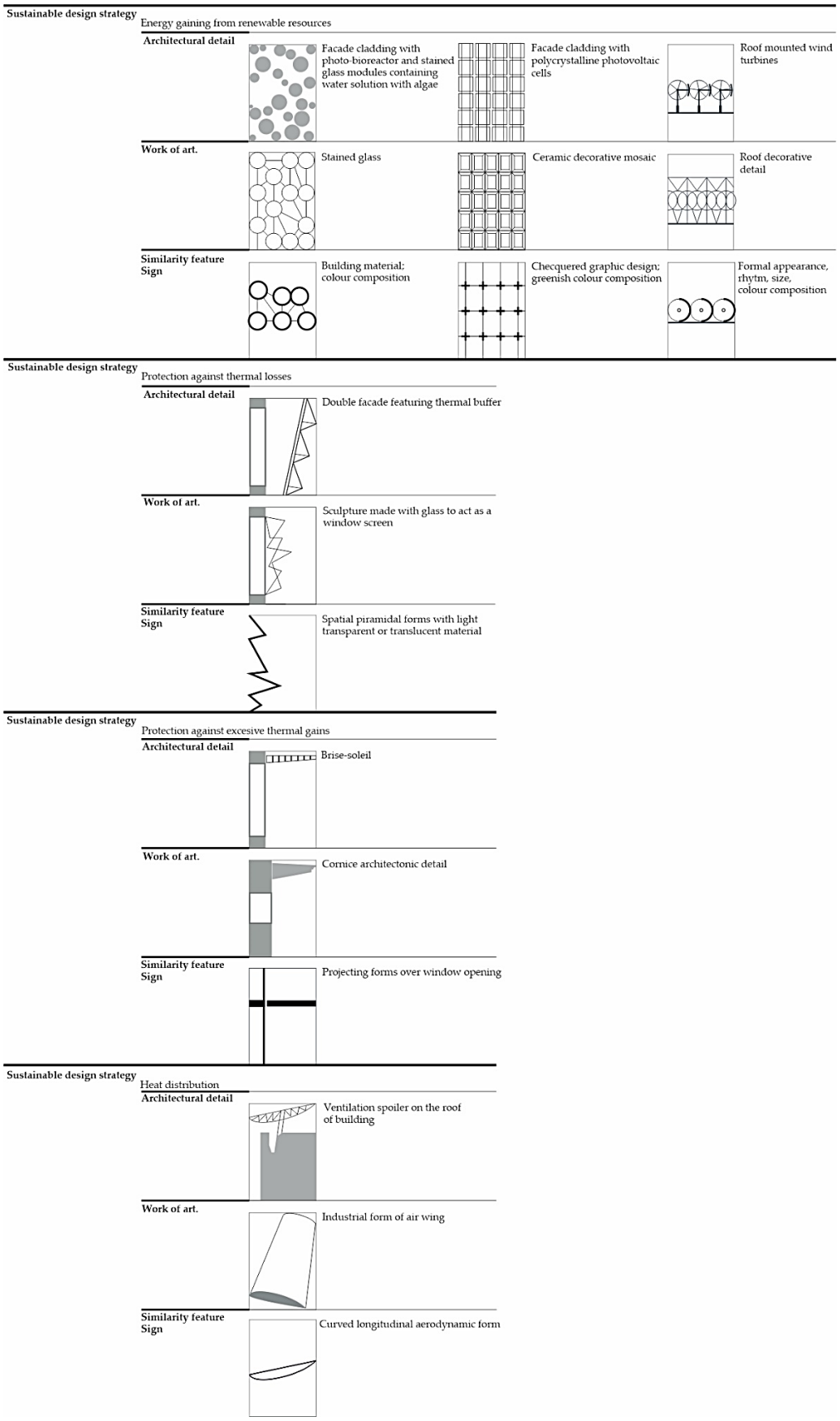


Figure 8. Selected sustainable design strategies and architectural details as relevant signs. Source: Authors' archive.

Some claim that historical architecture is a dressed-up construction, and that ornamentation is a covering of naked construction. However, architecture was originally primarily concerned with necessity [39]. It is contemporary architecture that clearly exposes a necessity in the form of visible technical equipment, as the expression of technological achievement has been a key concern in the development of modern architecture [40]. At present, there is a tendency to overemphasize technological components. This may be the effect of the reductive view of design and the idea that the improvement in environmental efficiency should be approached as though buildings were extensions of the technologies that they contain [41].

Ecological architecture (or green architecture), which is a necessity in this era, is sometimes considered more as a philosophy or ethical choice than as a building style or an aesthetic approach [42]. Herzog argued that ecological architecture should not hide necessary technical installations but should change their particular elements into artistic details [43]. However, in many respects, the association of "high art" with ecological architecture in such a way that advanced technology is translated into the language of aesthetics is self-contradictory [43]. These diverse attitudes toward the issue bespeak controversies arising around the research in question. This does not, however, make this discussion pointless.

5. Conclusions

Energy-related factors determine the forms, façades, and roofs of contemporary buildings in a significant way, which results from the paradigm of sustainability in architecture. The issue of the integration of art and technology finds its expression in the most conspicuous way in architecture due to the large dimensions of buildings and their visibility in public spaces. In historical architecture, which is usually equipped with decorative details on the elevations and other building components, the issue of technology manifested itself on a minor scale, such as in chimneys or window framing. Contemporary buildings frequently feature technical components strikingly exposed on building envelopes. Such architectural objects become works of technology in the perception of the public. They seem to be objects of art to a lesser degree than historical buildings. The aesthetics of modern buildings, which are based on the present canons of art, are mainly modernistic, and they are negatively assessed in the perception of many due to the presence of exposed technical elements that are integrated with them.

The associations between architectural details—purely technical or decorative—and some suitable works of art, presented in the illustrations above, indicate that there can also be an unconventional perception of contemporary architecture and its details. It seems that its acceptance must result from a specific unconventional approach to the perception of spatial and aesthetic traits of buildings based on the rather difficult revealing of the explored associations. This identification of the analyzed relations seems to offer a chance for an intentional and profound experience of the aesthetic appreciation of contemporary architecture.

These remarks can be perceived as important for practicing architects, as well as for theorists of architecture because they indicate another perspective on architectural design. They also suggest new ways of a practical approach to this issue that can be used in analytic research and practical application by making new buildings designed based on better-informed decisions.

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