

Organic Architecture

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Abstract:

In the history of architecture, emergent styles are often supported by new theories of form and function. This paper explores the development of organic architecture, a style that attempted to materialize the unwritten laws of nature. Organic Architecture integrates architecture and the natural environment. From appearance to function, from interior to exterior, the objective is to harmonize nature and culture. The renowned architect Frank Lloyd Wright, considered the father of Organic Architecture, brought to life the concept of this school of building. In addition to providing a history of the style, this paper analyzes one of its most famous examples, Frank Lloyd Wright's Falling Water, to show how the coordination of material and form developed a new style. This particular work, constructed on top of a waterfall in southwestern Pennsylvania, reflects almost all the typical qualities of an Organic Architecture.

Key words: architecture, organic architecture, Frank Lloyd Wright, nature, landscape, architect

1. The Concept of Organic Architecture

1.1 Defining a New Form

Organic Architecture originates in the desire to integrate works of architecture into the natural environment. The goal of this integration is to achieve harmonious balance between nature and culture. Not only does the exterior of the architecture blend into the landscape, but the building's function also ideally acts in coordination with its interior. From building materials to structure, the components of organic architecture resonate with each other, as if the architecture grew from the environment rather than was imposed upon it.

As it attempts to merge with the natural landscape, organic architecture often utilizes mathematical and geometrical structures. While other architectural styles often limit themselves to straight lines or gentle curves, organic architecture embraces a much more robust geometry in order to accomplish two things. The first is to sit perfectly in the landscape, and the second is to reconcile with nature through a variety of transcendent techniques. It can be said that nature instructs organic architecture, insofar as the latter learns from and incorporates the former. Evidence for this includes the fact that geometrical and mathematical rules, which often coordinate the design of organic buildings, originate in nature. For example, the golden ratio.

According to Frank Lloyd Wright, "Study nature, love nature, stays close to nature." What he meant by this was that the forms of architecture need not be invented. They need to be mined from the sketchbook that nature already provides: "The good building is not one that hurts the landscape, but one which makes the landscape more beautiful than it was before the building was built. Organic architecture seeks superior sense of use, and a finer sense of comfort expressed in organic simplicity" (Wright, *Racine: The Architect's Vision for One American City*, 11). In noting that the good building does not "hurt" nature, Wright underscores the ethical imperative that supports organic architecture. Rather than impose on nature, this form of architecture aims to become one with nature.

1.2 Origin of Organic Architecture

Frank Lloyd Wright was the father of organic architecture. But he was not the principle theorist of this school of building. In fact, Wright found it difficult to define organic architecture, but his works provide the best definitions for the phrase. Throughout his work, he consistently embodied the concept of organic architecture vividly through his designing. And yet, though he is probably its best-known practitioner, Wright was not the first architect who used the term organic architecture.

Eugene Emmanuel Viollet-le-Duc, a nineteenth-century architect and author, was the earliest to espouse the philosophy of architecture as a harmonious system of construction and composition. Throughout his work and his writing, he does not advocate that architectures should mimic nature.

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Instead, he claims that buildings ought to emulate the laws of nature. As he understood it, natural law was a unity consisting of mathematics, physics, and the interdependence of functions.

Following le Duc, the idea of architecture as an organic operation appears in Louis Sullivan, the mentor of Wright. In *Kindergarten Chats*, published in 1901, Sullivan argues that “if the work is to be organic, the function of the parts must have the same quality as the function of the whole.” Sullivan also focused on the simplicity of architecture. When Wright was learning with Sullivan, he first developed his Prairie building style, in which simplicity plays an important role. A Prairie building always has a wide base, with the second floor’s base not fully occupying the first floor’s roof. The strong geometrical sense that defines Wright’s style at this point later became an important component of Organic Architecture. Sullivan’s idea of simplicity suffused Wright’s thinking, and Wright used the idea in his early designs of Prairie buildings. In Wright’s later designs of Prairie houses, there were big fireplace and chimneys constructed in the middle, and the idea of central fireplace became an essential characteristic of Wright’s organic architecture.

Sullivan’s mindset deeply inspired and influenced Wright, and the latter interpreted the concept of organic architecture marvelously in his designs, spreading the idea of organic architecture into the public’s view.

2. Features of organic architecture

2.1 The Incorporation with Nature

For organic architecture, the site of the building has delicate relation with the building itself. The two should work in coordination with each other. The object of decisions regarding placement, material, and structural design is to make it appear as if the building grew naturally from the landscape. The buildings could either expand into the natural environment or close into urban areas. The architecture is based more on its environment than an imposed purpose.

In color, texture, pattern, and strength, the materials that are utilized should imitate the appearance of their surrounding. For example, in Fallingwater, raw materials were extracted directly from the site for construction. This direct sourcing was done to ensure that the materials reflected the building’s integration with nature. Additionally, this desire to draw the materials from the location serves as an early example of environmentally conscious architecture, since the purpose of organic methods is to steward the land the building is built on rather than merely mine it for resources. The building is meant to promote the health and longevity of the site.

When it comes to the spacing of organic architecture, the rooms inside are not just prim and rigid rectangles. There are no definite straight boxes. Instead, organic forms should be fluent, extending from exterior to interior and vice versa. As a result of this compositional need, the inside and outside are naturally linked and integrated. It can be said that exterior and interior are in unity, naturally combining into one state.

The internal furnishings—including chairs, tables, paintings, sculptures, and more—as well as the decorative ornaments—including tile, glass panels, and carved stone—must also match the whole building naturally. They are one with the building, not just plain decorations being applied. The entire building, from head to toe, from inside to it, must create one harmonious form.

2.2 Geometrical and Mathematical Features

The geometrical shapes and lines found in nature, such as the spiral pattern of snail shells, has influenced architects throughout history. In organic architecture, there are also geometrical and mathematical components. Take the divine proportion for instance. Architectural ratios could be based on that magical number. What’s more, Wright’s Guggenheim Museum (New York, 1959) originated in the snail-shaped helicoid (snail-shaped spiral). In architectural parlance, these geometrical elements are termed ruled surfaces. According to Louis Sullivan, those geometric and organic shapes are the key concept of designing.

The proportion and scale of furniture and the building should be comfortable with human body. That means, for example, table and chairs should be placed at a height that is natural and comfortable for people to sit at and work on. The proportion cannot be so high that a person must stretch to reach the table, nor so small that the person has to bend back on the chair. Wright cares very much about the comfort of humanity within the shelter. “Human use and comfort should have intimate possession of every interior—should be felt in every exterior,” he said.

3. Fallingwater and its History

Designed by Frank Lloyd Wright, Fallingwater is a perfect illustration of a style of building known as organic architecture.

One of the Wright's most renowned works, the house is constructed partially on a waterfall in a mountain in southwestern Pennsylvania. It was first designed in 1935, and the construction was completed in 1937. The design integrates architecture and nature in a completely harmonious way.

The exterior of the building is ochre-colored, which resonates with its natural surroundings. Formally, the structure consists of horizontal terraces that are layered on top of one another, as if to mimic the various sedimentary layers. Cypress (a kind of feathery coniferous tree) are planted around the house, which further accentuates its natural relationship to the woods around it. Stone, which is commonly seen in nature and especially around the waterfall, is also one of the main materials, including sandstone, which echoes the surrounding, and flagstone, which aids in the transition from exterior to interior. The waterfall runs beneath the building peacefully.

The house was originally conceived as a holiday house in Bear Run for an aesthetically-minded couple, Edgar J. Kaufmann and his wife Liliane. Kaufmann was the father of one of the members in Wright's Fellowship program, which is why Kaufmann reached out to Wright in 1935 and invited him to design the house. In Kaufmann and Liliane's original vision, the house was to be located near the waterfall, giving them a view of it. They were completely flabbergasted when Wright presented his design drawing in 1936, which relocated the building on top of the waterfall, rather than adjacent to it. In Wright's theory, the waterfall should be part of the residence, rather than a mere landscape detail that was visible from it. In this way, the family could live in harmony with the waterfall while actually feeling the water's presence. After the heated debate, the construction of the architecture began in the April of the same year.

As the construction began, local craftsman and constructors were hired. The building materials were extracted directly from the Kaufmanns' land, including local sandstone and other native materials. Cement, sand, and rounded river gravel were mixed as concrete for the construction. The structure of the house included a central fireplace that acted as the focal point. Cantilevered and geometrical structures were designed throughout the home, and the terraces were attached to a central chimney. After the foundation was completed in July, construction of living room cantilever was about to start. Edgar Kaufmann's office at the corner was the first to be completed.

After its completion 1937, the Kaufmann family took up residence in Fallingwater. The architecture quickly became known as media reports widely spread. From then on, curious visitors who wanted to view this masterpiece continued to visit the house. That is why Wright added a guest house in the design. The guest house was completed in 1939.

Preservation of the building was necessary as well. The Kaufmanns noticed the deflection of the terrace after years they moved in. Later research showed that it was because the concrete and steel of the terraces were overstressed and could no longer support the weight. Reinforcements were then done.

In 1963, Edgar Kaufmann entrusted Fallingwater, the surrounding land, and 500,000 dollars for conserving the house to the Western Pennsylvania Conservancy, a private non-profit organization dedicated to land conservation. In the following year, Fallingwater was opened publicly to tourists as a museum. The museum contains a collection of furniture and paintings, sculptures, and more, which were curated by the Kaufmanns. The Kaufmanns were surely an artistic family, and the collection shows their unique taste. In 1976, the United States Department of the Interior named Fallingwater a National Historic Landmark.

4. Analysis of Fallingwater

The most unique feature of Fallingwater is that it is situated on top of a waterfall. This particular site allows the water to flow directly through the building. People inside the building can actually hear the sound of water running, which allows them remain in touch with the nature, even when they are separated from it. In effect, the building dissolves some, not all, of the distance between civilization and nature. For true lovers of nature, the sound of waterfall is not distracting; instead, it is comforting and relaxing. The sound of nature calms people. Hearing the water from inside the house brings the exterior inside, integrating nature and the building. This incorporation of nature into architecture utterly fulfils the principle of Organic Architecture.

The mix of ochre and grey color on the exterior walls helps the building to homologize with the color of rocks in the landscape. The grey color matches the woods, and the ochre color aligns with the sand and autumn leaves. A small amount of red accentuates the whole building. However, there are no bright colors on the exterior. Around the house, the feathery coniferous trees further match the building naturally with the woods around, fitting it into the nature. The landscape and building are in context with each other. They support each other.

One of the dominant building materials is stone, a natural substance that abounds in the vicinity of the waterfall. Sandstone is used to echo the surrounding, and flagstone is implemented to transmit the exterior into

interior. There are grey, roughly-surfaced rocks on the vertical part of the exterior. In addition, there are smoother rocks with brownish cream color, mostly on the horizontal parts.

The differences in texture resonates with nature, for the textures in nature are not uniform. The constructional raw materials of Fallingwater were extracted directly from the site. This was done to ensure that the architecture matched its natural surroundings to the greatest extent possible.

The structure consists of horizontal terraces and vertical columns. The grey vertical columns are parallel with the trees. The overhanging balconies are like cliffs. When there is sunlight, shadows are cast, just like those that are found on natural cliffs, reflecting nature's creation. Terraces and columns crisscross with an irregular pattern, which shows the uneven pattern of nature. Different layers of horizontal terraces are similar to those layers of rocks under the waterfall. The height of the house does not exceed that of the surrounding woods, which places the building within the natural limitations that are sketched by nature. It is as if the building is emerging from the landscape, or growing out of it, rather than dominating it.

The interior of Fallingwater is commodious and bright, with wide windows where sunlight can easily shine through. Wrights' affection for sunlight can be seen in the quote "More and more, so it seems to me, light is the beauty fire of the building." The windows and doors are transparent. They are likewise so wide that the outside landscape can be easily seen with a glimpse, bringing the visual image of nature inside.

There are columns and walls made of stone, and their texture resembles the exterior, which further reinforces the concept of bringing the exterior environment into the interior. The floor consists of sporadically-shaped stone tile, rather than strict rectangular tiles. This irregular pattern reflects the irregularity of nature. What's more, although the materials of the columns and the floor are the same, their textures are not. The texture of the columns is rough and that of the floor is smooth and flat. These variations resonate with nature's variegated textures. When light shines on the rough surface of the columns, shadows are cast, making the surfaces seems rougher and giving a stronger visual impact.

The floor is not completely flat. At a corner there are several blocks of extrusive and raw stones, exactly like the rocks found by the river. The rocks can act as a short table, or people can sit on them. These completely natural rocks bring the sense of nature inside the house.

Near the ceiling, the upper part of the interior is adorned by bars made from woods. It is like in the forest when woods can be seen when raising your head. There are also wooden shelves on the stone walls. Those natural materials are just like the form when they are in nature. They support each other.

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