

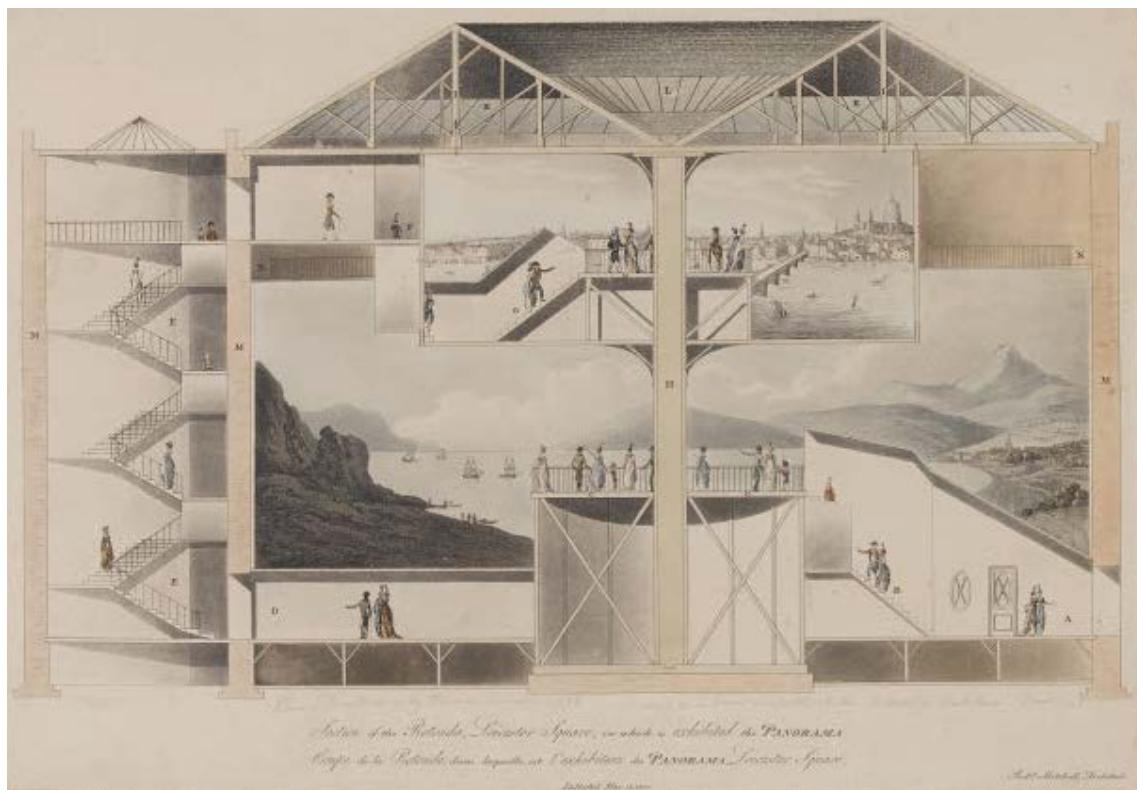
# Architectural relation to mountain landscape context

*Geomancy - Genius Loci - Landscript - Architecture and Nature - Contextual Design  
Landscape Integration - Spatial Narrative - Cultural and Spiritual Landscape  
- Vernacular Architecture - Landscape mountainouse terrain - Territories -  
Archietctural adaption - Landscape adaptation*

Part of the built environment is the landscape in which it is situated. Over the years, humans have colonized the landscape with buildings, roads, and bridges. Along these roads, villages have evolved into cities, and the landscape has been drastically altered by man-made interventions. The landscape along the Silk Road, stretching from eastern China to western Europe, changes dramatically in terms of form and elevation. Taking Chongqing as an example, a multi-million-population city built in the mountains, we observe how its rugged terrain presents challenges but also creates unique opportunities to relate to the uneven mountain landscape. Chongqing could be considered a vertical city due to its continuous height differences. According to Maria Sevely, an architectural designer featured in the Vertical City documentary, the modern concept of vertical cities often refers to building skyscrapers that rise upwards, freeing horizontal land. However, she argues that vertical cities can also be particularly effective in terrains where the ground is not flat (Leon, 2016). This essay explores the ways in which we, relate to our landscape, view our landscape and the architectural interventions we take to connect to our landscape, particularly in mountain regions, where construction presents significant challenges.

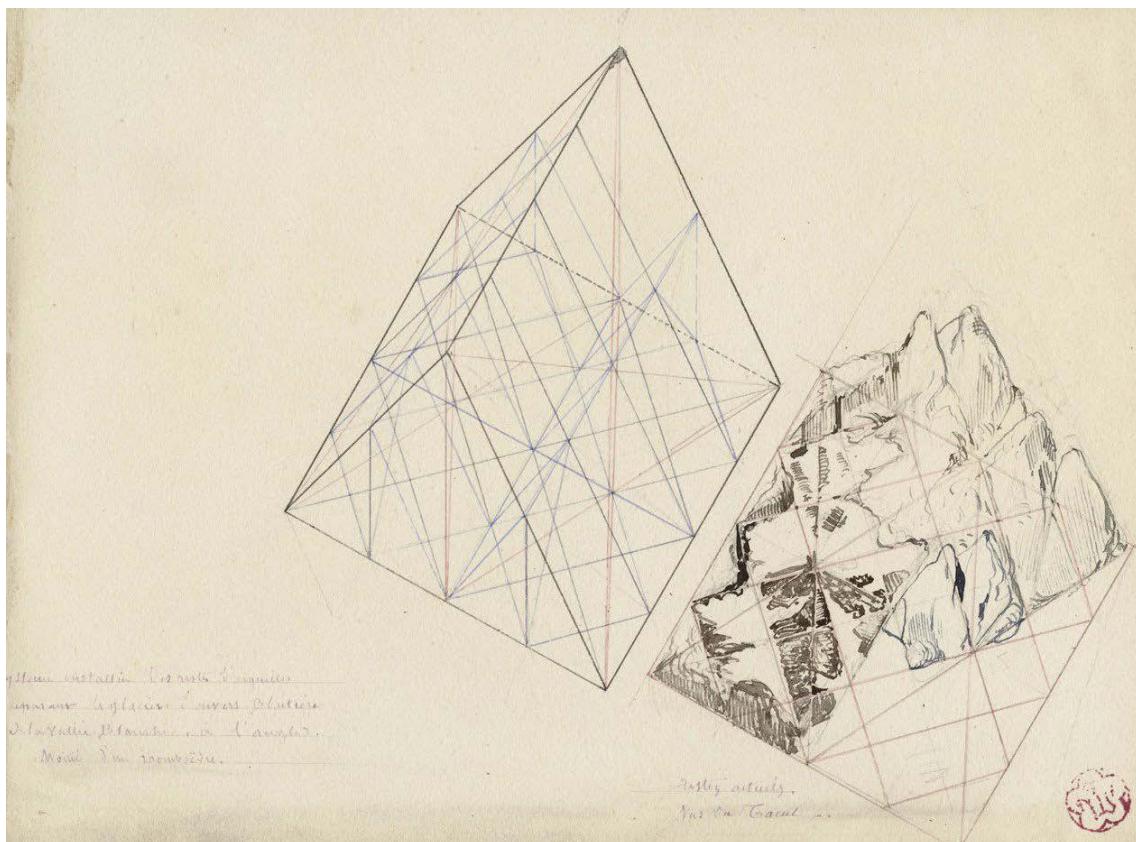
Mountains have developed over thousands of years, evolving naturally and being constructed layer by layer (Jakob, *On the Mountains: Scalable and Unscalable*, 2011). Similarly to a building, which is constructed piece by piece, the only difference is that a building is manmade, while a mountain is naturally formed. With numerous settlements now located around the world in mountain regions, humans have been deconstructing mountains to facilitate construction, to fit their new settlements. In other regions they adjust their interventions to the form of the mountain, which results in naturally formed settlements in and around a rugged terrain. Our perception of mountains shifts between their natural image, their cultural and spiritual significance, and their practical use in the mountain landscape. These three themes cannot be considered separately, as they overlap in the way humans relate to and interact with the surrounding mountain environment.

Our relationship with mountains has evolved over time, as has the way we view the mountains and the surrounding landscape. In ancient Greek history, mountains were considered mythological and abstract places (Jakob, *On Mountains*, 2017). Until the 17th century, mountains were regarded as dangerous (Jakob, *On Mountains*, 2017). Since then, this perception has shifted, and mountains have come to be appreciated as scenic views. Architects now design buildings to catch the perfect mountain view, with the landscape serving as an integral part of the



1: Section of the Rotunda, Leicester Square, Robert Mitchell.

building's identity. For example, the cross-section of the Rotunda in Leicester Square presents the mountain as a beautiful object in nature. Figure 1 show how Mitchell has drawn the landscape in a poetic way, manifesting interventions for buildings to be situated in mountain ranges with views of lakes and mountains. Later in 1814, the French architect Eugène-Emmanuel Viollet-le-Duc illustrated the geometrical structure of Mont Blanc. According to him, the mountain is a gigantic crystal, and its morphology follows the regular structure of a polyhedron (Bressani, 2017). The drawings show that Viollet-le-Duc tried to understand the mountain through geometry in a more abstract and systematic way. He sought to find order in nature, connecting natural forms with mathematical principles (Figure 2).



2: Crystalline system of the Mont Blanc, Eugène Viollet-le-Duc.

Beyond the aesthetic and geometrical view on mountains, there is also a cultural and spiritual connection with this rugged landscape. The relationship is less visible and more philosophical. Heidegger describes dwelling in the landscape as more than just an object; it is an extension of an event occurring between earth and sky, where the landscape itself becomes the poetic event (Botz-Bornstein, 2014). Interpreting it as the object and intervention in the landscape is mere a part of an event, called life, happening between the earth and sky. In addition, there is the practical view of the landscape, in which designers and academics offer methods, basic principles, and design solutions for navigating mountain environments. These solutions range from respecting the natural landscape to making more direct modifications to the terrain.

This essay examines the effects of rugged, mountain terrain in our built environment through three themes: the aesthetic relationship, the cultural and spiritual relationship, and the practical relationship. By using case studies, architectural references, literature and theories.

## Geomorphic architecture

Since ancient times, humans have sought to coexist harmoniously with nature. Architectural expressions often aim to reflect this relationship by aesthetically shaping the built environment to mimic natural surroundings and context. Geomorphic architecture provides a solution to integrate the built form with the landscape. This approach, as defined by Burger (1987), involves designs inspired by nature's imagery and processes, fitting within its contours, merging with the natural environment, or incorporating elements of the earth itself.

For instance, Machu Picchu in Peru exemplifies this principle. Its structures not only resemble the surrounding mountains but are also situated on the same slopes, effectively mimicking the natural context (figure 3). Another example is the pilgrimage church in Neviges designed by Gottfried Böhm in West Germany. The church's form emulates the shape of nearby mountains in a contemporary style, abstracting the essence of nature rather than directly replicating it (figure 4). These examples show that the relationship with the landscape is taken literally, in a geomorphic way, by visually imitating the mountain.



3: The 'guardian's house' in the archaeological site of Machu Picchu, Peru.



4: The 'guardian's house' in the archaeological site of Machu Picchu, Peru.

In addition to merging with nature, geomorphic designs can also adapt to the form of the terrain. For example, the Terrassensiedlung Mühlehalde designed by Hans Ulrich Scherer in Umiken, Switzerland, follows the slope and contours of the mountain (figure 5). This terraced housing arrangement positions the homes along the natural topography, stacking them to ensure each has a terrace with a view of the river (Burger, 1987). The rugged terrain allows for unobstructed views while maintaining a direct connection to the ground. The houses and pathways utilize the sloping terrain to enhance views and connectivity.

On steeper mountains, constructing accessible housing poses challenges. However, employing solutions like stilts, columns, and elevators can enable construction, albeit at the cost of reducing the building's connection to the natural landscape. This highlights that the relationship between architecture and nature is not solely about aesthetic integration but also about strategic placement to maximize views and adapt to the mountainous environment.



5: The Terrassensiedlung Mühlehalde in Umiken, Switzerland

## Landform

Instead of merging with nature and fitting to its contours, a building can define its space in a mountain landscape through principles. The walls of a building define the space, while columns elevate this space from the ground (Leatherbarrow, 2000). Le Corbusier introduced the Five Points of a New Architecture that defines the space, which include pilotis, roof gardens, free plans, elongated windows, and free façades (Moos, 2009). Published in *Oeuvre Complète* in 1927, these points served as a manifesto for promoting modernist architectural principles (Moos, 2009).

The use of pilotis, the first point in Le Corbusier's manifesto, involves raising a building above the ground on slender supports, allowing the landscape to pass underneath without modification. While this approach can provide a flat surface in uneven terrain, it physically disconnects the building from its natural context. Pilotis can be utilized to elevate the entire structure or to a certain height, maintaining a connection with the terrain on one side.

A more drastic example of intervention and modification in the mountain landscape is the AlpTransit project. Known as the New Railway Link through the Alps (NRLA), this project involves a tunnel through the Sotto Ceneri mountain range in Switzerland, connecting the Lombardy region and the Lugano region to northern Switzerland. As a result of this mega infrastructural project, 3.7 million cubic meters of earth and stone were excavated. This massive amount of material needed to be relocated, so it was deposited at a site near the small village of Sigirino (figure 6).



6: The site where the earth material is placed in Sigirino in Switzerland.

Since the location is a nature zone, special care was required to address the artificial alteration in the Alps. This change affected not only the natural environment but also the infrastructure, including highways and railways crossing Switzerland to Italy. Atelier Girot designed the transformation of this altered landscape by integrating the resulting earth material from the AlpTransit project with the new existing terrain (figure 7). The result is a tourist-friendly nature attraction with pathways for visitors, where the morphology of the depot also incorporates a water collection system (Pradel, 2020).

According to Booth (1983), landforms serve various purposes in architecture, both aesthetic and functional. These uses provide advantages to architecture designed within diverse landscapes. Booth emphasizes the role of landforms in space definition, where the slope of the terrain inherently defines or implies spatial boundaries.

A landform with a steep slope provides a strong sense of spatial definition but often limits views. Conversely, a gentle slope offers more expansive and open spaces, allowing broader views. Booth describes space as behaving like a liquid, flowing toward areas of least resistance, typically open spaces. For instance, when a landform features a high slope on one side and a low slope on the other, the visual focus naturally gravitates toward the lower slope, much like water flowing downhill.

Booth also highlights that landforms can influence and control views. By shaping how views are directed, landforms can create focal points or points of reference within the landscape. This concept parallels architectural practices where openings in a façade are carefully positioned to frame specific views while the rest of the façade remains closed.



7: A section of the site, showing the alteration in the landscape in Sigirino in Switzerland.

In addition to defining space and controlling views, landforms can guide movement within a landscape (Booth, 1983). They influence the direction, speed, and rhythm of pedestrian movement. Similar to the behavior of liquid, people tend to move toward paths of least resistance, favoring routes with minimal obstacles and energy expenditure. Flat surfaces or those with minimal changes in height are often preferred for their ease of navigation.

Booth's observations reveal how landforms, when thoughtfully integrated into architectural design, can enhance spatial definition, control visual focus, and shape the movement of people within a given environment. Through this, we establish a relationship with our context by altering and manipulating the landscape.

According to research on design methods for addressing height differences in Qingdao, China, three primary approaches are employed to adapt landforms for buildings: flattening the surface, introducing steps into the terrain, or using ramps to manage the elevation changes (Zeng, Zhao, Chen, & Wang, 2023). For minor height differences, ramps or flattened surfaces are often sufficient to connect two levels. However, when greater height variations occur, stairs are necessary to provide a functional connection.

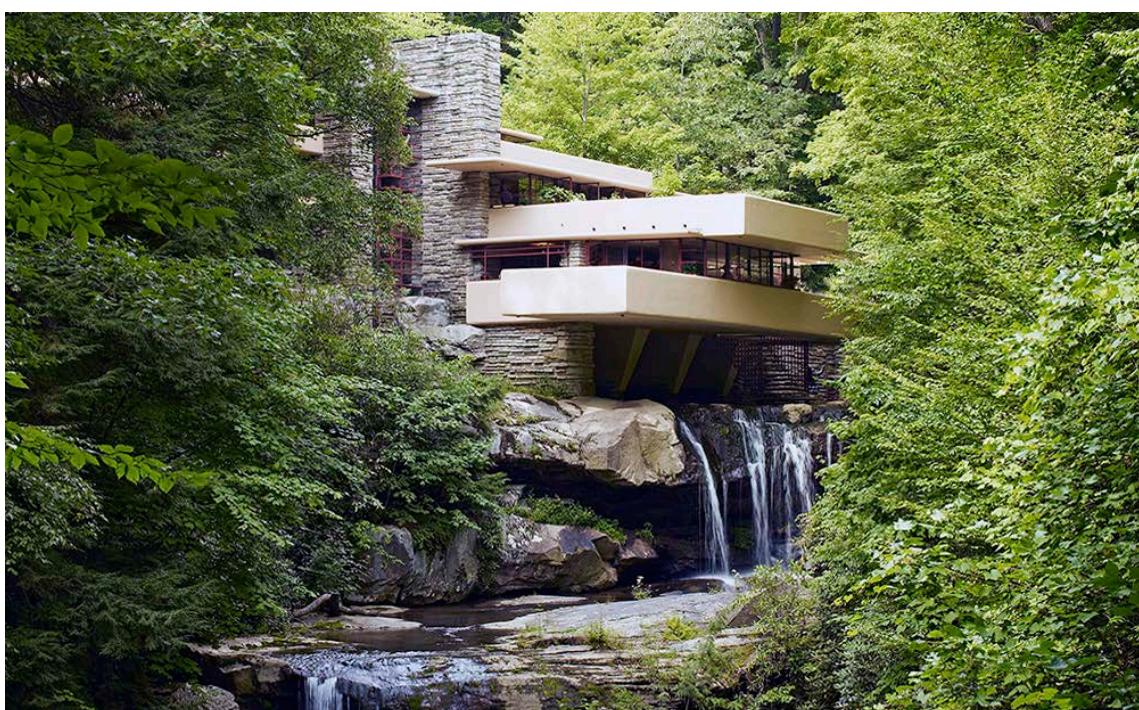
The study identifies three types of stairs commonly used in such contexts: small stairs comprising a few steps, single-run stairs, folded stairs, and long single-run stairs (Zeng, Zhao, Chen, & Wang, 2023). Even when surfaces are flattened in mountain terrain, stairs—whether short or long—are often required to connect these flat areas at different elevations.

The research also distinguishes between design approaches for single buildings versus groups of buildings. For single buildings, it is generally simpler to flatten a single surface to accommodate the structure. In contrast, for groups of buildings, more surfaces must be leveled, or the buildings must be distributed across different elevations. In such cases, stairs are typically used to connect the various levels (Zeng, Zhao, Chen, & Wang, 2023). This highlights our ability to adapt to hilly landscapes rather than completely altering them, though minor modifications, such as flattening a surface, may occasionally be necessary.

## Landscript

The poet Alexander Pope introduced the term *genius loci* in 1731 in a poem addressed to gardeners (Song & Cinn, 2015). This concept refers to the “spirit of the place,” emphasizing respect for nature and its inherent narrative. It advocates for considering the context and adapting architectural designs to harmonize with the natural environment.

Frank Lloyd Wright embraced this principle in his work, seeking to reflect the essence of nature by following the existing narrative of the context and landscape (Song & Cinn, 2015). A notable example is his project Fallingwater in Pennsylvania (figure 8), where the design strongly embodies the spirit of the place, or *genius loci* (Wiebe, 2019). Wright further reinforced this connection by using locally sourced materials, enhancing the integration of the structure with its natural surroundings and deepening the sense of place. One could argue that vernacular architecture also plays a significant role in relating to the context, particularly in mountain landscapes. Through the use of local materials, traditional construction techniques, and designs adapted to the specific terrain and climate, vernacular architecture naturally integrates with its surroundings, creating a harmonious relationship between the built environment and the landscape.

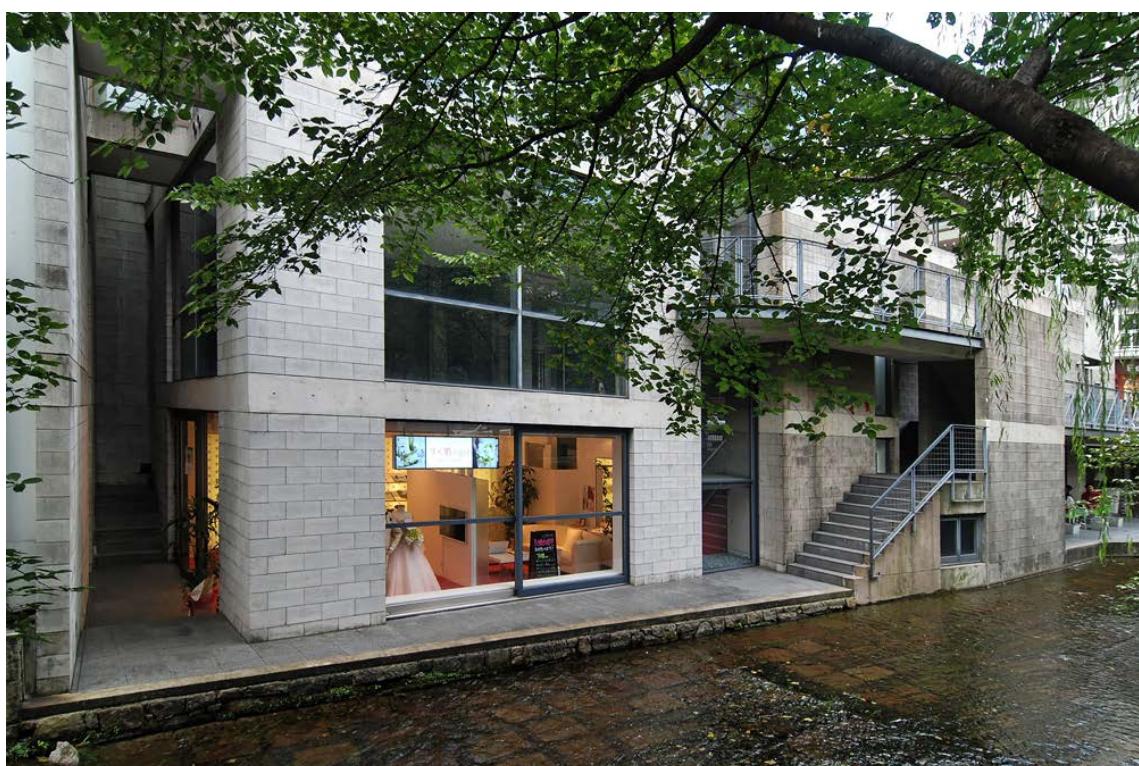


8: The house Falling water bleeding in nature, in Pennsylvania in United States.

Seung Hyosang introduces the concept of “landschrift,” which he describes the right way of building and living (Botz-Bornstein, 2014). According to Seung, the land itself provides its own inherent logic, shaped by nature and history. It offers sceneries, stories, and townscapes, emphasizing the narrative already present within the landscape (Botz-Bornstein, 2014). This idea parallels the concept of *genius loci*, as it acknowledges the pre-existing narrative embedded in the landscape.

Seung further argues that, in Korea, preserving the spatial context that shapes a building is more significant than conserving the building itself. This perspective highlights the importance of the layers of time and history surrounding a structure, reinforcing the notion of “landschrift,” where nature and history define a site’s logic and identity (Botz-Bornstein, 2014). Consequently, Korean architecture often embraces emptiness, allowing the surrounding space to inform and shape the architecture.

The Japanese architect Tadao Ando has similar philosophy, who asserts that “One cannot speak about architecture without mentioning where it is to belong” (Botz-Bornstein, 2014). An example of Ando’s contextual approach is the Times’s Building I in Kyoto, Japan (figure 9). Here, the structure appears to float on Kyoto’s shallow waters, integrating harmoniously with its environment. Ando enhances this connection by incorporating stairs leading to the river, creating a space where people can walk, sit, and interact with the water. In this way, the building not only occupies its context but also engages with it.



9: The building Times I, where the users are close to the river in Kyoto, Japan.

The philosophy of “landscape” builds upon the foundational principles of geomancy, which involves arranging buildings based on earth divination (Botz-Bornstein, 2014). In traditional Korean geomancy, geography is perceived as celestially charged, where heaven, earth, and human beings converge at specific time-space coordinates (Nemeth, 1987). Historically, geomancy was used primarily to locate family gravesites, making these locations culturally and historically significant. In modern times, its application has expanded to include determining the ideal location for residences (Yoon, 2006).

According to Yoon (2006), geomancy was also historically employed in China to identify suitable cave sites on the Loess Plateau. The ideal site was a flat area with protective hills at the back, providing shelter and protection. Geomancy emphasizes the importance of energy flows within the landscape, suggesting that any modification or alteration of the natural terrain disrupts these flows, making the site less favourable (Yoon, 2006).

This perspective aligns with the philosophy of “landscape,” which underscores the inherent logic and history of the landscape, cautioning against unnecessary alterations that could diminish the site’s natural balance and significance.

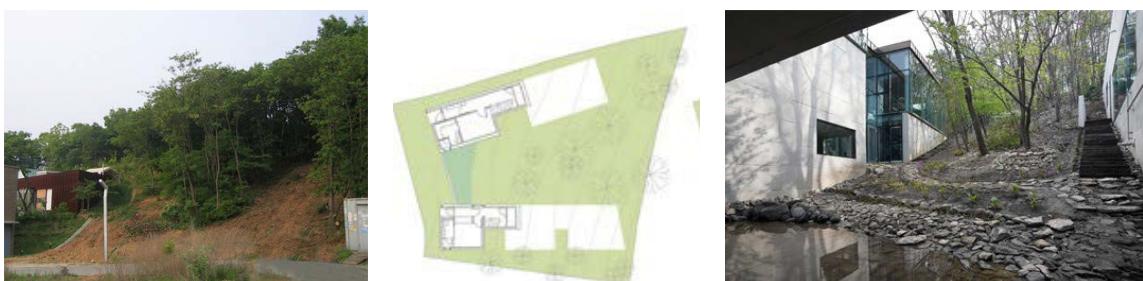
In his essay “Poetically Man Dwells,” Martin Heidegger describes the landscape not merely as a geological phenomenon but as a cultural and spiritual entity. He introduces the concept of the “fourfold”—earth, sky, gods, and mortals—as the essential elements of dwelling, emphasizing the interconnectedness of humans and their environment (Botz-Bornstein, 2014).

This perspective resonates with the earlier discussion on Korean geomancy, which assigns the landscape its own narrative, shaped by energy flows, history, and cultural significance. Both Heidegger’s philosophy and Korean geomancy advocate for respecting and preserving the inherent qualities of the landscape, cautioning against disruptions or modifications by architectural interventions. They suggest that architecture should harmonize with, rather than dominate or alter, the natural and cultural logic of its surroundings.

Taking the concept of landscript by Korean architect Seung Hyosang into consideration, it explains the location and emptiness of temples and villages in Korea, particularly when the temples and villages are being placed in valley areas within mountains and where the geography height changes (Song & Cinn, 2015). These sites hold significant cultural and spiritual value. The emptiness inherent in Korean architecture can also be traced back to Seung's idea of landscript, where the space in which a building is placed forms the building itself, rather than the building defining the space. Seung suggests that by locating Korean temples in the "inner space" of the mountain, the building embodies emptiness (Song & Cinn, 2015).

The practice of placing architectural bodies into the inner spaces of mountains has been adopted by architects such as Kim Incheurl, whose houses are situated at the foot of a mountain, on a slope, or in a valley between mountains (Song & Cinn, 2015). In these examples, the atmosphere is shaped by the surrounding context. According to Song, Kim Incheurl's work is considered performative within the landscape, where architecture complements nature.

For instance, in the house Forest Garden designed by Kim Incheurl, the courtyard was not artificially designed; instead, the slope of the mountain is preserved within the courtyard, continuing the natural slope of the terrain. This creates a performative relationship between the building and its natural surroundings (Figure 10).



10: The house Forest Garden on the foot of the mountain, embracing the slope of the mountain Muryangsujeon in South Korea.

## Conclusion

The intricate relationship between architecture and mountainous landscapes reflects not only technical ingenuity but also a profound cultural and spiritual engagement. Through concepts such as *genius loci* and *landscape*, we see how architecture can transcend mere functionality to become a medium for interpreting and harmonizing with the natural world. These philosophies remind us that mountains are more than physical obstacles or aesthetic backdrops—they are cultural artifacts and spiritual entities, shaping and shaped by human perception over time.

As explored in this essay, the cultural and philosophical lens offers a powerful framework for architectural interventions in rugged terrains. Rather than imposing dominance over nature, architecture should aspire to participate in the narrative of the landscape, respecting its inherent logic and historical layers. Projects such as Kim Incheul's Forest Garden exemplify this performative relationship, where the built form emerges from and interacts with the natural slope, creating a dialogue rather than a division between the artificial and the organic. Also, the projects of Tadao Ando, where the Time's building is integrated harmoniously with its surrounding, having the building floating on the river."

Ultimately, the challenge lies not in mastering the terrain but in embracing its complexities and stories. By grounding architectural practices in cultural philosophies and contextual sensitivity, we can ensure that our interventions resonate deeply with the spirit of the place, fostering a sustainable and meaningful coexistence between humanity and the mountainous landscapes that inspire us.

## References literature

Zeng, G., Zhao, D., Chen, X., & Wang, X. (2023). Architectural design methods for mountainous environments. *Journal of Asian Architecture and Building Engineering*.

Jakob, M. (2011). On the mountains: scalable and unscalable. In K. Frampton, S. Allen, & M. McQuade, *Landform Building* (p. 136). Lars Müller.

Jakob, M. (2017, February 9). On mountains. From Transfer: <http://www.transfer-arch.com/monograph/mountains/>

Leatherbarrow, D. (2000). *Uncommon ground: Architecture, Technology and Topography*. Cambridge: Massachusetts Institute of Technology.

Moos, S. v. (2009). *Le Corbusier : Elements of a synthesis*. Rotterdam: 010 Publishers.

Song , H., & Cinn, E. (2015). The Complementary Relationship between Architecture and Topography: Focus on the Performative Relationship between the Houses of Kim Incheul and Topography. *Journal of Asian Architecture and Building Engineering*.

Wiebe, C. (2019, Januari 1). Frank Lloyd Wright's Fallingwater. Retrieved November 21, 2024 from Smart history: <https://smarthistory.org/seeing-america-2/fallingwater-sa/>

Botz-Bornstein, T. (2014, March). H-Sang Seung: Design Is Not Design. *The Journal of Aesthetic Education*, 115-117.

Nemeth, D. J. (1987). *The architecture of ideology*. University of California press.

Yoon, H.-k. (2006). *The Culture of Fengshui in Korea*. Lexington Books.

Booth, N. K. (1983). *Basic elements of landscape architectural design*. Newyork: Elsevier Sciencc Publishing.

Leon, C. (Director). (2016). *Vertical City Documentary* [Motion Picture].

Burger, E. (1987). *Geomorphic Architecture: Multifamily Residential Design Solutions*. Pergamon Journals, 287-297.

Bressani, M. (2017, Februari 17). *Viollet-Le-Duc: Mont Blanc*. Retrieved December, 2024 from Drawing Matter: <https://drawingmatter.org/viollet-le-duc-mont-blanc/>

Pradel, C. (2020). Moving ground. *Ardeth*, 67-83.

## References figures

*Figure 1:* Mitchell, R. (n.d.). Section of the Rotunda, Leicester Square. The Brtish museum, London.

*Figure 2:* Viollet-le-Duc, E. (n.d.). Crystalline system of the Mont Blanc. Ministère de la Culture – Médiathèque du Patrimoine.

*Figure 3:* u/effdone4. (2023). The ‘guardian’s house’ in the archaeological site of Machu Picchu, Peru. Retrieved from r/architecture: [https://www.reddit.com/r/architecture/comments/17xz435/the\\_guardians\\_house\\_in\\_the\\_archaeological\\_site\\_of/?rdt=58417](https://www.reddit.com/r/architecture/comments/17xz435/the_guardians_house_in_the_archaeological_site_of/?rdt=58417)

*Figure 4:* (n.d.). Pilgrimage Church, Neviges by Gottfried Böhm. Seier+Seier.

*Figure 5:* Heinrich, M. (n.d.). Terrassenhaussiedlungen revisited. Ur-ba-ne En-sem-bles. Espazium, Umiken.

*Figure 6 & 7:* Girot. (2020). Atelier Girot. Retrieved from Alp Transit Depot – Sigirino, Canton Ticino: <http://www.girot.ch/?project=alptransit-depot-sigirino-sbb>

*Figure 8:* Carol, M. (n.d.). Frank Lloyd Wright’s Fallingwater. Retrieved from Smarthistory: <https://smarthistory.org/seeing-america-2/fallingwater-sa/>

*Figure 9:* Petr Šmídek, P. (2012). Time’s I + II. Retrieved from Archiweb: <https://www.archiweb.cz/en/b/time-s-i-ii>

*Figure 10:* Song , H., & Cinn, E. (2015). The Complementary Relationship between Architecture and Topography: Focus on the Performative Relationship between the Houses of Kim Incheoul and Topography. Journal of Asian Architecture and Building Engineering.